

TIMING BELT

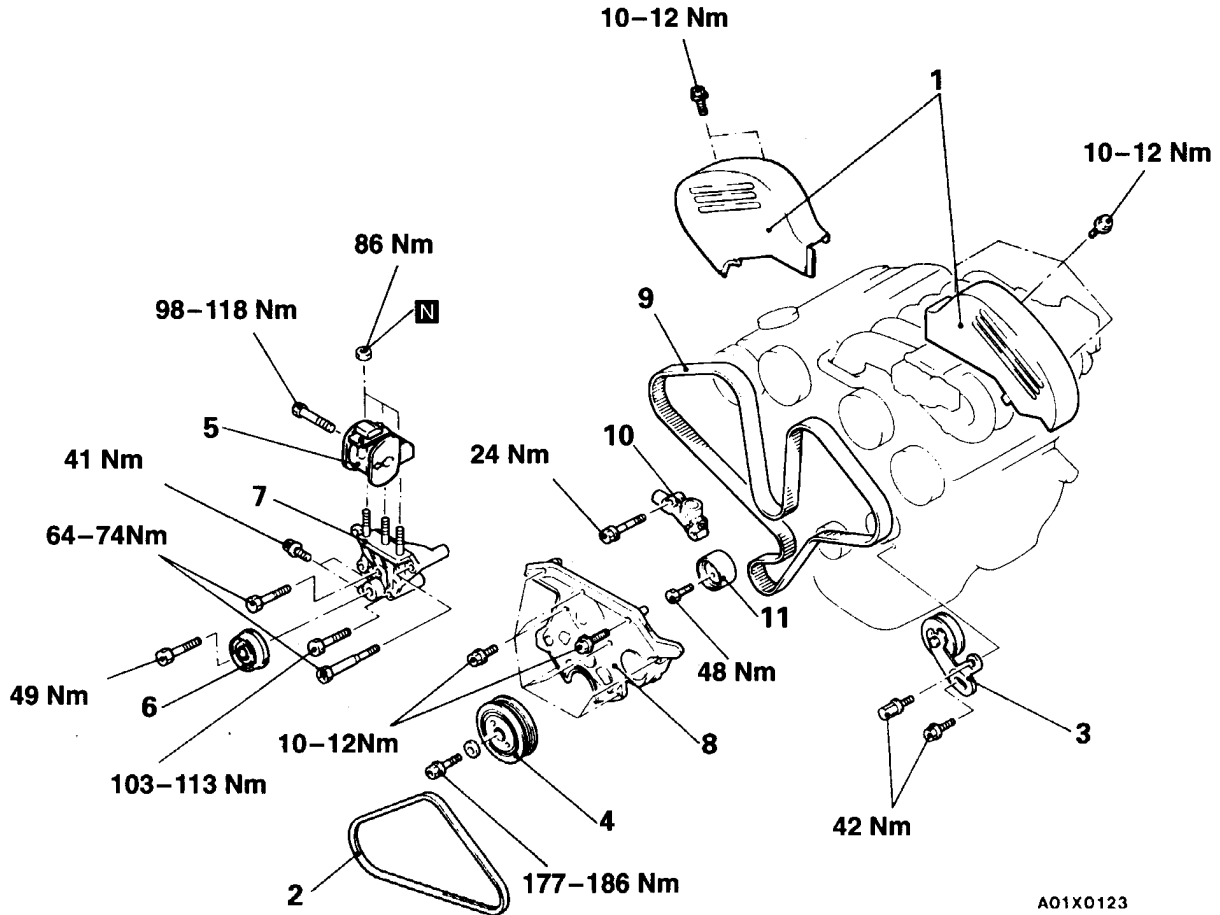
REMOVAL AND INSTALLATION

Pre-removal Operation

- (1) Jack up the engine and transmission assembly until there is no load on the insulators.
- (2) Under Cover (L.H.) Removal
- (3) Alternator Removal (Refer to GROUP 16 - Alternator.)

Post-Installation Operations

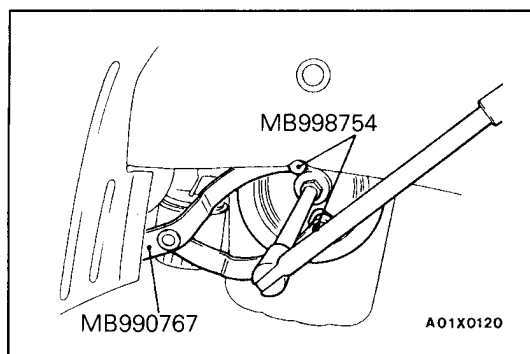
- (1) Alternator Installation (Refer to GROUP 16 - Alternator.)
- (2) Under Cover (L.H.) Installation



A01X0123

Removal steps

1. Timing belt upper cover
 - Drive belt tension adjustment (Refer to P.11F-7.)
 2. Drive belt (power steering)
 3. Tension pulley
 4. Crankshaft pulley
 5. Engine mount bracket
 6. Idler pulley
 7. Engine support bracket
 8. Timing belt lower cover
 - Timing belt tension adjustment
 9. Timing belt
- ◆A◆ ◆G◆ 10. Auto tensioner
 ◆B◆ ◆F◆ 11. Tension pulley
 ◆C◆ ◆E◆
 ◆D◆ ◆B◆

**REMOVAL SERVICE POINTS**

E11FM01AA

◊A◊ CRANKSHAFT PULLEY REMOVAL

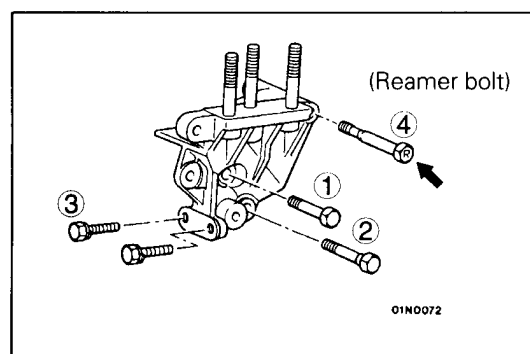
Using special tools, remove the crankshaft pulley from the crankshaft.

Caution

Use only the specified special tools, or a damaged pulley damper could result.

◊B◊ IDLER PULLEY REMOVAL

First use the special tool (MB991164) to loosen the idler pulley mounting bolt, and then use a spanner or similar tool to remove the bolt.

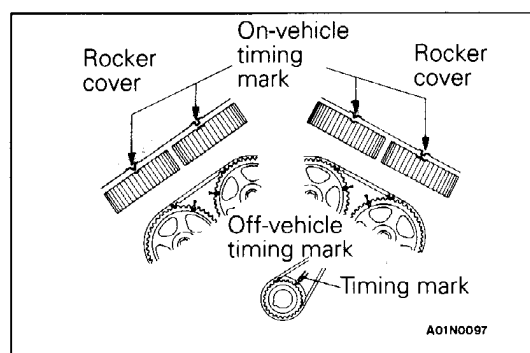
**◊C◊ ENGINE SUPPORT BRACKET REMOVAL**

Remove the engine support bracket in the numbered sequence shown in the illustration.

Spraying lubricant, slowly remove the bolt (reamer bolt) indicated by the arrow.

Caution

Keep in mind that the reamer bolt is sometimes heat seized on the engine support bracket.

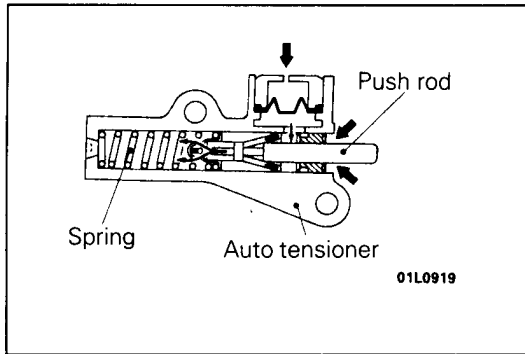
**◊D◊ TIMING BELT REMOVAL**

- (1) Align the timing marks.
- (2) Make a mark on the back of the timing belt indicating the direction of rotation so it may be reassembled in the same direction if it is to be reused.
- (3) Loosen the center bolt on the tensioner pulley to remove the timing belt.

Caution

1. **The cam of the front bank camshaft lifts the valve by means of the rocker arm, the spring force of the valve will easily turn the sprocket, so be careful not to insert your fingers, etc.**
2. **Water or oil on the belt shorten its life drastically, so the removed timing belt, sprocket and tensioner must be free from oil and water. These parts should not be washed. Replace parts if seriously contaminated.**

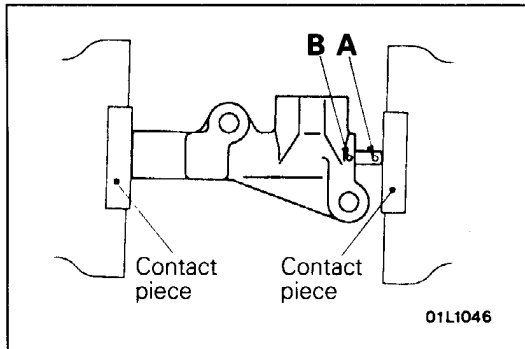
If there is oil or water on each part check the front case oil seals, camshaft oil seal and water pump for leaks.

**INSPECTION**

E11FM02AA

AUTO TENSIONER

- Check the auto tensioner for possible leaks.
- Check the push rod for cracks.

**INSTALLATION SERVICE POINTS**

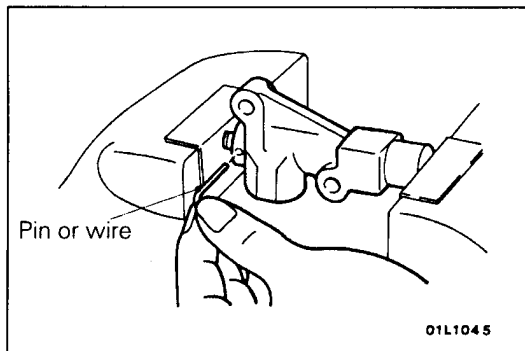
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▶◀ AUTO TENSIONER INSTALLATION

- (1) Using a press or vise, compress the push rod of the auto tensioner as slowly as possible and align pin hole A of the push rod and pin hole B of the tensioner cylinder.

Caution

1. **The auto tensioner must be placed at a right angle to the pressing surface of the press or vise.**
2. **Push in the rod slowly to prevent the push rod from being damaged.**

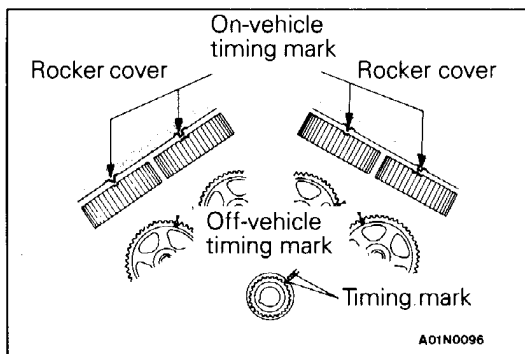


- (2) Insert a wire with a diameter of 1.4 mm into the aligned pin holes.

NOTE

The wire should be as stiff as possible (such as piano wire, etc.), and should be bent into the shape of an "L".

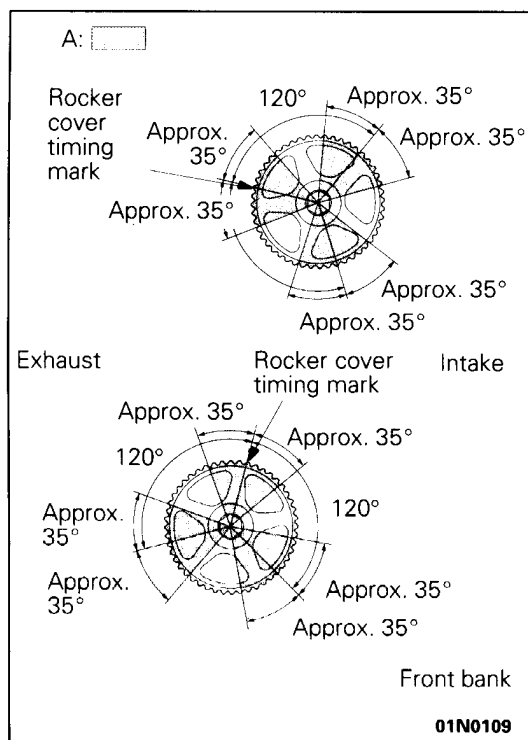
- (3) Install the tensioner to engine.

**▶◀ TIMING BELT INSTALLATION**

- (1) Align the timing marks of each sprocket. Carry out the following procedure for the front bank camshaft sprocket.
 - 1) Install the crankshaft pulley and turn the crankshaft sprocket timing mark forward 3 teeth to move the piston slightly past No.1 cylinder top dead centre.

Caution

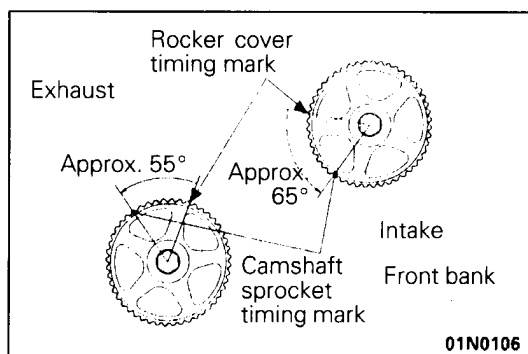
When the camshaft sprocket is turned with No.1 cylinder top dead centre, there is a danger that the valve and piston will interfere.



- 2) Check that the timing marks for the intake and exhaust camshaft sprockets are not within the range of A in the figure at left. If they are within the range of A, turn the camshaft sprocket to move the timing marks as near as possible to the range of A but outside it.

Caution

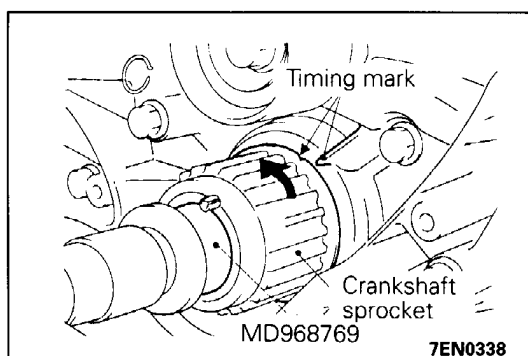
Within the range of A, the cam of the camshaft lifts the valve by means of the rocker arm, and the camshaft sprocket will easily turn because of the valve spring force, so be careful not to insert your fingers, etc.



- 3) After turning either one of the intake and exhaust camshaft sprockets to the position in the diagram at left, to align it with the timing mark, turn the other sprocket to align it as shown in the diagram.

Caution

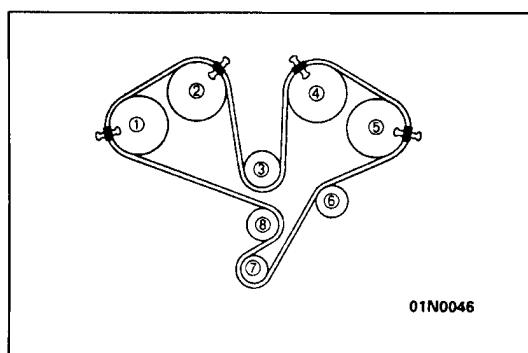
If the intake and exhaust valves of the same cylinder are lifted at the same times, both valves will interfere with each other, so the intake and exhaust camshaft sprockets should be turned alternately.



- 4) Turn the camshaft sprockets clockwise to align them with the timing marks.
If a sprocket is turned too far, turn it back the other way to align it with the timing marks.
- 5) Align the crankshaft sprocket timing marks.

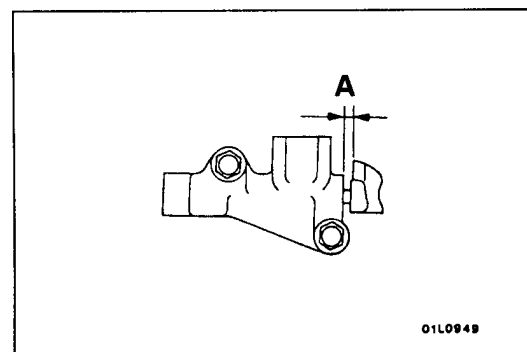
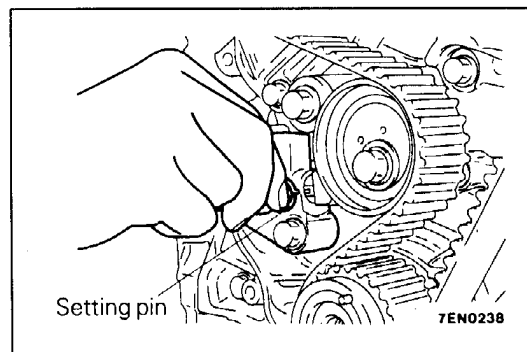
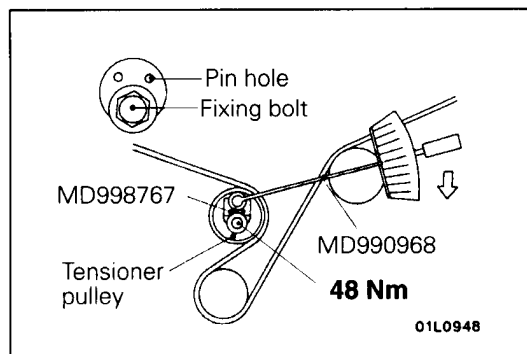
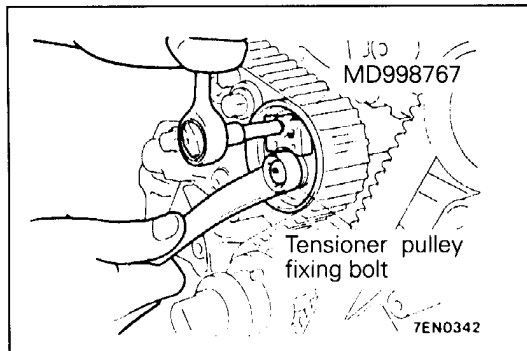
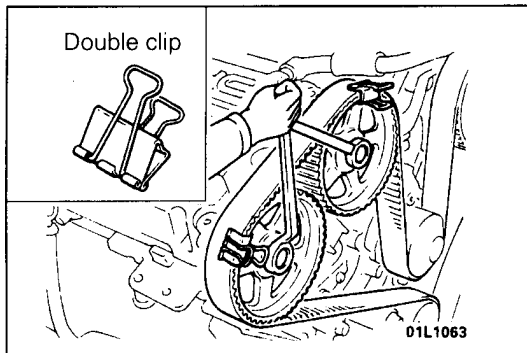
NOTE

If the crankshaft sprocket timing marks are turned anticlockwise one tooth, working will become easier.



- (2) Use double clips to fix the timing belt in the following procedure, to prevent the belt from slacking.

Front bank side exhaust camshaft sprocket → 2. Intake camshaft sprocket → 3. Water pump pulley → 4. Rear bank side intake camshaft sprocket → 5. Exhaust camshaft sprocket → 6. Idler pulley → 7. Crankshaft sprocket → 8. Tensioner pulley.



NOTE

As the camshaft sprockets turn easily, use a box wrench to stop them from turning when fitting the timing belt.

Caution

If the timing belt is reused, install so that the arrow marked on it at the time of removal is pointing in the clockwise direction.

- (3) Place the tensioner pulley pin hole so that it is towards the top. Press the tensioner pulley onto the timing belt, and provisionally tighten the fixing bolt.
- (4) Check that each of the sprocket timing mark is aligned.
- (5) Remove the 4 double clips.

⚡ TIMING BELT TENSION ADJUSTMENT

- (1) After turning the crankshaft a 1/4 turn anticlockwise, turn it clockwise to the position where the timing marks are aligned.
- (2) Next, loosen the center bolt of the tensioner pulley and using the special tool and a torque wrench, apply tension to the timing belt as shown in the illustration; then tighten the center bolt at the specified torque.

Caution

When tightening the bolt, ensure that the tensioner pulley shaft doesn't rotate with the bolt.

Specified torque: 10 Nm (tensional torque)

- (3) Pull out the auto tensioner setting pin. At this time, check that the setting pin can be pulled out easily. Turn the crankshaft clockwise 2 turns, and after leaving it in this position for 5 minutes or more, check again that the auto tensioner setting pin can be pulled or inserted easily.

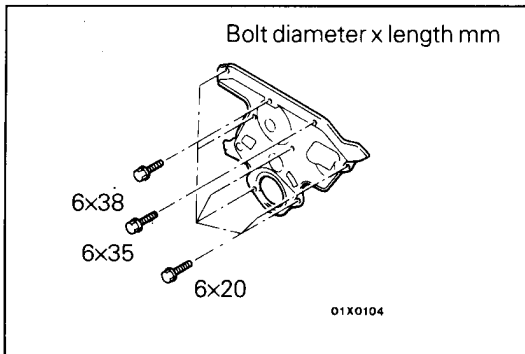
NOTE

If the setting pin cannot be easily inserted, then it is satisfactory if the auto tensioner rod projection amount is within the standard value.

Standard value (A): 3.8–4.5 mm

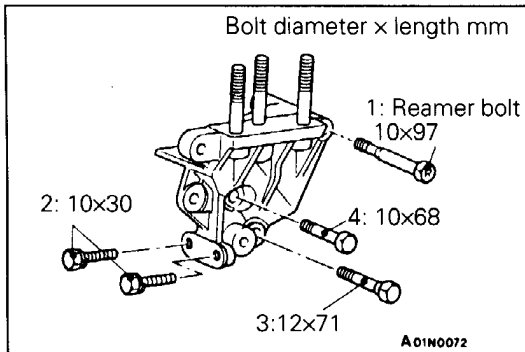
If it is outside the standard value, repeat the operations in steps 1. to 3.

- (4) Check again that each of the sprocket timing marks is aligned.



▶D▶ TIMING BELT LOWER COVER INSTALLATION

The dimensions of the mounting bolts are different, so do be sure to install them correctly.



▶E▶ ENGINE SUPPORT BRACKET INSTALLATION

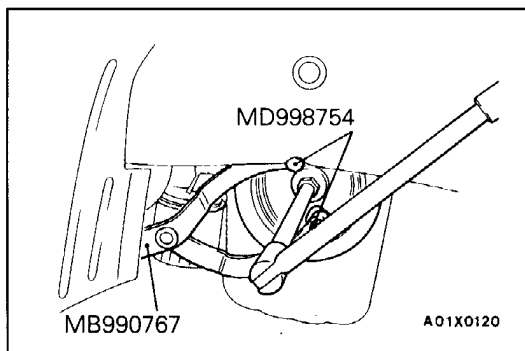
Since the engine support bracket mounting bolts differ in size depending on their locations, install them in the numbered sequence shown in the figure.

Caution

When installing the reamer bolt, tighten it slowly while spraying lubricant on the reamer area.

▶F▶ IDLER PULLEY INSTALLATION

Lastly, use the special tool (MB991164) to securely tighten the idler pulley mounting bolt.



▶G▶ CRANKSHAFT PULLEY INSTALLATION

Caution

Use only the specified special tools, otherwise the pulley damper could be damaged.