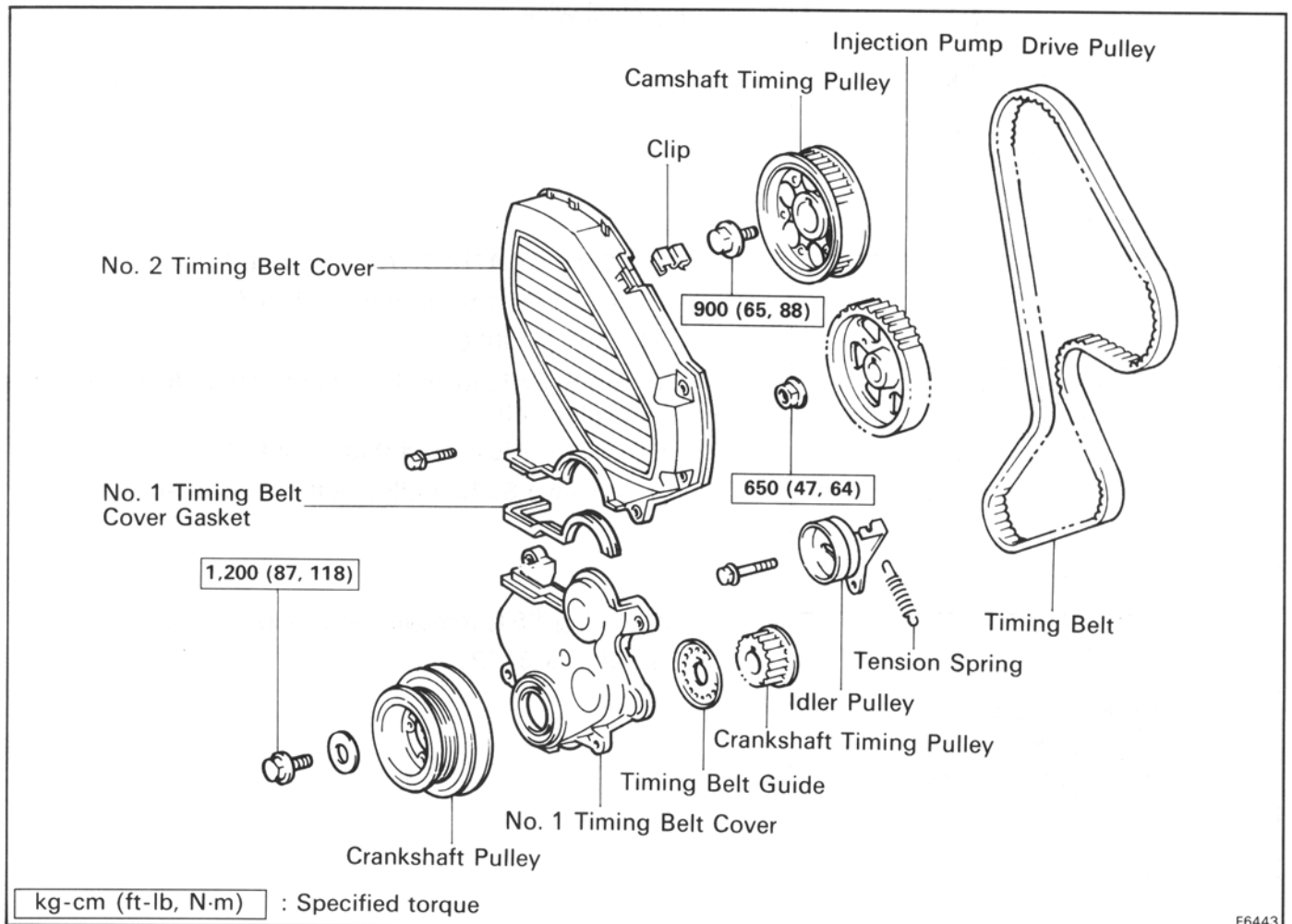
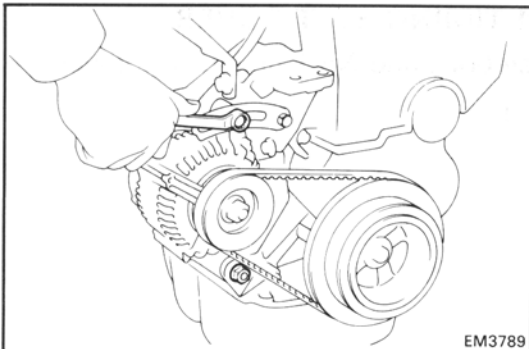


TIMING BELT COMPONENTS

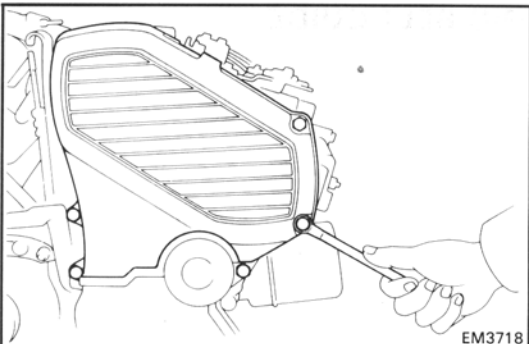


F6443



REMOVAL OF TIMING BELT

1. REMOVE DRIVE BELT

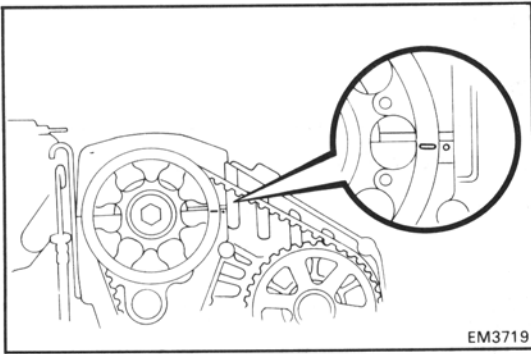


2. REMOVE NO.2 TIMING BELT COVER

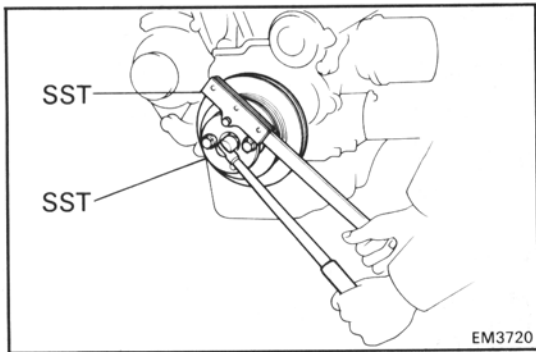
Remove the clip, five bolts and the No.2 timing belt cover with the gasket.

3. REMOVE GLOW PLUGS (See step 8 on pages EM-42, 43)

NOTE: It is necessary to remove the glow plugs so that the crankshaft will turn smoothly and enable the belt to be adjusted properly.

**4. SET NO.1 CYLINDER AT TDC / COMPRESSION**

Align the line mark of the camshaft timing pulley with the cavity of the cylinder head by turning the crankshaft pulley clockwise.

**5. REMOVE CRANKSHAFT PULLEY**

(a) Install the SST to the crankshaft pulley.

SST 09213-70010

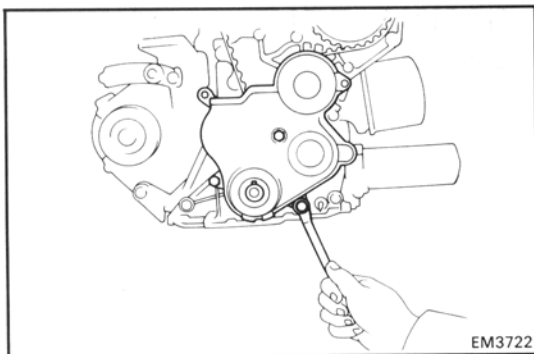
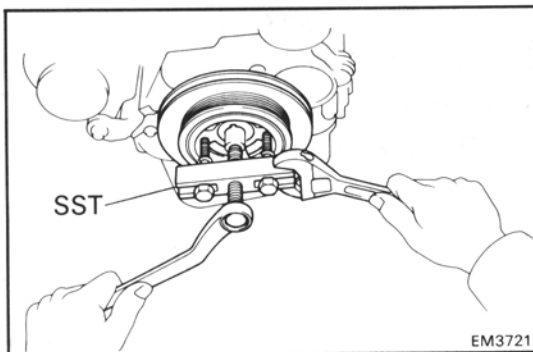
(b) Using SSTs to hold the crankshaft pulley, loosen the pulley bolt.

SST 09213-70010 and 09330-00021

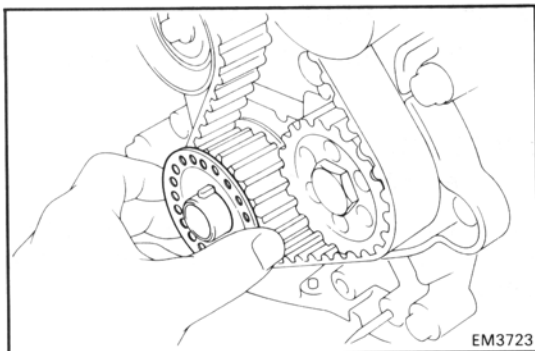
(c) Remove SSTs, pulley bolt and washer.

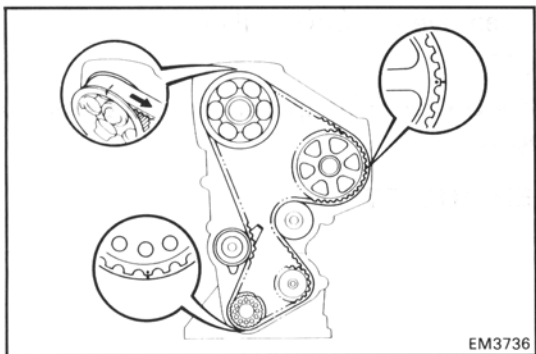
(d) Using SST, remove the crankshaft pulley.

SST 09213-31021

**6. REMOVE NO.1 TIMING BELT COVER**

Remove the three bolts and No.1 timing belt cover.

**7. REMOVE TIMING BELT GUIDE**



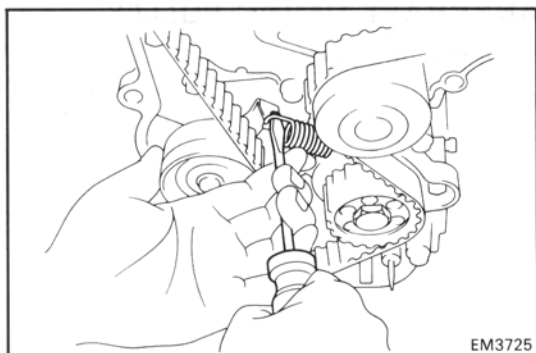
8. REMOVE TIMING BELT

NOTE: If reusing the timing belt, draw a direction arrow on the belt (in direction of engine revolution), and place matchmarks on the pulleys and timing belt.

- (a) Using a screwdriver, remove the tension spring.

CAUTION: Do not pinch the tension spring with pliers or such.

- (b) Loosen the idler pulley bolt.
(c) Remove the timing belt from each pulley.

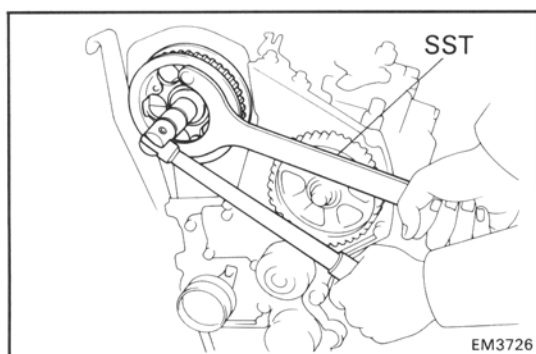


9. REMOVE CAMSHAFT TIMING PULLEY

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

SST 09278-54012

CAUTION: Avoid turning the camshaft or the valves will hit against the pistons.

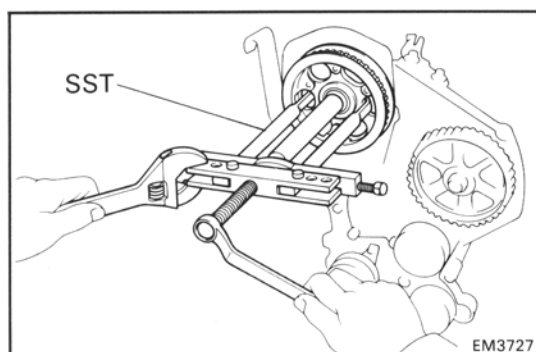


- (b) Using SST, remove the timing pulley.

SST 09950-20016

CAUTION: The pulley will spring out so be careful not let it fall.

- (c) Remove the woodruff key from the camshaft.

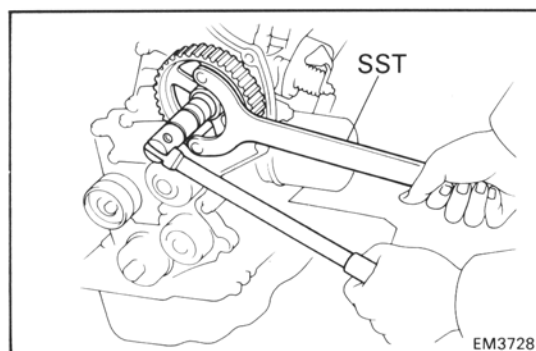


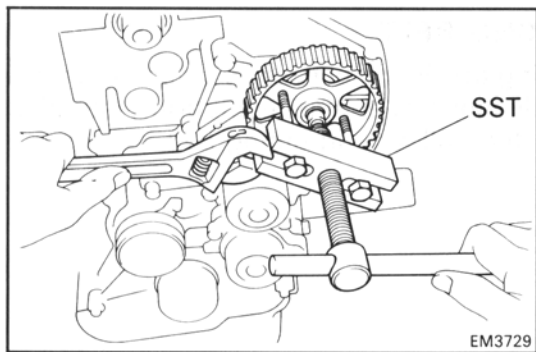
10. REMOVE INJECTION PUMP DRIVE PULLEY

- (a) Using SST to hold the drive pulley, remove the pulley nut.

SST 09278-54012

CAUTION: Do not use an impact wrench.



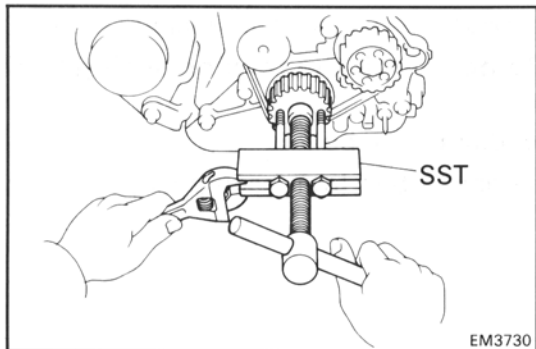


(b) Using SST, remove the drive pulley.

SST 09213-60017

CAUTION: The pulley will spring out so be careful not to drop it.

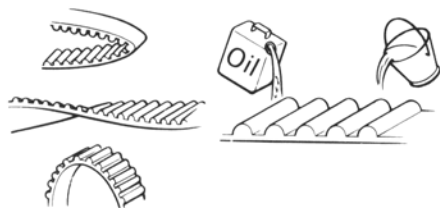
11. REMOVE IDLER PULLEY



12. REMOVE CRANKSHAFT TIMING PULLEY

Using SST, remove the timing pulley.

SST 09213-60017

NO !

EM0126

INSPECTION OF COMPONENTS

1. INSPECT TIMING BELT

CAUTION:

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

If there are defects as shown in the figures, check the following points and replace the timing belt if necessary.

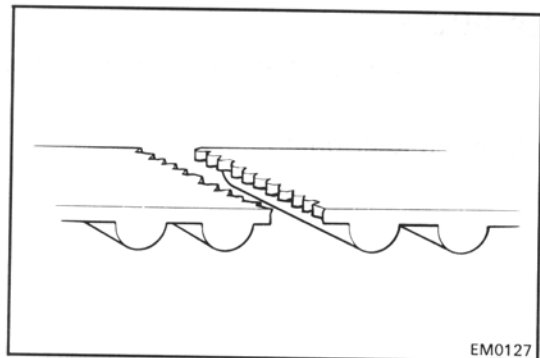
(a) Premature parting

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

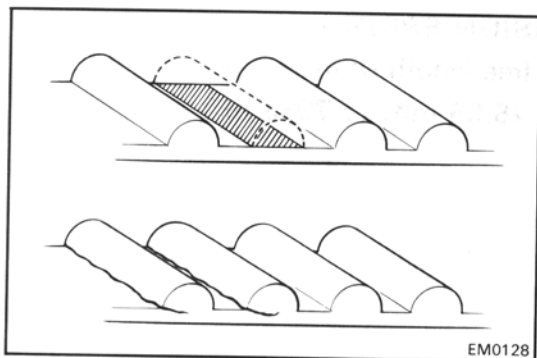
- (b) If the belt teeth are cracked or damaged, check to see if the camshaft, water pump or oil pump is locked.

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

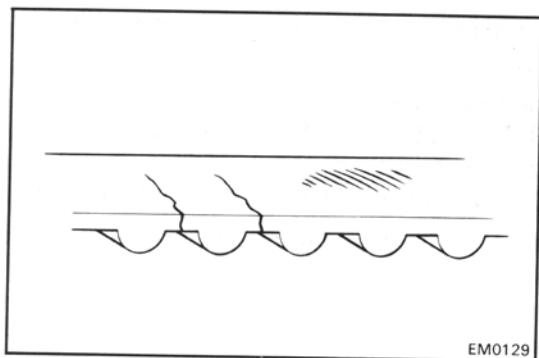
- (d) If there is wear or damage on only one side of the belt, check the best guide and the alignment of each pulley.



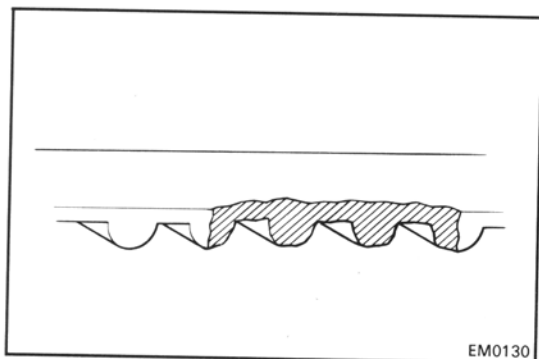
EM0127



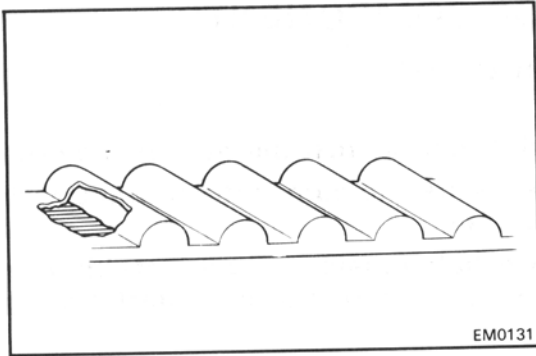
EM0128



EM0129



EM0130

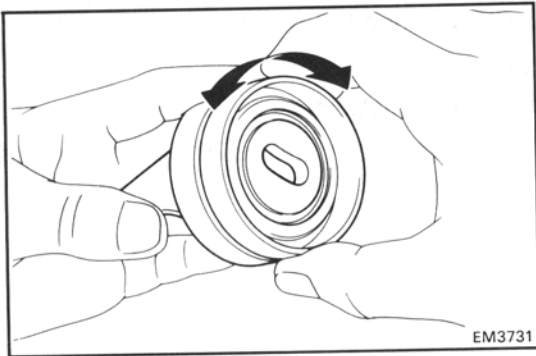


- (e) If there is noticeable wear on the belt teeth, check the timing cover gasket for damage and proper installation. Check for foreign material on the pulley teeth.

2. INSPECT IDLER PULLEY

Check the turning smoothness of the timing belt idler pulley.

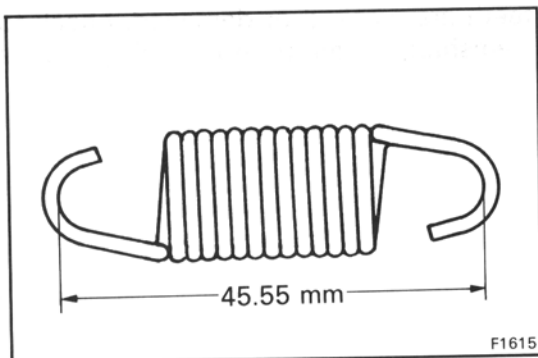
If necessary, replace the idler pulley.



3. INSPECT TENSION SPRING

- (a) Check the free length of the spring.

Free length: 45.55 mm (1.7933 in.)



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

Standard installed tension:

6.0 kg (13.2 lb, 59 N) at 52.7 mm (2.07 in.)

Minimum installed tension:

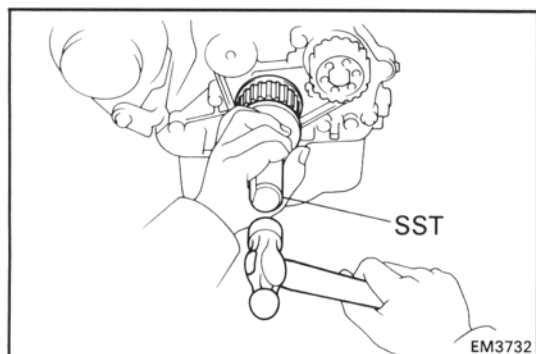
5.4 kg (11.9 lb, 53 N) at 52.7 mm (2.07 in.)

If the installed tension is less than minimum, replace the tension spring.

INSTALLATION OF TIMING BELT

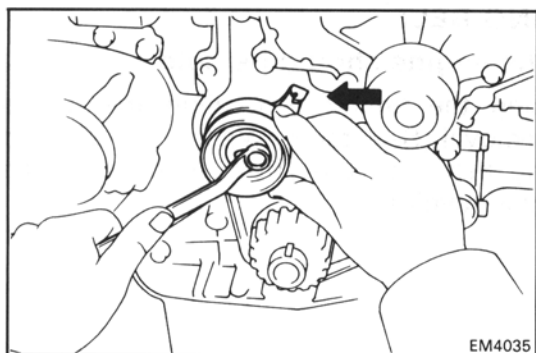
(See page EM-25)

NOTE: Remove any oil or water on the timing pulleys and keep it clean.



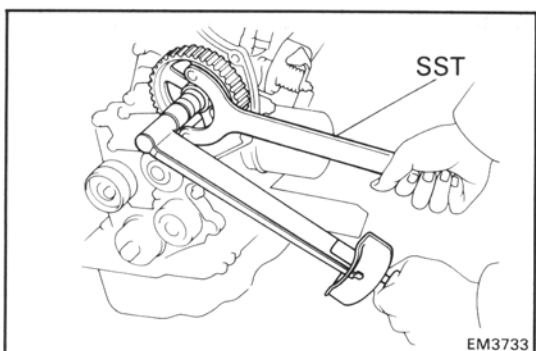
1. INSTALL CRANKSHAFT TIMING PULLEY

- (a) Align the woodruff key groove of the timing pulley with the woodruff key on the crankshaft.
- (b) Using SST and a hammer, drive in the timing pulley.
SST 09214-60010



2. INSTALL IDLER PULLEY

- (a) Install the idler pulley.
- (b) Pry the idler pulley toward the left as far as it will go and temporarily tighten it.



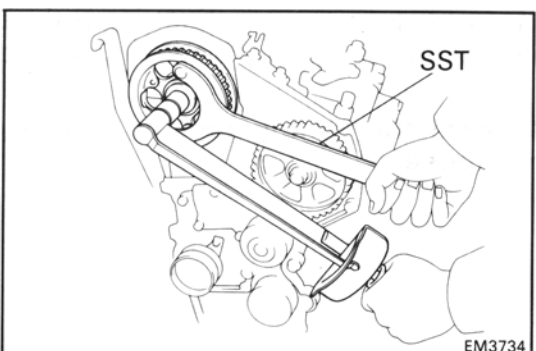
3. INSTALL INJECTION PUMP DRIVE PULLEY

- (a) Align the woodruff key groove of the drive pulley with the woodruff key on the drive shaft.
- (b) Using SST to hold the drive pulley, install and torque the pulley nut.

SST 09278-54012

Torque: 650 kg-cm (47 ft-lb, 64 N·m)

CAUTION: Do not use an impact wrench.



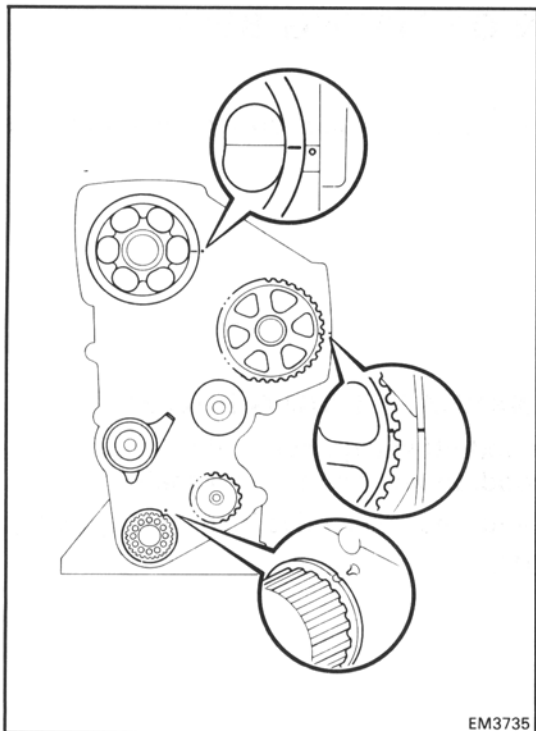
4. INSTALL CAMSHAFT TIMING PULLEY

- (a) Install the woodruff key to the groove of the camshaft.
- (b) Align the woodruff key groove of the timing pulley with the woodruff key on the camshaft.
- (c) Using SST to hold the timing pulley, install and torque the pulley bolt.

SST 09278-54012

Torque: 900 kg-cm (65 ft-lb, 88 N·m)

CAUTION: Avoid turning the camshaft or the valves will hit against the pistons.

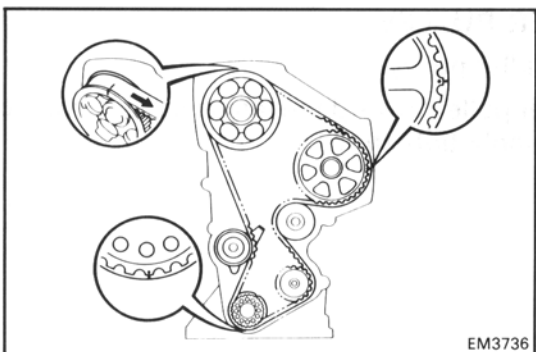


5. SET TIMING AND DRIVE PULLEYS

- (a) Align the line mark of the camshaft timing pulley with the cavity of the cylinder head.
- (b) Align the grooves of the crankshaft timing pulley with the protrusion mark on the oil pump.

CAUTION: When turning the crankshaft or camshaft, the valves will hit against the pistons so do not turn them more than necessary.

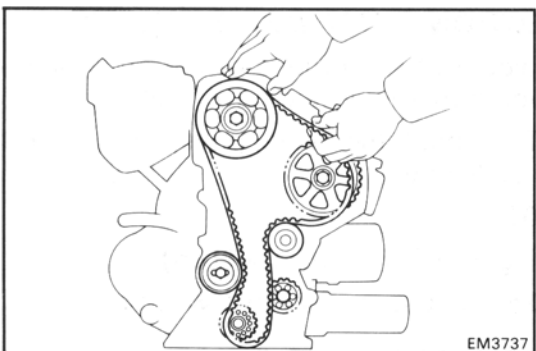
- (c) Align the cavity of the injection pump drive pulley with the line mark on the water pump.



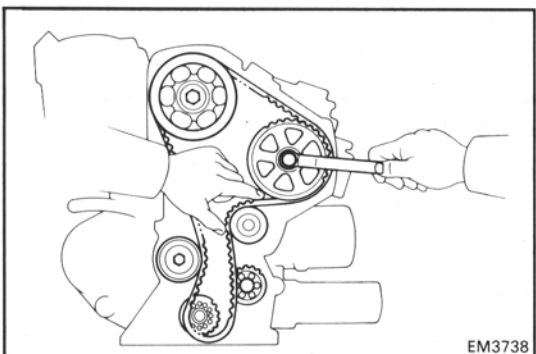
6. INSTALL TIMING BELT

CAUTION: The engine should be cold.

NOTE: If reusing the timing belt, align the points marked during removal (See step 8 on page EM-27) and install the timing belt with the arrow pointing in the direction of engine revolution.

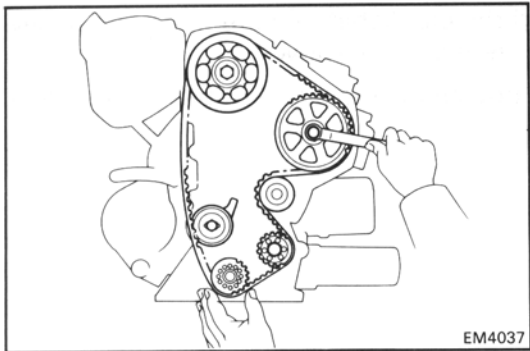


- (a) Place the timing belt on the camshaft timing pulley.



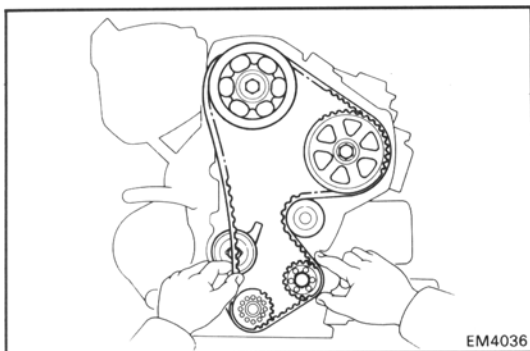
- (b) Place the timing belt to the injection pump drive pulley while holding the pulley stationary with a wrench.

CAUTION: Be sure the timing belt is securely meshed and not loose.



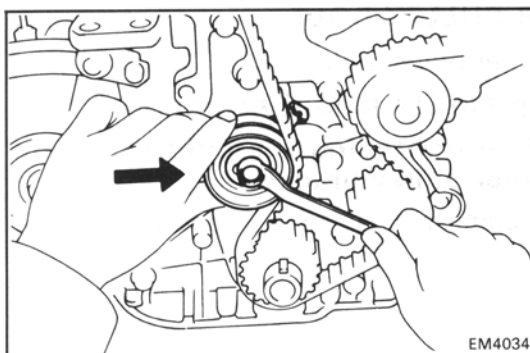
- (c) Place the timing belt to the water pump pulley, oil pump drive pulley and crankshaft timing pulley.

CAUTION: Be sure the timing belt is securely meshed and not loose.

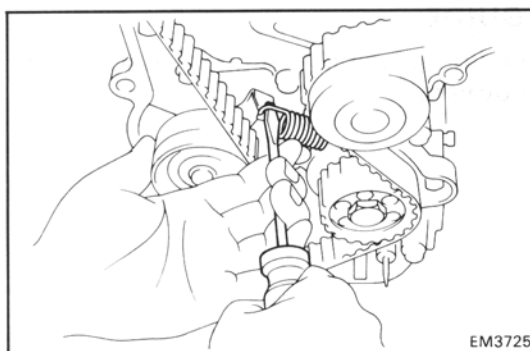


- (d) Place the timing belt to the idler pulley.

CAUTION: Be sure the belt is not twisted or too tight.



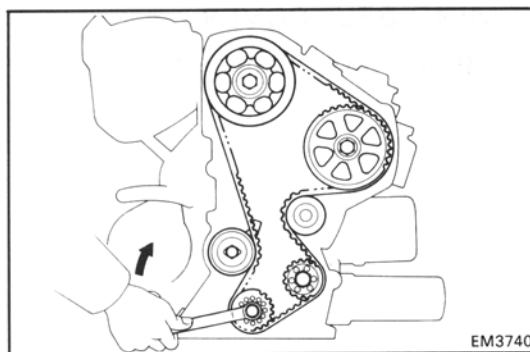
- (e) Pry the idler pulley toward the right far as it will go and temporarily tighten it.



- (f) Using a screwdriver, install the tension spring.

CAUTION: Do not pinch the tension spring with pliers or such.

- (g) Loosen the idler pulley bolt to where the idle pulley lightly moves with tension spring force.

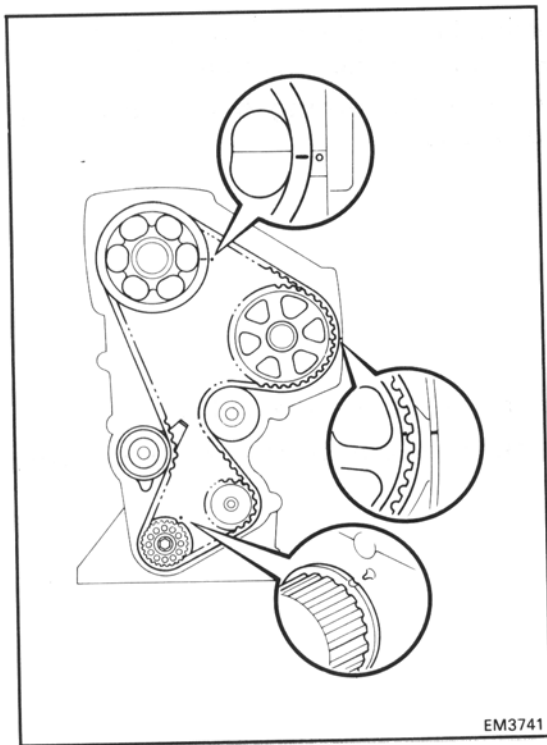


7. CHECK VALVE TIMING

- (a) Temporarily install the crankshaft pulley bolt.
 (b) Turn the crankshaft two revolutions to where the line mark of the camshaft pulley and the cavity of the cylinder head are again aligned.

CAUTION: Always turn the crankshaft clockwise.

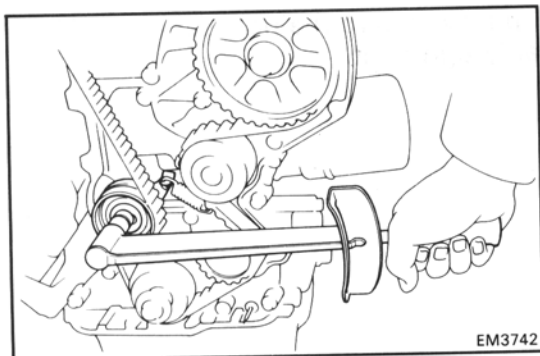
If turned counter clockwise, there is possibility of the belt teeth becoming unmeshed and the best tension changing.



EM3741

(c) After turning the crankshaft, insure that each pulley aligns with the marks as shown.

If the marks do not align, repeat the above procedure from step 6.



EM3742

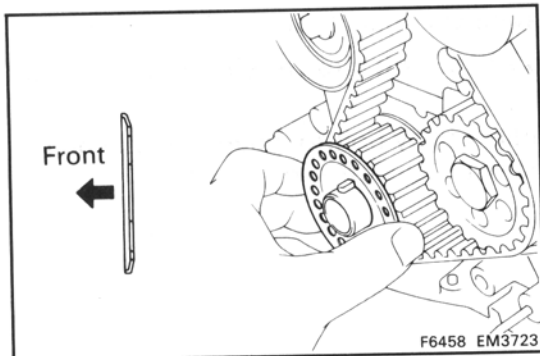
8. TORQUE IDLER PULLEY BOLT

(a) Torque the idler pulley bolt.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

CAUTION: While tightening the pulley bolt, do not move the idler pulley bracket.

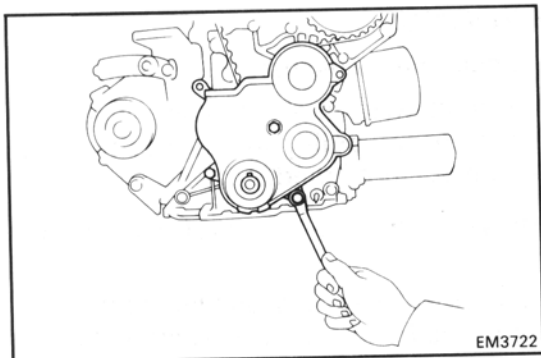
(b) Remove the crankshaft pulley bolt and washer.



F6458 EM3723

9. INSTALL BELT GUIDE

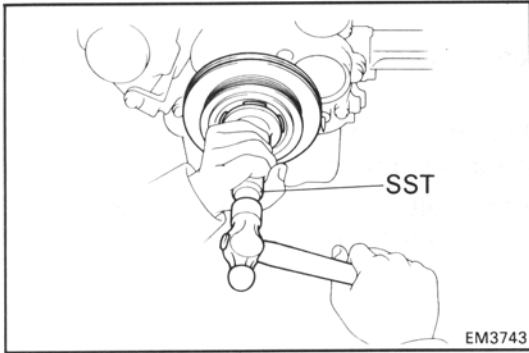
Place the belt guide on the crankshaft timing pulley, facing the cup side outward.



EM3722

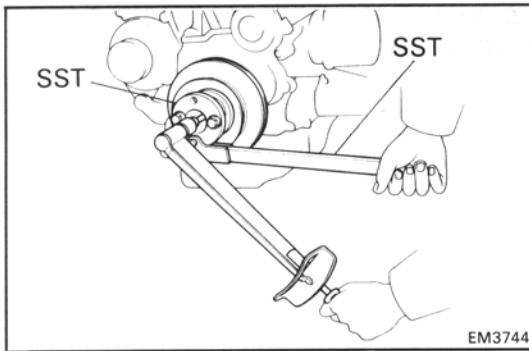
10. INSTALL NO.1 TIMING BELT COVER

Install the No.1 timing belt cover with the three bolts.

**11. INSTALL CRANKSHAFT PULLEY**

- (a) Align the woodruff key groove of the crankshaft pulley with the woodruff key on the crankshaft.
- (b) Using SST and hammer, drive in the crankshaft pulley.

SST 09223-46011



- (c) Install the washer, pulley bolt and SST to the crankshaft pulley.

SST 09212-70010

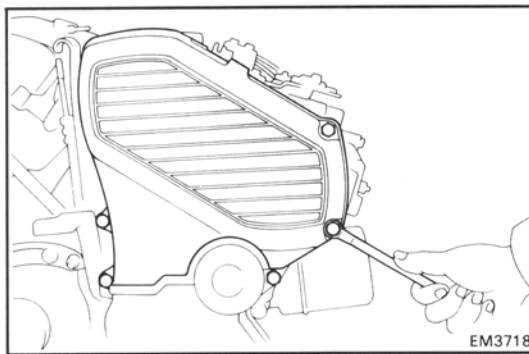
- (d) Using SST to hold the crankshaft pulley, torque the pulley bolt.

SST 09212-70010 and 09330-00021

Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)

12. INSTALL GLOW PLUGS
(See step 7 on page EM-57)**13. INSTALL NO.2 TIMING BELT COVER**

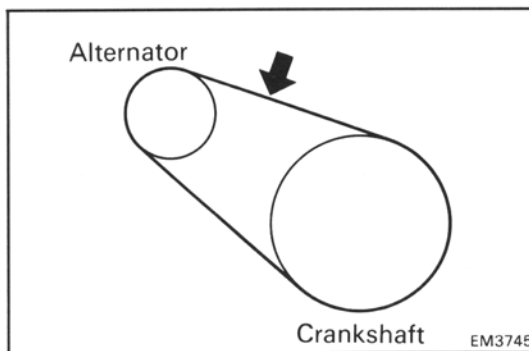
Install the No.2 timing belt cover and gasket with the clip and five bolts.

**14. INSTALL AND ADJUST DRIVE BELT**

Drive belt deflection at 10 kg (22.0 lb, 98 N)

New belt 6 – 7 mm (0.24 – 0.28 in.)

Used belt 8 – 11 mm (0.32 – 0.43 in.)



(Reference)

Using SST, check the drive belt tension.

SST A 09216-00020

SST B 09216-00030

Drive belt tension: New belt 45 – 55 kg
Used belt 20 – 35 kg

