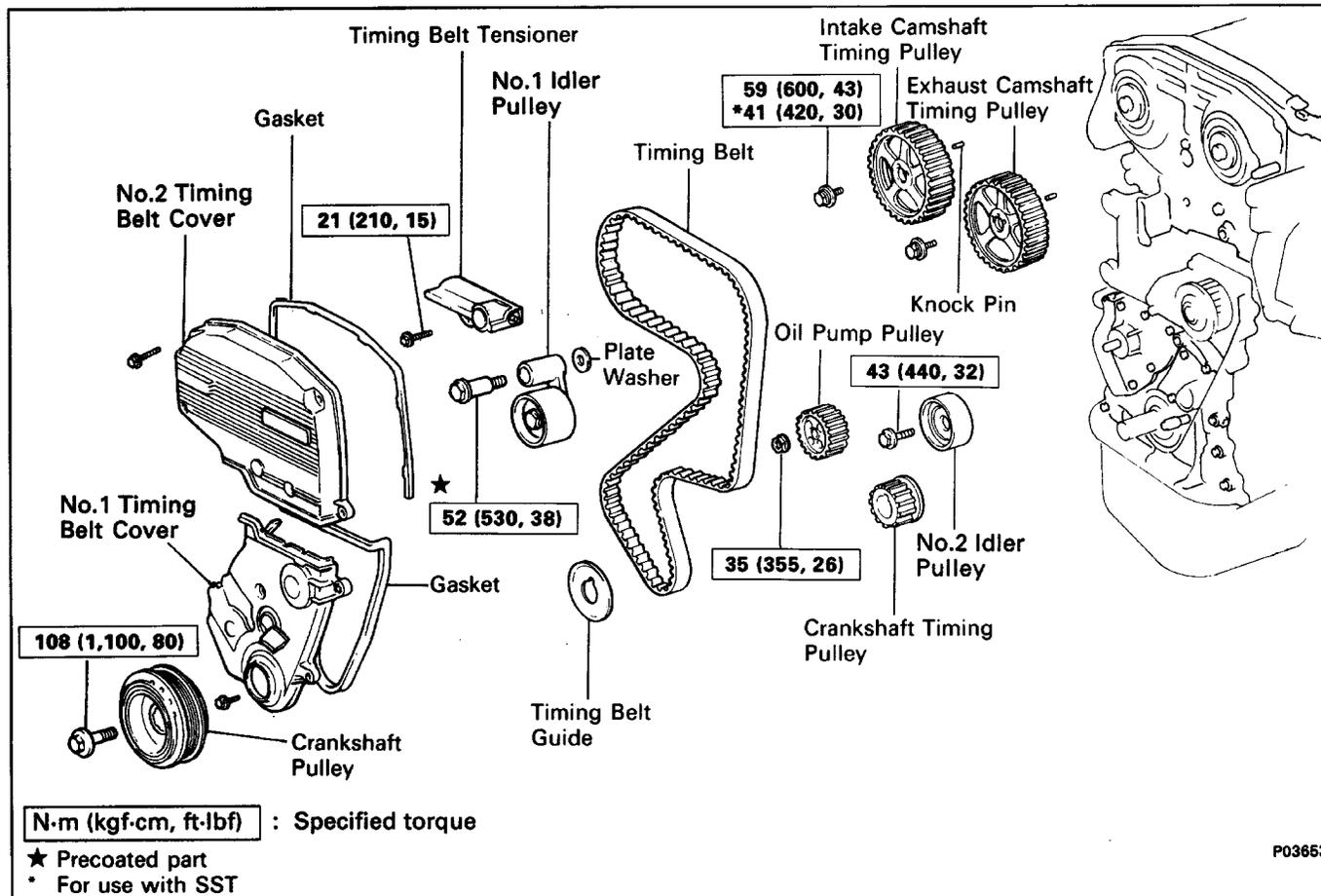
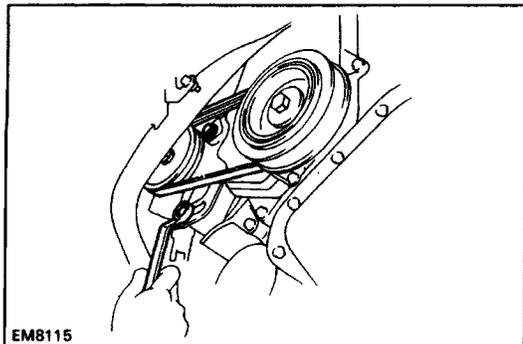


TIMING BELT (3S-GTE) COMPONENTS

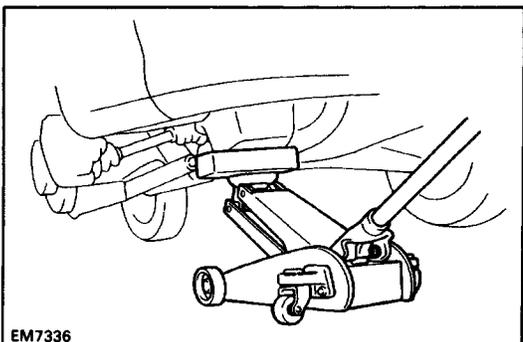


REMOVAL OF TIMING BELT

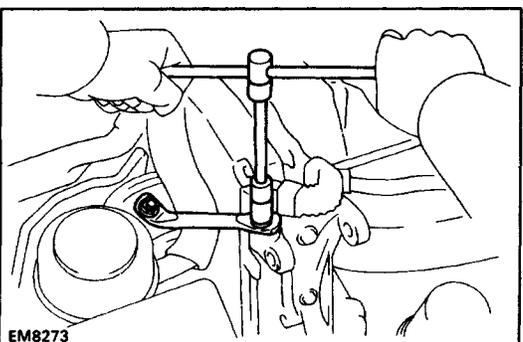
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY
CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.
2. REMOVE RH FRONT WHEEL
3. REMOVE RH ENGINE UNDER COVER
4. REMOVE GENERATOR (See page [CH-7](#))
5. REMOVE CHARGE AIR COOLER
(See steps 13 to 15 on pages [TC-9](#) and 10)
6. REMOVE EGR VACUUM MODULATOR AND VSV
(See step 20 on page [EM-121](#))
7. REMOVE EGR VALVE AND PIPE
(See step 21 on page [EM-121](#))
8. REMOVE THROTTLE BODY
(See steps 2, 3, 5 to 8, 10 and 11 on pages [FI-194](#) and 195)

**9. REMOVE PS DRIVE BELT**

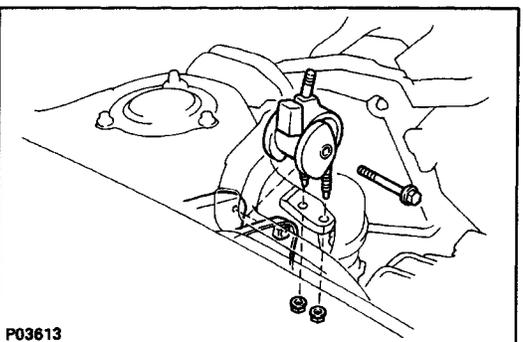
Loosen the two bolts, and remove the drive belt.

**10. SLIGHTLY JACK UP ENGINE**

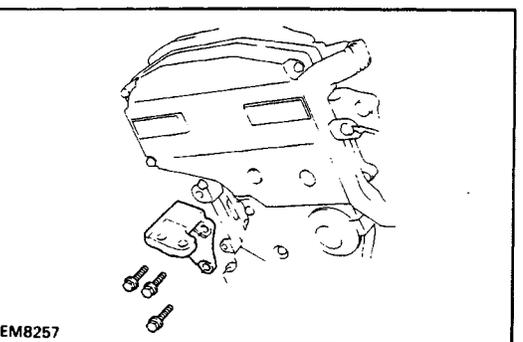
Raise the engine enough to remove the weight from the engine mounting on the right side.

**11. REMOVE RH ENGINE MOUNTING STAY**

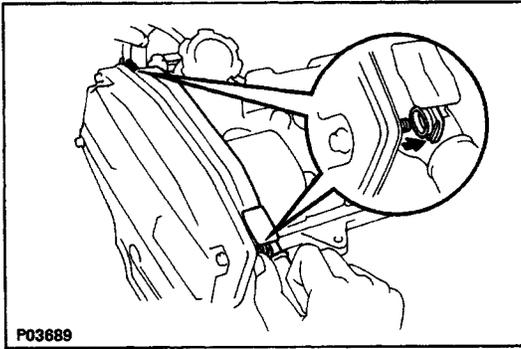
Remove the bolt, nut and mounting stay.

**12. REMOVE RH ENGINE MOUNTING INSULATOR**

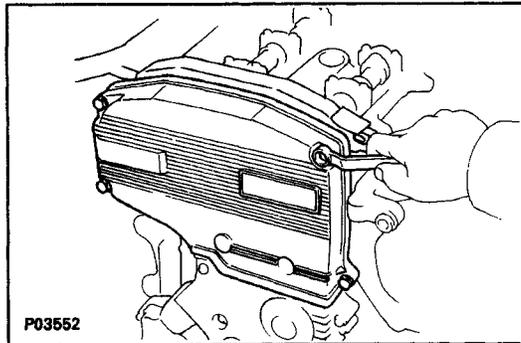
Remove the through bolt, two nuts and mounting insulator.

**13. REMOVE RH ENGINE MOUNTING BRACKET**

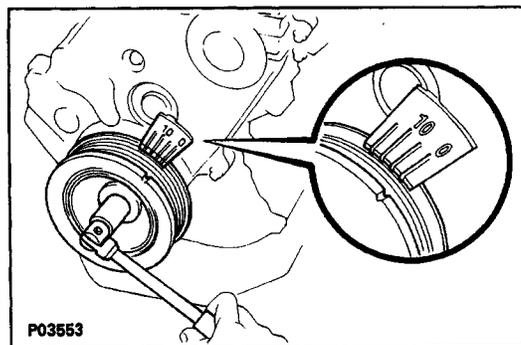
Remove the three bolts and mounting bracket.
HINT: Lower the jack and perform the operation with the engine fully down.

**14. REMOVE CYLINDER HEAD COVER**

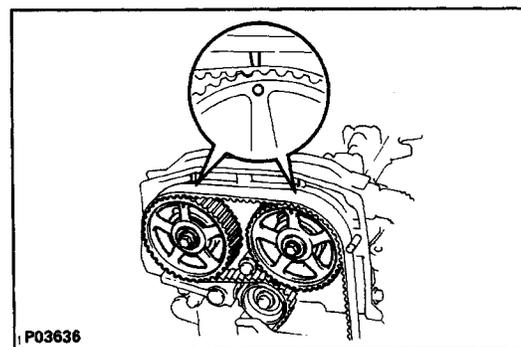
- (a) Disconnect the engine wire protector between the cylinder head cover and No.3 timing belt cover.
- (b) Remove the cylinder head cover.
(See step 33 on page [EM-124](#))

15. REMOVE SPARK PLUGS**16. REMOVE NO.2 TIMING BELT COVER**

Remove the five screws, timing belt cover and gasket.

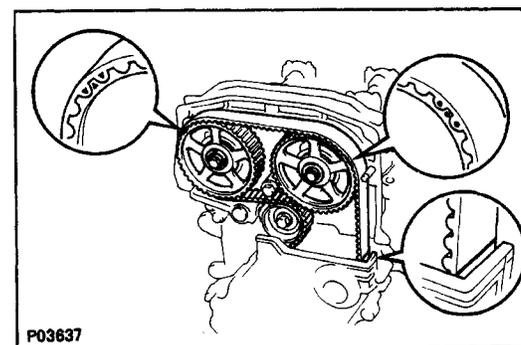
**17. SET NO.1 CYLINDER TO TDC/COMPRESSION**

- (a) Turn the crankshaft pulley and align its groove with timing mark "0" of the No.1 timing belt cover.
NOTICE: Always turn the crankshaft clockwise.

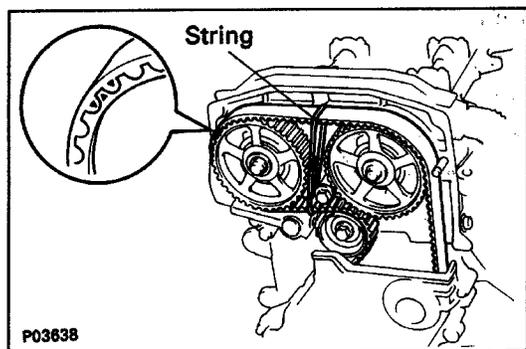


- (b) Check that the timing marks of the camshaft timing pulleys are aligned with the timing marks of the No.3 timing belt cover.

If not, turn the crankshaft one revolution (360°).

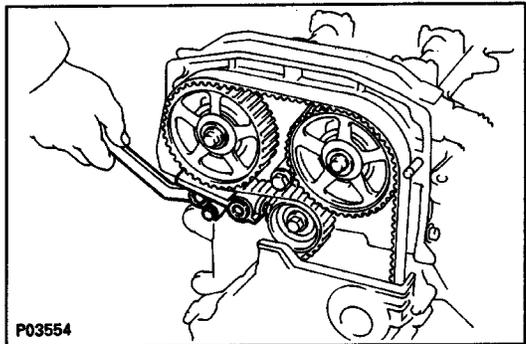
**18. REMOVE TIMING BELT FROM CAMSHAFT TIMING PULLEYS****H I N T:**

- (Re-using timing belt)
Place matchmarks on the timing belt and camshaft timing pulleys, and place a matchmarks on the timing belt to match the end of the No.1 timing belt cover.

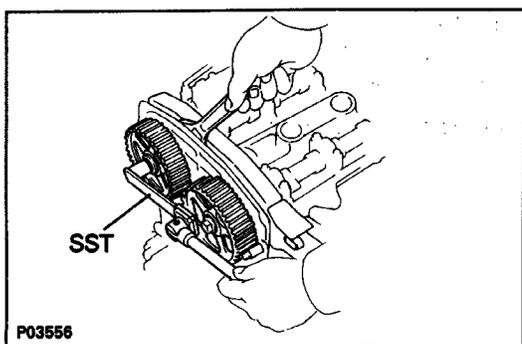
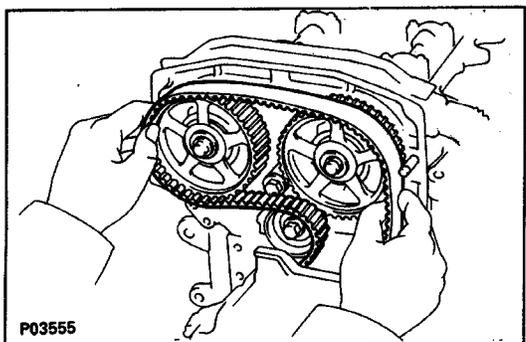


- (When replacing timing belt tensioner only)
To avoid meshing of the timing belt and timing pulley, secure one with a string. And place the matchmarks on the timing belt and RH camshaft timing pulley.

(a) Remove the two bolts and timing belt tensioner.



(b) Remove the timing belt from the camshaft timing pulley.

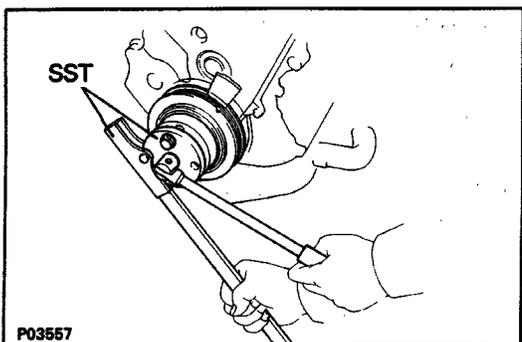


19. REMOVE CAMSHAFT TIMING PULLEYS

- (a) Hold the hexagon wrench head portion of the camshaft with a wrench, and remove the pulley mounting bolts.

HINT (Intake camshaft timing pulley): Use SST.
SST 09249-63010

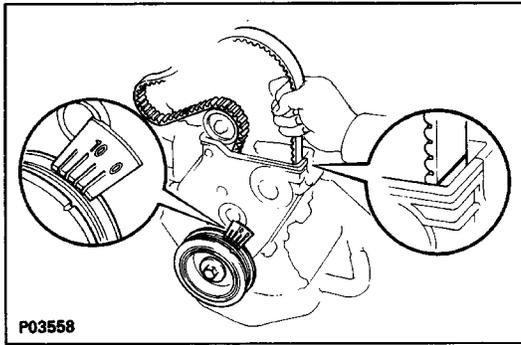
- (b) Remove the camshaft pulleys and pins.
HINT: Arrange the intake and exhaust timing pulleys.



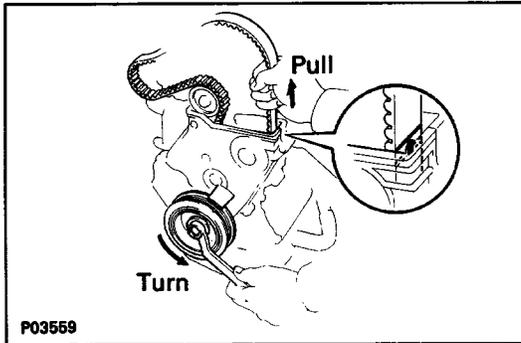
20. REMOVE CRANKSHAFT PULLEY

- (a) Using SST, remove the pulley bolt.

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

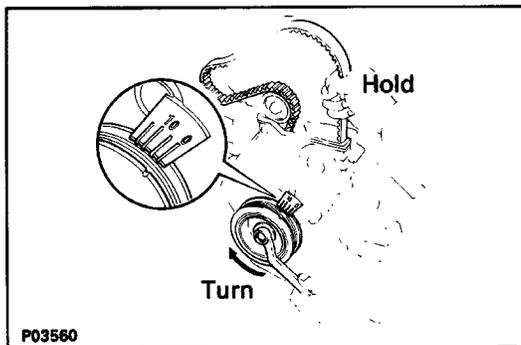


HINT (When re-using timing belt): After loosening the crankshaft pulley bolt, check that the timing belt matchmark aligns with the end of the No.1 timing belt cover when the crankshaft pulley groove is aligned with the timing mark "0" of the No.1 timing belt cover. If the matchmarks does not align, align as follows:

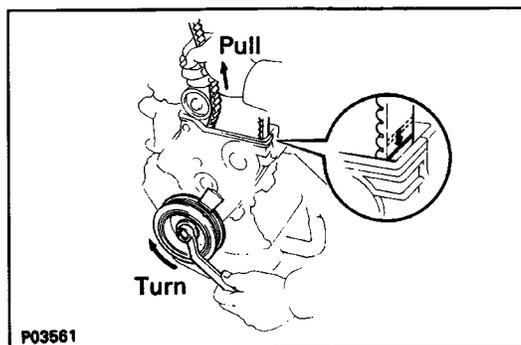


(When matchmark is out of alignment clockwise)

- Align the matchmark by pulling the timing belt up on the water pump pulley side while turning the crankshaft pulley counterclockwise.

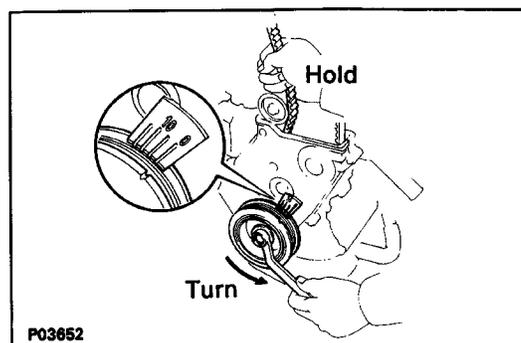


- After aligning the matchmark, hold the timing belt. And turn the crankshaft pulley clockwise, and align its groove with timing mark "0" of the No.1 timing belt cover.

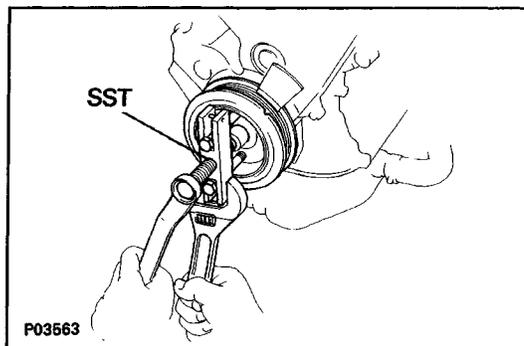


(When matchmark is out of alignment counter-clockwise)

- Align the matchmark by pulling the timing belt up on the No.1 idler pulley side while turning the crankshaft pulley clockwise.



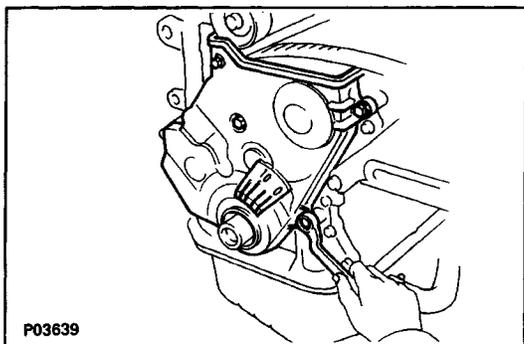
- After aligning the matchmark, hold the timing belt. And turn the crankshaft pulley counterclockwise, and align its groove with timing mark "0" of the No.1 timing belt cover.



(b) Using SST, remove the pulley.

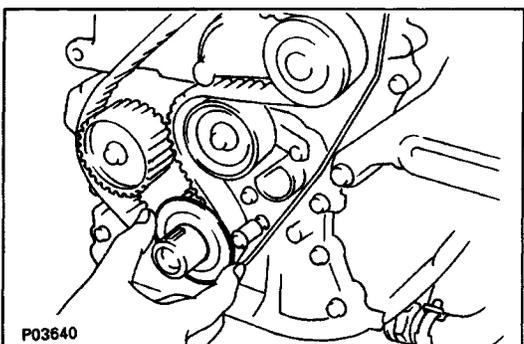
SST 09213-31021

HINT (When re-using timing belt): Remove the pulley without turning it.

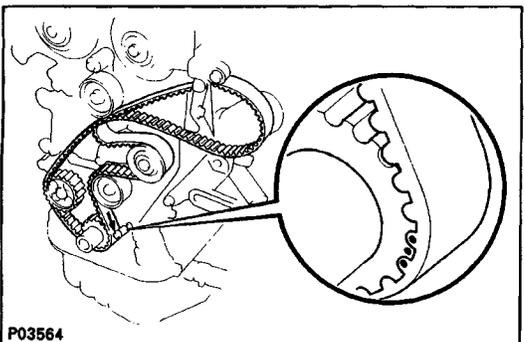


21. REMOVE NO.1 TIMING BELT COVER

Remove the six bolts, timing belt cover and gasket.

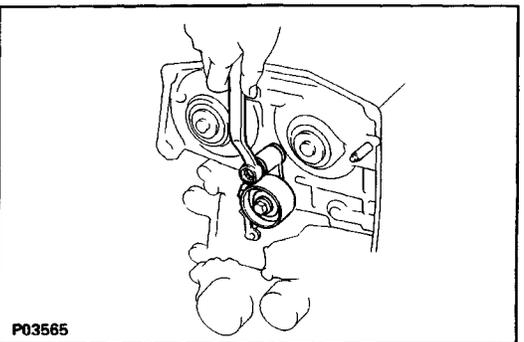


22. REMOVE TIMING BELT GUIDE



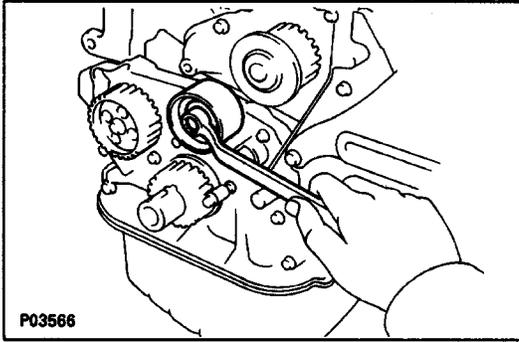
23. REMOVE TIMING BELT

HINT (When re-using timing belt): Draw a direction arrow on the timing belt (in the direction of engine revolution), and place matchmarks on the timing belt and crankshaft timing pulley.

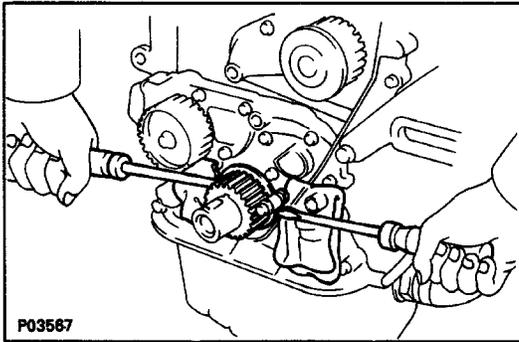


24. REMOVE NO.1 IDLER PULLEY

Remove the pivot bolt, pulley and plate washer.

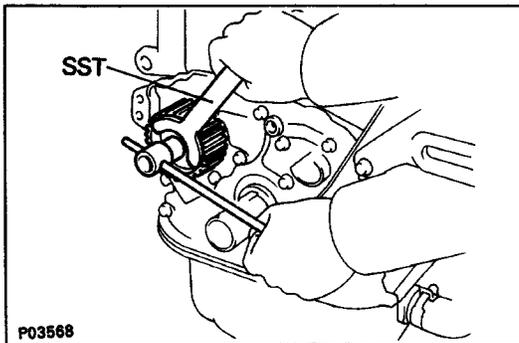
**25. REMOVE NO.2 IDLER PULLEY**

Remove the bolt and pulley.

**26. REMOVE CRANKSHAFT TIMING PULLEY**

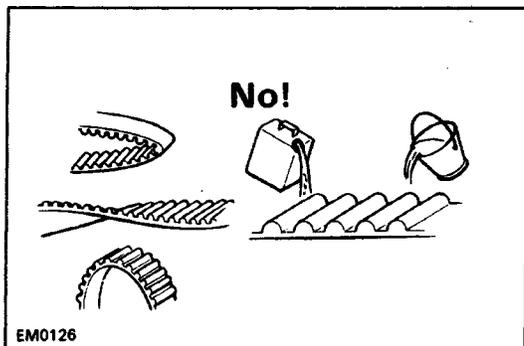
If the pulley cannot be removed by hand, use two screwdrivers.

HINT: Position shop rags as shown to prevent damage.

**27. REMOVE OIL PUMP PULLEY**

Using SST, remove the nut and pulley.

SST 09616-30011



INSPECTION OF TIMING BELT COMPONENTS

1. INSPECT TIMING BELT

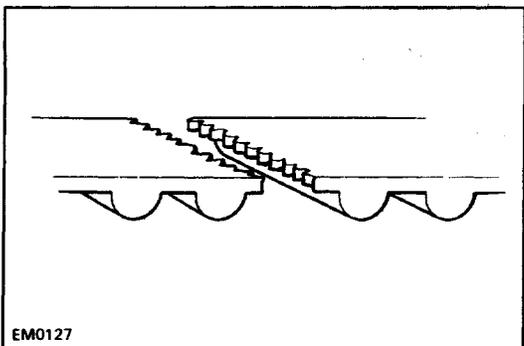
NOTICE:

- 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 mounting bolt of the camshaft timing pulley.

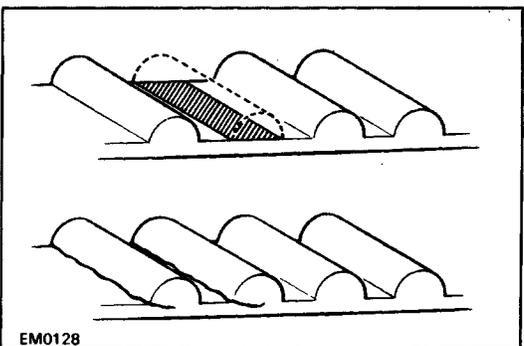
If there are any defects as shown in the illustrations, check the following points:

(a) Premature parting

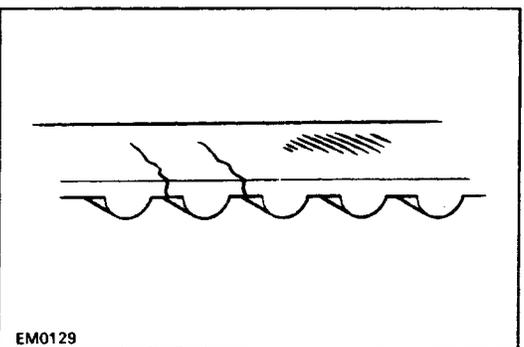
- Check for proper installation.
- Check the timing cover gasket for damage and proper installation.



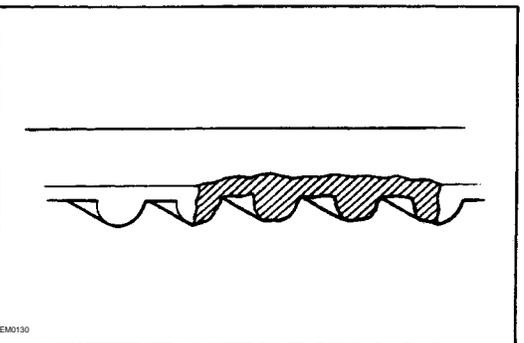
(b) If the belt teeth are cracked or damaged, check to see if either the camshaft or water pump is locked.

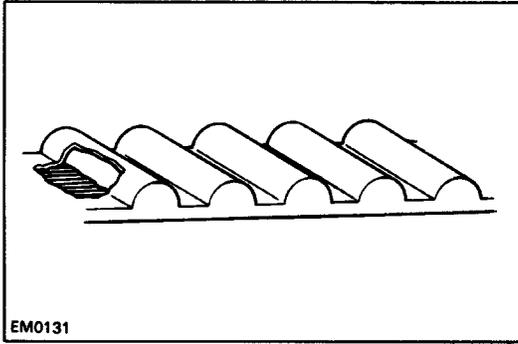


(c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on the side of the idler pulley lock.

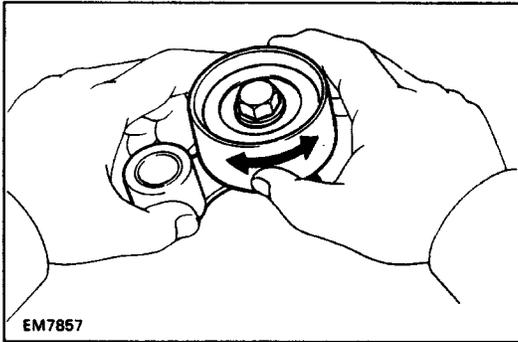


(d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.



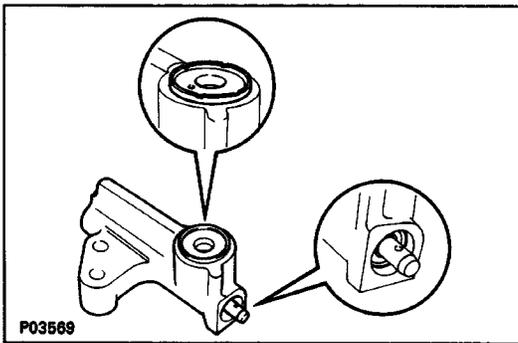


- (e) If there is noticeable wear on the belt teeth, check the timing cover for damage, correct gasket installation and the foreign material on the pulley teeth. If necessary, replace the timing belt.



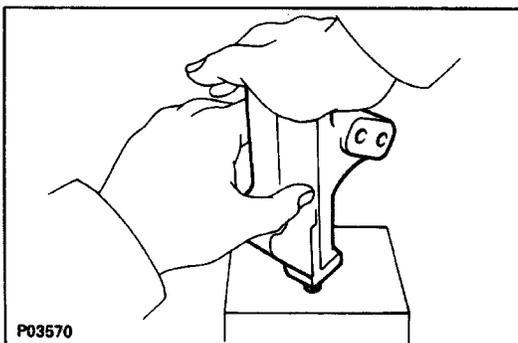
2. INSPECT IDLER PULLEYS

Check that the idler pulley turns smoothly. If necessary, replace the idler pulley.

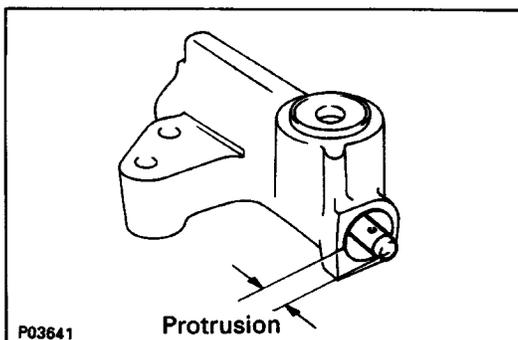


3. INSPECT TIMING BELT TENSIONER

- (a) Visually check tensioner for oil leakage.
 HINT: If there is only a small trace of oil on the seal of the push rod, the tensioner is all right. If leakage is found, replace the tensioner.



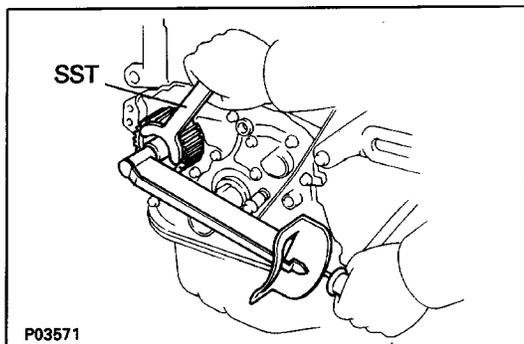
- (b) Hold the tensioner with both hands, and push the push rod strongly against the floor or wall to check that it doesn't move. If the push rod moves, replace the tensioner.



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

Protrusion: 8.5–9.5 mm (0.335–0.374 in.)

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



INSTALLATION OF TIMING BELT

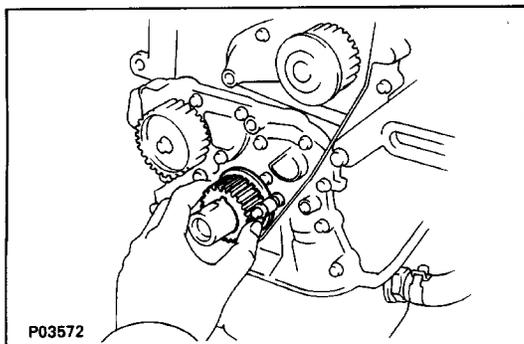
(See page [EM-46](#))

1. INSTALL OIL PUMP PULLEY

- (a) Align the cutouts of the pulley and shaft, and slide the pulley.
- (b) Using SST, install the nut.

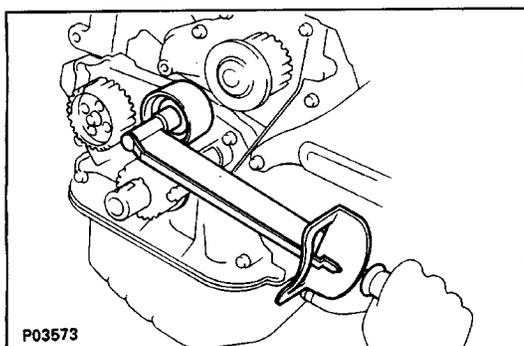
SST 09616-30011

Torque: 35 N-m (355 kgf-cm, 26 ft-lbf)



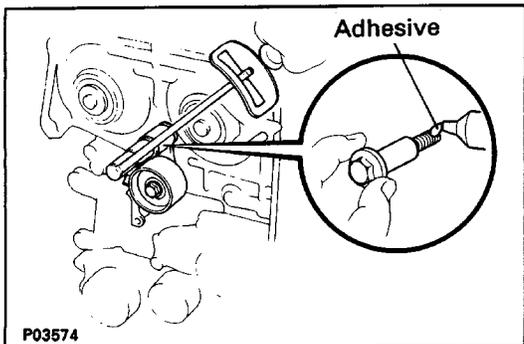
2. INSTALL CRANKSHAFT TIMING PULLEY

- (a) Align the pulley set key with the key groove of the pulley.
- (b) Slide on the timing pulley facing the flange side inward.



3. INSTALL NO.2 IDLER PULLEY

- (a) Install the pulley with the bolt.
- Torque: 43 N-m (440 kgf-cm, 32 ft-lbf)**
- (b) Check that the idler pulley moves smoothly.



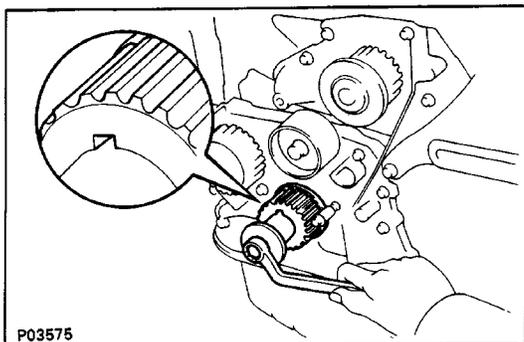
4. INSTALL NO.1 IDLER PULLEY

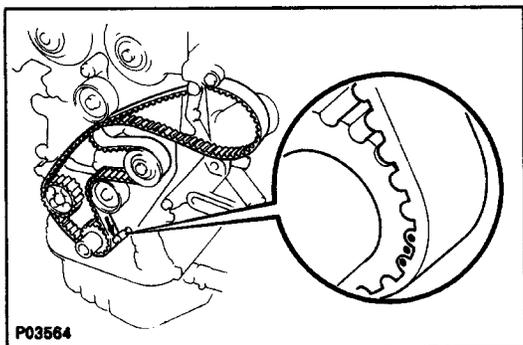
- (a) Apply adhesive to two or three threads of the pivot bolt.
- Adhesive: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent**
- (b) Install the plate washer and pulley with the pivot bolt.
- Torque: 52 N-m (530 kgf-cm, 38 ft-lbf)**
- (c) Check that the pulley bracket moves smoothly.

5. TEMPORARILY INSTALL TIMING BELT

NOTICE: The engine should be cold.

- (a) Using the crankshaft pulley bolt, turn the crankshaft and face the key groove of the crankshaft timing pulley upward.





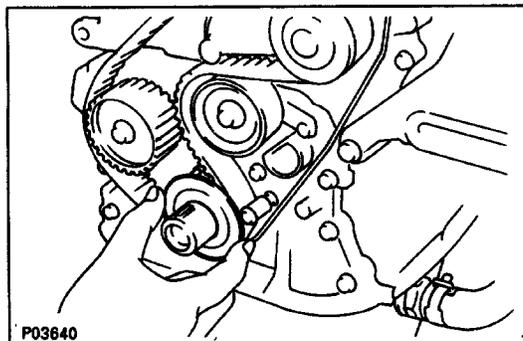
(b) Remove any oil or water on the crankshaft pulley, oil pump pulley, water pump pulley, No.1 idler pulley and No.2 idler pulley, and keep them clean.

(c) Install the timing belt on the crankshaft timing pulley, oil pump pulley, No.2 idler pulley, water pump pulley and No.1 idler pulley.

HINT (When re-using timing belt): Align the match-marks of the crankshaft timing pulley and timing belt, and install the belt with the arrow pointing in the direction of engine revolution.

6. INSTALL TIMING BELT GUIDE

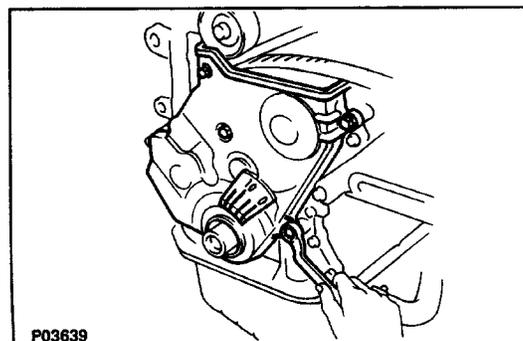
Install the guide, facing the cup side outward.



7. INSTALL NO.1 TIMING BELT COVER

(a) Install the gasket to the timing belt cover.

(b) Install the timing belt cover with the six bolts.



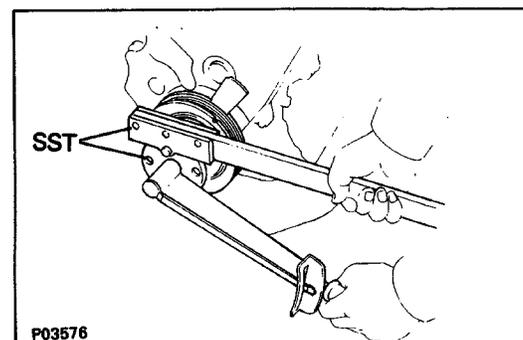
8. INSTALL CRANKSHAFT PULLEY

(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 bolt.

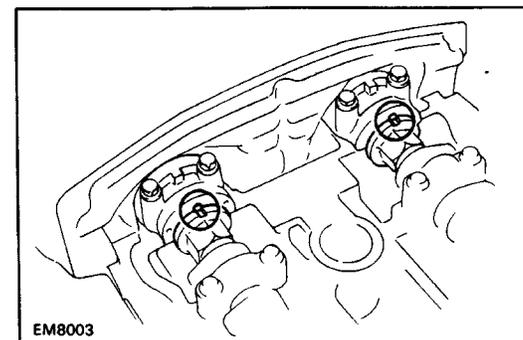
SST 09213-54015 (90119-08216) and 09330-00021

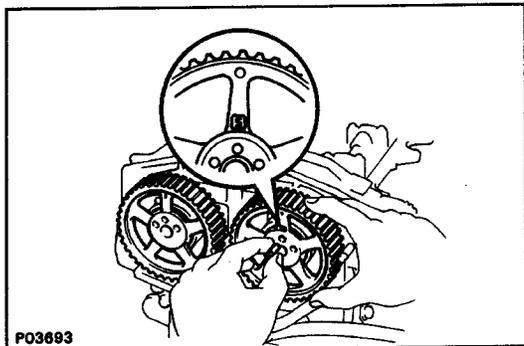
Torque: 108 N-m (1,100 kgf-cm, 80 ft-lbf)



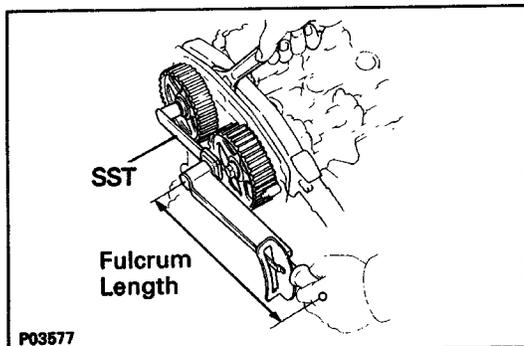
9. INSTALL CAMSHAFT TIMING PULLEYS

(a) Using a wrench, turn and align the groove of the camshaft with the drilled mark of the No.1 camshaft bearing cap.





- (b) Slide the timing pulley onto the camshaft, facing mark "S" upward.
- (c) Align the pin holes of the camshaft and timing pulley, and insert the knock pin.



- (d) Hold the hexagon wrench head portion of the camshaft with a wrench, and tighten the bolts.

Torque: 59 N-m (600 kgf-cm, 43 ft-1160

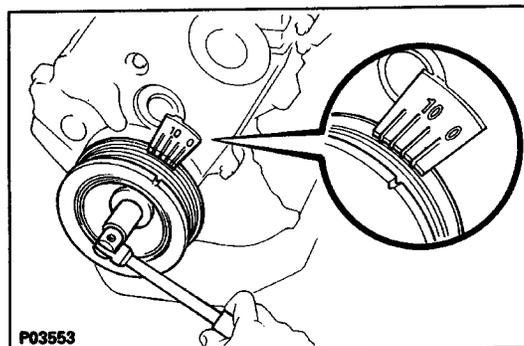
41 N-m (420 kgf-cm, 30 ft-1160

HINT (Intake camshaft timing, pulley):

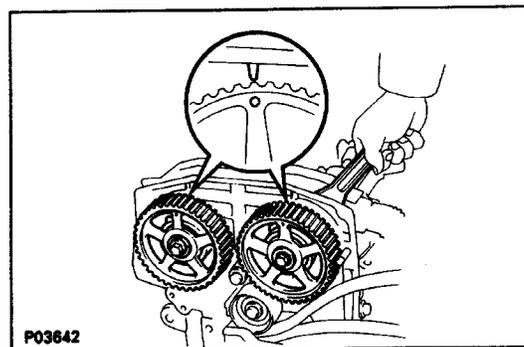
- Use SST.
SST 09249-63010
- Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).

10. SET NO.1 CYLINDER TO TDC/COMPRESSION

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



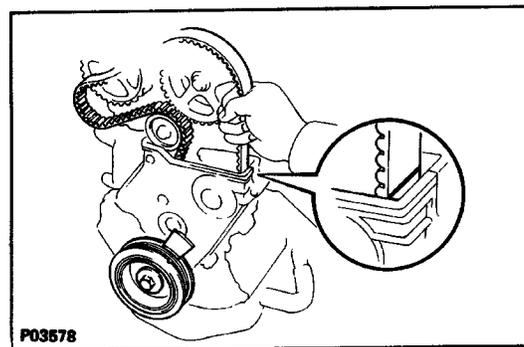
- (b) Turn the camshaft, and align the timing marks of the camshaft timing pulleys and No-3 timing belt cover.

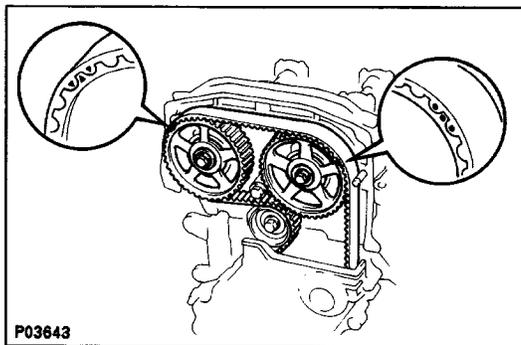


11. INSTALL TIMING BELT

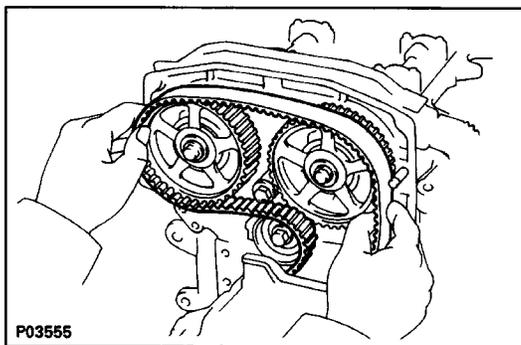
HINT (When re-using timing belt):

- Check that the matchmark
 - k on the timing belt matches the end of the No.1 timing belt cover.
- If the matchmark does not align, shift the meshing of the timing belt and crankshaft timing pulley until they align.
- (See page [EM-50](#))

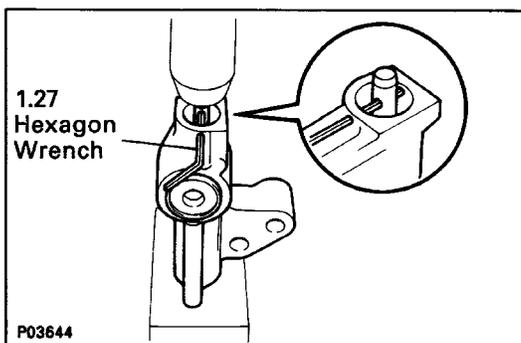




- Align the matchmarks of the timing belt and camshaft timing pulleys.

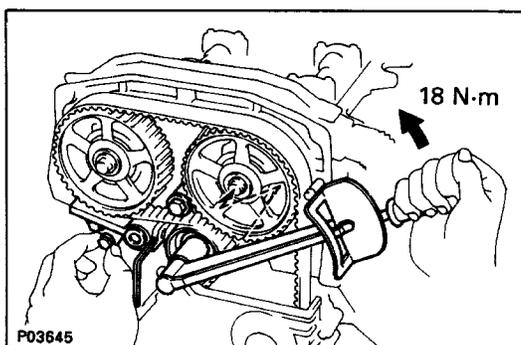


- Remove any oil or water on the camshaft timing pulley, and keep it clean.
- Install the timing belt, checking the tension between the crankshaft timing pulley and intake camshaft timing pulley.



12. SET TIMING BELT TENSIONER

- Using a press, slowly press in the push rod using 100–1,000 kg (220–2,205 lb, 981–9,807 N) 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.

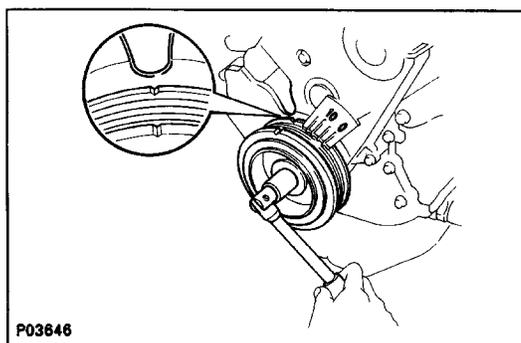


13. INSTALL TIMING BELT TENSIONER

- Turn the No.1 idler pulley bolt counterclockwise to obtain the specified torque toward the left as far as the No.1 idler pulley will go, and temporarily install the tensioner with the two bolts.

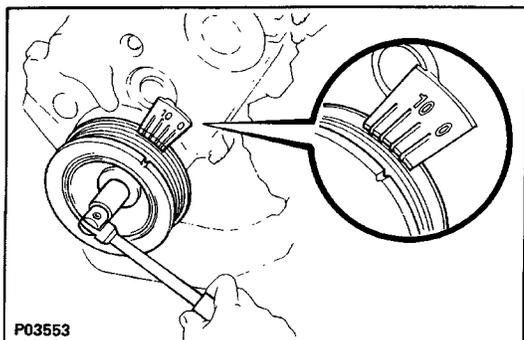
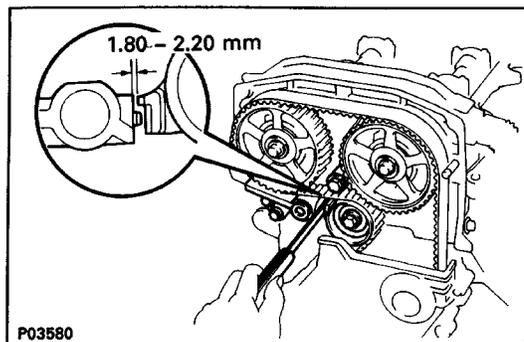
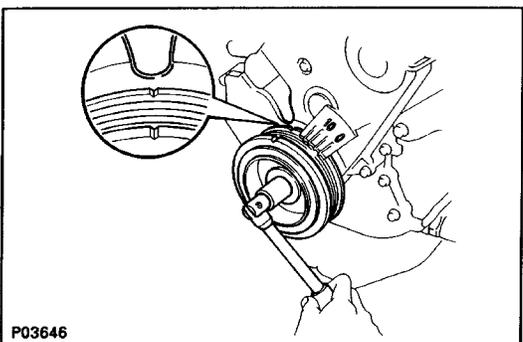
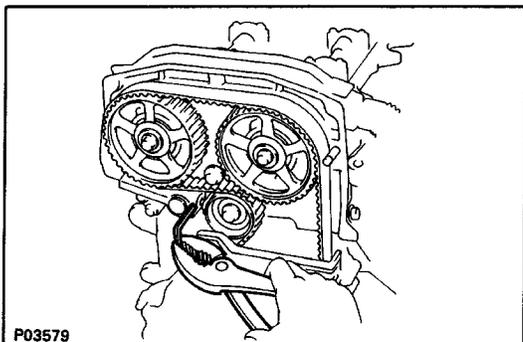
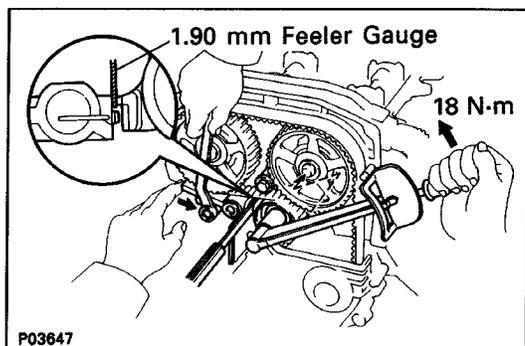
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

NOTICE: To apply the correct torque, apply the torque wrench along the axis through the bolts of the No-1 idler pulley and exhaust camshaft timing pulley.



- Slowly turn the crankshaft pulley 5/6 revolution, and align its groove with the ATDC 60° mark of the No.1 timing belt cover.

NOTICE: Always turn the crankshaft clockwise.



- (c) Insert a 1.90 mm (0.075 in.) feeler gauge between the tensioner body and No.1 idler pulley stopper.
 (d) Turn the No.1 idler pulley bolt counterclockwise to obtain the specified torque.

Torque: 18 N-m (180 kgf-cm, 13 ft-lbf)

NOTICE: To apply the correct torque, apply the torque wrench along the axis through the bolts of the No.1 idler pulley and exhaust camshaft timing pulley.

- (e) While pushing the tensioner, alternately tighten the two bolts.

Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)

- (f) Remove the 1.90 mm (0.075 in.) feeler gauge.
 (g) Remove the 1.27 mm hexagon wrench from the tensioner.

- (h) Slowly turn the crankshaft pulley one revolution, and align its groove with the ATDC 60° mark of the No.1 timing belt cover.

NOTICE: Always turn the crankshaft clockwise.

- (i) Using a feeler gauge, check the specified clearance between the tensioner body and No.1 idler pulley stopper.

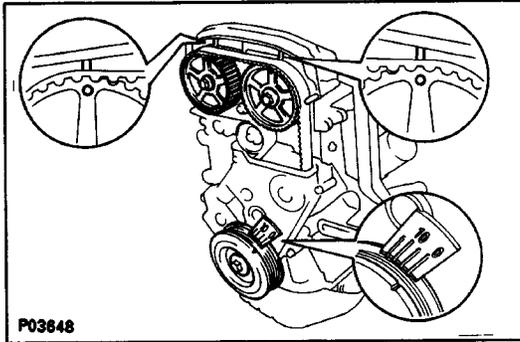
Clearance: 1.80-2.20 mm (0.071-0.087 in.)

If the clearance is not as specified, remove the tensioner and reinstall it.

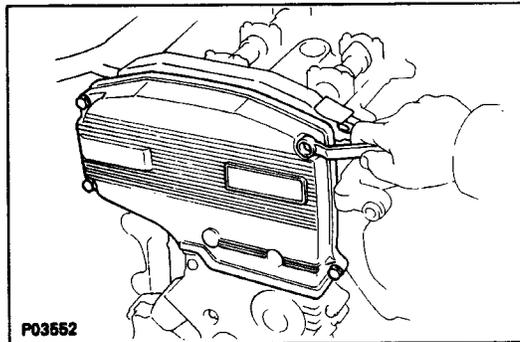
14. CHECK VALVE TIMING

- (a) Slowly turn the crankshaft pulley two revolutions from TDC to TDC.

NOTICE: Always turn the crankshaft clockwise.



- (b) Check that each pulley aligns with the timing marks as shown in the illustration.
If the marks do not align, remove the timing belt and reinstall it.



15. INSTALL NO.2 TIMING BELT COVER

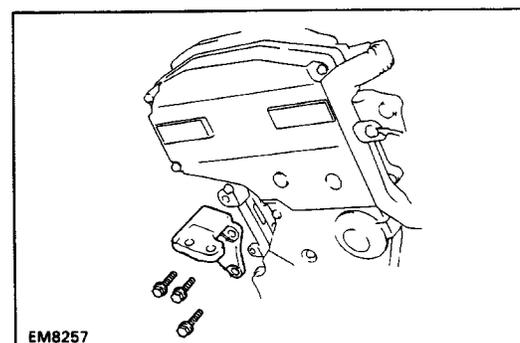
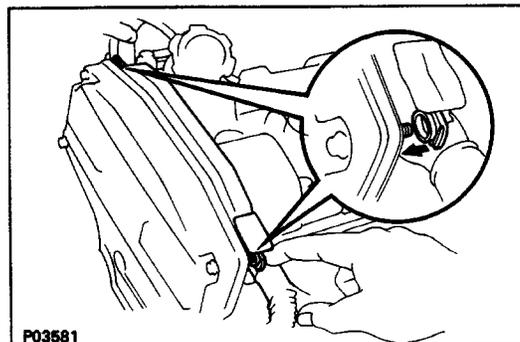
- (a) Install the gasket to the timing belt cover.
(b) Install the belt cover with the five bolts.

16. INSTALL SPARK PLUGS (See page IG-13)

Torque: 18 N-m (180 kgf-cm, 13 ft-lbf)

17. INSTALL CYLINDER HEAD COVER

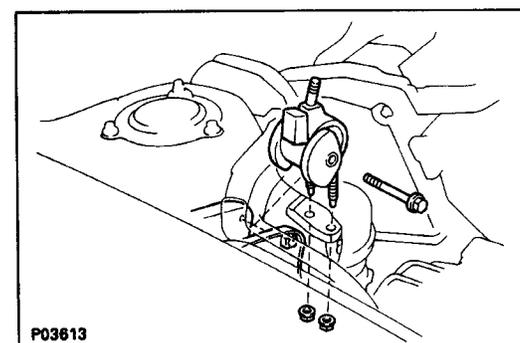
- (a) Install the cylinder head cover.
(See step 7 on pages EM-143 and 144)
(b) Install the engine wire protector between the cylinder head cover and No.3 timing belt cover.



18. INSTALL RH ENGINE MOUNTING BRACKET

Install the mounting bracket with the three bolts.

Torque: 52 N-m (530 kgf-cm, 38 ft-lbf)



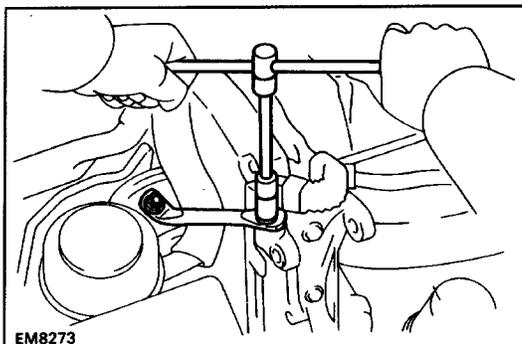
19. INSTALL RH ENGINE MOUNTING INSULATOR

Install the mounting insulator with the through bolt and two nuts.

Torque:

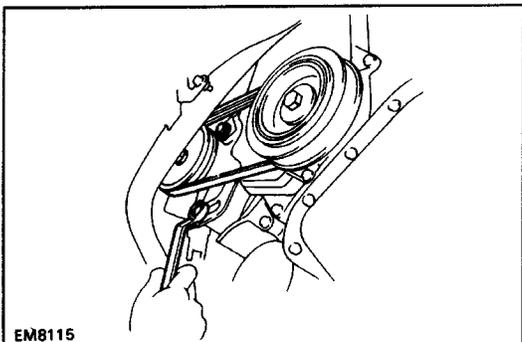
Nut 52 N-m (530 kgf-cm, 38 ft-lbf)

Through bolt 87 N-m (890 kgf-cm, 64 ft-lbf)

**20. INSTALL RH ENGINE MOUNTING STAY**

Install the mounting stay with the bolt and nut.

Torque: 73 N-m (740 kgf-cm, 54 ft-lbf)

**21. INSTALL PS DRIVE BELT**

Install the drive belt with the pivot bolt and adjusting bolt.

22. INSTALL THROTTLE BODY

(See steps 2, 3, 5 to 8, 10 and 11 on pages [FI-197](#) and [198](#))

23. INSTALL EGR VALVE AND PIPE

(See step 19 on page [EM-145](#))

24. INSTALL EGR VACUUM MODULATOR AND VSV

(See step 20 on page [EM-146](#))

25. INSTALL CHARGE AIR COOLER

(See steps 11 to 13 on page [TC-17](#))

26. INSTALL GENERATOR (See page [CH-23](#))**27. INSTALL RH ENGINE UNDER COVER****28. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY****29. CHECK AND ADJUST DRIVE BELTS**

(a) Adjust the generator drive belt.

Drive belt tension:

w/ A/C New belt 165 ± 10 lbf

Used belt 84 ± 15 lbf

w/o A/C New belt 150 ± 25 lbf

Used belt 130 ± 20 lbf

(b) Adjust the PS drive belt.

Drive belt tension: New belt 125 ± 25 lbf

Used belt 80 ± 20 lbf

30. INSTALL RH FRONT WHEEL

ADJUSTMENT OF VALVE TIMING

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

2. REMOVE RH FRONT WHEEL

3. REMOVE RH ENGINE UNDER COVER

4. REMOVE GENERATOR (See page CH-7)

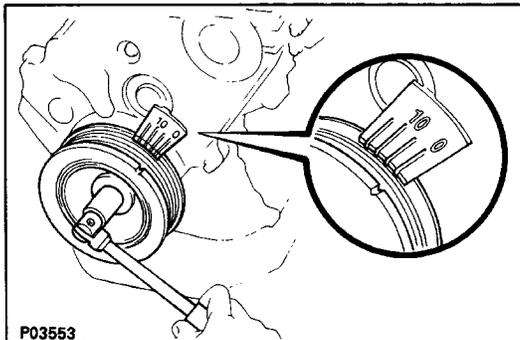
5. REMOVE CHARGE AIR COOLER

(See steps 13 to 15 on pages TC-9 and 10)

6. REMOVE SPARK PLUGS

7. REMOVE NO.2 TIMING BELT COVER

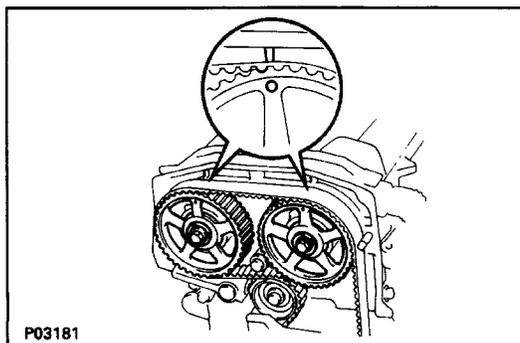
(See step 16 on page EM-48)



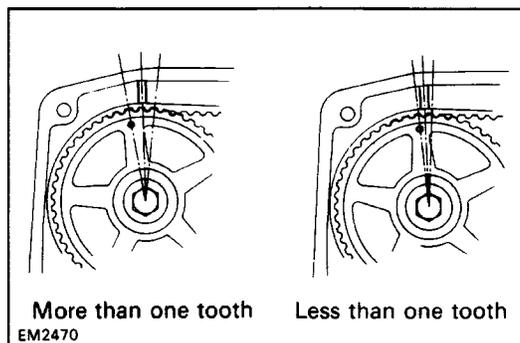
8. CHECK CAMSHAFT TIMING PULLEY MARKS

(a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the No.1 timing belt cover.

NOTICE: Always turn the crankshaft clockwise.



(b) Check that the timing marks of the camshaft timing pulleys are aligned with the timing mark of the No.3 timing belt cover.



- If there is more than one timing pulley tooth between the timing marks, realign the timing marks in accordance with step 13.
- If the timing marks are aligned or the difference is less than one timing pulley tooth, proceed to step 14.

9. REMOVE EGR VACUUM MODULATOR AND VSV

(See step 20 on page EM-121)

10. REMOVE EGR VALVE AND PIPE

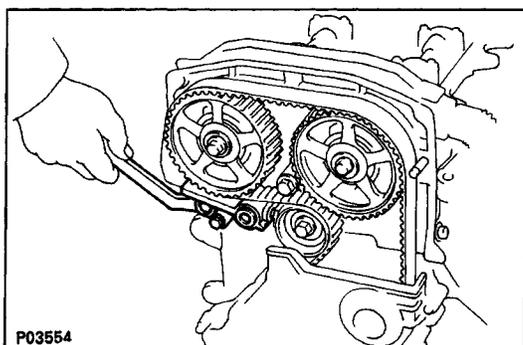
(See step 21 on page EM-121)

11. REMOVE THROTTLE BODY

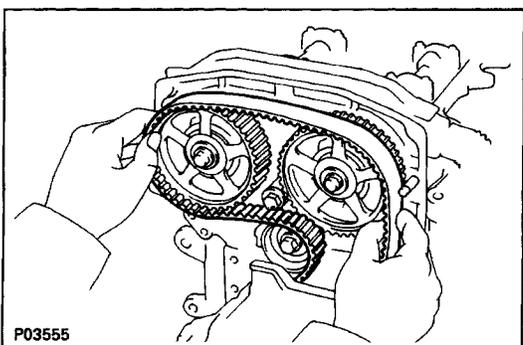
(See steps 2, 3, 5 to 8, 10 and 11 on pages FI-194 and 195)

12. REMOVE CYLINDER HEAD COVER

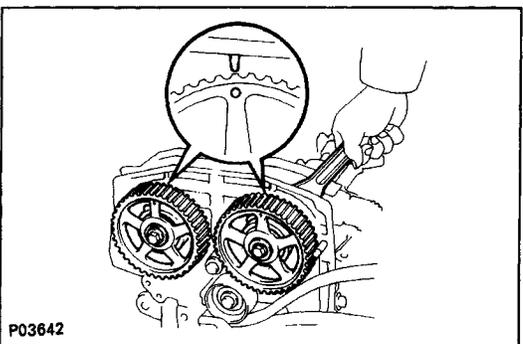
(See step 33 on page EM-124)

**13. ADJUST CAMSHAFT TIMING PULLEY TIMING MARKS**

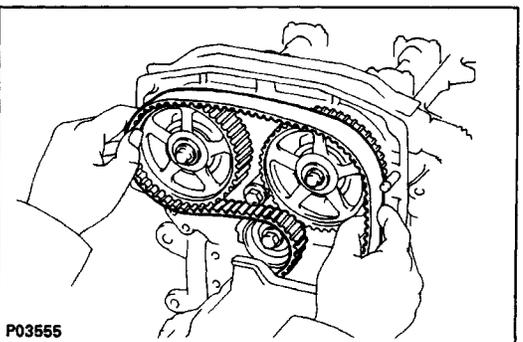
(a) Remove the two bolts and timing belt tensioner.



(b) Remove the timing belt from the camshaft timing pulleys.

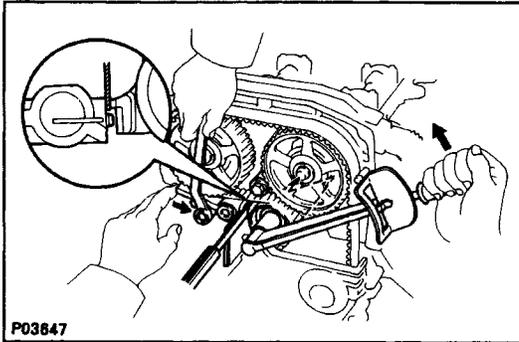


(c) Rotate the camshaft with a wrench and align the alignment marks of the camshaft timing pulley and No.3 timing belt cover.

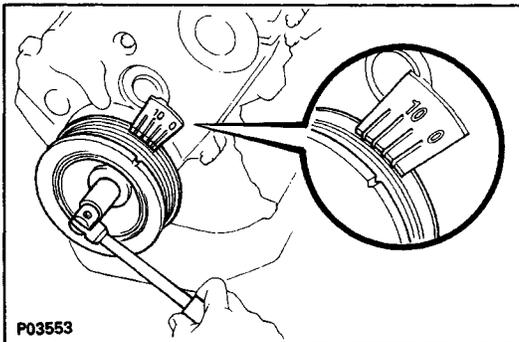


(d) Reinstall the timing belt, checking the tension between the crankshaft timing pulley and intake camshaft timing pulley.

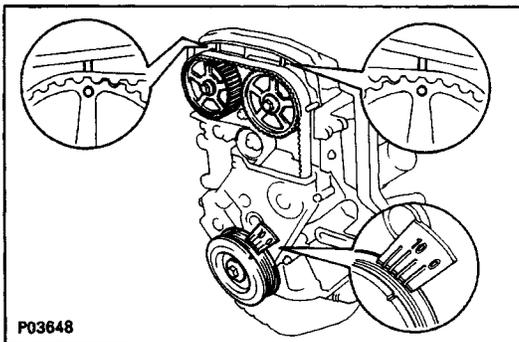
NOTICE: Install the timing belt when the engine is cold.



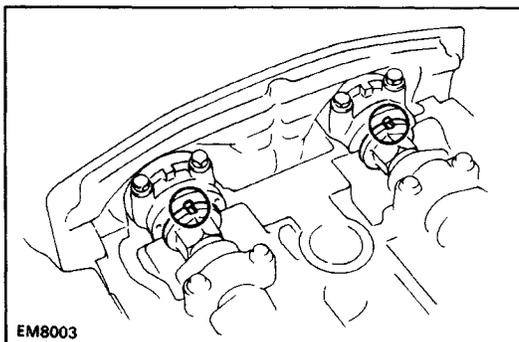
- (e) Install the timing belt tension with the two bolts.
 (See steps 12 and 13 on page [EM-58](#))
Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)



- (f) Turn the crankshaft pulley two revolutions from TDC to TDC.
NOTICE: Always turn the crankshaft clockwise.



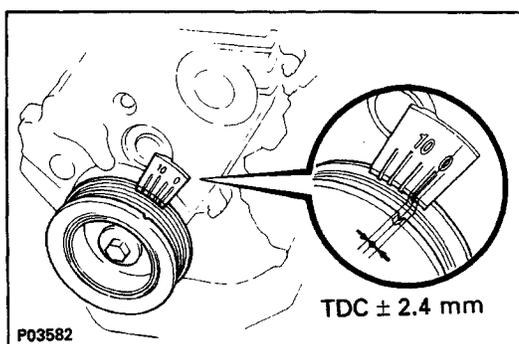
- (g) Check that each pulley aligns with the timing marks as shown in the illustration.



14. CHECK VALVE TIMING

- (a) Using a wrench, turn and align the groove of the camshaft with the drilled mark of the No.1 camshaft bearing cap.

NOTICE: Always turn the crankshaft clockwise.



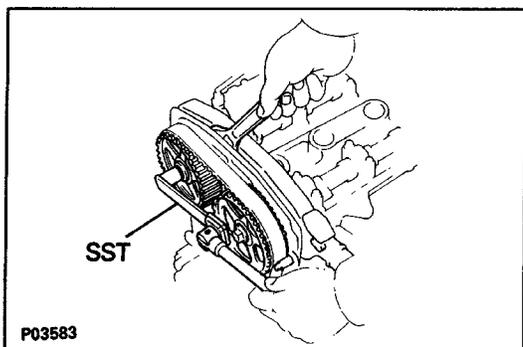
- (b) Next make a note of the crankshaft pulley angle on the No.1 timing belt cover.
 HINT: Perform this check separately for the intake and exhaust sides.
 If the crankshaft pulley movement is within + 2.4 mm (0.094 in.) of TDC, it is correct.
 If it is greater than 2.4 mm (0.094 in.), go back to step 11.

15. ADJUST VALVE TIMING

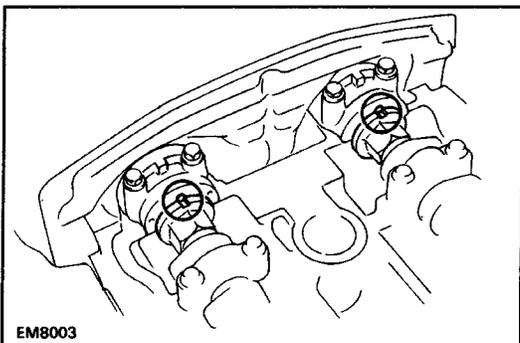
- (a) Hold the hexagon wrench head portion of the camshaft with a wrench, and remove the two camshaft timing pulley bolts.

HINT (Intake camshaft timing pulley): Use SST.
SST 09249-63010

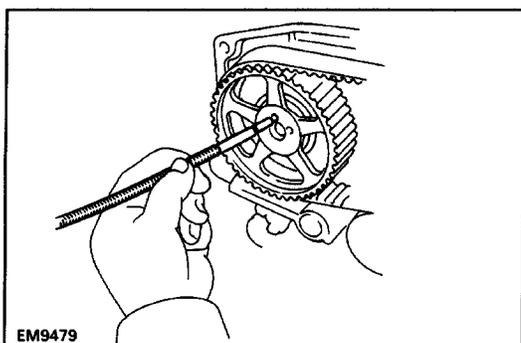
NOTICE: Do not make use of the timing belt tension when loosening the pulley bolts.



- (b) Check that the camshaft grooves are aligned with the drilled mark of the No.1 camshaft bearing cap.

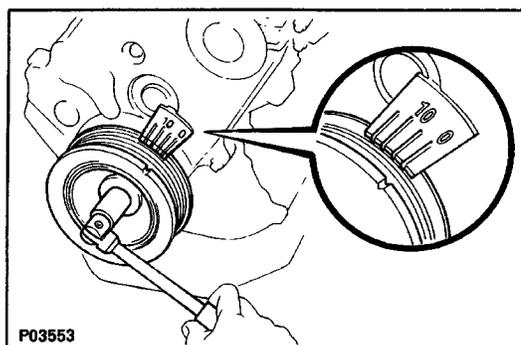


- (c) Using a magnetic finger, remove the knock pin from the pin hole of the camshaft timing pulley.



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

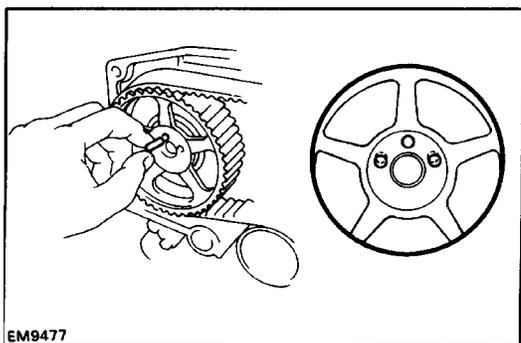
NOTICE: Always turn the crankshaft clockwise.

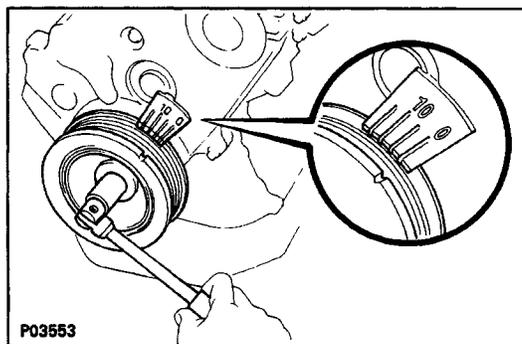
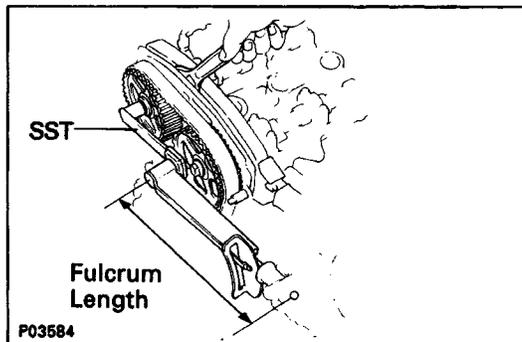


- (e) Select one overlapped hole of the camshaft and timing pulley, and insert the match pin into it.

HINT:

- If there is not an overlapped hole, rotate the crankshaft a little and insert the pin into the nearly overlapped hole.
- By changing the pin hole to the next one, the crankshaft pulley angle can be adjusted by approx. 2°.
- By changing the pin hole to the next two, the crankshaft pulley angle can be adjusted by approx. 5°.





(f) Hold the hexagon wrench head portion of the camshaft with a wrench, and install the pulley bolt.

Torque: 59 N-m (600 kgf-cm, 43 ft-lbf)

41 N-m (420 kgf-cm, 30 ft-1160 for SST)

HINT (Intake camshaft timing pulley):

- Use SST.
SST 09249-63010
- Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).

NOTICE: Do not make use of the timing belt tension when tightening the bolt.

(g) Turn the crankshaft clockwise two revolutions from TDC to TDC.

(h) Recheck the valve timing.

(See step 14 on page [EM-64](#))

16. REINSTALL NO.2 TIMING BELT COVER

(See step 15 on page [EM-60](#))

17. REINSTALL SPARK PLUGS (See page [IG-13](#))

Torque: 180 kg-cm (13 ft-lb, 18 N-m)

18. REINSTALL CYLINDER HEAD COVER

(See step 7 on pages [EM-143](#) and 144)

19. REINSTALL THROTTLE BODY

(See steps 2, 3, 5 to 8, 10 and 11 on pages [FI-197](#) and 198)

20. REINSTALL EGR VALVE AND PIPE

(See step 19 on page [EM-145](#))

21. REINSTALL EGR VACUUM MODULATOR AND VSV

(See step 20 on page [EM-146](#))

22. REINSTALL CHARGE AIR COOLER

(See steps 11 to 13 on page [TC-17](#))

23. REINSTALL GENERATOR (See page [CH-23](#))

24. REINSTALL RH ENGINE UNDER COVER

25. REINSTALL RH FRONT WHEEL

26. RECONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY