1411A–01

REPLACEMENT

1. **REMOVE ENGINE UNDER COVER SUB–ASSY NO.1**
2. **DRAIN ENGINE COOLANT (See page 16–18)**
3. **REMOVE AIR CLEANER ASSY (See page 14–91)**
4. **REMOVE RADIATOR SUPPORT SEAL UPPER**
5. **REMOVE RADIATOR HOSE NO.1**
6. **REMOVE VANE PUMP V BELT (See page 14–77)**
7. **REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (W/ AIR CONDITIONING) (See page 14–77)**
8. **REMOVE FAN AND GENERATOR V BELT (W/O AIR CONDITIONING) (See page 14–77)**

HINT:

Loosen the 4 fan pulley nuts.

9. **REMOVE FAN AND GENERATOR V BELT (W/ AIR CONDITIONING) (See page 14–77)**

HINT:

Loosen the 4 fan pulley nuts.

10. **REMOVE FLUID COUPLING ASSY**

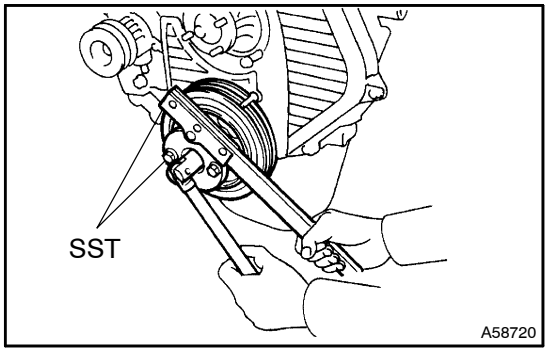
(a) Remove the 4 pulley nuts, the fan, fluid coupling and fan pulley.

11. **REMOVE FAN SHROUD**
12. **REMOVE IDLE PULLEY BRACKET (W/ AIR CONDITIONING)**
13. **SEPARATE COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING) (See page 14–91)**
14. **REMOVE COMPRESSOR MOUNTING BRACKET NO.1 (W/ AIR CONDITIONING)**
15. **REMOVE VANE PUMP DRIVE PULLEY (W/O AIR CONDITIONING)**

(a) Remove the 4 bolts, vane pump drive pulley and the vane pump drive pulley spacer.

16. **REMOVE VANE PUMP DRIVE PULLEY (W/ AIR CONDITIONING)**

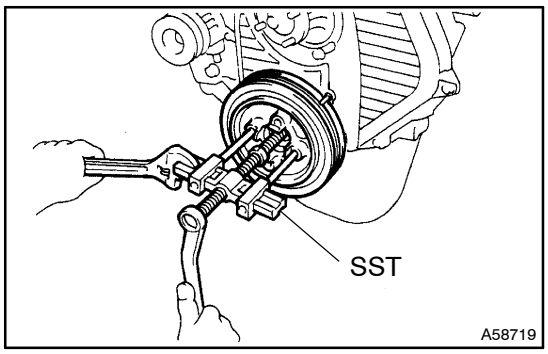
(a) Remove the 4 bolts, vane pump drive pulley and the crankshaft pulley No.2.



17. **REMOVE CRANKSHAFT PULLEY**

(a) Using SST, remove the pulley bolt.

SST 09213–54015 (91651–60855), 09330–00021,



(b) Using SST, remove the pulley.

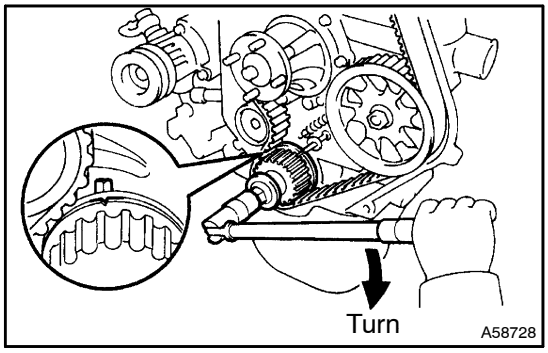
SST 09950–50013 (09951–05010, 09952–05010, 09953–05010, 09953–05020, 09954–05030)

18. REMOVE RADIATOR HOSE HOSE CLAMP

19. REMOVE TIMING CHAIN OR BELT COVER SUB–ASSY

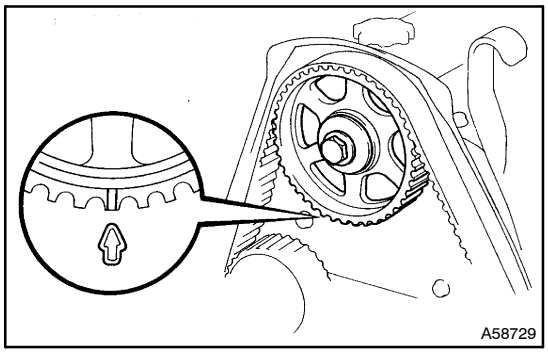
(a) Remove the 11 bolts, washers, timing belt cover and 2 gaskets.

20. REMOVE TIMING BELT GUIDE

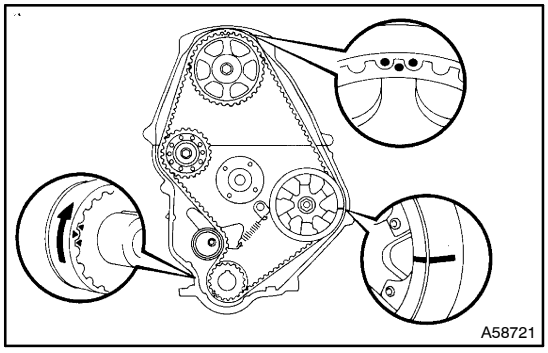


21. SET NO. 1 CYLINDER TO TDC/COMPRESSION

(a) Using the crankshaft pulley bolt, align its groove with the timing pointer by turning the crankshaft clockwise.

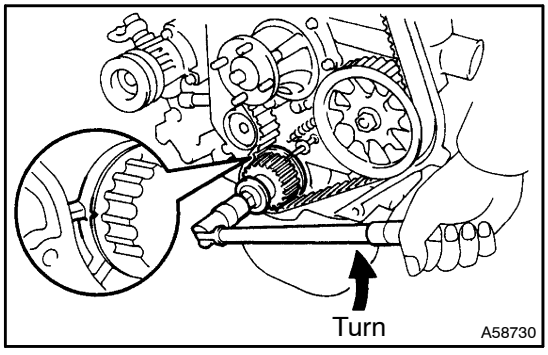


(b) Check that timing marks of the camshaft timing pulley and No.2 timing belt cover are aligned.
If not, turn the crankshaft 1 revolution (360°).



22. REMOVE TIMING BELT

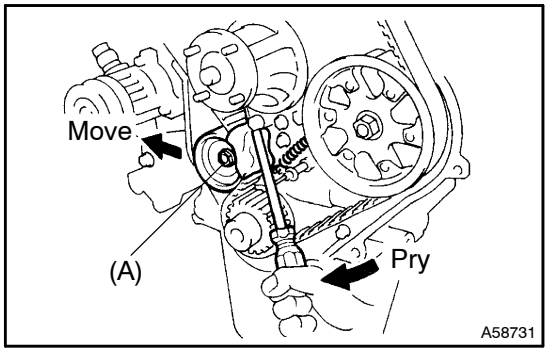
HINT:
If re–using the timing belt, draw a direction arrow on the timing belt (in direction of engine revolution), and place matchmarks on the pulleys and timing belt.



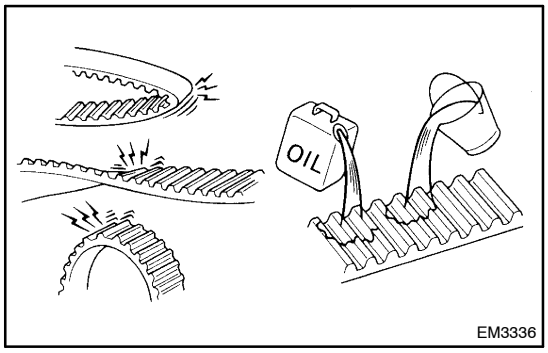
(a) Turn the crankshaft 90° counterclockwise, and put the timing mark of the crankshaft timing pulley with the protrusion of the timing gear case.

NOTICE:

If the timing belt is disengaged, having the crankshaft timing 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, causing damage. So always set the crankshaft pulley at the correct angle.



(b) Loosen the timing belt idler No.1 bolt (A), and shift left as far as it will go.
(c) Temporarily tighten the pulley bolt (A), and then relieve the timing belt tension.
(d) Remove the timing belt.



23. INSPECT TIMING BELT

NOTICE:

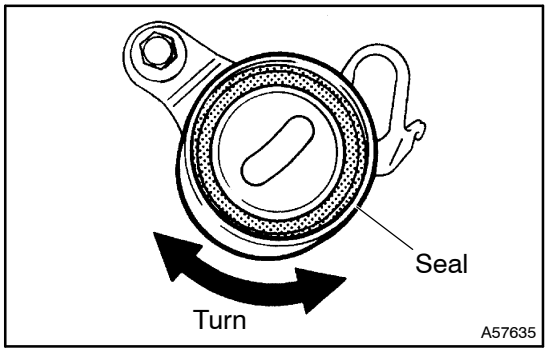
- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow the timing belt to come into contact with oil, water or steam.**
- **Do not utilize timing belt tension when installing or re moving the mount bolt of the camshaft timing pulley.**

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

(a) If there is 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.
- Check gasket has been installed correctly.
- Check for foreign material on the pulley teeth.

If necessary, replace the timing belt.



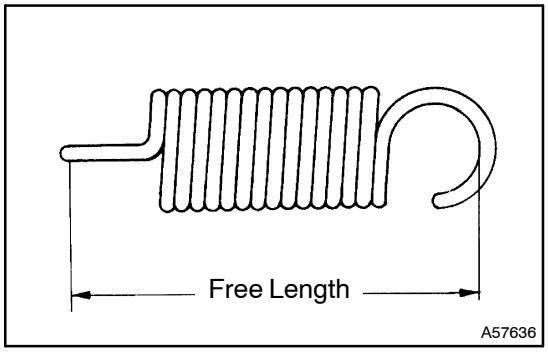
24. INSPECT TIMING BELT IDLER SUB–ASSY NO.1

(a) Visually check the seal portion of the timing belt idler No.1 for oil leakage.

If leakage is found, replace the timing belt idler No.1.

(b) Check that the timing belt idler No.1 turns smoothly.

If necessary, replace the timing belt idler No.1.



25. INSPECT IDLER TENSION SPRING

(a) Measure the free length of tension spring.

Free length: 44.4 – 45.4 mm (1.748 – 1.787 in.)

If the free length is not as specified, replace the tension spring.

(b) Measure the tension of the tension spring at the specified installed length.

Installed tension:
53 – 59 N (5.42 – 5.98 kgf, 11.9 – 13.2 lbf)
at 52.1 mm (2.051 in.)

If the installed tension is not as specified, replace the tension-spring.

26. INSPECT WATER PUMP ASSY

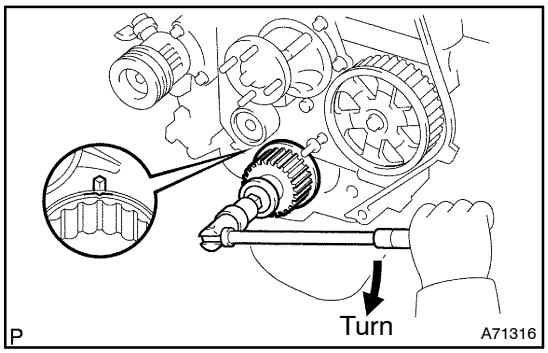
(a) Visually check air holes for coolant leakage.

If leakage is found, replace the water pump.

If engine coolant has leaked onto the timing belt, replace the timing belt.

(b) Turn the pulley and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.

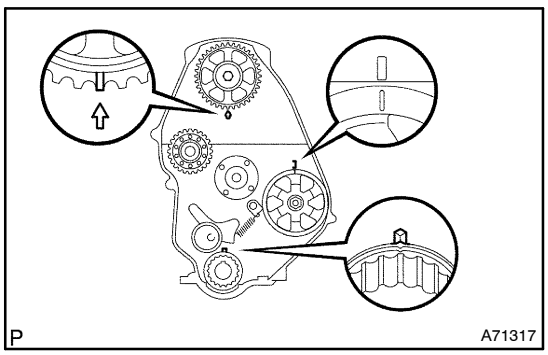


27. SET NO. 1 CYLINDER TO TDC/COMPRESSION

(a) Using the crankshaft pulley bolt, align its groove with the timing pointer by turning the crankshaft clockwise.

NOTICE:

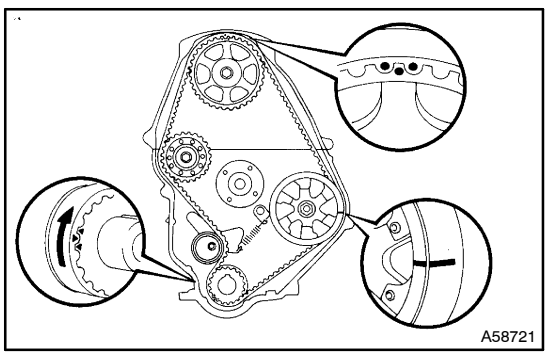
Do not turn the crankshaft pulley counterclockwise.



(b) Set the timing and drive pulleys at each position.

NOTICE:

- **The engine should be cold.**
- **When turning the crankshaft or camshaft, the valve heads will hit against the piston top so do not turn them move than necessary.**



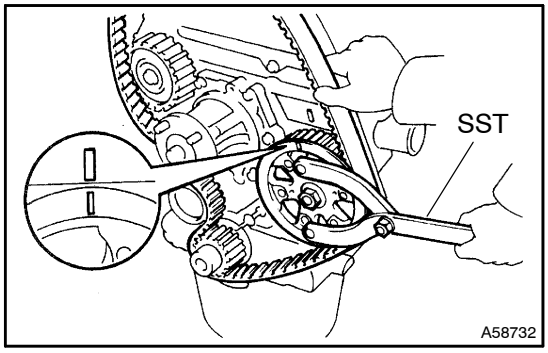
28. INSTALL TIMING BELT

HINT:

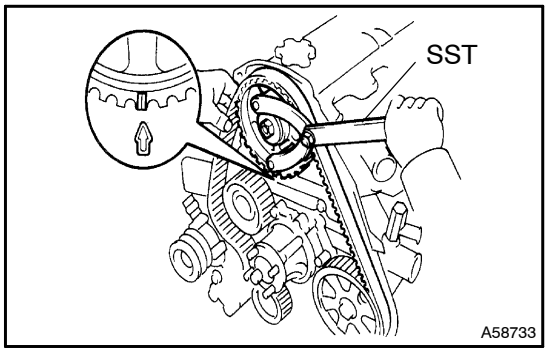
If re–using the timing belt, align the points marked during removal, and install the timing belt with the arrow pointing in the direction of engine revolution.

(a) Remove any oil or water on each pulleys, and keep them clean.

(b) Install the timing belt on the crankshaft timing and timing belt idlers.



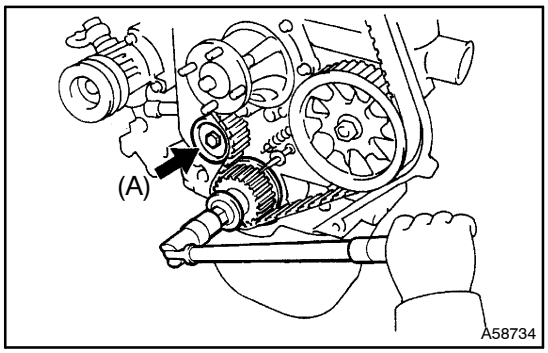
(c) Using SST, slightly turn the injection pump drive pulley clockwise. Hang the timing belt on the drive pulley, and align the timing marks of the drive pulley and timing belt case.
SST 09960–10010 (09962–01000, 09963–01000)



(d) Using SST, Slightly turn the camshaft timing pulley clockwise. Hang the timing belt on the timing pulley, and align the timing marks of the timing pulley and timing belt case.
SST 09960–10010 (09962–01000, 09963–01000)

(e) Check that the timing belt has tension between the injection pump drive and camshaft timing pulleys.

(f) Install the timing belt on the timing belt idler No.2.

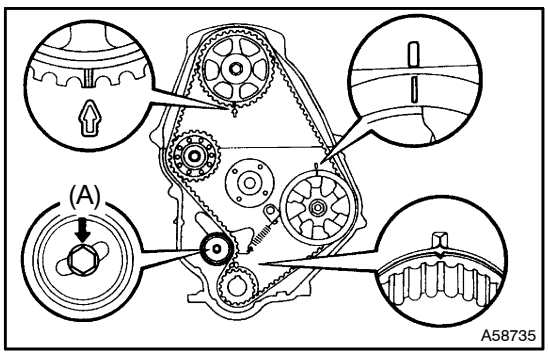


29. CHECK VALVE TIMING

(a) Loosen the timing belt idler No.1 bolt (A), and stretch the timing belt.

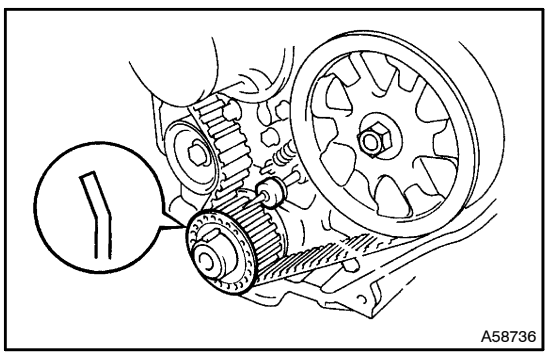
(b) Slowly the crankshaft pulley 2 revolutions from TDC to TDC.

NOTICE:
Always turn the crankshaft clockwise.



(c) 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.

(d) Tighten the timing belt idler No.1 bolt (A).
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)



30. INSTALL TIMING BELT GUIDE

(a) Install the belt guide, facing the cup side outward.

31. INSTALL TIMING CHAIN OR BELT COVER SUB–ASSY

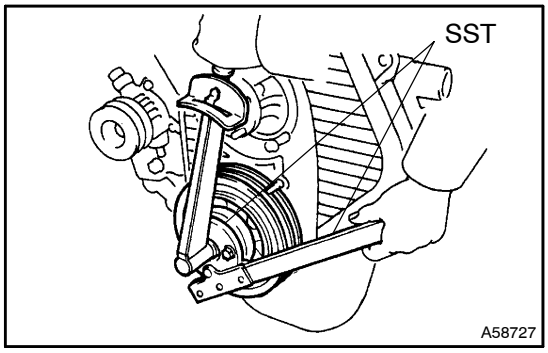
(a) Install the 2 gaskets to the timing belt cover.

(b) Install the timing belt cover with the 11 bolts.

Torque: 11 N·m (105 kgf·cm, 8 ft·lbf)

32. INSTALL RADIATOR HOSE HOSE CLAMP

Torque: 6.5 N·m (66 kgf·cm, 58 in·lbf)



33. INSTALL CRANKSHAFT PULLEY

(a) Align the pulley set key with the key groove of the pulley, and slide the pulley to the crankshaft.

(b) Using SST, install the pulley bolt.

SST 09213–54015 (91651–60855), 09330–00021

Torque: 235 N·m (2,400 kgf·cm, 173 ft·lbf)

34. INSTALL VANE PUMP DRIVE PULLEY (W/O AIR CONDITIONING)

(a) Install the vane pump drive pulley and vane pump pulley spacer with the 4 bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

35. INSTALL VANE PUMP DRIVE PULLEY (W/ AIR CONDITIONING)

(a) Install the vane pump drive pulley and crankshaft pulley No.2 with the 4 bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

36. INSTALL COMPRESSOR MOUNTING BRACKET NO.1 (W/ AIR CONDITIONING) (See page 14–91)

37. INSTALL COMPRESSOR AND MAGNETIC CLUTCH (W/ AIR CONDITIONING) (See page 14–91)

38. INSTALL IDLE PULLEY BRACKET (W/ AIR CONDITIONING) (See page 14–91)

39. INSTALL FAN SHROUD (See page 16–20)

40. TEMPORARILY TIGHTEN FLUID COUPLING ASSY

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

41. INSTALL FAN AND GENERATOR V BELT (W/O AIR CONDITIONING) (See page 14–77)

42. INSTALL FAN AND GENERATOR V BELT (W/ AIR CONDITIONING) (See page 14–77)

43. TIGHTEN FLUID COUPLING ASSY

Torque: 19 N·m (185 kgf·cm, 14 ft·lbf)

44. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (W/ AIR CONDITIONING) (See page 14–77)

45. INSTALL VANE PUMP V BELT (See page 14–77)

46. INSTALL AIR CLEANER ASSY (See page 14–91)

47. ADD ENGINE COOLANT (See page 16–18)

48. CHECK FOR ENGINE COOLANT LEAKS (See page 16–18)

49. INSTALL ENGINE UNDER COVER SUB–ASSY NO.1 (See page 14–91)