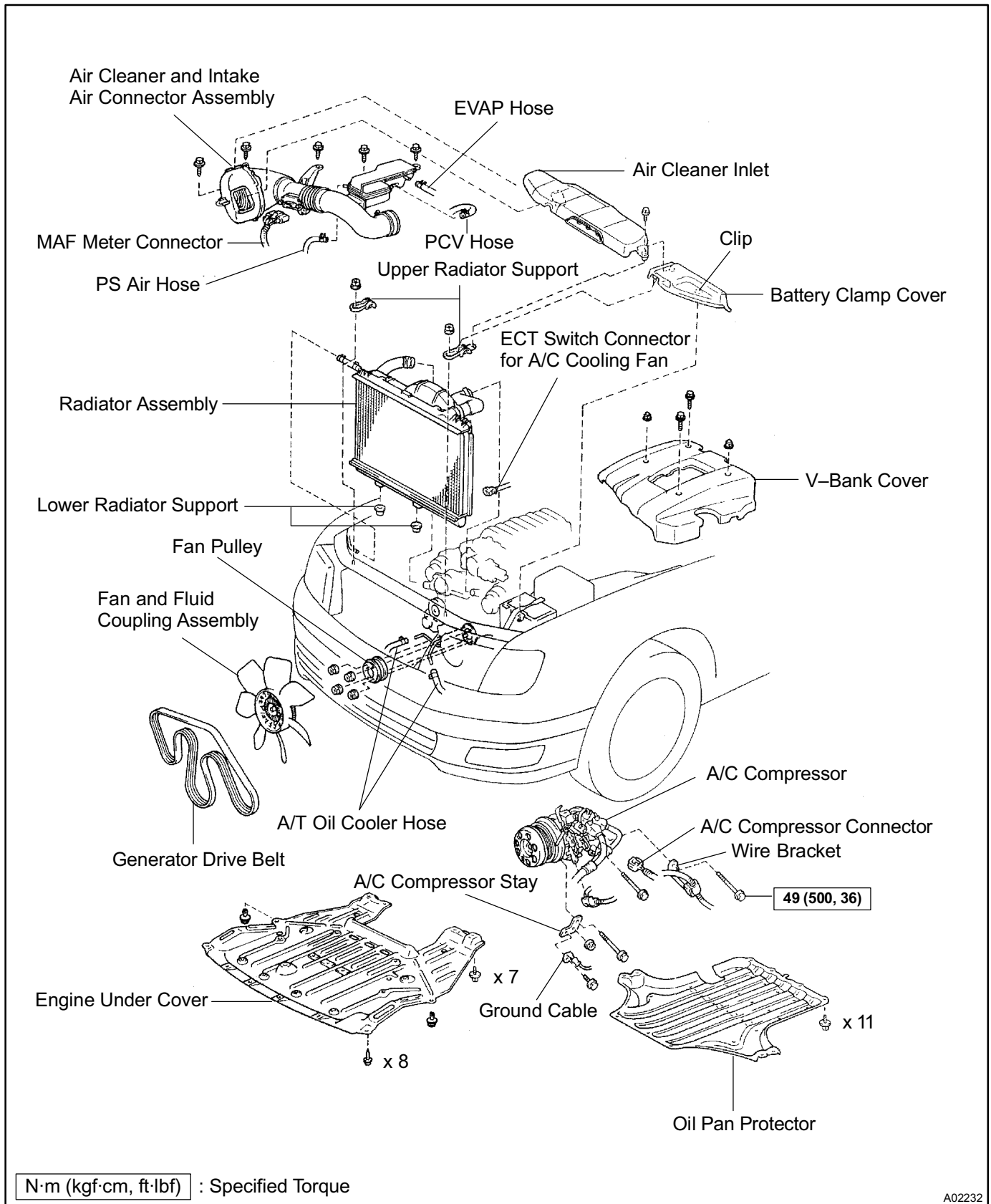


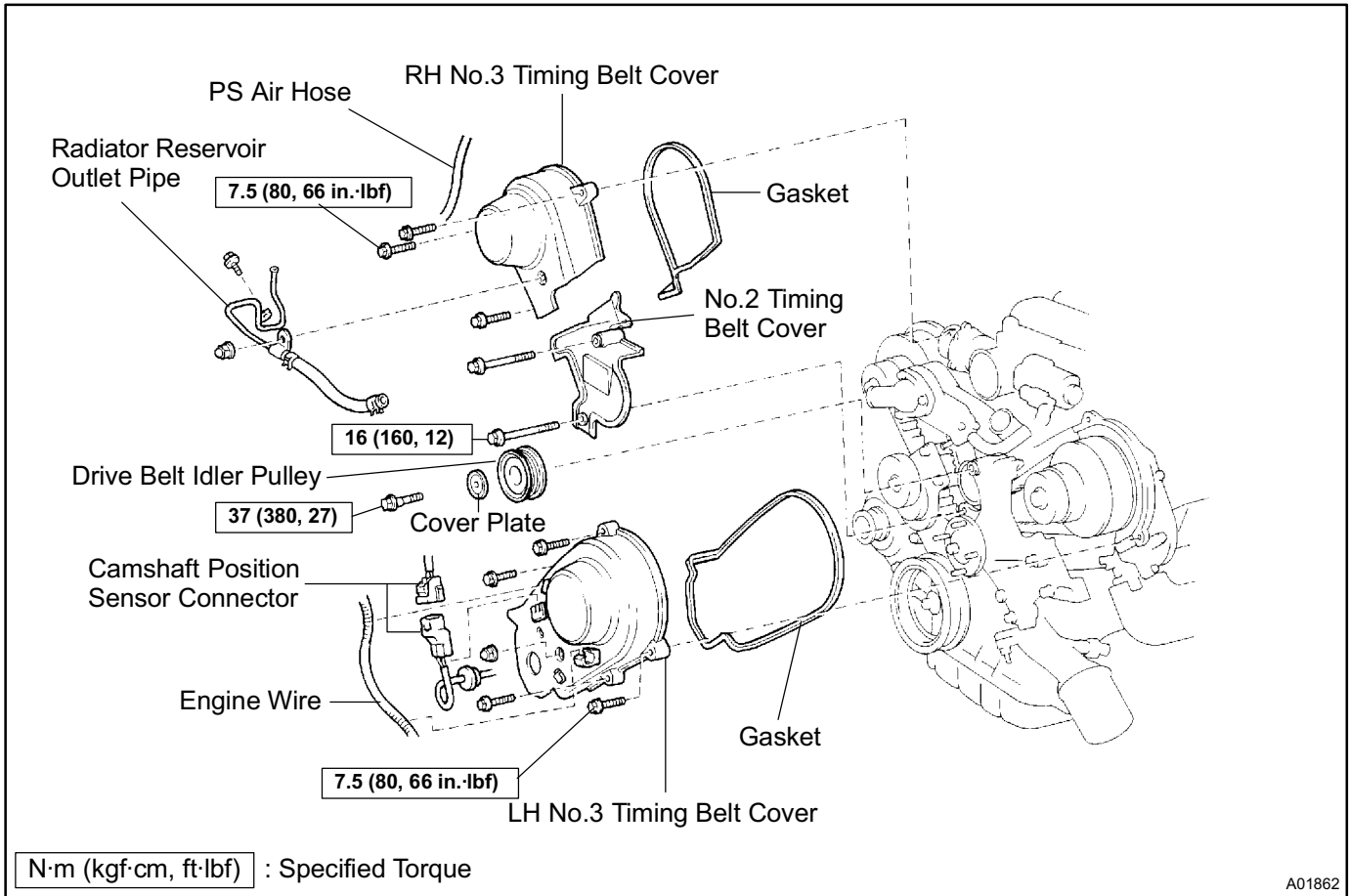
TIMING BELT COMPONENTS

EM09L-02

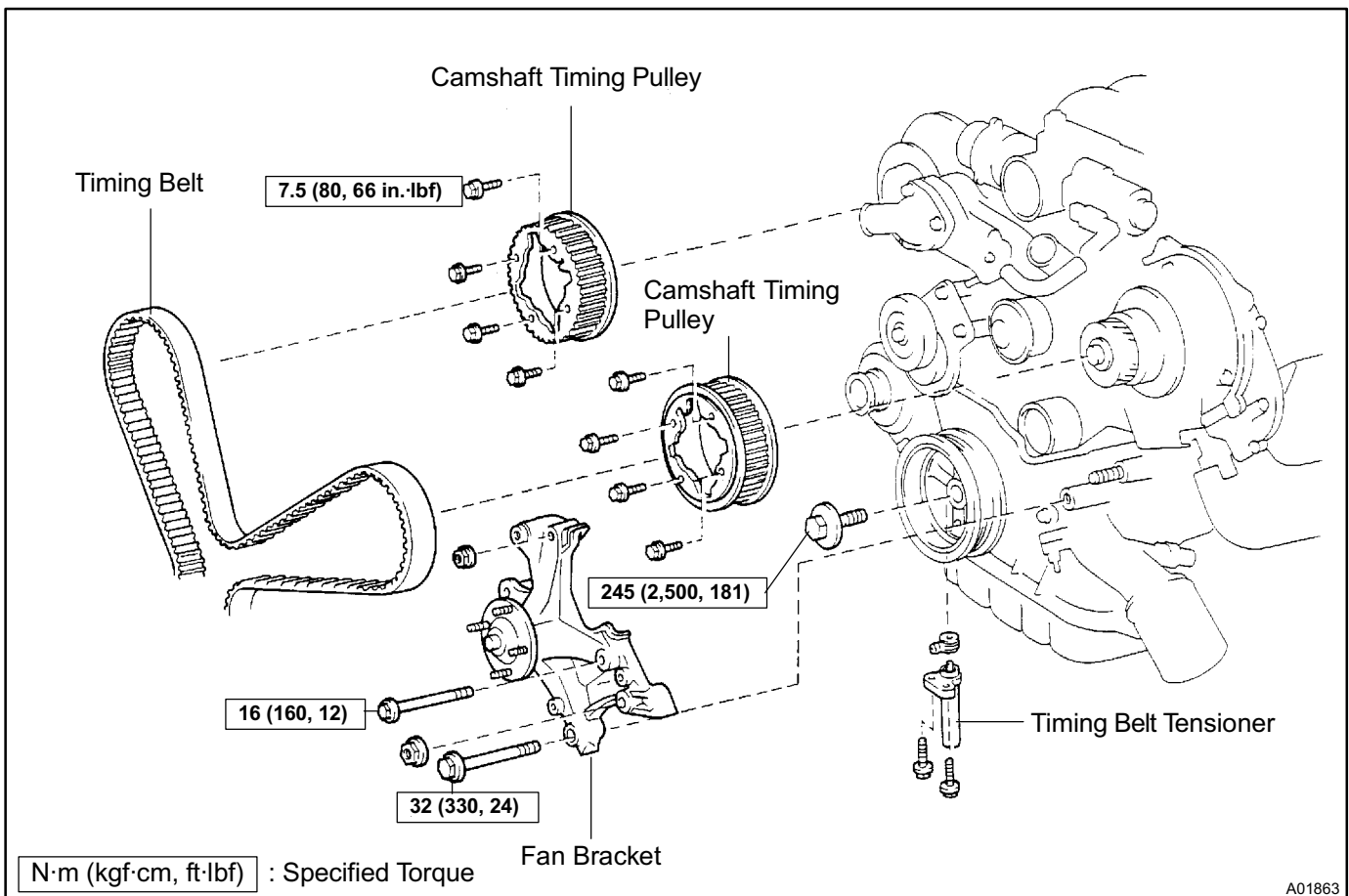


N·m (kgf·cm, ft·lbf) : Specified Torque

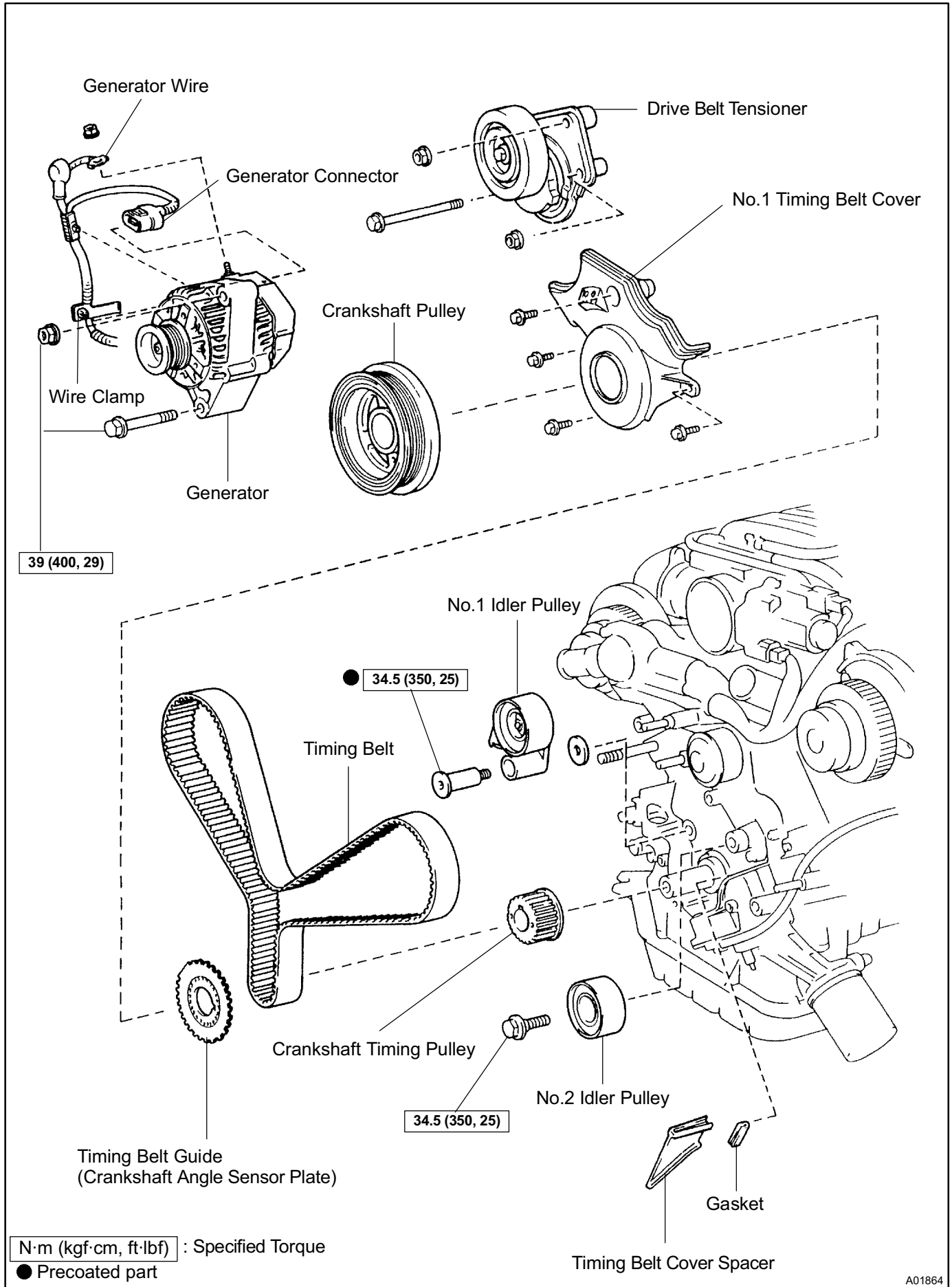
ENGINE MECHANICAL - TIMING BELT



A01862

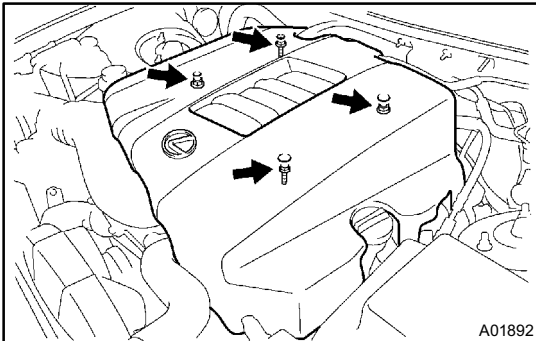


A01863



REMOVAL

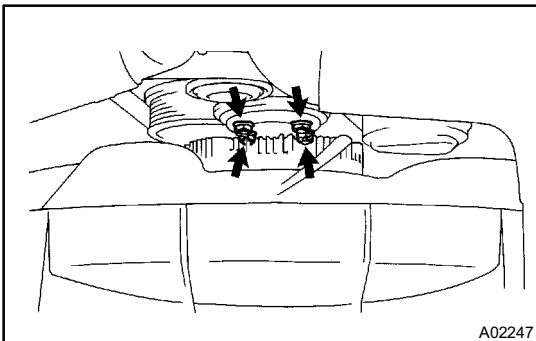
1. REMOVE OIL PAN PROTECTOR
2. REMOVE ENGINE UNDER COVER
3. DRAIN ENGINE COOLANT
4. REMOVE BATTERY CLAMP COVER
5. REMOVE AIR CLEANER INLET



6. REMOVE V-BANK COVER

Remove the bolt, 2 cap nuts and V-bank cover.

7. REMOVE AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY



8. REMOVE DRIVE BELT, FAN, FLUID COUPLING AND FAN PULLEY

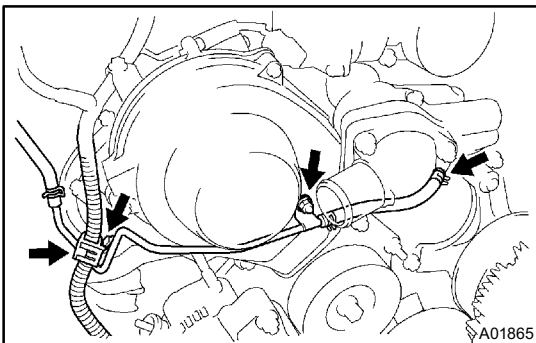
- (a) Loosen the 4 nuts holding the fluid coupling to the fan bracket.
- (b) Remove the generator drive belt. (See page [CH-8](#))
- (c) Remove the 4 nuts, the fan, fluid coupling assembly and fan pulley.

9. REMOVE RADIATOR ASSEMBLY (See page [CO-21](#))

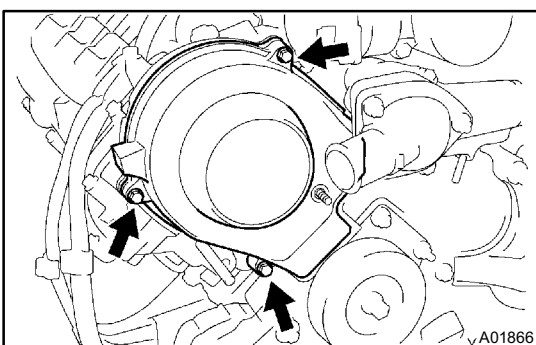
10. REMOVE DRIVE BELT IDLER PULLEY

Remove the pulley bolt, cover plate and idler pulley.

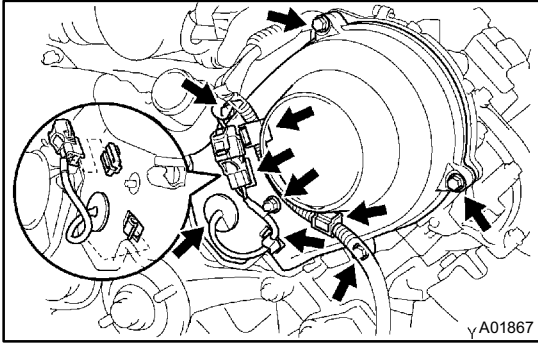
11. REMOVE RH NO.3 TIMING BELT COVER



- (a) Disconnect the PS air hose from the clamp of the timing belt cover.
- (b) Disconnect the wire clamp.
- (c) Disconnect the radiator reservoir outlet hose from the water inlet housing.
- (d) Remove the bolt and nut, disconnect the outlet pipe from the timing belt cover and LH cylinder head.



- (e) Remove the 3 bolts, timing belt cover and gasket.

**12. REMOVE LH NO.3 TIMING BELT COVER**

- Disconnect the engine wire from the 2 wire clamps.
- Remove the 4 bolts and nut.
- Disconnect the camshaft position sensor wire from the wire clamp on the timing belt cover.
- Disconnect the sensor connector from the connector bracket.
- Disconnect the sensor connector.
- Remove the wire grommet from the timing belt cover.
- Remove the timing belt cover and gasket.

13. REMOVE NO.2 TIMING BELT COVER

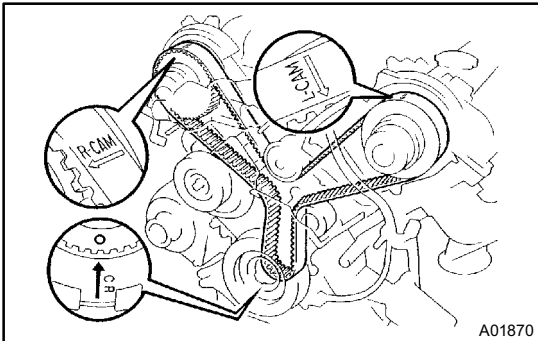
Remove the 2 bolts and No.2 timing belt cover.

14. DISCONNECT A/C COMPRESSOR FROM ENGINE

(See page [EM-77](#))

15. REMOVE FAN BRACKET

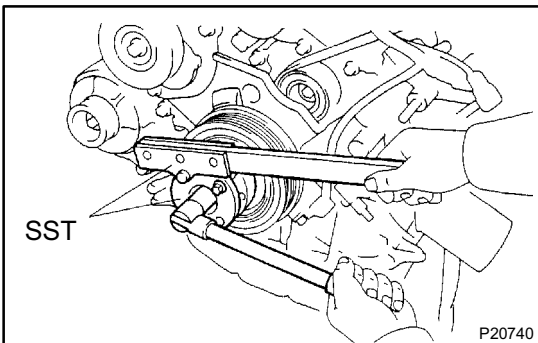
Remove the 2 bolts, 2 nuts and fan bracket.

**16. IF RE-USING TIMING BELT, CHECK INSTALLATION MARKS ON TIMING BELT**

Check that there are 3 installation marks on the timing belt by turning the crankshaft pulley as shown in the illustration.

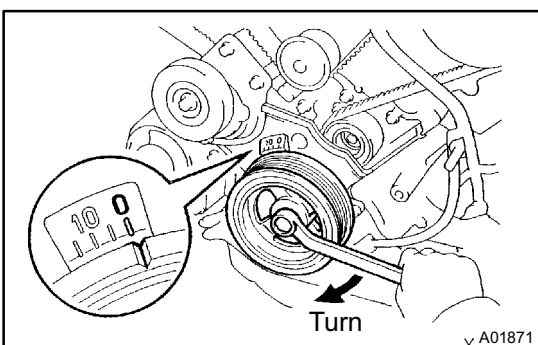
HINT:

If the installation marks have disappeared, place a new installation mark on the timing belt before removing each part.

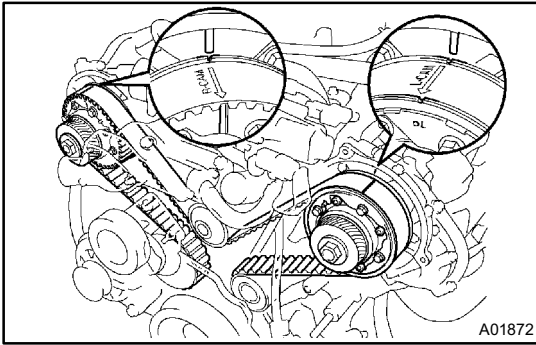
**17. LOOSEN CRANKSHAFT PULLEY BOLT**

Using SST, loosen the pulley bolt.

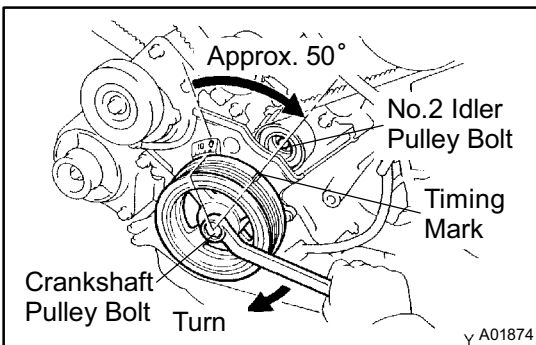
SST 09213-70010 (90105-08076),
09330-00021

**18. SET NO.1 CYLINDER TO APPROX. 50° ATDC/COMPRESSION**

- Turn the crankshaft pulley and align its groove with timing mark "0" of the No.1 timing belt cover.



- (b) Check that the timing marks of the camshaft timing pulleys and timing belt rear plates aligned. If not, turn the crankshaft 1 revolution (360°).



- (c) Turn the crankshaft pulley approx. 50° clockwise, and put the timing mark of the crankshaft pulley in line with the centers of the crankshaft pulley bolt and the idler pulley bolt.

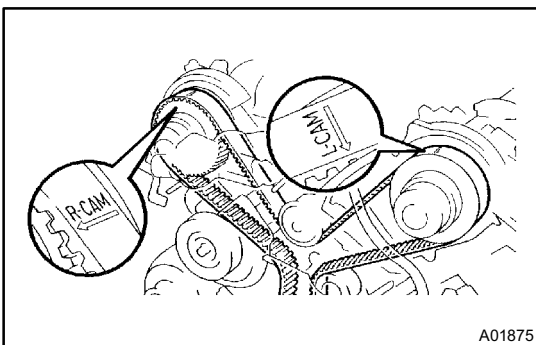
NOTICE:

If the timing belt is disengaged, having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other when you remove the camshaft timing pulley (step 19), causing damage. So always set the crankshaft pulley at the correct angle.

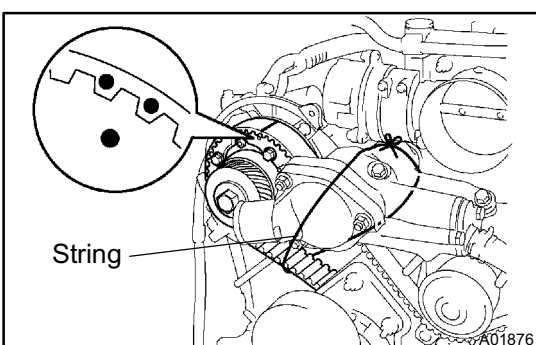
- (d) Remove the crankshaft pulley bolt.

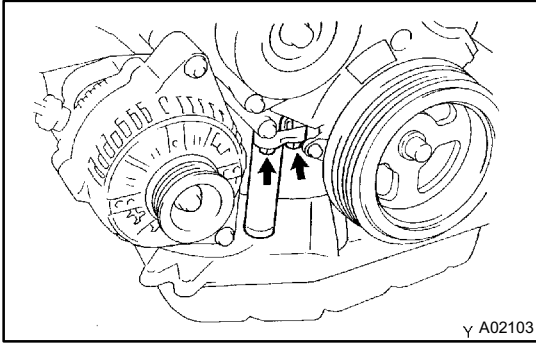
NOTICE:

Do not turn the crankshaft pulley.

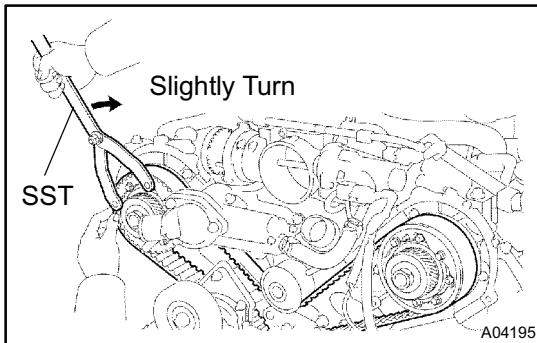
**19. REMOVE TIMING BELT TENSIONER****HINT:**

- When re-using timing belt:
If the installation marks have disappeared, before remove the timing belt, place 2 new installation marks on the timing belt to match the timing marks of the camshaft timing pulleys.
- When replacing timing belt tensioner only:
To avoid meshing of the timing pulley and timing belt, secure one of them with string. And place matchmarks on the timing belt and RH camshaft timing pulley.





Alternately loosen the 2 bolts, and remove them, the belt tensioner and dust boot.

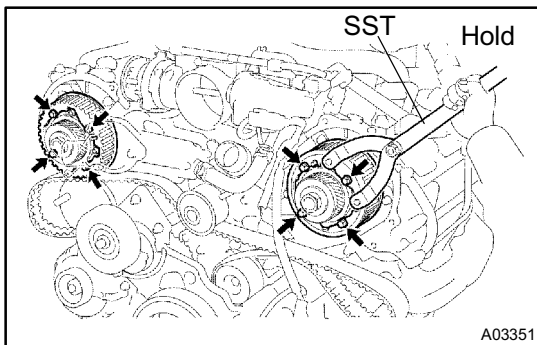


20. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS

- (a) Using SST, loosen the tension spring between the LH and RH camshaft timing pulleys by slightly turning the RH camshaft timing pulley clockwise.

SST 09960-10010 (09962-01000, 09963-00350)

- (b) Disconnect the timing belt from the camshaft timing pulleys.



21. REMOVE CAMSHAFT TIMING PULLEYS

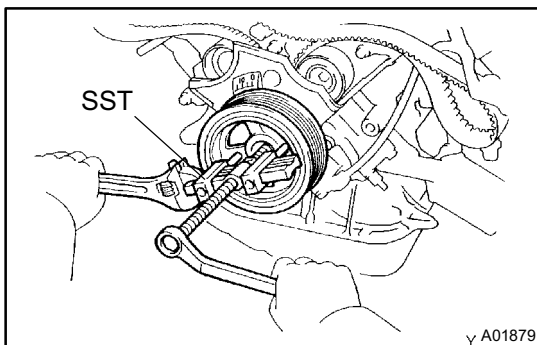
Using SST, remove the 4 bolts and timing pulley. Remove the 2 timing pulleys.

SST 09960-10010 (09962-01000, 09963-00350)

22. REMOVE GENERATOR (See page CH-8)

23. REMOVE DRIVE BELT TENSIONER

Remove the bolt, 2 nuts and belt tensioner.



24. REMOVE CRANKSHAFT PULLEY

Using SST, remove the crankshaft pulley.

SST 09950-50012 (09951-05010, 09952-05010, 09953-05010, 09953-05020, 09954-05020)

NOTICE:

Do not turn the crankshaft pulley.

25. REMOVE NO.1 TIMING BELT COVER

Remove the 4 bolts, timing belt cover.

26. REMOVE TIMING BELT GUIDE

27. REMOVE TIMING BELT COVER SPACER

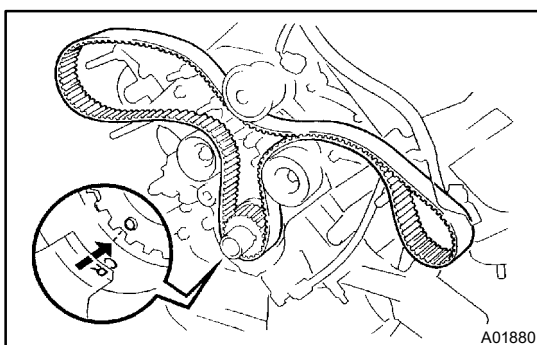
28. REMOVE TIMING BELT

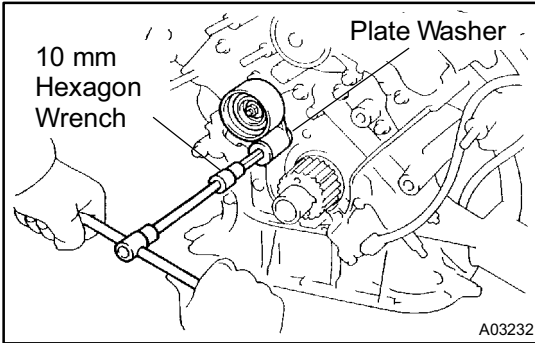
HINT:

If re-using the belt and the installation mark has disappeared from it, place a new installation mark on the timing belt to the match the dot mark of the crankshaft timing pulley.

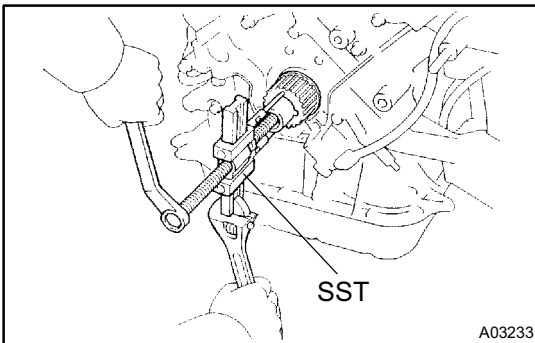
29. REMOVE NO.2 IDLER PULLEY

Remove the bolt and idler pulley.



**30. REMOVE NO.1 IDLER PULLEY**

Using a 10 mm hexagon wrench, remove the bolt, idler pulley and plate washer.

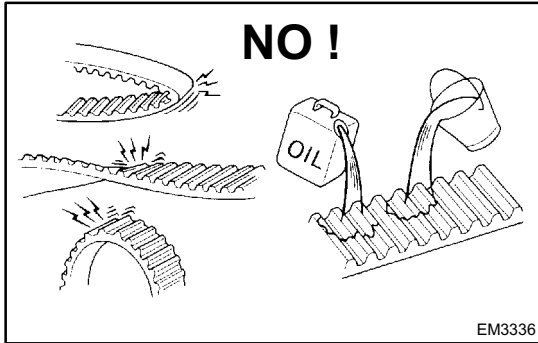
**31. REMOVE CRANKSHAFT TIMING PULLEY**

Using SST, remove the timing pulley.

SST 09950-50012 (09951-05010, 09952-05010,
09953-05010, 09953-05020, 09954-05010)

NOTICE:

Do not turn the timing pulley.



INSPECTION

1. INSPECT TIMING BELT

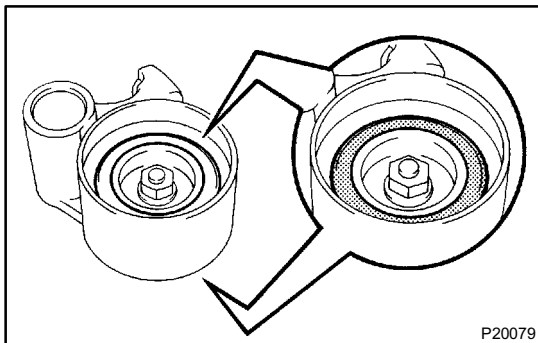
NOTICE:

- Do not bend, twist or turn the timing belt inside out.
- Do not allow the timing belt to come into contact with oil, water or steam.
- Do not utilize timing belt tension when installing or removing the mount bolt of the camshaft timing pulley.

If there are any defects, as shown in the illustrations, check these points:

- (a) Premature parting
 - Check for proper installation.
 - Check the timing cover gasket for damage and proper installation.
- (b) If the belt teeth are cracked or damaged, check to see if either camshaft is locked.
- (c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on the side of the idler pulley lock and water pump.
- (d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.
- (e) If there is noticeable wear on the belt teeth, check timing cover for damage and check gasket has been installed correctly and for foreign material on the pulley teeth.

If necessary, replace the timing belt.



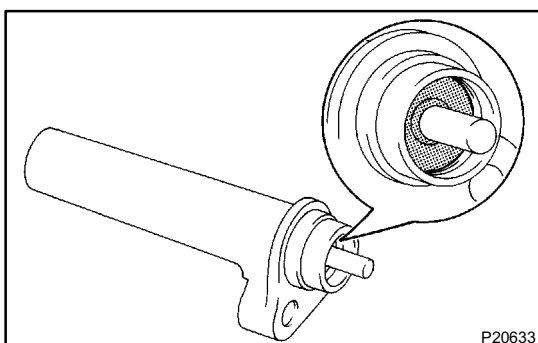
2. INSPECT IDLER PULLEYS

- (a) Visually check the seal portion of the idler pulley for oil leakage.

If leakage is found, replace the idler pulley.

- (b) Check that the idler pulley turns smoothly.

If necessary, replace the idler pulley.



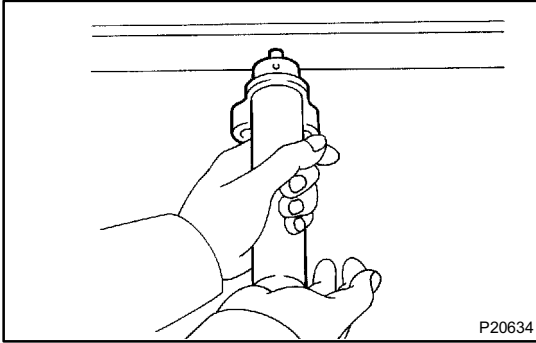
3. INSPECT TIMING BELT TENSIONER

- (a) Visually check the seal portion of the tensioner for oil leakage.

HINT:

If there is only the faintest trace of oil on the seal on the push rod side, the tensioner is all right.

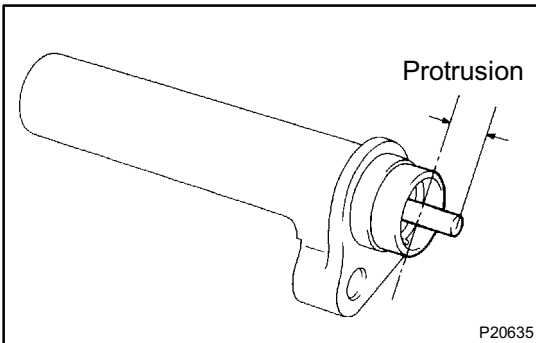
If leakage is found, replace the tensioner.



- (b) Hold the tensioner with both hands and push the push rod strongly as shown to check that it doesn't move. If the push rod moves, replace the tensioner.

NOTICE:

Never hold the tensioner push rod facing downward.

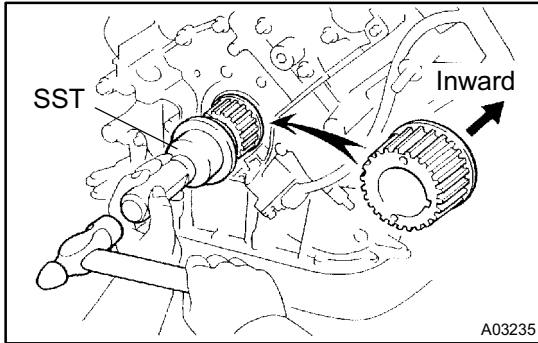


- (c) Measure the protrusion of the push rod from the housing end.

Protrusion: 10.5 – 11.5 mm (0.413 – 0.453 in.)

If the protrusion is not as specified, replace the tensioner.

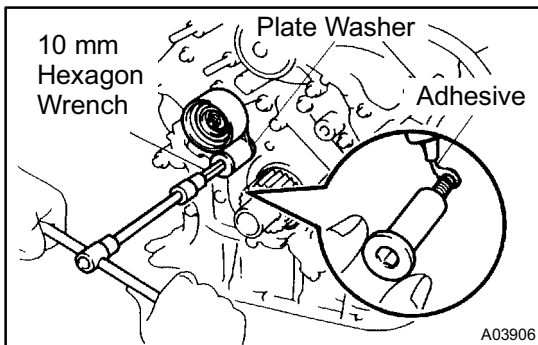
4. INSPECT WATER PUMP (See page CO-9)



INSTALLATION

1. INSTALL CRANKSHAFT TIMING PULLEY

- (a) Align the timing pulley set key with the key groove of the pulley.
- (b) Using SST and a hammer, tap in the timing pulley, facing the flange side inward.
SST 09223-46011



2. INSTALL NO.1 IDLER PULLEY

- (a) Apply adhesive 2 or 3 threads of the pivot bolt.

Adhesive:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Using a 10 mm hexagon wrench, install the plate washer and idler pulley with the pivot bolt.
Torque: 34.5 N·m (350 kgf·cm, 25 ft·lbf)
- (c) Check that the pulley bracket moves smoothly.

3. INSTALL NO.2 IDLER PULLEY

- (a) Install the idler pulley with the bolt.
Torque: 34.5 N·m (350 kgf·cm, 25 ft·lbf)
- (b) Check that the idler pulley moves smoothly.

4. TEMPORARILY INSTALL TIMING BELT

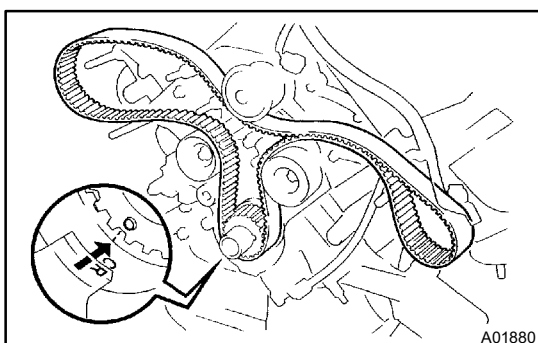
NOTICE:

The engine should be cold.

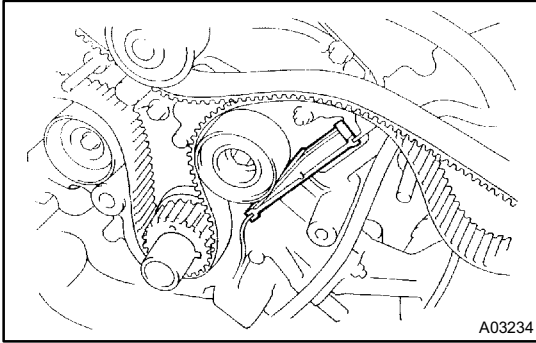
- (a) Remove any oil or water on the crankshaft pulley, oil pump pulley, water pump pulley, No.1 idler pulley and No.2 idler pulley, and keep them clean.

NOTICE:

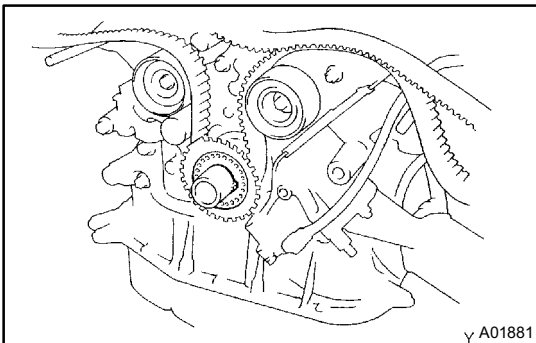
Only wipe the pulleys; do not use any cleansing agent.



- (b) Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.
- (c) Install the timing belt on the crankshaft timing pulley, No.1 idler pulley and No.2 idler pulley.

**5. INSTALL TIMING BELT COVER SPACER**

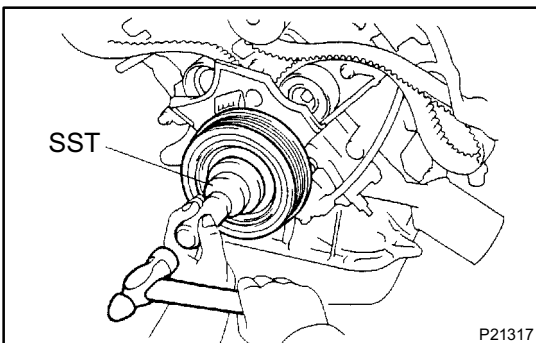
- (a) Install the gasket to the cover spacer.
- (b) Install the cover spacer.

**6. INSTALL TIMING BELT GUIDE**

Install the belt guide, facing the cup side outward.

7. INSTALL NO.1 TIMING BELT COVER

Install the timing belt cover with the 4 bolts.

**8. INSTALL CRANKSHAFT PULLEY**

- (a) Align the pulley set key with the key groove of the crankshaft pulley.
- (b) Using SST and a hammer, tap in the crankshaft pulley.
SST 09223-46011

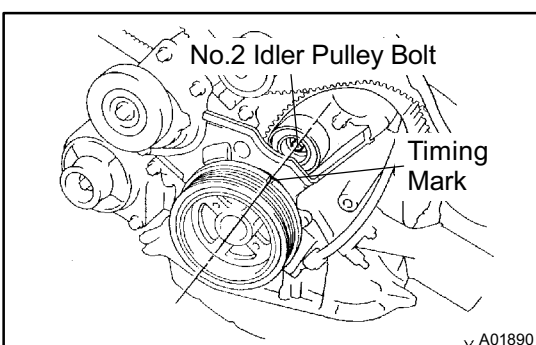
9. INSTALL DRIVE BELT TENSIONER

Install the belt tensioner with the bolt and 2 nuts.

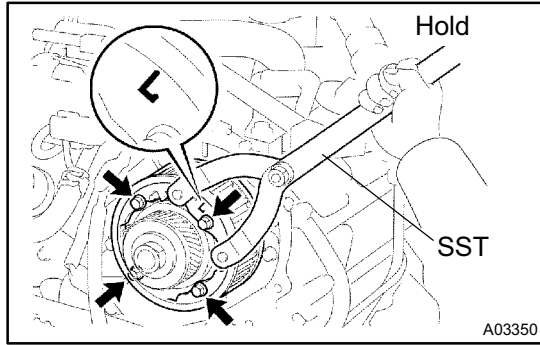
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

HINT:

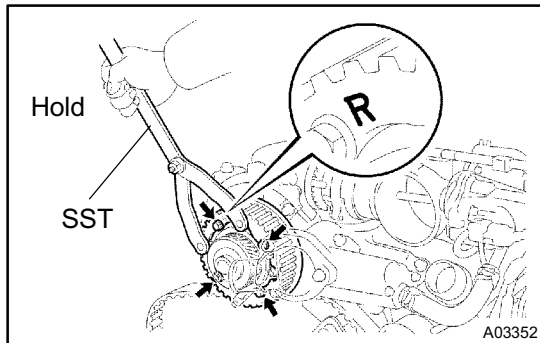
Use a bolt 106 mm (4.18 in.) in length.

10. INSTALL GENERATOR (See page CH-18)**11. CHECK CRANKSHAFT PULLEY POSITION**

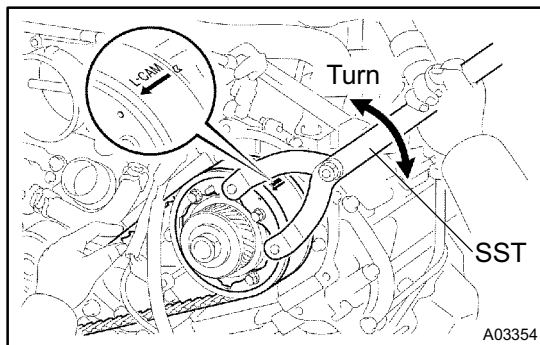
Check that the timing mark of the crankshaft pulley is aligned with the centers of the crankshaft pulley and the idler pulley bolt.

**12. INSTALL LH CAMSHAFT TIMING PULLEY**

- Align the camshaft timing tube knock pin with the knock pin groove of the timing pulley.
- Attach the timing pulley to the camshaft timing tube, facing the "L" mark forward.
- Using SST, install the 4 pulley bolts.
SST 09960-10010 (09962-01000, 09963-00350)
Torque: 7.5 N·m (80 kgf·cm, 66 ft·lbf)

**13. INSTALL RH CAMSHAFT TIMING PULLEY**

- Align the camshaft timing tube knock pin with the knock pin groove of the timing pulley.
- Attach the timing pulley to the camshaft timing tube, facing the "R" mark forward.
- Using SST, install the 4 pulley bolts.
SST 09960-10010 (09962-01000, 09963-00350)
Torque: 7.5 N·m (80 kgf·cm, 66 ft·lbf)

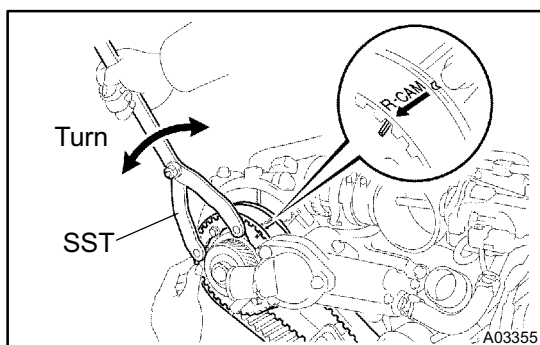
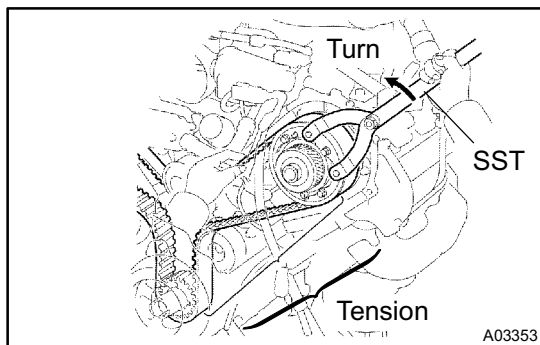
**14. CONNECT TIMING BELT TO LH CAMSHAFT TIMING PULLEY**

- Remove any oil or water on the LH camshaft timing pulley, and keep it clean.

NOTICE:

Only wipe the pulleys; do not use any cleansing agent.

- Using SST, turn the timing pulley. Align the installation mark on the timing belt with the timing mark of the timing pulley, and hang the timing belt on the timing pulley.
SST 09960-10010 (09962-01000, 09963-00350)
- Using SST, turn the LH camshaft timing pulley counter-clockwise until there is tension between the crankshaft timing pulley and LH camshaft timing pulley.
SST 09960-10010 (09962-01000, 09963-00350)

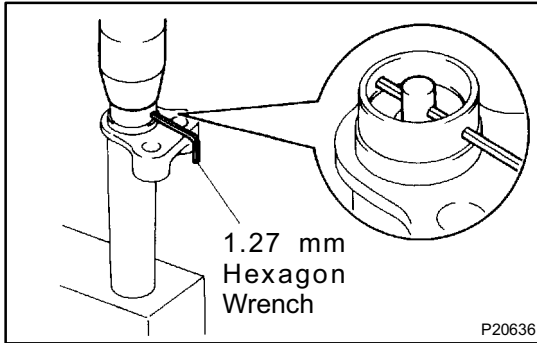
**15. CONNECT TIMING BELT TO RH CAMSHAFT TIMING PULLEY**

- Remove any oil or water on the RH camshaft timing pulley and water pump pulley, and keep them clean.

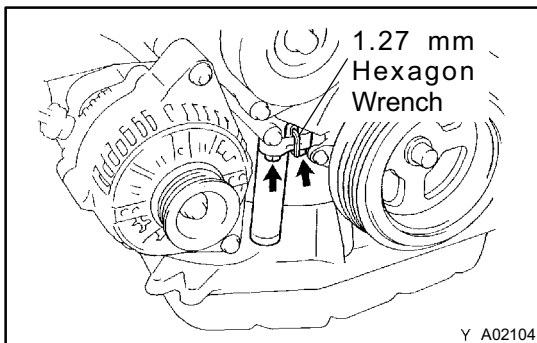
NOTICE:

Only wipe the pulleys; do not use any cleansing agent.

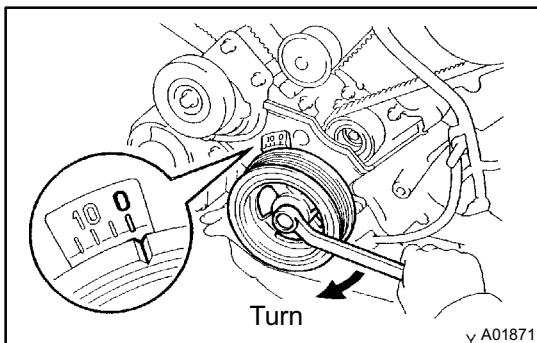
- Using SST, turn the timing pulley. Align the installation mark on the timing belt with the timing mark of the timing pulley, and hang the timing belt on the timing pulley.
SST 09960-10010 (09962-01000, 09963-00350)

**16. SET TIMING BELT TENSIONER**

- Using a press, slowly press in the push rod using 981 – 9,807 N (100 – 1,000 kgf, 220 – 2,205 lbf) of pressure.
- Align the holes of the push rod and housing, pass a 1.27 mm hexagon wrench through the holes to keep the setting position of the push rod.
- Release the press.
- Install the dust boot to the belt tensioner.

**17. INSTALL TIMING BELT TENSIONER**

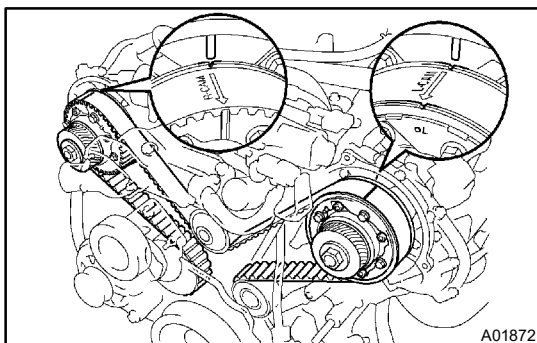
- Temporarily install the belt tensioner with the 2 bolts.
- Alternately tighten the 2 bolts.
Torque: 26 N·m (270 kgf·cm, 19 ft·lbf)
- Using pliers, remove the 1.27 mm hexagon wrench from the belt tensioner.

**18. CHECK VALVE TIMING**

- Temporarily install the crankshaft pulley bolt.
- Slowly turn the crankshaft pulley 2 revolutions from TDC to TDC.

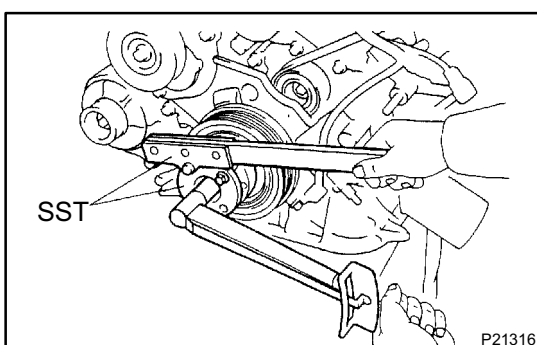
NOTICE:

Always turn the crankshaft pulley clockwise.



- Check that each pulley aligns with the timing marks as shown in the illustration.

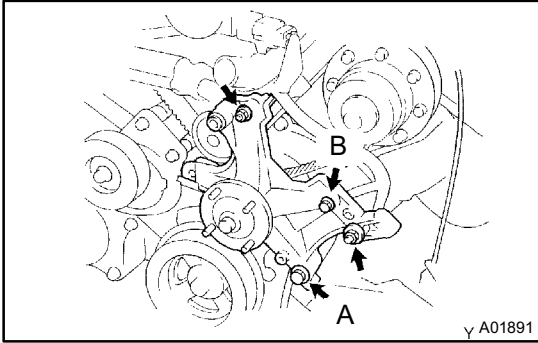
If the timing marks do not align, remove the timing belt and reinstall it.

**19. TIGHTEN CRANKSHAFT PULLEY BOLT**

Using SST, install the pulley bolt.

SST 09213-54015 (90119-08216),
09330-00021

Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)

**20. INSTALL FAN BRACKET**

Install the fan bracket with the 2 bolts and 2 nuts.

Torque:

12 mm head: 16 N·m (160 kgf·cm, 12 ft·lbf)

14 mm head: 32 N·m (330 kgf·cm, 24 ft·lbf)

HINT:

Each bolt length is indicated in the illustration.

Bolt Length:

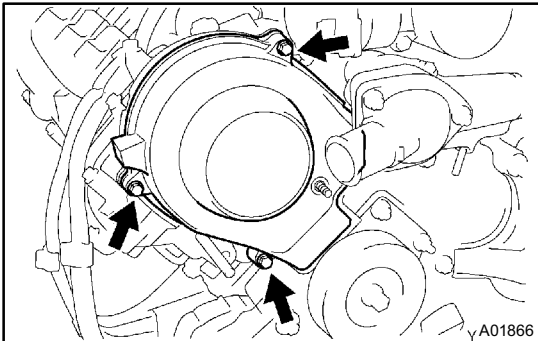
106 mm (4.17 in.) for 12 mm head (A)

114 mm (4.49 in.) for 14 mm head (B)

21. INSTALL A/C COMPRESSOR (See page EM-82)**22. INSTALL NO.2 TIMING BELT COVER**

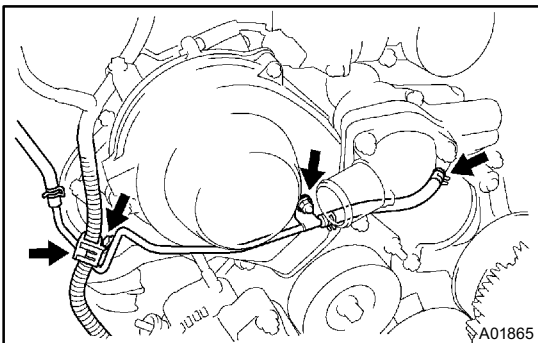
Install the No.2 timing belt cover with the 2 bolts.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

**23. INSTALL RH NO.3 TIMING BELT COVER**

- (a) Install the gasket to the timing belt cover.
- (b) Fit the timing belt cover, matching it with the fan bracket.
- (c) Install the timing belt cover with the 3 bolts.

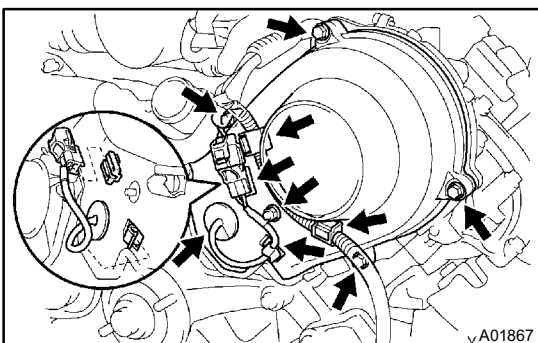
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)



- (d) Install the radiator reservoir outlet pipe to the RH cylinder head and timing belt cover with the bolt and nut.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

- (e) Connect the outlet hose to the water inlet housing.
- (f) Connect the wire clamp.
- (g) Connect the PS air hose to the clamp of the timing belt cover.

**24. INSTALL LH NO.3 TIMING BELT COVER**

- (a) Install the gasket to the timing belt cover.
 - (b) Run the camshaft position sensor wire through the timing belt cover hole.
 - (c) Fit the timing belt cover, matching it with the fan bracket.
 - (d) Install the timing belt cover with the 4 bolts and nut.
- Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)**
- (e) Install the wire grommet to the timing belt cover.
 - (f) Install the sensor connector to the connector bracket.
 - (g) Connect the sensor connector.

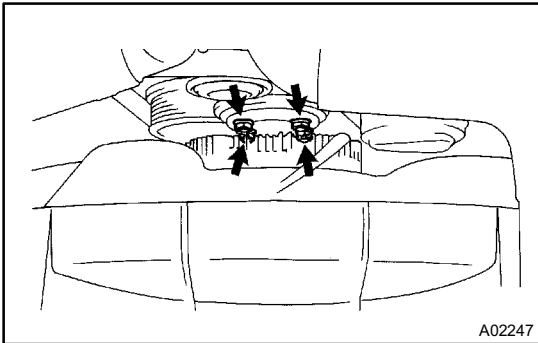
- (h) Install the sensor wire to the wire clamp on the timing belt cover.
- (i) Install the engine wire to the 2 wire clamps on the timing belt cover.

25. INSTALL DRIVE BELT IDLER PULLEY

Install the idler pulley and cover plate with the bolt.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

26. INSTALL RADIATOR ASSEMBLY (See page [CO-27](#))



27. INSTALL FAN PULLEY, FAN, FLUID COUPLING AND DRIVE BELT

- (a) Temporarily install the fan pulley, the fan, fluid coupling assembly with the 4 nuts.
- (b) Install the generator drive belt. (See page [CH-18](#))
- (c) Tighten the 4 nuts holding the fluid coupling to the fan bracket.

Torque: 21 N·m (215 kgf·cm, 16 ft·lbf)

28. INSTALL AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY

29. INSTALL V-BANK COVER

30. FILL WITH ENGINE COOLANT

31. START ENGINE AND CHECK FOR LEAKS

32. RECHECK ENGINE COOLANT LEVEL

33. INSTALL AIR CLEANER INLET

34. INSTALL BATTERY CLAMP COVER

35. INSTALL ENGINE UNDER COVER

36. INSTALL OIL PAN PROTECTOR