

KIA

3.5L V6 - DOHC

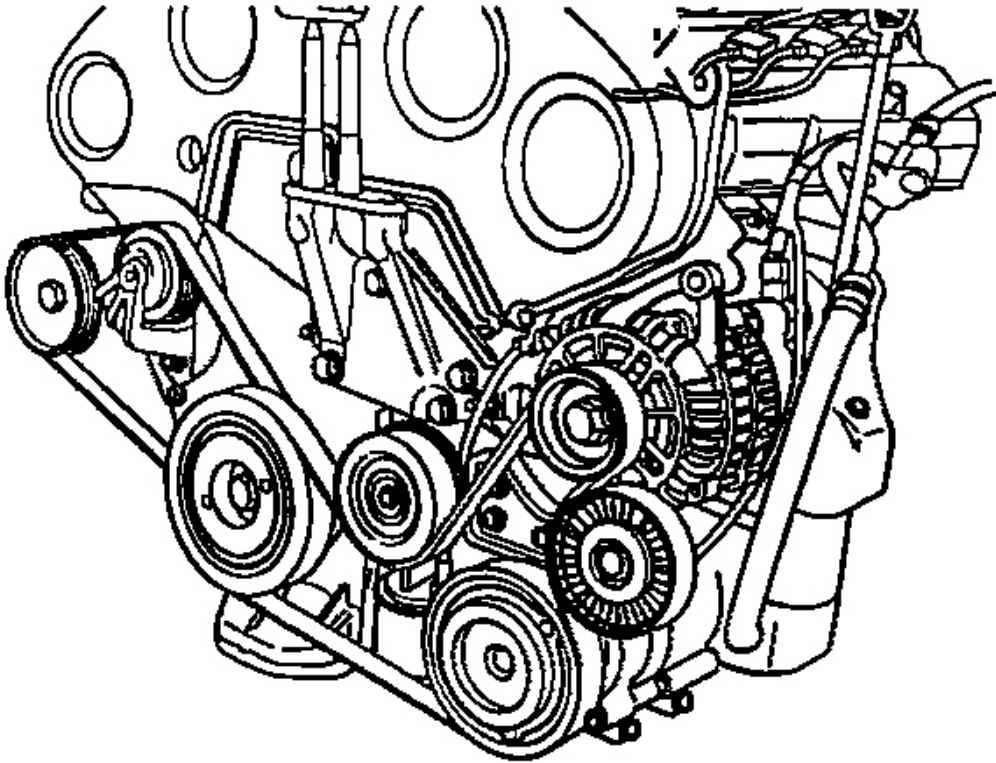
MANUFACTURER'S SUGGESTED SCHEDULED MAINTENANCE

Manufacturer recommends the belt be replaced every 60,000 miles, except in California. In California, inspect timing belt at 60,000 miles, and replace as necessary.

REMOVAL & INSTALLATION

REMOVAL

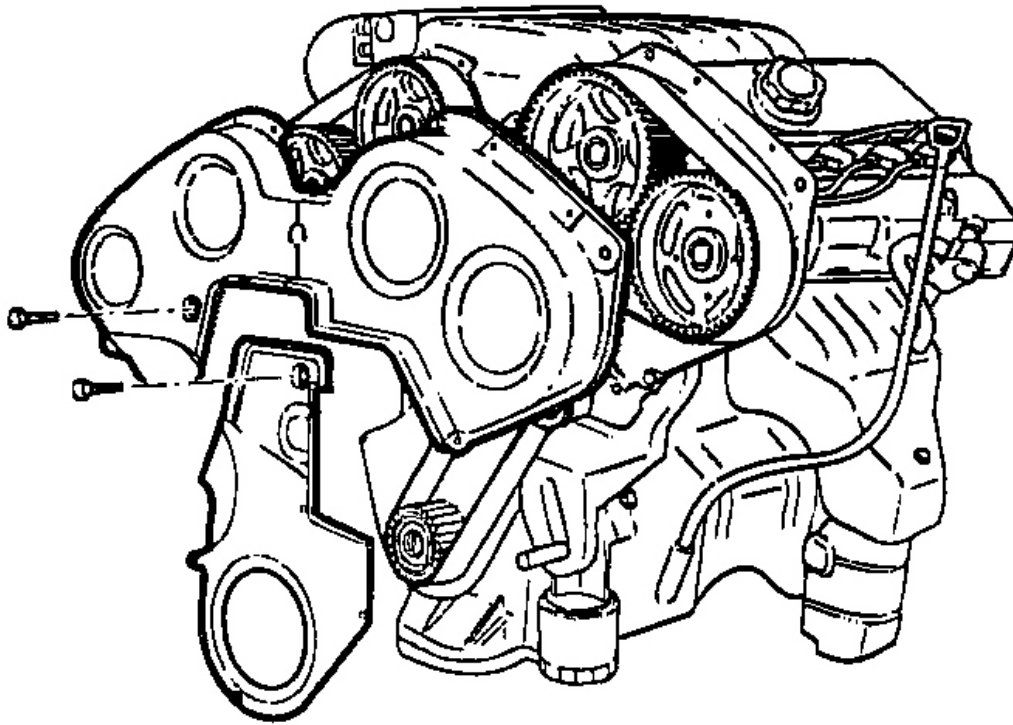
1. Remove the engine cover.
2. Remove the drive belt.
3. Remove the idler pulley, crankshaft pulley, power steering pulley and tensioner pulley.



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Fig. 1: Identifying Belt Routing
Courtesy of KIA MOTORS AMERICA, INC.

4. Remove the upper and lower timing belt cover.



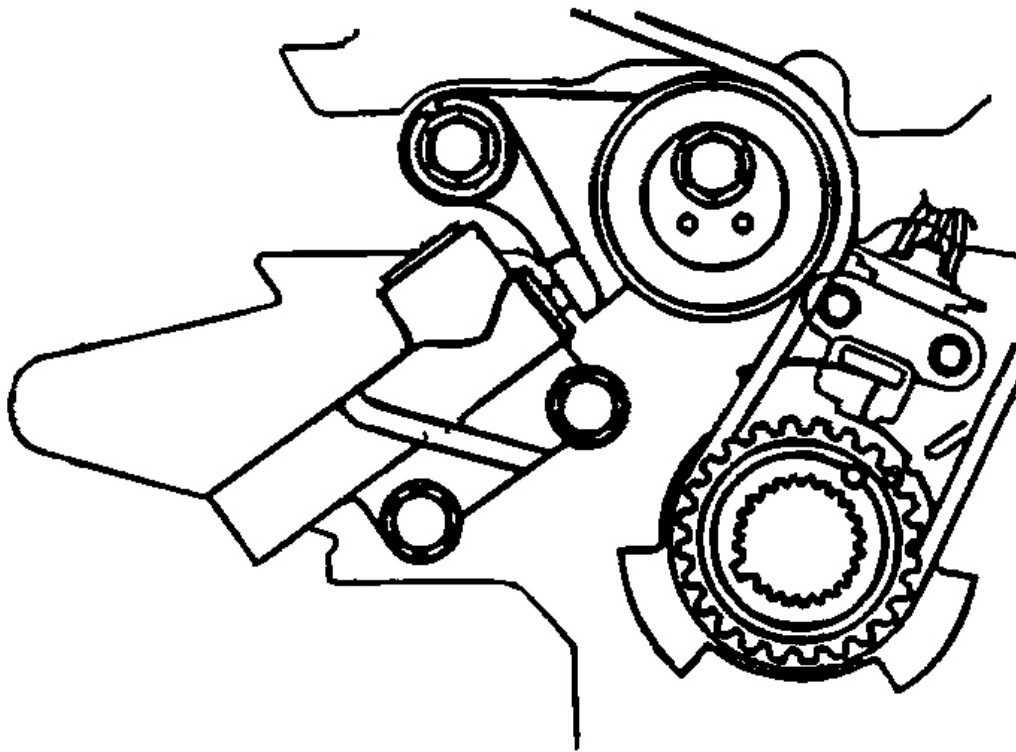
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Fig. 2: Removing The Upper & Lower Timing Belt Cover
Courtesy of KIA MOTORS AMERICA, INC.

5. Support the engine with garage jack or special tool, and then remove the engine mounting insulator.

CAUTION: Take care not to deform the engine oil pan.

6. Remove the auto tensioner.

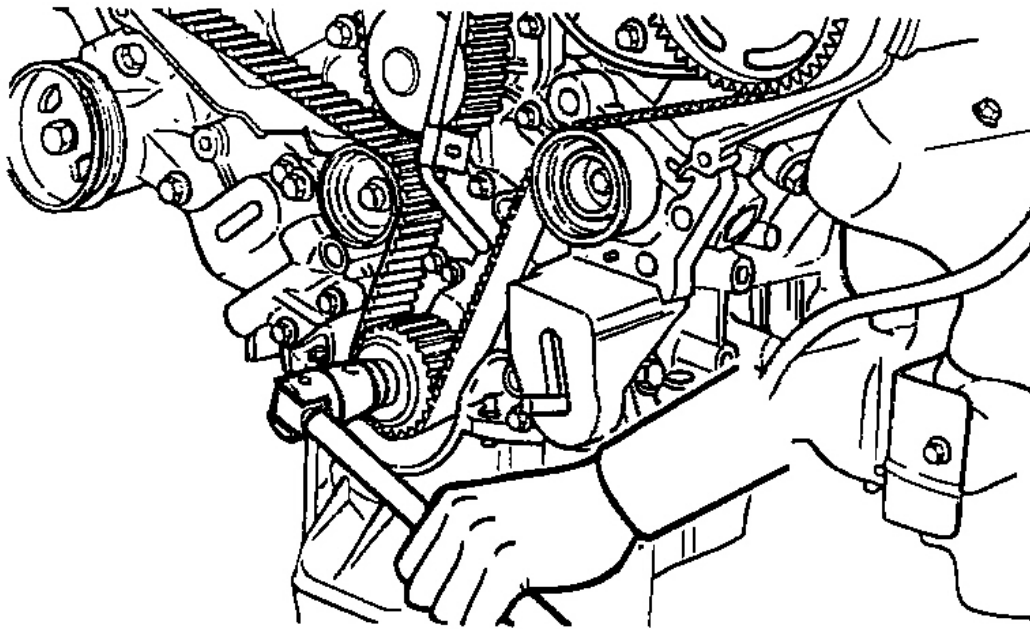


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Fig. 3: Removing The Auto Tensioner
Courtesy of KIA MOTORS AMERICA, INC.

NOTE: Rotate the crankshaft clockwise and align the timing mark to get the No. 1 cylinder's piston be in TDC position (compression stroke). At this time, the timing marks of the camshaft sprocket and cylinder head cover should coincide with each other.

7. Remove the timing belt.



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Fig. 4: Removing The Timing Belt

Courtesy of KIA MOTORS AMERICA, INC.

NOTE: When re-using timing belt, make sure of marking the rotating direction on the belt so as to install correctly.

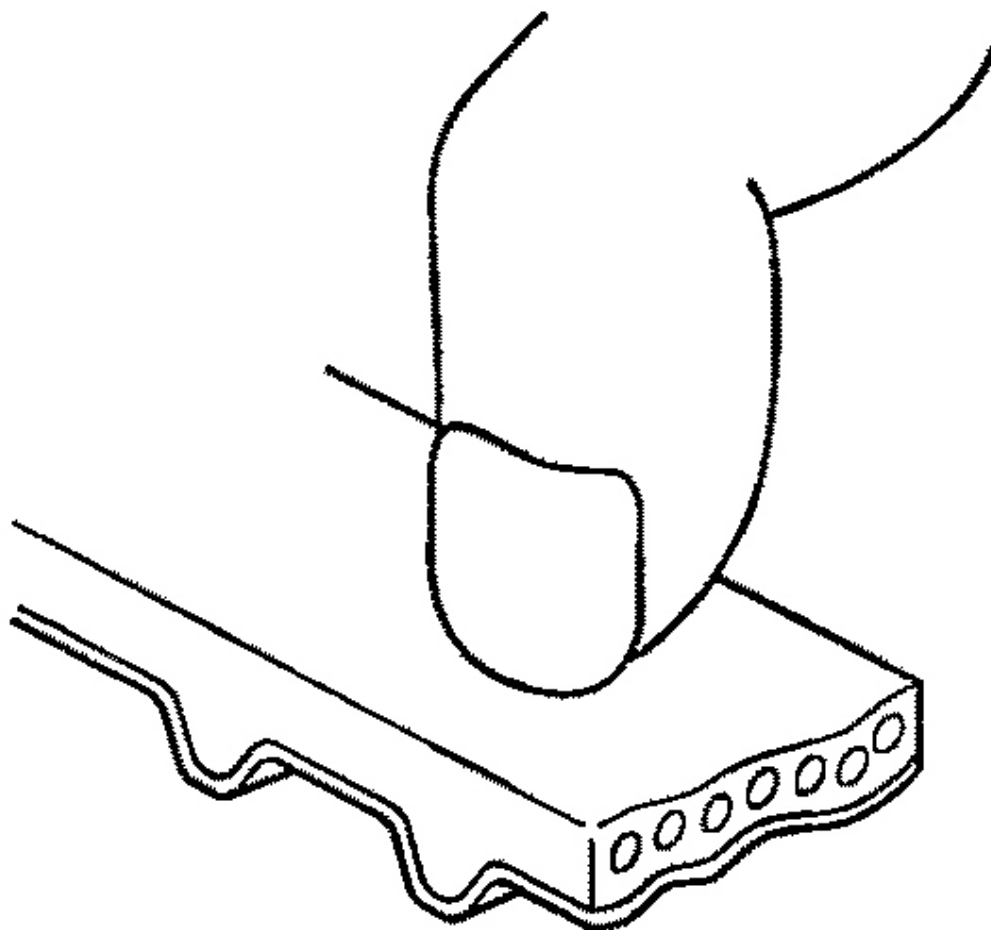
INSPECTION

TIMING BELT

Check the belt carefully and if any damage is found, exchange it with a new one.

1. Vulcanization of the rubber backside.

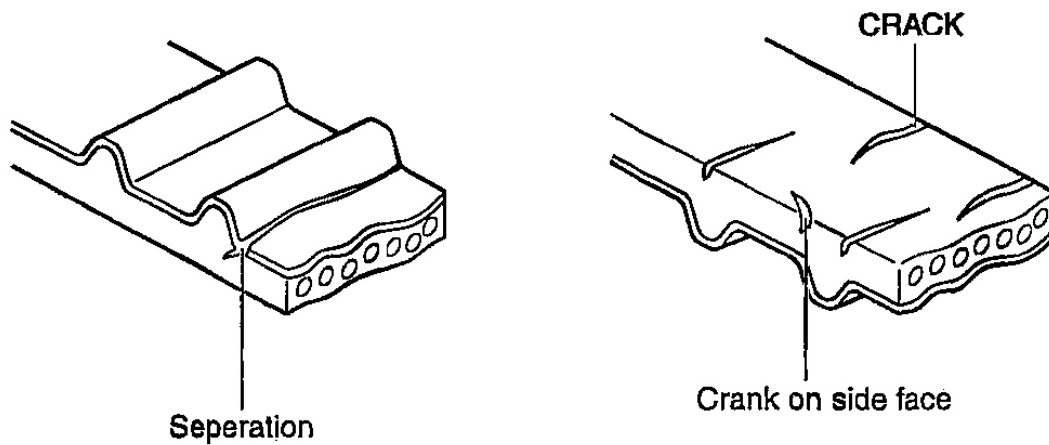
The backside is glossy and non-elastic so that, even if a finger nail is forced into it, no mark is produced.



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Fig. 5: Testing Timing Belt For Vulcanization
Courtesy of KIA MOTORS AMERICA, INC.

2. Crack on the rubber belt surface.



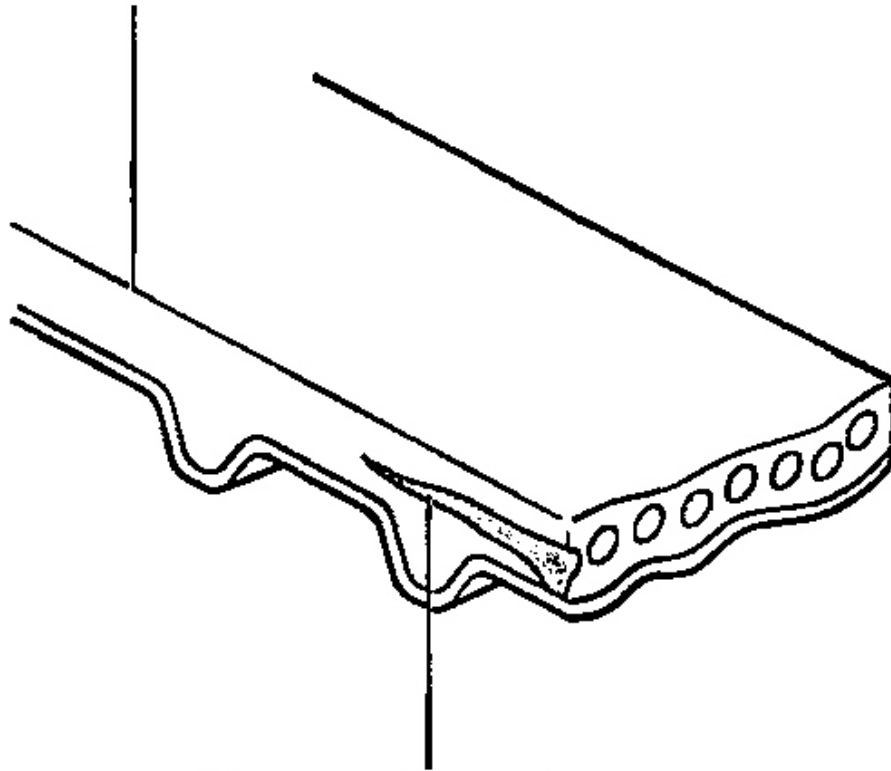
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Fig. 6: Testing Timing Belt For Cracks
Courtesy of KIA MOTORS AMERICA, INC.

3. Abnormal wearing of side face of belt.

CAUTION: Belts in good condition seem to be cut by a sharp knife.

Round shaped edge

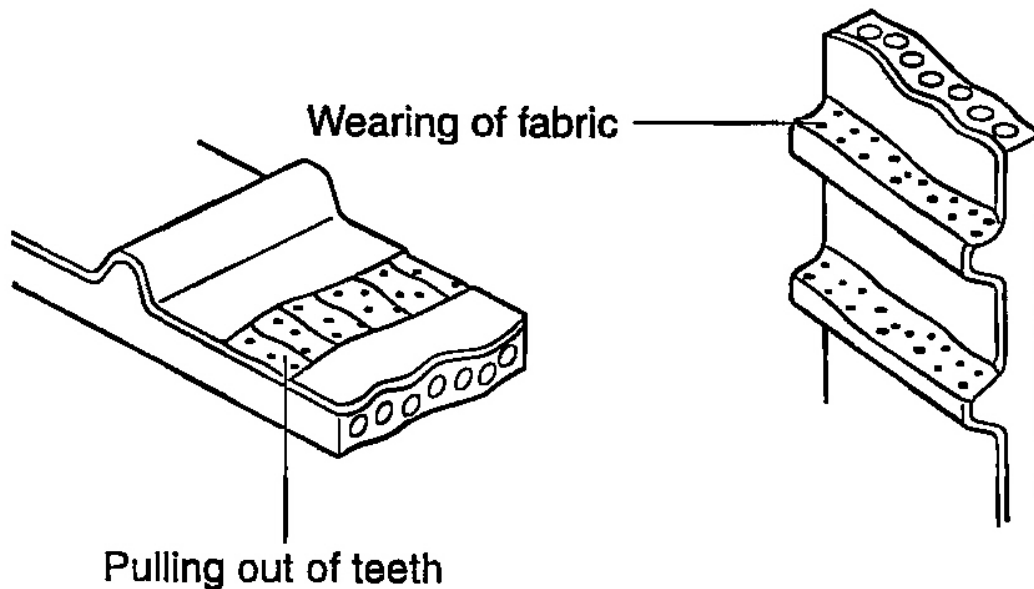


Abnormal wearing

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Fig. 7: Testing Timing Belt For Side Face Wear
Courtesy of KIA MOTORS AMERICA, INC.

4. Abnormal tooth wearing



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Fig. 8: Testing Timing Belt For Abnormal Tooth Wear
 Courtesy of KIA MOTORS AMERICA, INC.

Initial stage

Wearing of side face of load exerting tooth (Fabric puff up, rubber material peel off with color changing to white and fabric become uneven and rough).

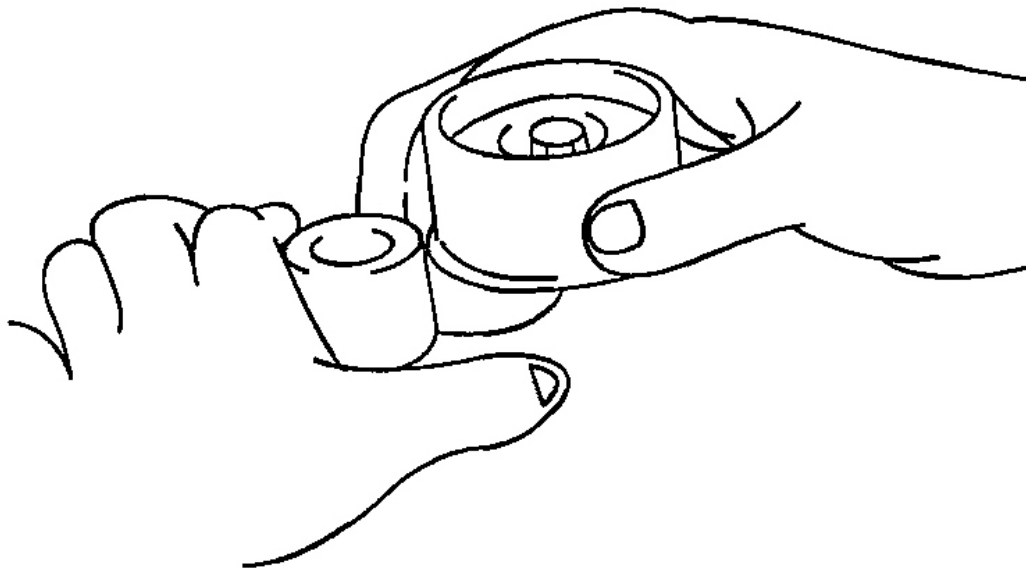
Last stage

Fabric wearing of side face of load exerting tooth occurs and rubber is exposed (Length between teeth decrease).

5. Missing tooth.

TIMING BELT TENSIONER

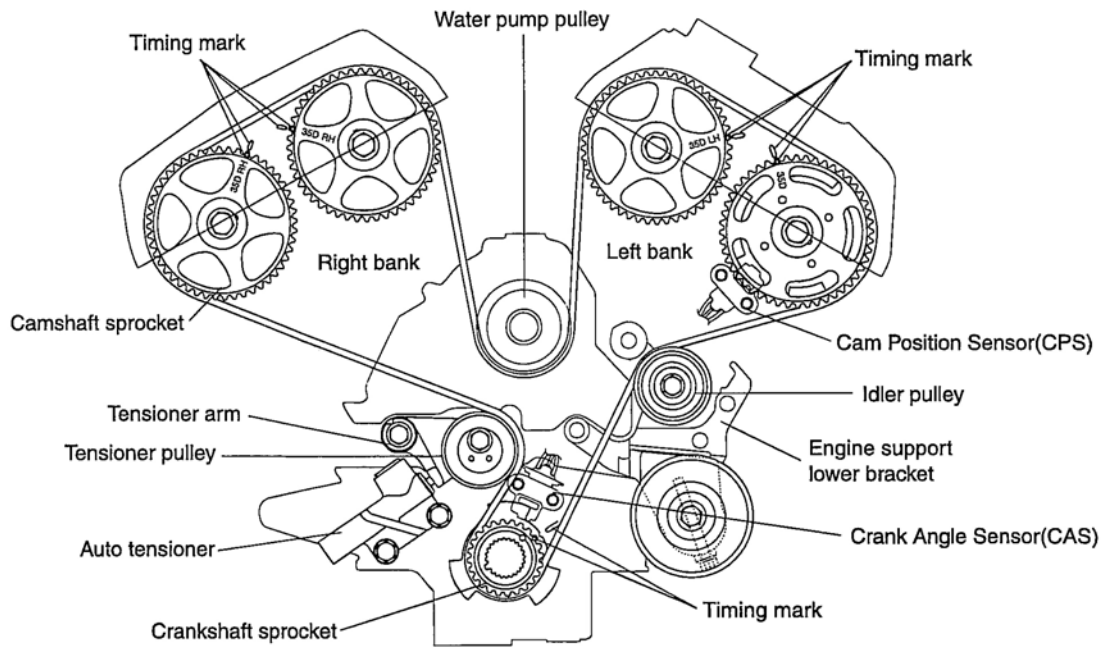
If any abnormal noise or difficulty in rotating the pulley by hand is noticed, replace the timing belt tensioner and idler pulley.



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Fig. 9: Testing Timing Belt Tensioner
Courtesy of KIA MOTORS AMERICA, INC.

INSTALLATION

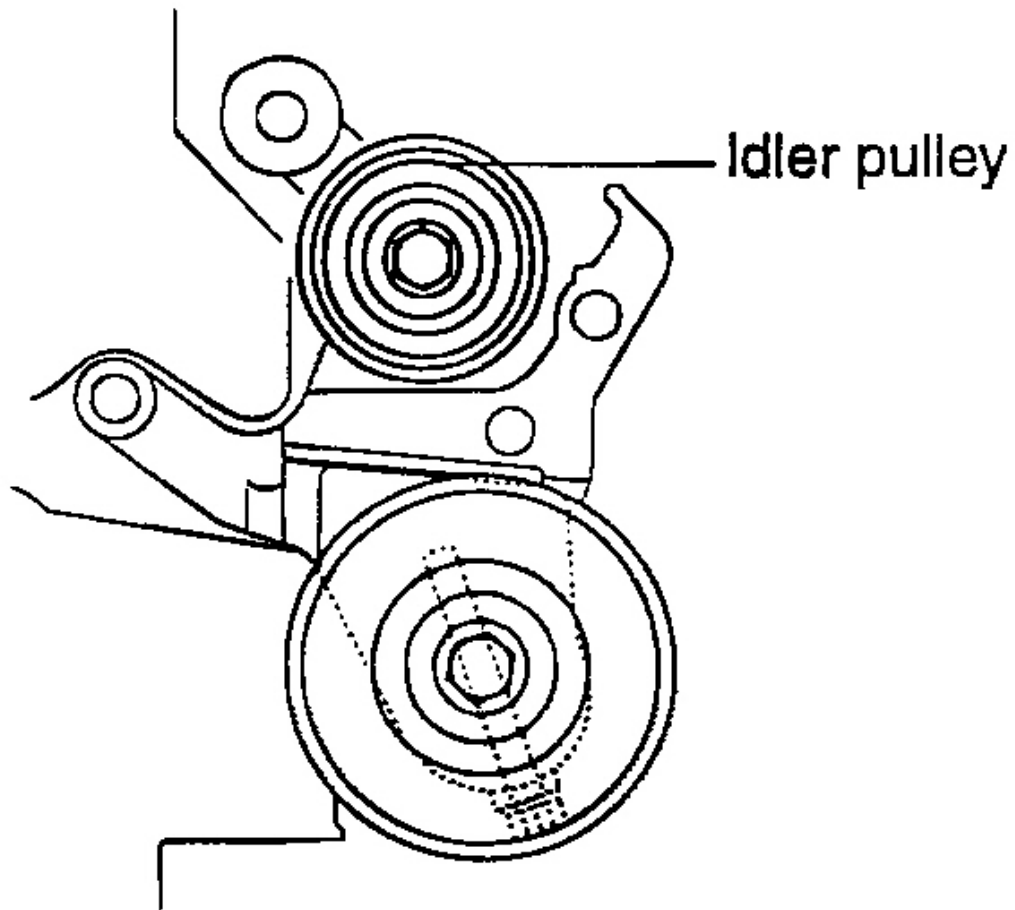


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Fig. 10: Identifying Timing Belt Positions
 Courtesy of KIA MOTORS AMERICA, INC.

TIMING BELT AND AUTO TENSIONER

1. Install the idler pulley to the engine support lower bracket.

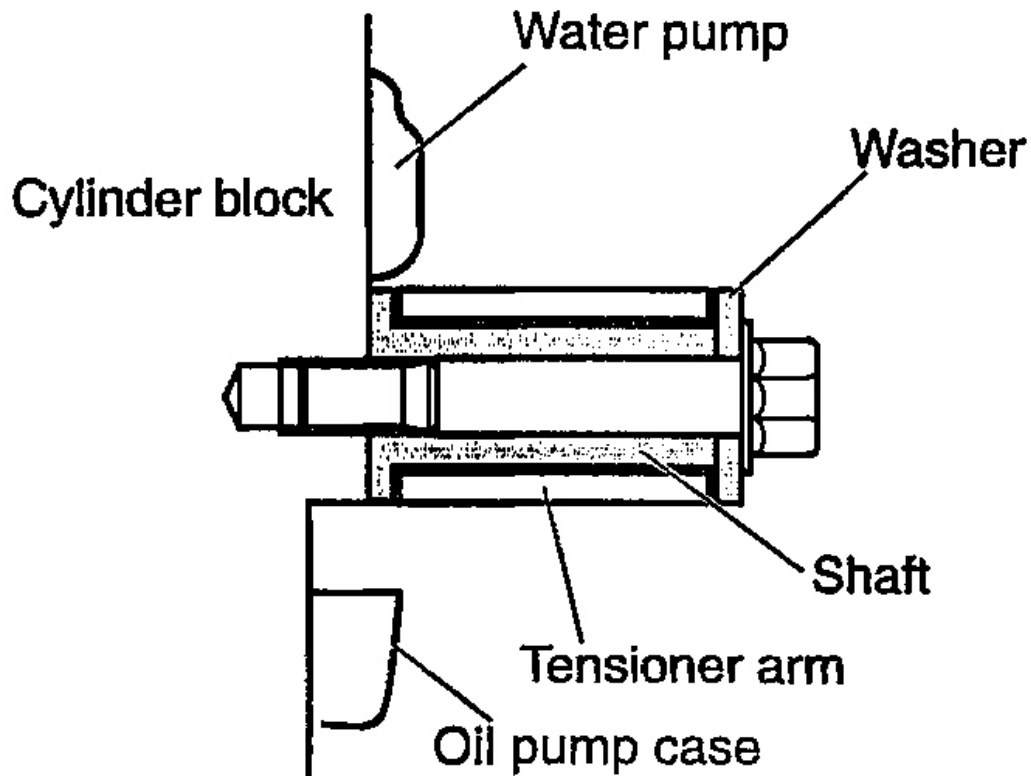


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Fig. 11: Installing The Idler Pulley To The Engine Support Lower Bracket
Courtesy of KIA MOTORS AMERICA, INC.

2. Install the tensioner arm, shaft and plain washer to the cylinder block.

Tightening torque: 35-55 N.m (350-550 kg/cm, 25.82-40.57 lb. ft.)

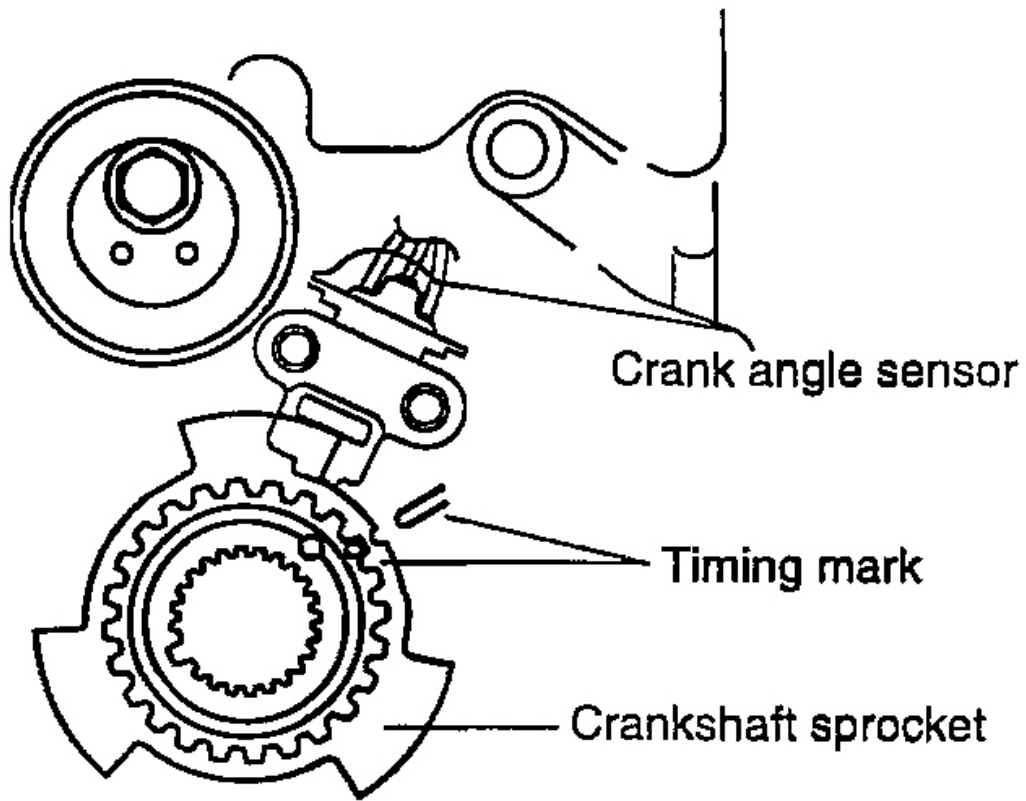


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Fig. 12: Installing The Tensioner Arm, Shaft And Plain Washer To The Cylinder Block
Courtesy of KIA MOTORS AMERICA, INC.

3. Install the crankshaft sprocket.

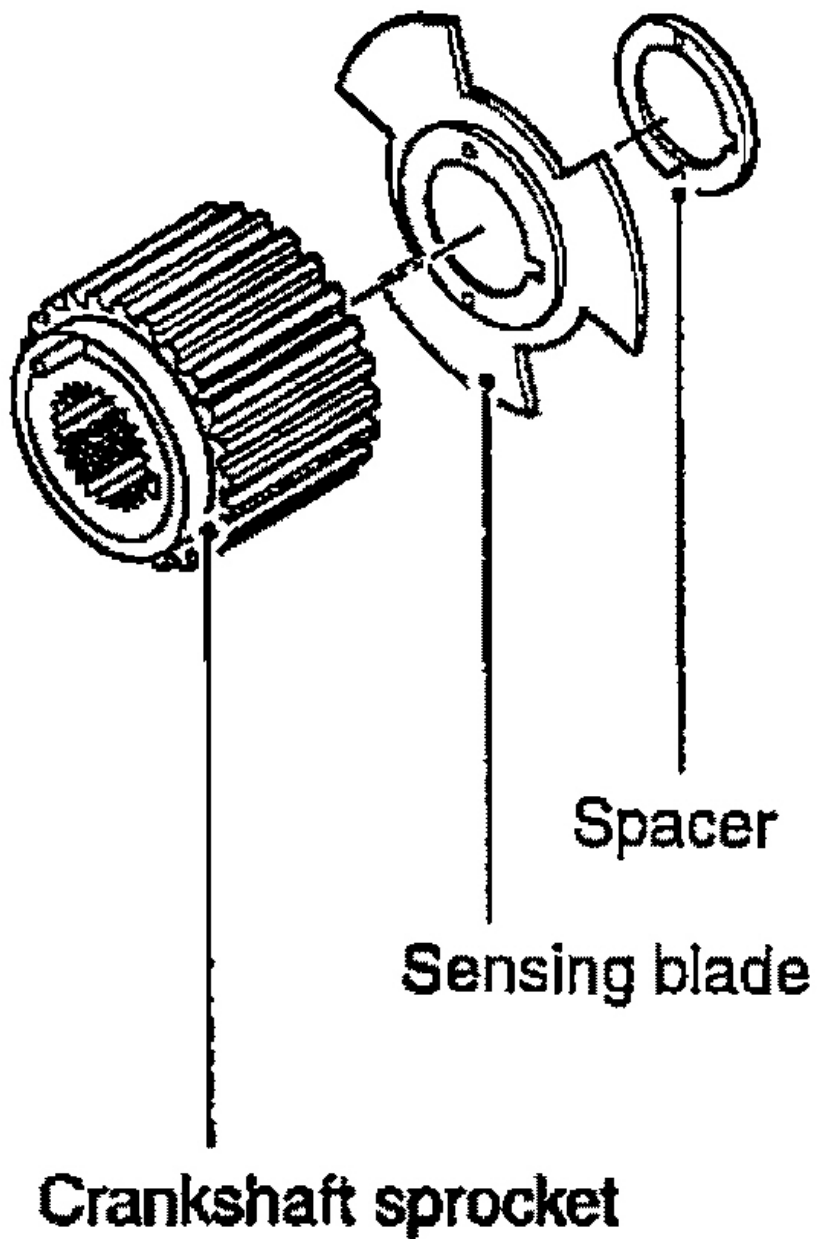
NOTE: Confirm if timing marks coincide with.



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Fig. 13: Installing The Crankshaft Sprocket
Courtesy of KIA MOTORS AMERICA, INC.

CAUTION: Align the spacer with a pin, and assemble it exerting even force not to deform the crankshaft sensing blade.



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Fig. 14: Aligning The Spacer & Pin
Courtesy of KIA MOTORS AMERICA, INC.

4. Install the camshaft sprocket.

Align it like initial state as shown on the picture.

CAUTION: When installing camshaft sprocket, tighten the bolt holding hexagonal part of camshaft to prevent it from turning.

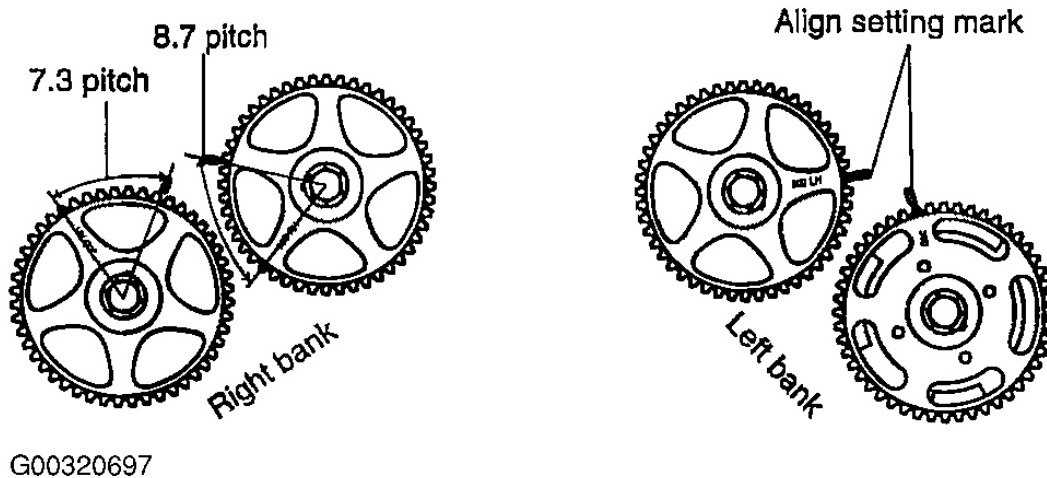
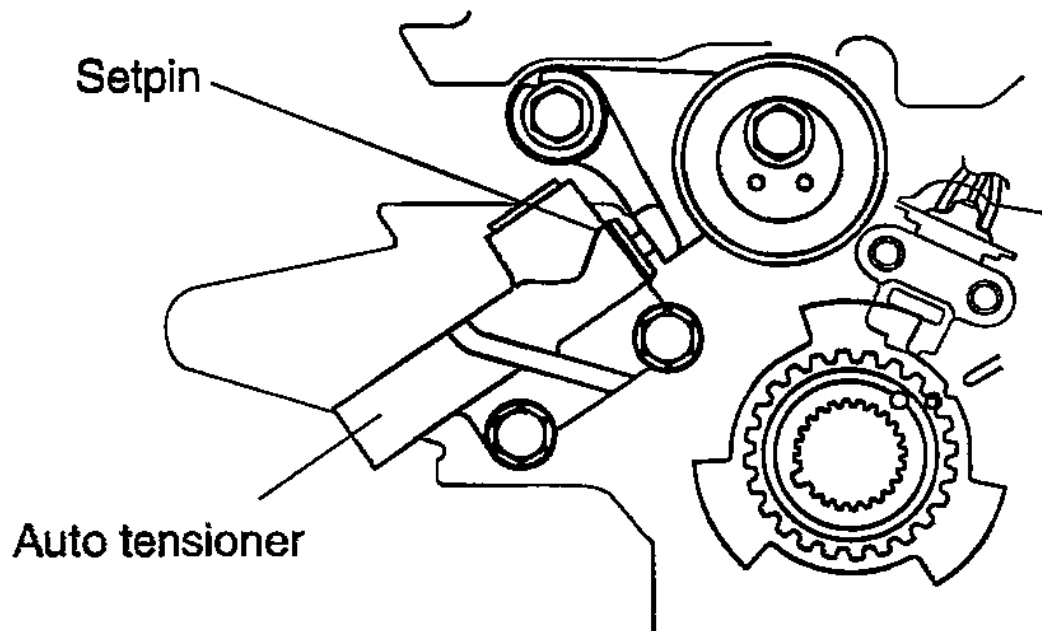


Fig. 15: Installing & Aligning Camshaft Sprockets
Courtesy of KIA MOTORS AMERICA, INC.

5. Install the auto tensioner to the oil pump case.

CAUTION: At this time the auto tensioner's set pin should be assembled completely.

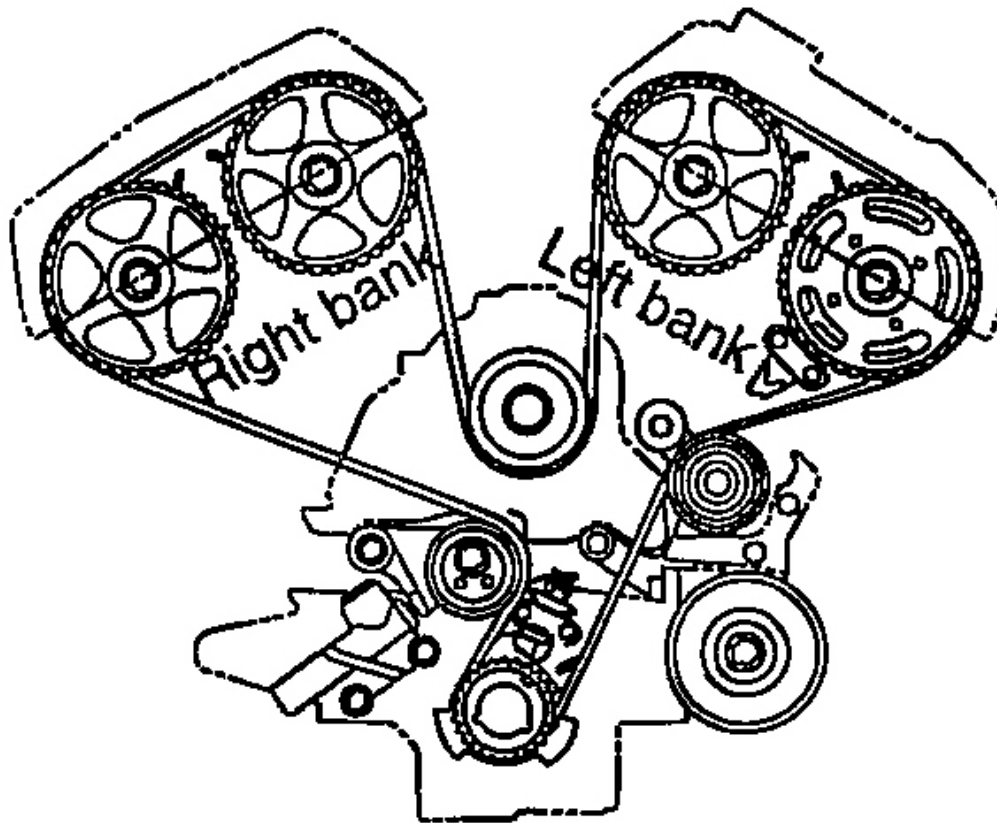


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Fig. 16: Installing The Auto Tensioner To The Oil Pump Case
Courtesy of KIA MOTORS AMERICA, INC.

6. Align the timing marks of each sprocket and install the timing belt, maintaining the proper belt tension between each shaft in this order.

Crankshaft sprocket, Idler pulley, Left bank exhaust camshaft sprocket, Left bank intake camshaft sprocket, Water pump pulley, Right bank intake camshaft sprocket, Right bank exhaust camshaft sprocket and Tensioner pulley.



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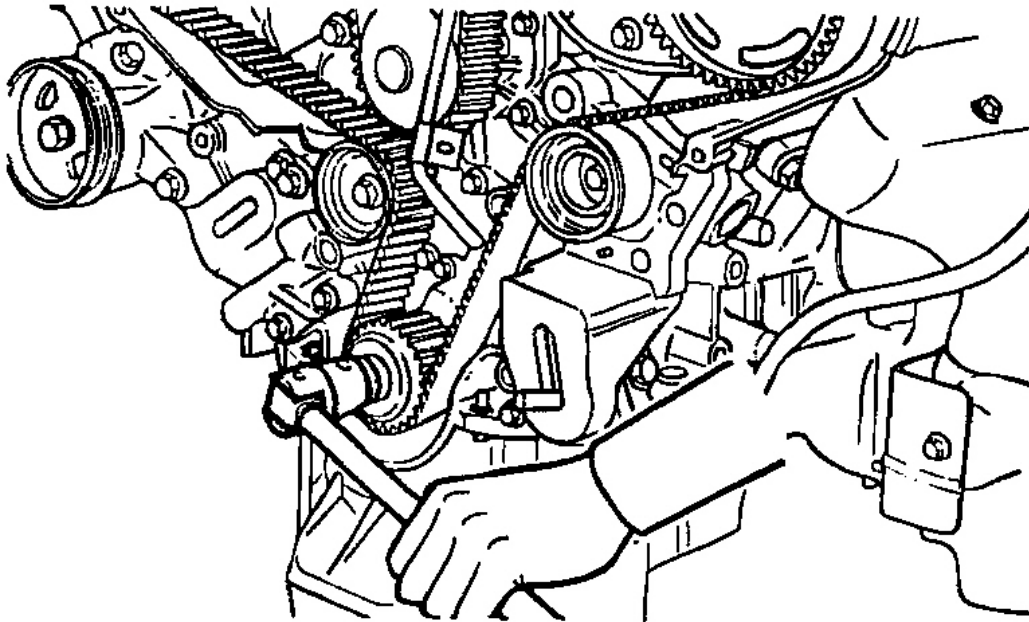
Fig. 17: Identifying Timing Belt Routing
Courtesy of KIA MOTORS AMERICA, INC.

CAUTION:

- As a result of this, position of No. 1 cylinder comes to compression TDC.
- As each camshaft sprocket tends to rotate by itself, pay attention not to injure fingers or other bodily part. Especially be careful with the right bank.
- In case the right bank camshaft sprocket rotates excessively, be cautious not to rotate more than the initial stable position. Always align timing mark of rotating sprocket by turning it reversely. In this case, pay attention not to rotate it reversely from the initial position. (If, with one sprocket fixed at No. 1

compression TDC position, the other sprocket is rotated one revolution clockwise or counter clockwise, then the intake and exhaust valve might interfere each other.)

7. After installing the timing belt, exert the reverse-directed force to the right bank exhaust camshaft sprocket to give tension on the belt. Holding this state, recheck if each timing mark is correctly positioned.
8. With tensioner pulley slightly pushing the belt down, tighten the center bolts lightly.



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Fig. 18: Exerting The Reverse-Directed Force To The Right Bank Exhaust Camshaft Sprocket
Courtesy of KIA MOTORS AMERICA, INC.

9. Pull out the auto tensioner set pin.

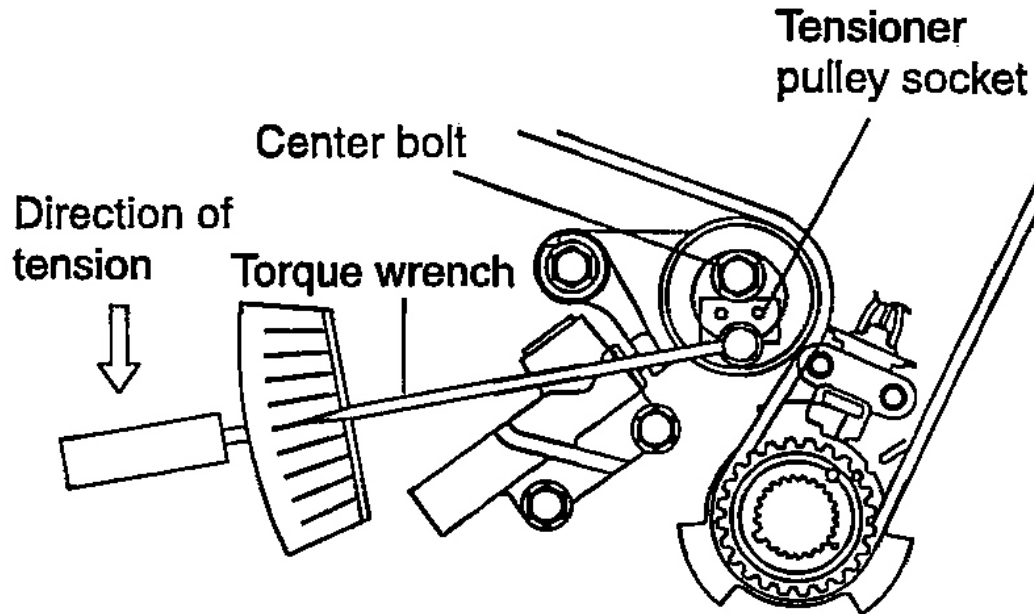
ADJUSTING TIMING BELT TENSION

1. Tension setting (While auto tensioner is not operating: And set pin being kept installed).
 1. After rotating crankshaft 1/4 revolution reversely, rotate it clockwise to position No. 1 cylinder at TDC.

Then, loosen the center bolt and give the belt 50 kg/cm of tension with tensioner pulley socket

(Two pins are attached) and torque wrench. While maintaining this state, tighten the center bolt to the standard torque.

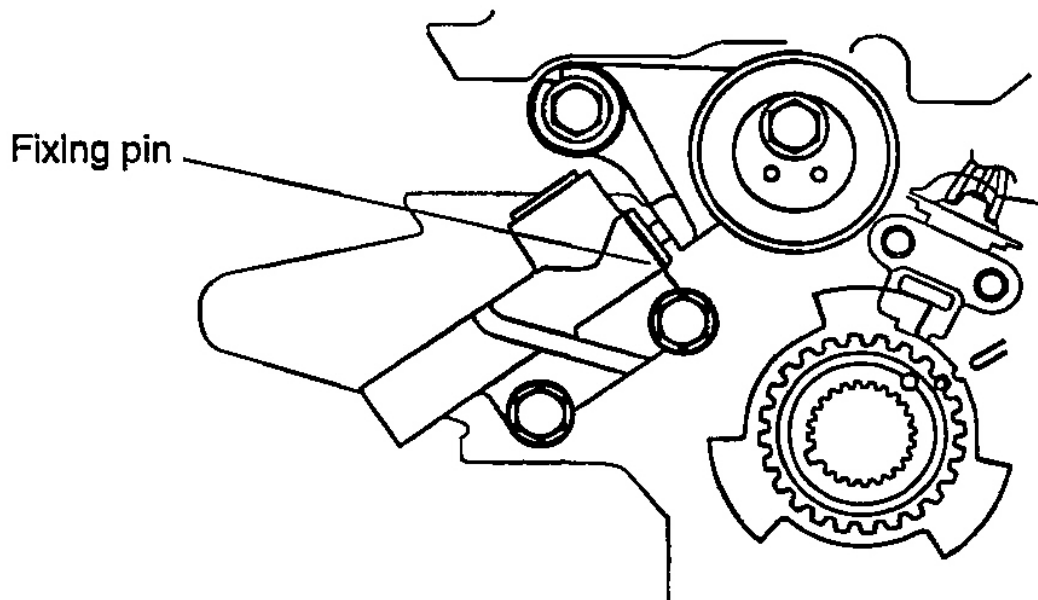
Center bolt standard torque: 43-55 N.m (430-550 kg/cm, 31.72-40.57 lb. ft.)



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Fig. 19: Tensioning Timing Belt
Courtesy of KIA MOTORS AMERICA, INC.

2. Pull out the auto tensioner fixing pin.



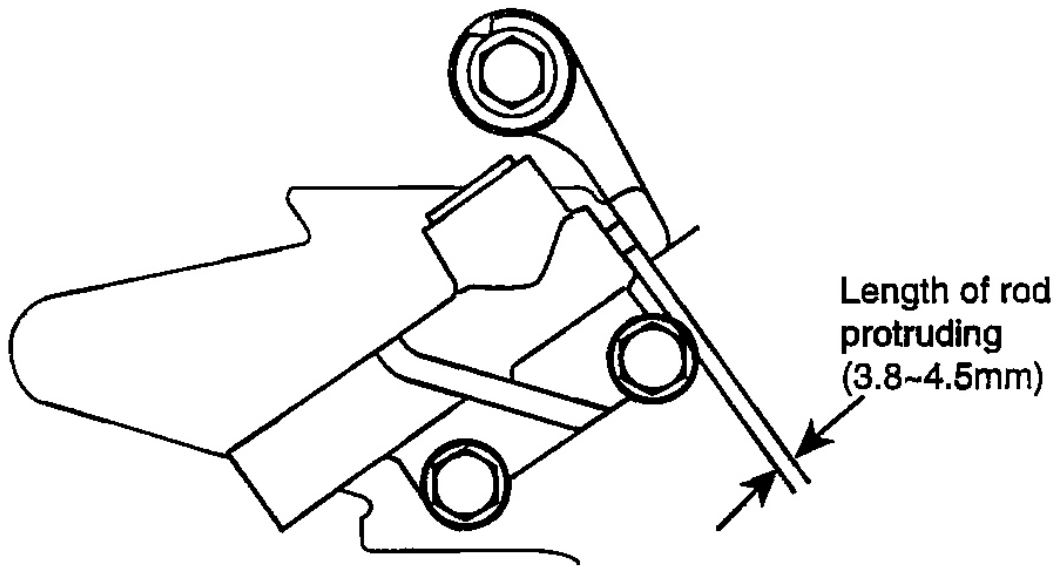
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Fig. 20: Removing Auto Tensioner Fixing Pin
Courtesy of KIA MOTORS AMERICA, INC.

2. How to check tension (While auto tensioner is operating: and fixing pin being uninstalled).
 - a. After rotating crankshaft 2 revolutions clockwise to position No. 1 cylinder at TDC, wait for about 5 minutes, and measure the amount of protruding of the auto tensioner rod.

CAUTION: This is "leak down" time for the auto tensioner rod to protrude 1mm when tension caused by rotation of the crankshaft has changed.

- b. Check if the amount of rod protruding is in the range of 3.8~4.5mm.



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Fig. 21: Measuring The Amount Of Rod Protruding From Auto Tensioner
 Courtesy of KIA MOTORS AMERICA, INC.

- c. Recheck if each sprocket is within the specified range.

NOTE: If it is not within the specified range, repeat from TIMING BELT AND AUTO TENSIONER .

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Auto Tensioner Fixed Bolt	15-20 (20-27)
Camshaft Sprocket Bolt	60-74 (80-100)
Crankshaft Pulley Bolt	133-140 (180-190)
Drive Belt Pulley Bolt	26-41 (35-55)
Drive Belt Tensioner Bolt/Nut	33-37 (45-50)
Timing Belt Cover Bolt	
6-mm	(1)
8-mm	15-20 (20-27)
Timing Belt Tensioner Arm Fixed Bolt	26-41 (35-55)
Timing Belt Tensioner Pulley Bolt	32-41 (43-55)

Timing Belt Idler Pulley Bolt

37-44 (50-60)

(1) Tighten bolts to 89-106 INCH lbs. (10-12 N.m).