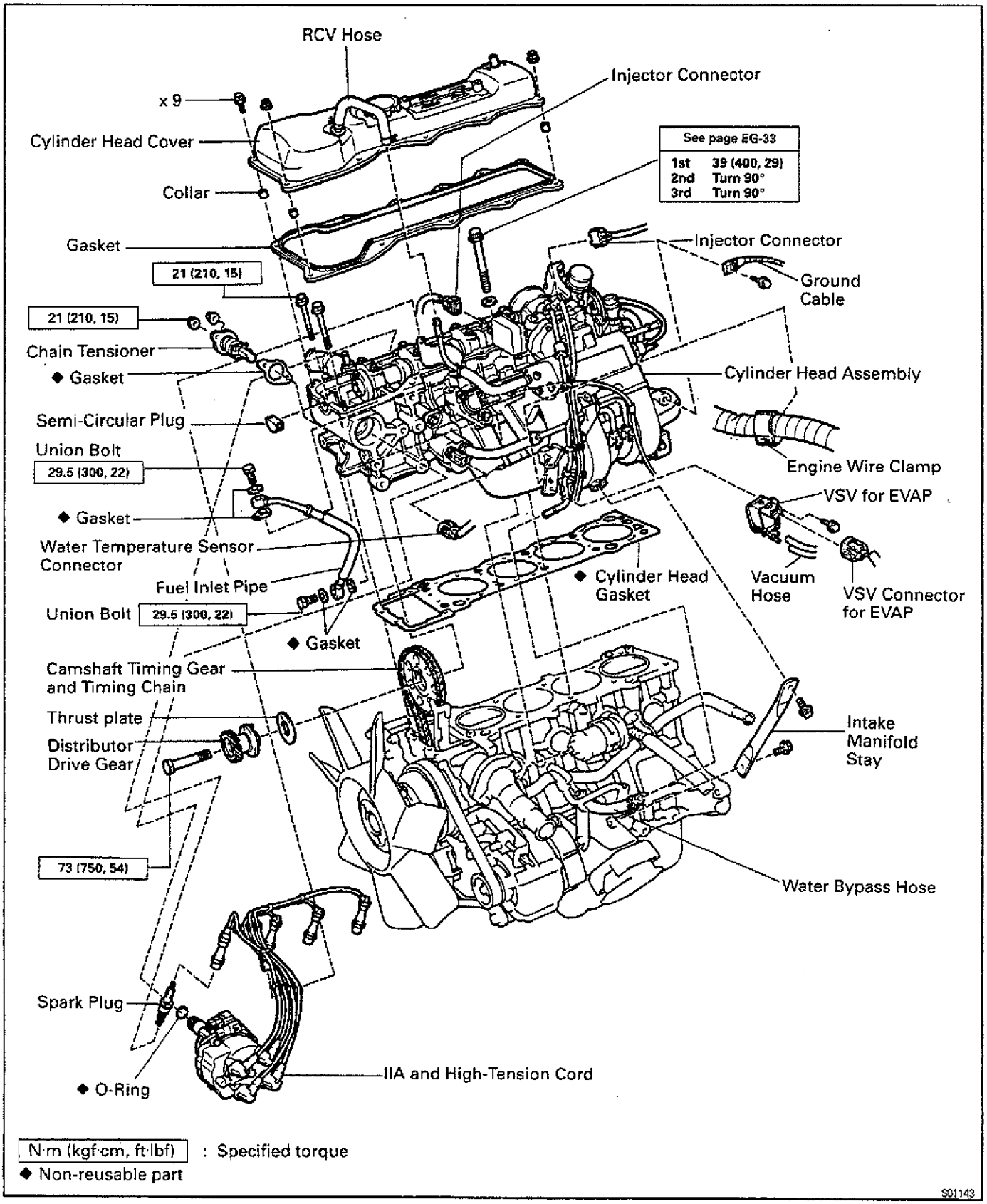
TIMING CHAIN

COMPONENTS FOR REMOVAL AND INSTALLATION

EG488-01

EG

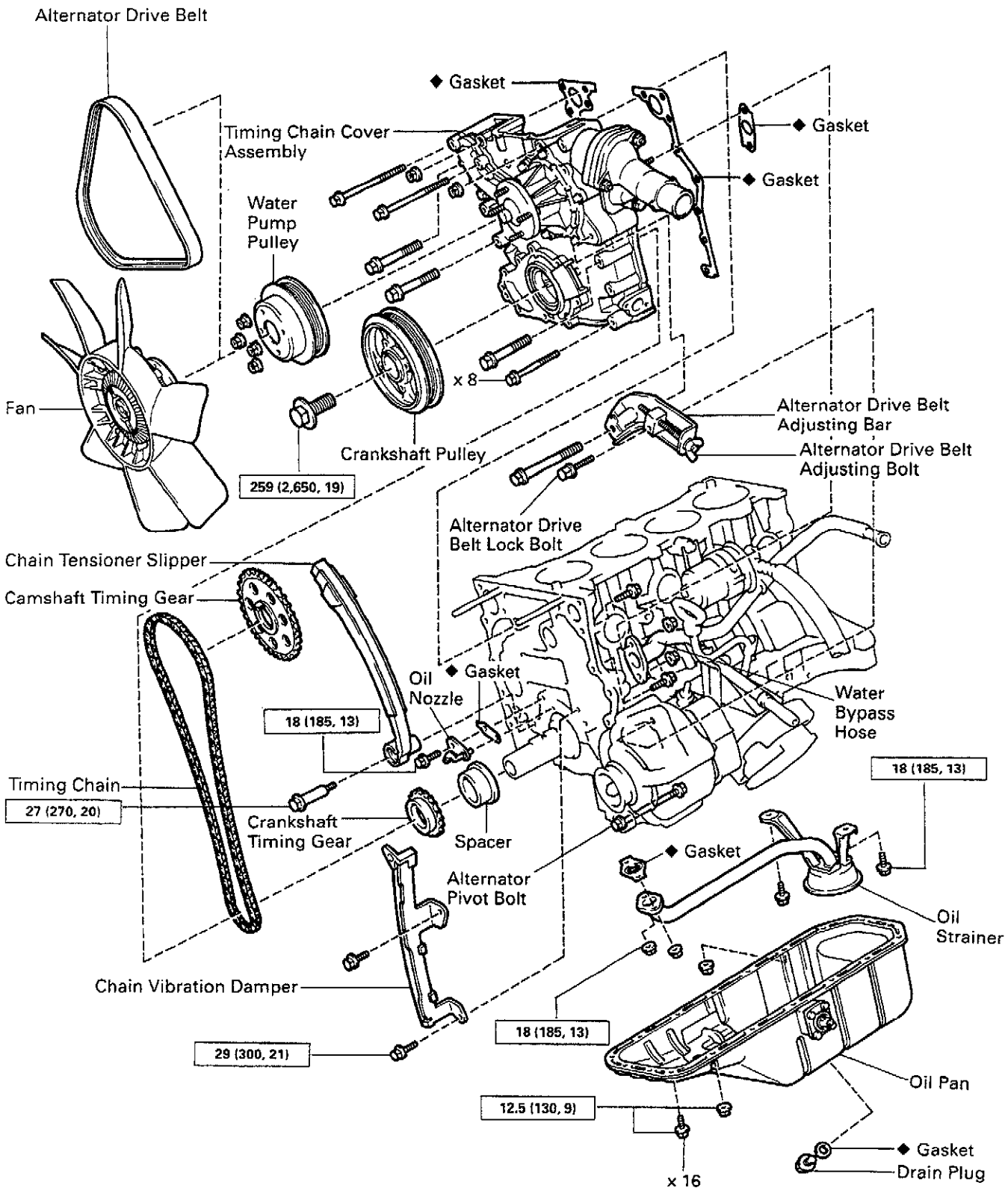


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

S01143

EG



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

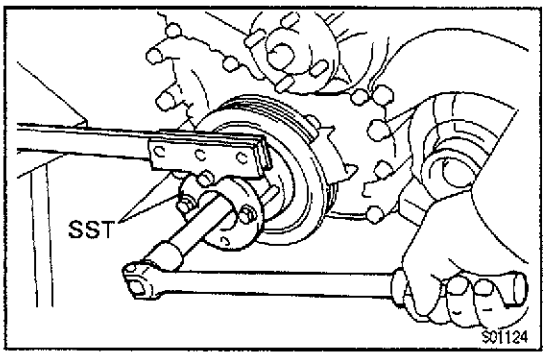
S01145

EG6QM-01

TIMING CHAIN REMOVAL

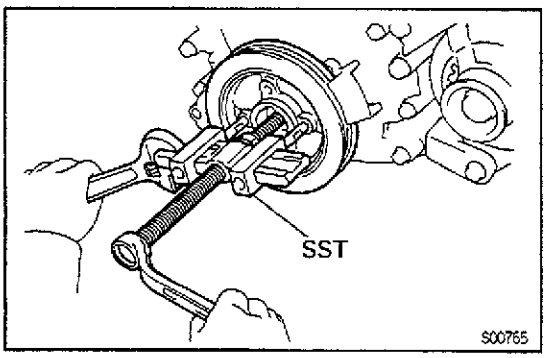
1. **DRAIN ENGINE OIL**
2. **DRAIN ENGINE COOLANT**
3. **REMOVE CYLINDER HEAD ASSEMBLY**
   (See cylinder head assembly removal)
4. **REMOVE OIL PAN**
   (See step 4 in oil pump removal in Lubrication System)
5. **REMOVE OIL STRAINER**
   (See step 6 in oil pump removal in Lubrication System)
6. **REMOVE ALTERNATOR DRIVE BELT, FAN, FLUID COUPLING AND WATER PUMP PULLEY**

(a) Loosen the 4 water pump pulley nuts.
(b) Loosen the alternator pivot bolt and adjusting bolt, and remove the drive belt.
(c) Remove the 4 nuts, the fan, fluid coupling assembly and pulley.

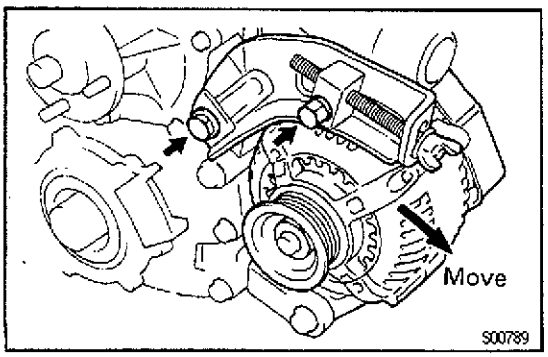


7. **REMOVE CRANKSHAFT PULLEY**

(a) Using SST, remove the pulley bolt.
SST 09213−70010, 09330−00021



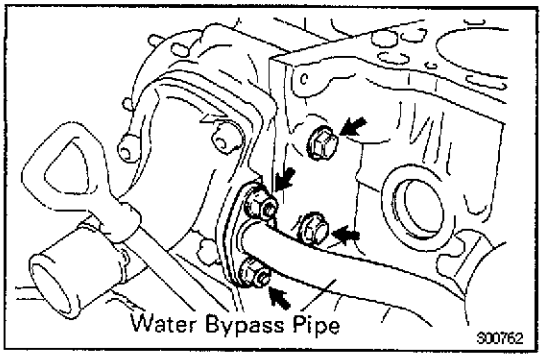
(b) Using SST, remove the pulley.
SST 09950−50010 (09951−05010, 09952−05010, 09953−05010, 09953−05020, 09954−05020)



8. **REMOVE ALTERNATOR DRIVE BELT ADJUSTING BAR**

(a) Remove the 2 bolts and adjusting bar.
(b) Move the alternator toward outward.

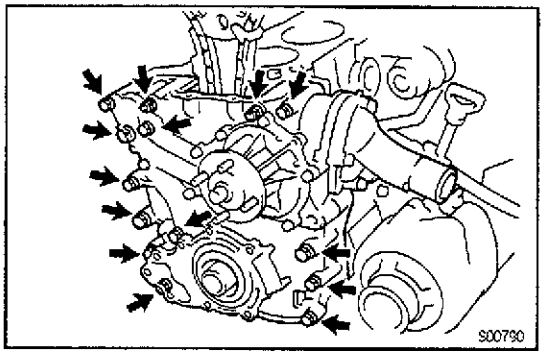
EG



9. REMOVE TIMING CHAIN COVER ASSEMBLY

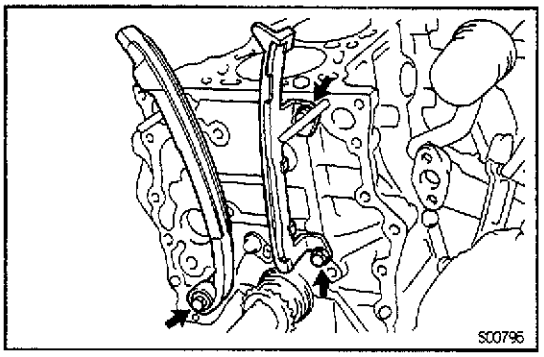
(a) Remove the 2 nuts holding the water bypass pipe to the timing gear cover.

(b) Remove the 2 bolts holding the cylinder block to the timing gear cover.



(c) Remove the 12 bolts, 2 nuts, timing chain cover assembly and 2 gaskets.

10. REMOVE TIMING CHAIN AND CAMSHAFT TIMING GEAR

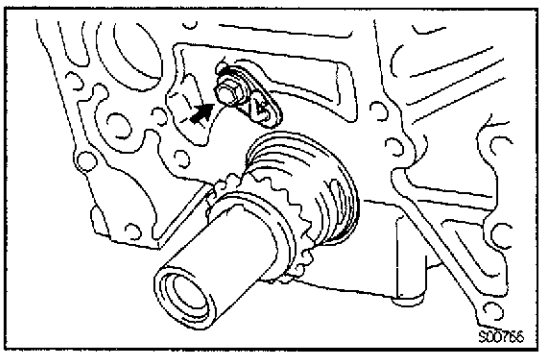


11. REMOVE CHAIN TENSIONER SLIPPER

Remove the bolt and slipper.

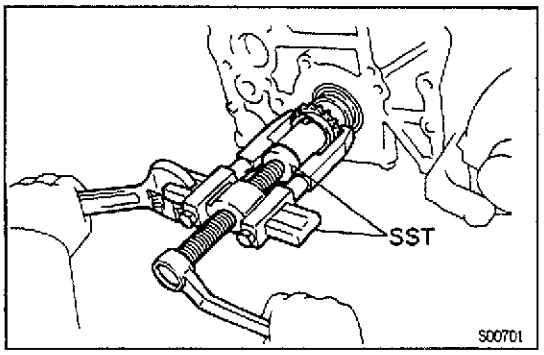
12. REMOVE CHAIN VIBRATION DAMPER

Remove the 2 bolts and vibration damper.



13. REMOVE OIL JET

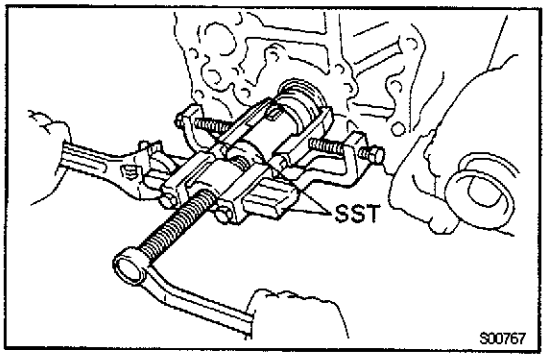
Remove the bolt and oil jet.



14. REMOVE CRANKSHAFT TIMING GEAR

Using SST, remove the timing gear.

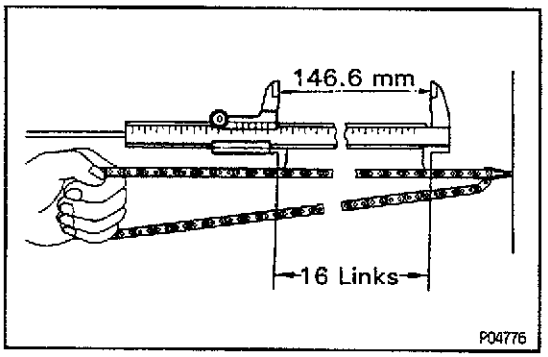
SST 09950–40010 (09951–04010, 09952–04010, 09953–04020, 09954–04010, 09955–04060), 09950–60010 (09951–00330)

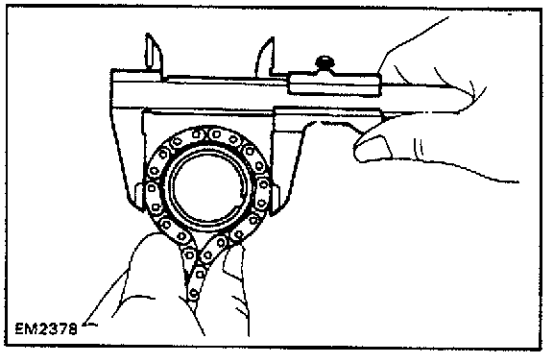


15. REMOVE CRANKSHAFT TIMING GEAR SPACER

Using SST, remove the spacer.

SST 09950–40010 (09951–04010, 09952–04010, 09953–04020, 09954–04010, 09955–04060, 09958–04010), 09950–60010 (09951–00330)





TIMING CHAIN COMPONENTS INSPECTION

EO6QM–01

1. INSPECT TIMING CHAIN AND TIMING GEARS

(a) Using vernier calipers, 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 3 or more places selected at random.

(b) Wrap 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):

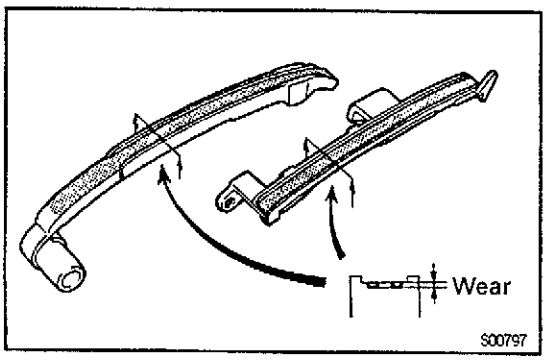
Camshaft

113.8 mm (4.480 in.)

Crankshaft

59.4 mm (2.339 in.)

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



2. INSPECT CHAIN TENSIONER SLIPPER AND VIBRATION DAMPER

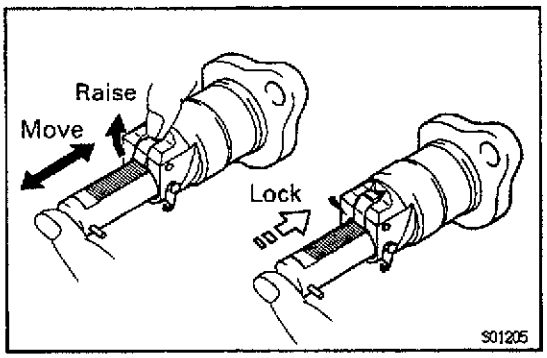
Measure the chain tensioner slipper and vibration damper wears.

Maximum wear:

1.0 mm (0.039 in.)

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

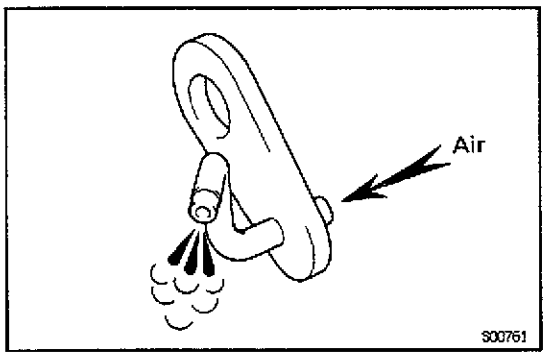
EG



3. 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.

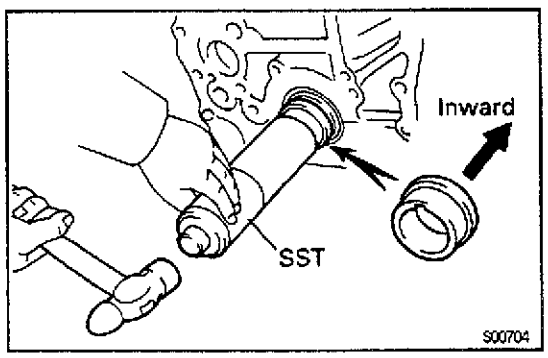


3. INSPECT OIL JET

Check the oil jet for damage or clogging.
If necessary, replace the oil jet.

CRANKSHAFT FRONT OIL SEAL REPLACEMENT

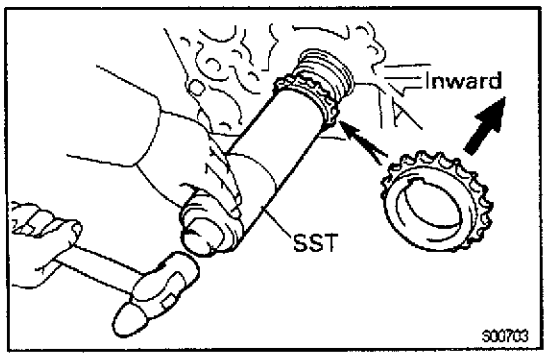
(See oil pump in Lubrication System)



TIMING CHAIN INSTALLATION

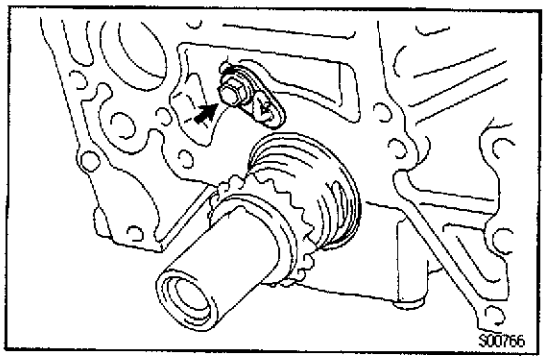
1. INSTALL CRANKSHAFT TIMING GEAR SPACER

Using SST and a hammer, tap in the spacer.
SST 09608–06041



2. INSTALL CRANKSHAFT TIMING GEAR

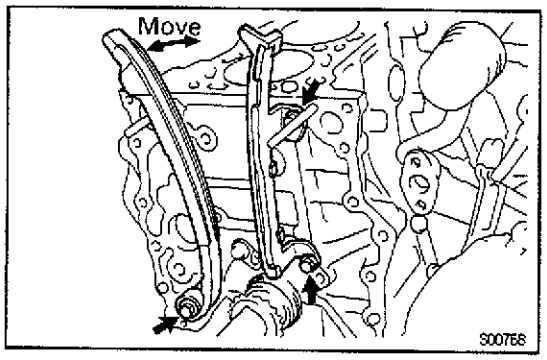
Using SST and a hammer, tap in the timing gear.
SST 09608–06041



3. INSTALL OIL JET

Install the oil jet with the bolt.

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



4. INSTALL CHAIN TENSIONER SLIPPER

(a) Install the slipper with the bolt.

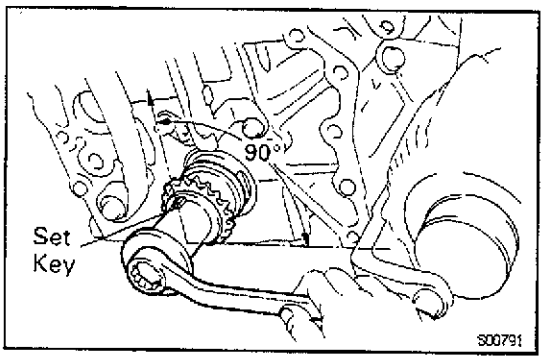
Torque: 27 N·m (270 kgf·cm, 20 ft·lbf)

(b) Check that the slipper moves smoothly.

5. INSTALL CHAIN VIBRATION DAMPER

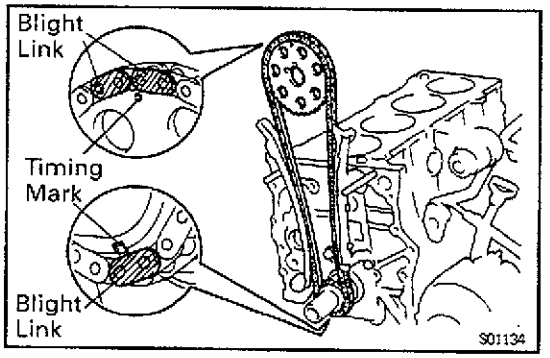
Install the damper with the 2 bolts.

Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)



6. SET CRANKSHAFT

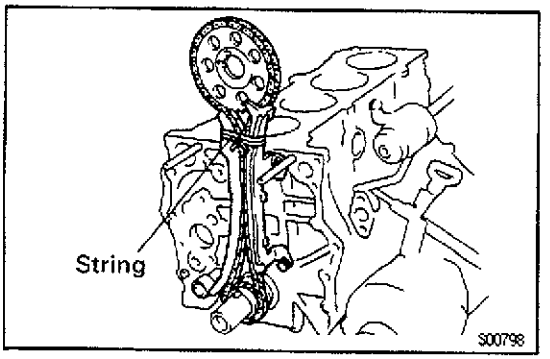
Turn the crankshaft, set the set key on the crankshaft as shown in the illustration.



7. INSTALL TIMING CHAIN AND CAMSHAFT TIMING GEAR

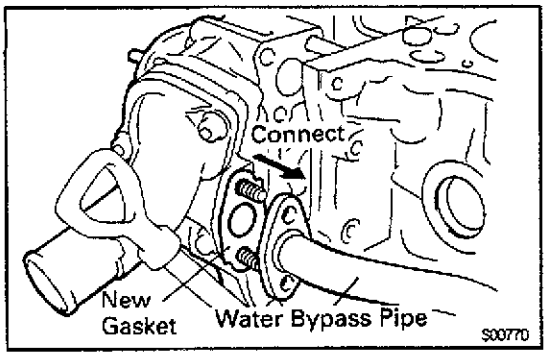
(a) Install the timing chain on the camshaft timing gear with the 2 blight links aligned with the timing mark on the camshaft timing gear.

(b) Install the timing chain on the crankshaft timing gear with the 1 blight link aligned with the timing mark on the crankshaft timing gear.



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

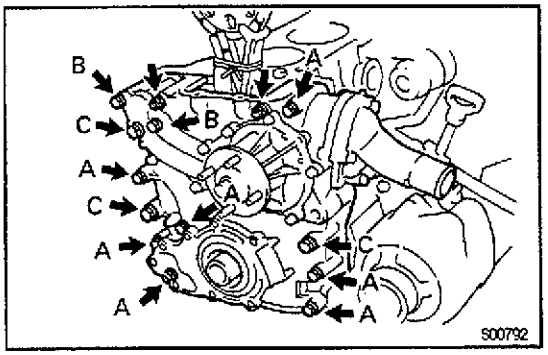
EG



8. INSTALL TIMING CHAIN COVER ASSEMBLY

(a) Install a new gasket to the timing gear cover.

(b) Connect the timing chain cover to the water bypass pipe.



(c) Install 2 new gaskets and the timing chain cover assembly with the 12 bolts and 2 nuts.

Torque:

12 mm head

20 N·m (200 kgf·cm, 15 ft·lbf)

14 mm head

39 N·m (440 kgf·cm, 29 ft·lbf)

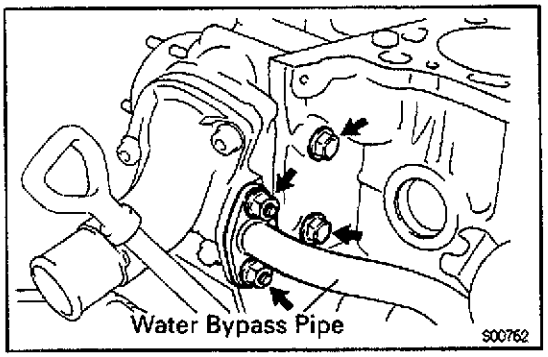
HINT: Each bolt length is indicated in the illustration.

Bolt length:

67 mm (2.64 in.) for A of 12 mm head

87 mm (3.43 in.) for B of 12 mm head

70 mm (2.76 in.) for C of 14 mm head



(d) Install the 2 bolts holding the cylinder block to the timing chain cover.

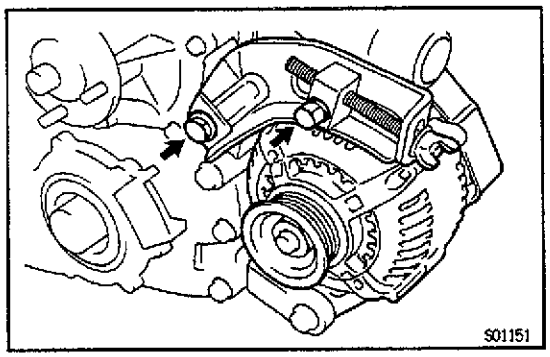
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

HINT: Use a bolt 35 mm (1.38 in.) in length.

(e) Install the 2 nuts holding the water bypass pipe to the timing chain cover.

Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

(f) Remove the string from the chain.



9. INSTALL ALTERNATOR DRIVE BELT ADJUSTING BAR

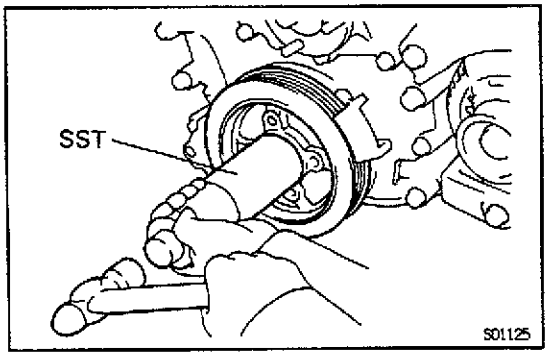
Install the adjusting bar with the 2 bolts. Tighten the adjusting lock bolt yet.

Torque:

Timing chain cover side

63.7 N·m (650 kgf·cm, 47 ft·lbf)

HINT: Use a bolt 87 mm (3.43 in.) in length for the timing chain cover side.

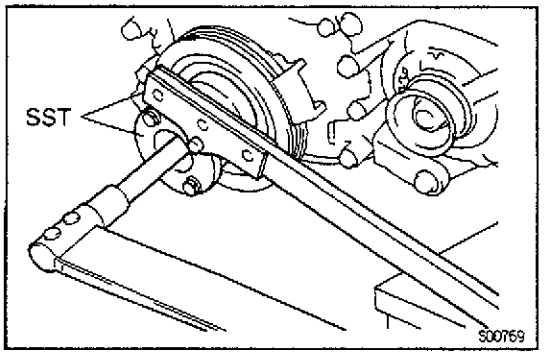


10. INSTALL CRANKSHAFT PULLEY

(a) Align the pulley set key with the key groove of the pulley.

(b) Using SST and a hammer, tap in the pulley.

SST 09608−06041



(b) Using SST, install the pulley bolt.
SST 09213–70010, 09330–00021
Torque: 259 N·m (2,650 kgf·cm, 191 ft·lbf)

11. INSTALL WATER PUMP PULLEY, FLUID COUPLING, FAN AND ALTERNATOR DRIVE BELT

(a) Temporarily install the pump pulley, the fan and fluid coupling assembly with the 4 nuts.

(b) Temporarily install the drive belt with the alternator adjusting bolt and lock bolt.

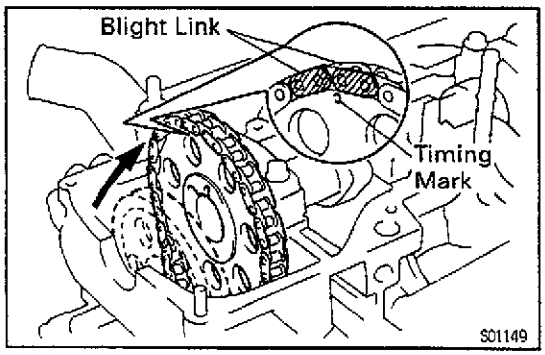
(c) Tighten the 4 water pump pulley nuts.
Torque: 20.5 N·m (210 kgf·cm, 15 ft·lbf)

(d) Adjust the drive belt deflection.
Drive belt deflection:
See step 3 in on–vehicle inspection in Charging System

(e) Tighten the adjusting lock bolt and pivot bolt.
Torque:
Adjusting lock bolt
19 N·m (195 kgf·cm, 14 ft·lbf)
Pivot bolt
59 N·m (600 kgf·cm, 44 ft·lbf)

12. INSTALL OIL STRAINER
(See step 4 in oil pump installation in Lubrication System)

13. INSTALL OIL PAN
(See step 5 in oil pump installation in Lubrication System)



14. INSTALL CYLINDER HEAD ASSEMBLY
(See cylinder head assembly installation)
NOTICE: However, for the installation of the camshaft timing gear and timing chain, follow the below procedure. Align the 2 blight links of the timing chain with the timing mark of the camshaft timing gear, and install them to the camshaft.

15. FILL ENGINE WITH OIL

16. START ENGINE AND CHECK FOR LEAKS