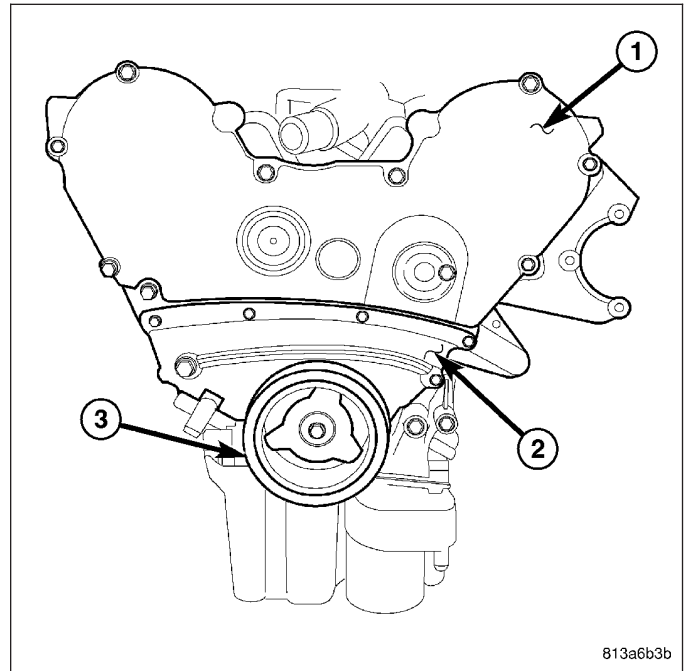


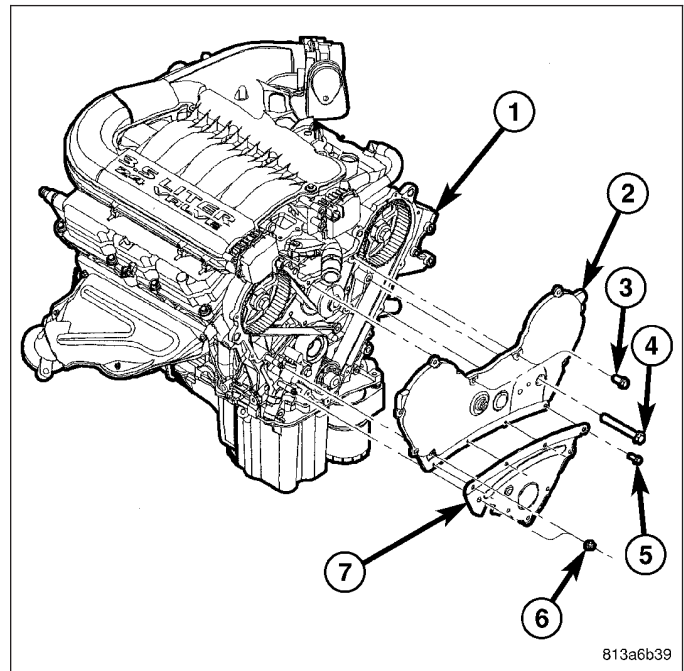
## COVER-FRONT TIMING BELT

### REMOVAL

1. Perform fuel pressure release procedure. (Refer to 14 - FUEL SYSTEM/FUEL DELIVERY - STANDARD PROCEDURE).
2. Disconnect negative battery cable.
3. Remove accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - REMOVAL).
4. Remove accessory drive belt tensioner.
5. Remove bolts for power steering pump. Reposition power steering pump aside.
6. Raise vehicle on hoist.
7. Remove crankshaft damper (Refer to 9 - ENGINE/ENGINE BLOCK/VIBRATION DAMPER - REMOVAL).
8. Remove the lower front timing belt cover fasteners.

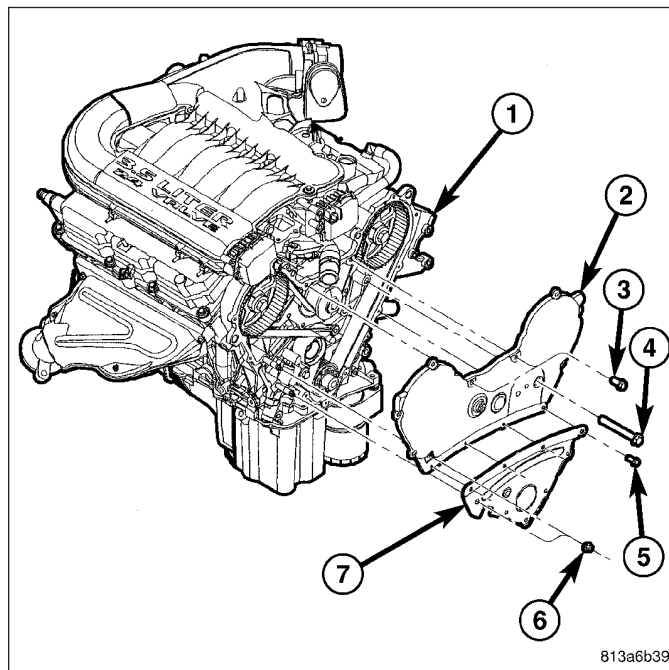


9. Lower the vehicle.
10. Remove the upper timing belt cover bolts and remove front timing belt cover.



## INSTALLATION

1. Exchange the accessory drive belt pulley if necessary. Tighten bolt to 61 N·m (45 ft.lbs.).
2. Install upper front timing belt cover.
3. Install lower timing belt front cover.
4. Tighten the timing cover bolts as follows:
  - M6 bolts - 12N·m (105 in.lbs.)
  - M8 bolts - 28N·m (250 in.lbs.)
  - M10 bolts - 54N·m (40 lbs.ft.)
5. Install power steering pump fasteners. Tighten bolts to 23 N·m (200 lbs. in.).
6. Install crankshaft damper (Refer to 9 - ENGINE/ENGINE BLOCK/VIBRATION DAMPER - INSTALLATION).
7. Install accessory drive belt tensioner (Refer to 7 - COOLING/ACCESSORY DRIVE/BELT TENSIONERS - INSTALLATION). Torque fastener to 28 N·m (250 in. lbs.).
8. Install accessory drive belt (Refer to 7 - COOLING/ACCESSORY DRIVE/DRIVE BELTS - INSTALLATION).
9. Lower vehicle.
10. Connect negative battery cable.

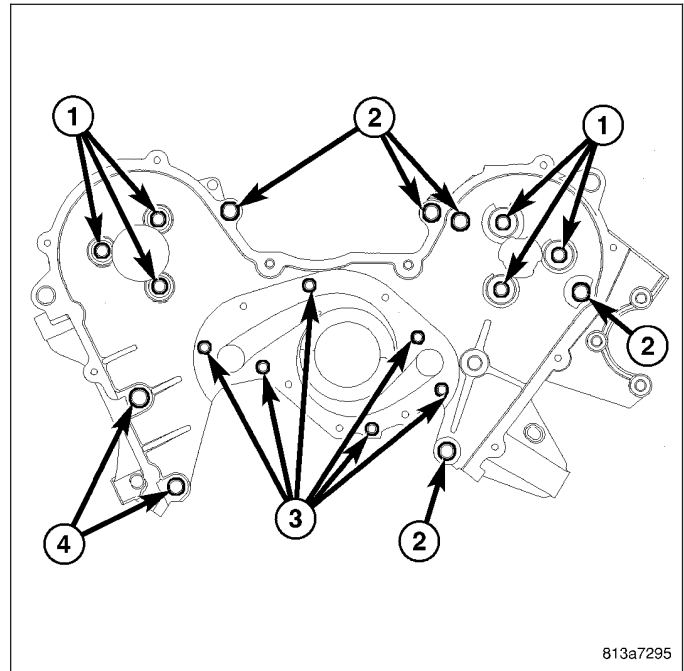


## COVER-REAR TIMING BELT

### REMOVAL

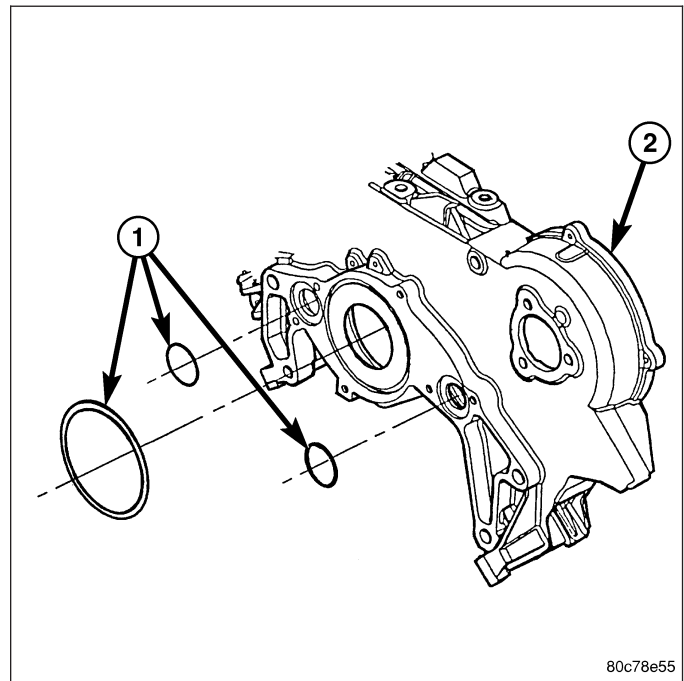
**NOTE:** The rear timing belt cover has O-rings to seal the water pump passages to cylinder block. Do not reuse the O-rings.

1. Perform fuel pressure release procedure. (Refer to 14 - FUEL SYSTEM/FUEL DELIVERY - STANDARD PROCEDURE).
2. Disconnect the negative battery cable.
3. Remove timing belt (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT/CHAIN AND SPROCKETS - REMOVAL).
4. Remove camshaft sprockets (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT/CHAIN AND SPROCKETS - REMOVAL).
5. Remove rear timing belt cover bolts (1, 2, 3).
6. Remove the rear cover.

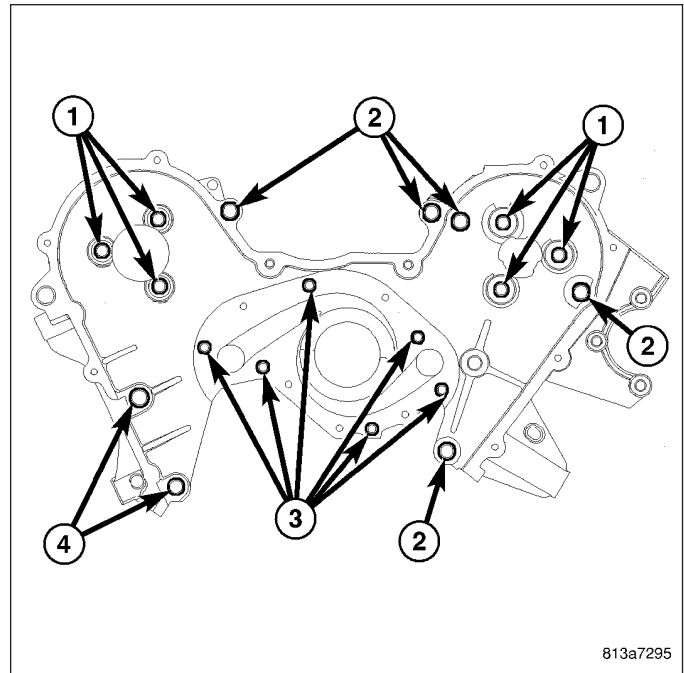


### INSTALLATION

1. Clean rear timing belt cover O-ring (1) sealing surfaces and grooves. Lubricate new O-rings with Mopar® Dielectric Grease or equivalent to facilitate assembly.
2. Position **NEW** O-rings on cover (2).



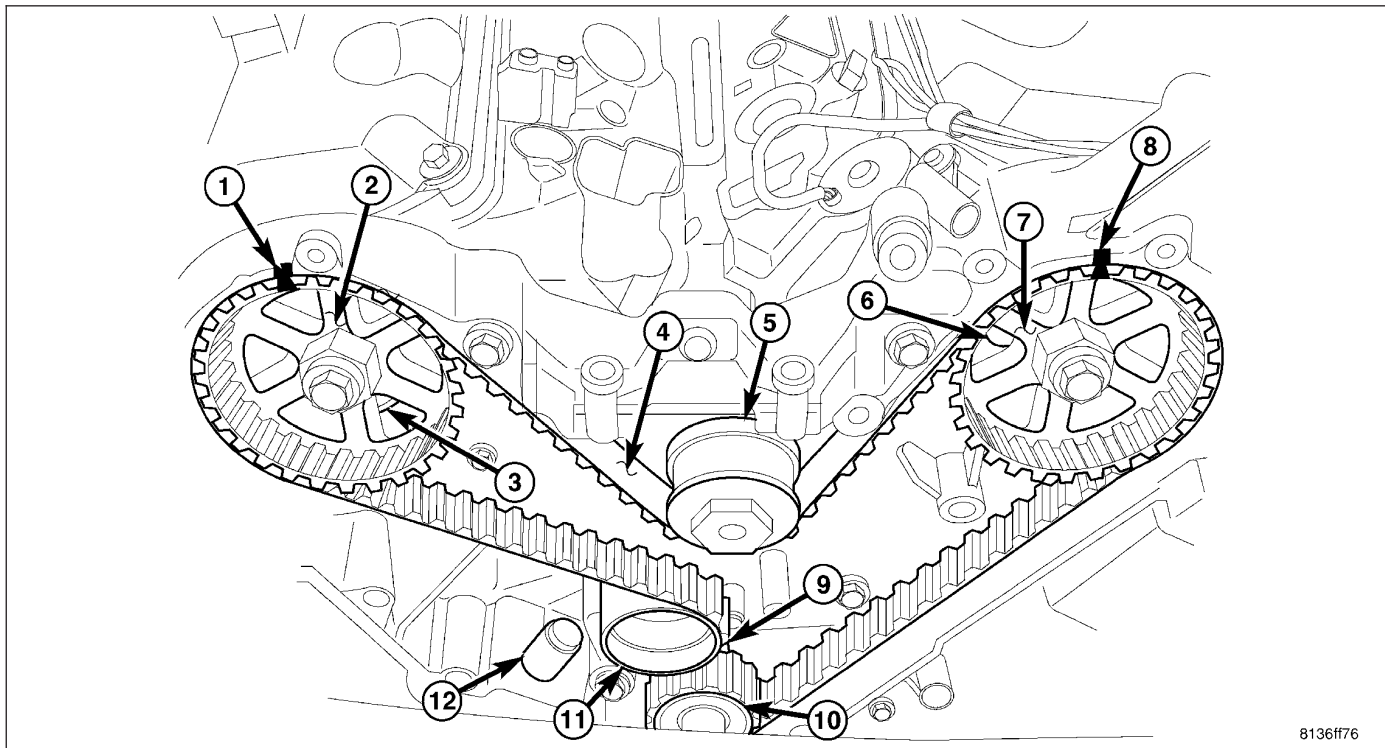
3. Install rear timing belt cover (4). Tighten bolts to the following specified torque:
  - M10 (2, 5) - 54 N·m (40 ft. lbs.)
  - M8 (1) - 28 N·m (20 ft. lbs.)
  - M6 (3) - 12 N·m (105 in. lbs.)
4. Install camshaft sprockets (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT/CHAIN AND SPROCKETS - INSTALLATION).
5. Install timing belt (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT/CHAIN AND SPROCKETS - INSTALLATION).



## BELT-TIMING AND SPROCKETS

### REMOVAL

#### TIMING BELT



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**TIMING GEAR ALIGNMENT**

- 1 - RIGHT CAMSHAFT GEAR ALIGNMENT MARK
- 2 - RIGHT CAMSHAFT GEAR
- 3 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - RIGHT
- 4 - TIMING BELT
- 5 - WATER PUMP PULLEY
- 6 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - LEFT

- 7 - LEFT CAMSHAFT GEAR
- 8 - LEFT CAMSHAFT GEAR ALIGNMENT MARK
- 9 - CRANKSHAFT GEAR ALIGNMENT MARK
- 10 - CRANKSHAFT GEAR
- 11 - TIMING BELT TENSIONER PULLEY
- 12 - TIMING BELT TENSIONER

**CAUTION:** The 3.5L is NOT a freewheeling engine. Therefore, loosen the valve train rocker assemblies before servicing the timing drive.

1. Perform fuel pressure release procedure. (Refer to 14 - FUEL SYSTEM/FUEL DELIVERY - STANDARD PROCEDURE).
2. Disconnect negative battery cable.
3. Remove both cylinder head covers and loosen the rocker arm assemblies (Refer to 9 - ENGINE/CYLINDER HEAD/ROCKER ARM / ADJUSTER ASSY - REMOVAL).
4. Remove the front timing belt cover (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT / CHAIN COVER(S) - REMOVAL).
5. Mark belt running direction, if timing belt is to be reused.

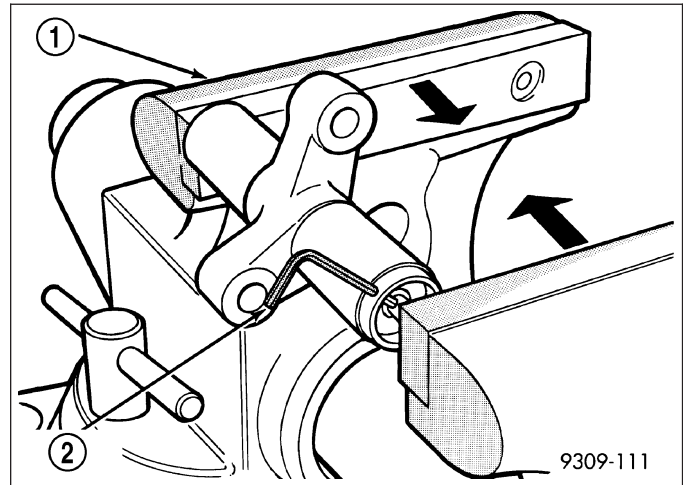
**CAUTION:** When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

6. Rotate engine clockwise until crankshaft (10) mark aligns with the TDC mark on oil pump housing (9) and the camshaft sprocket (2, 7) timing marks (1, 8) are aligned with the marks on the rear cover.
7. Remove the timing belt tensioner (12) and remove timing belt.

8. Inspect the tensioner for fluid leakage.
9. Inspect the pivot and bolt for free movement, bearing grease leakage, and smooth rotation. If not rotating freely, replace the arm and pulley assembly.
10. When tensioner is removed from the engine it is necessary to compress the plunger into the tensioner body.

**CAUTION:** Index the tensioner in the vise the same way it is installed on the engine. This ensures proper pin orientation when tensioner is installed on the engine.

- a. Place the tensioner into a vise (1) and SLOWLY compress the plunger. Total bleed down of tensioner should take about 5 minutes.
- b. When plunger is compressed into the tensioner body install a pin (2) through the body and plunger to retain plunger in place until tensioner is installed.

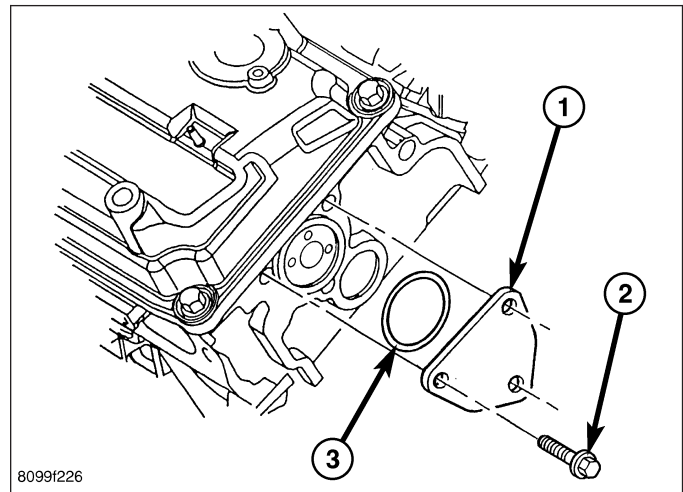


## CAMSHAFT SPROCKETS

**CAUTION:** The 3.5L engine is NOT a free-wheeling design. Therefore, care should be taken not to rotate the camshafts or crankshaft with the timing belt removed.

**NOTE:** The camshaft timing gears are keyed to the camshaft.

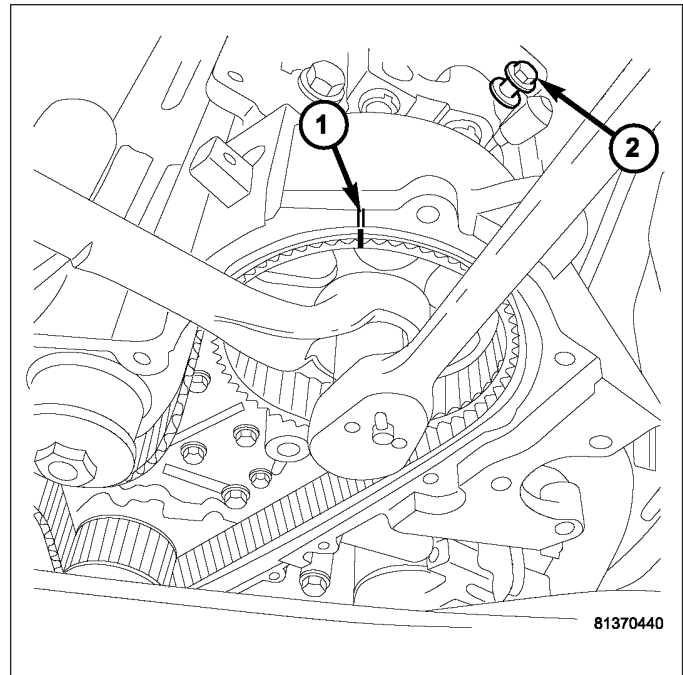
1. Perform fuel pressure release procedure. (Refer to 14 - FUEL SYSTEM/FUEL DELIVERY - STANDARD PROCEDURE).
2. Remove front timing belt cover (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT / CHAIN COVER(S) - REMOVAL).
3. Position crankshaft sprocket to the TDC mark on the oil pump housing by turning crankshaft in the clockwise direction.
4. Install a dial indicator in number 1 cylinder to check TDC of the piston. Rotate the crankshaft until the piston is at exactly TDC.
5. Remove camshaft retainer/thrust plate (1) from rear of right cylinder head.
6. Remove the right cylinder head cover.
7. Remove the right rocker arm assembly.
8. Remove the timing belt tensioner and timing belt.



9. Hold left camshaft sprocket with a 36 mm (1 7/16 in.) box end wrench.
10. Loosen and remove the camshaft gear retaining bolt and washer. The left bolt is 255 mm (10.0 in.) long.

**NOTE:** The camshaft timing gears are keyed to the camshaft.

11. Remove the camshaft sprocket.

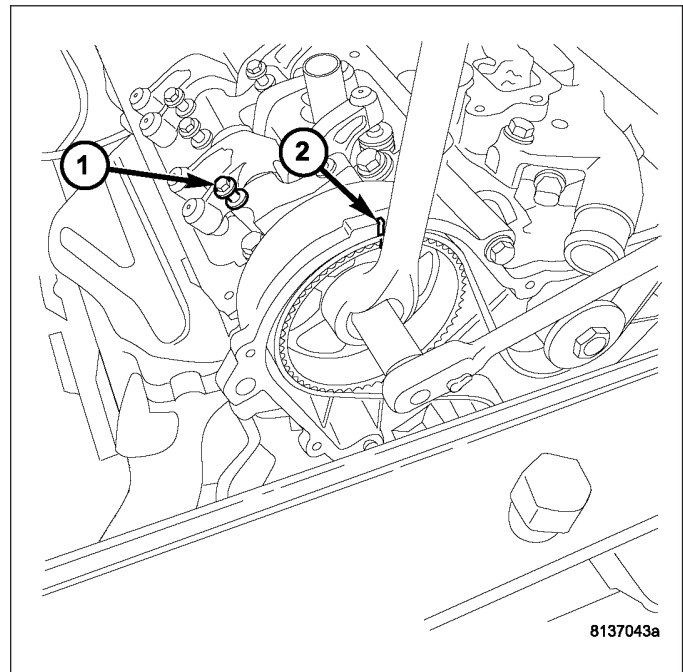


**CAUTION:** The right camshaft must be pushed rearward approximately 3 1/2 inches to remove the camshaft gear retaining bolt and gear. Care must be taken not to scratch or nick the camshaft or cylinder head journals when moving camshaft.

12. Hold right camshaft sprocket with a 36 mm (1 7/16 in.) box end wrench.
13. Loosen and remove the camshaft gear retaining bolt and washer. The right bolt is 213 mm (8 3/8 in.) long.

**NOTE:** The camshaft timing gears are keyed to the camshaft.

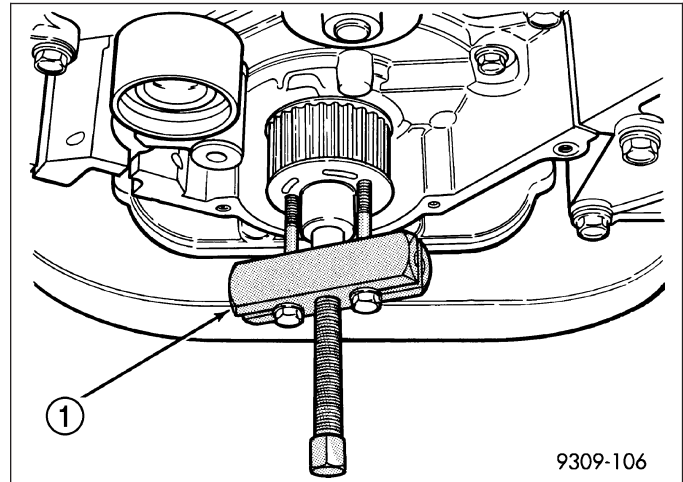
14. Remove the camshaft sprocket.





## CRANKSHAFT SPROCKET

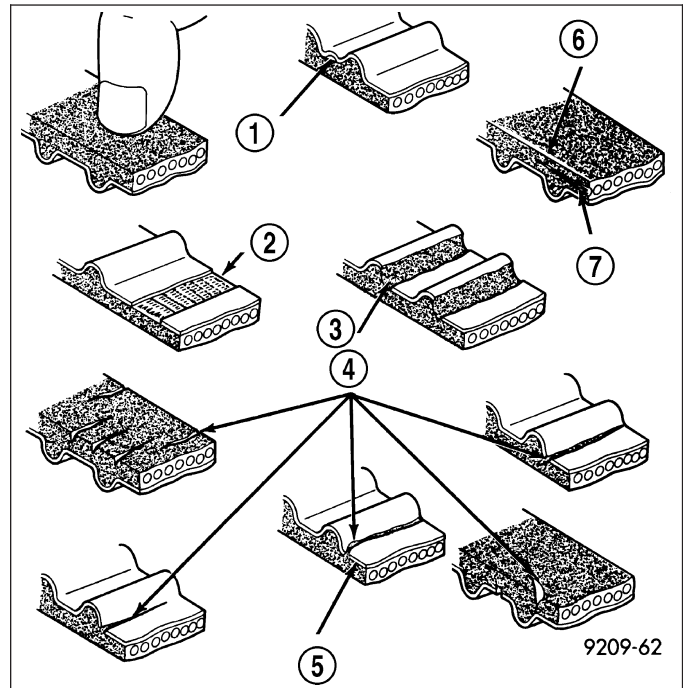
1. Remove the timing belt (Refer to 9 - ENGINE/ VALVE TIMING/TIMING BELT/CHAIN AND SPROCKETS - REMOVAL).
2. Remove crankshaft sprocket using Special Tool L-4407-A (1).



## INSPECTION

### TIMING BELT

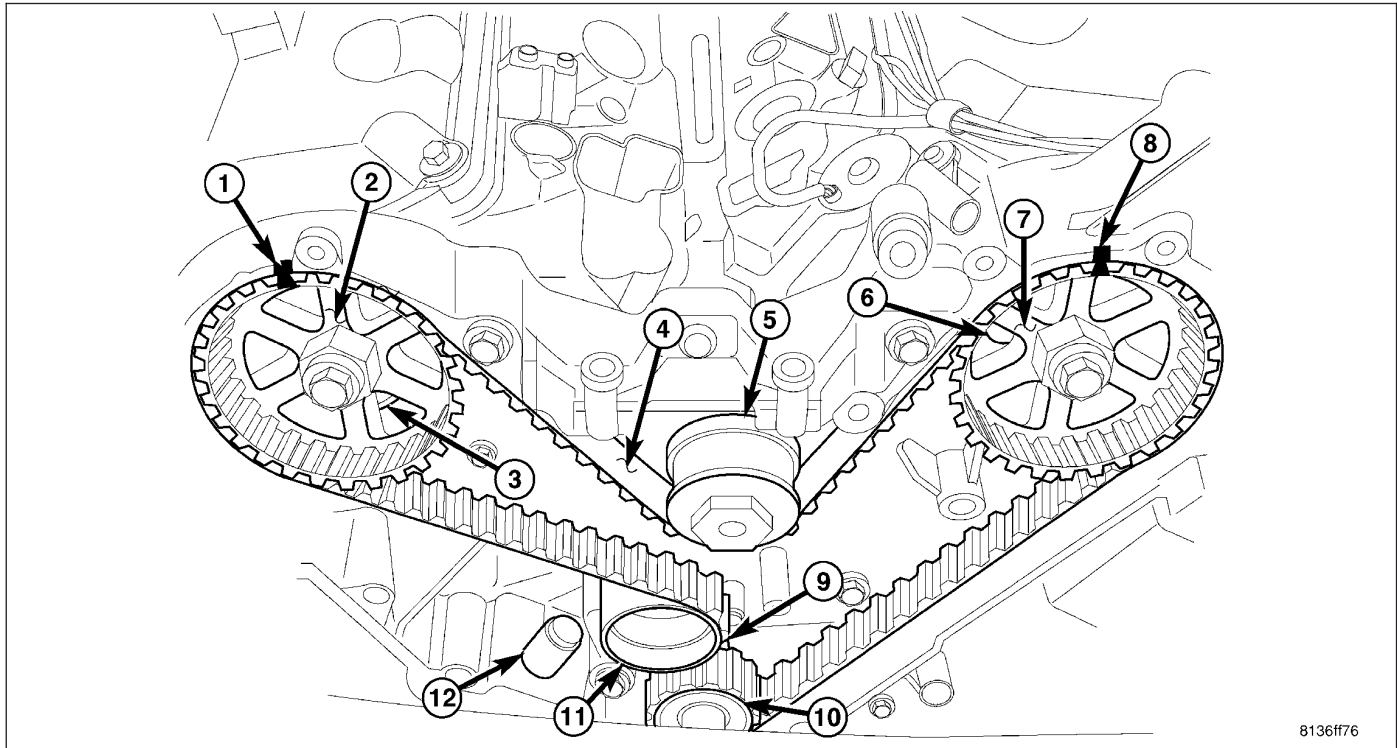
1. Remove front timing belt cover (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT / CHAIN COVER(S) - REMOVAL).
2. Inspect both sides of the timing belt. Replace belt if any of the following conditions exist :
  - a. Hardening of back rubber back side is glossy without resilience and leaves no indent when pressed with fingernail.
  - b. Cracks (4) on rubber back.
  - c. Cracks or peeling (1) of canvas.
  - d. Cracks on rib root.
  - e. Cracks on belt sides.
  - f. Missing teeth (2).
  - g. Abnormal wear (7) of belt sides. The sides are normal if they are sharp as if cut by a knife.
  - h. Vehicle mileage or time at component maintenance requirement. (Refer to LUBRICATION & MAINTENANCE/MAINTENANCE SCHEDULES - DESCRIPTION)



3. If none of the above conditions are seen on the belt, the front timing belt cover can be installed (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT / CHAIN COVER(S) - INSTALLATION).



## TIMING VERIFICATION



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**TIMING GEAR ALIGNMENT**

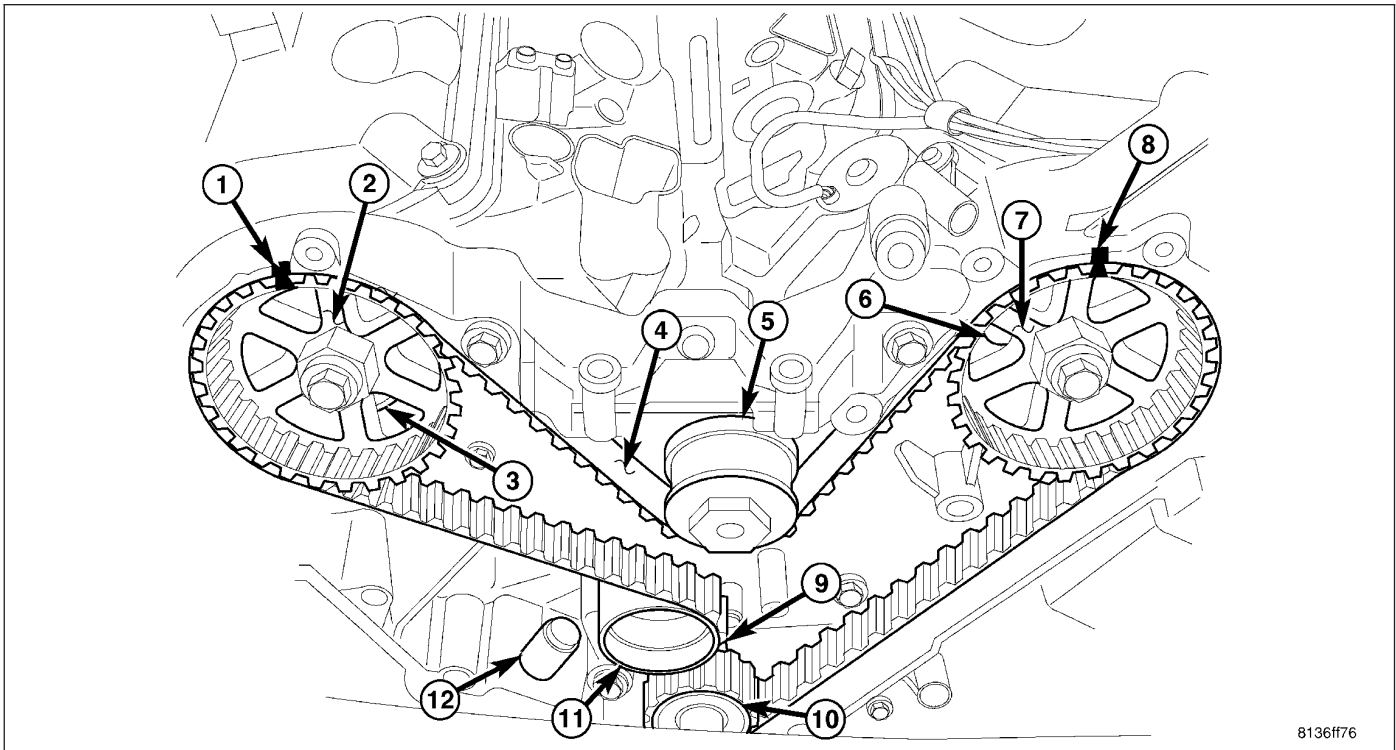
- |  |                                       |
|--|---------------------------------------|
| 1 - RIGHT CAMSHAFT GEAR ALIGNMENT MARK                     | 7 - LEFT CAMSHAFT GEAR                |
| 2 - RIGHT CAMSHAFT GEAR                                    | 8 - LEFT CAMSHAFT GEAR ALIGNMENT MARK |
| 3 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - RIGHT | 9 - CRANKSHAFT GEAR ALIGNMENT MARK    |
| 4 - TIMING BELT  | 10 - CRANKSHAFT GEAR                  |
| 5 - WATER PUMP PULLEY                                      | 11 - TIMING BELT TENSIONER PULLEY     |
| 6 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - LEFT  | 12 - TIMING BELT TENSIONER            |

Remove the outer timing covers. Rotate the crankshaft until the pointer on the crankshaft sprocket (10) aligns the TDC mark on the oil pump (9). Check to determine if the camshaft sprocket (2, 7) timing marks (1, 8) are aligned with the marks on the inner timing cover. It may take an additional full revolution of the crankshaft before the camshaft sprocket marks are aligned.

## INSTALLATION

### TIMING BELT

**CAUTION:** If camshafts have moved from the timing marks, always rotate camshaft towards the direction nearest to the timing marks (**DO NOT TURN CAMSHAFTS A FULL REVOLUTION OR DAMAGE** to valves and/or pistons could result).



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**TIMING GEAR ALIGNMENT**

- |  |                                       |
|--|---------------------------------------|
| 1 - RIGHT CAMSHAFT GEAR ALIGNMENT MARK                     | 7 - LEFT CAMSHAFT GEAR                |
| 2 - RIGHT CAMSHAFT GEAR                                    | 8 - LEFT CAMSHAFT GEAR ALIGNMENT MARK |
| 3 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - RIGHT | 9 - CRANKSHAFT GEAR ALIGNMENT MARK    |
| 4 - TIMING BELT  | 10 - CRANKSHAFT GEAR                  |
| 5 - WATER PUMP PULLEY                                      | 11 - TIMING BELT TENSIONER PULLEY     |
| 6 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - LEFT  | 12 - TIMING BELT TENSIONER            |

- Align the crankshaft sprocket (10) with the TDC mark (9) on oil pump cover.
- Align the camshaft sprockets (2, 7) timing reference marks (1, 8) with the marks on the rear cover.
- Install the timing belt starting at the crankshaft sprocket (10) going in a counterclockwise direction. Install the belt around the last sprocket. Maintain tension on the belt as it is positioned around the tensioner pulley (11).

**NOTE:** If the camshaft gears have been removed it is only necessary to have the camshaft gear retaining bolts installed to a snug torque at this time.

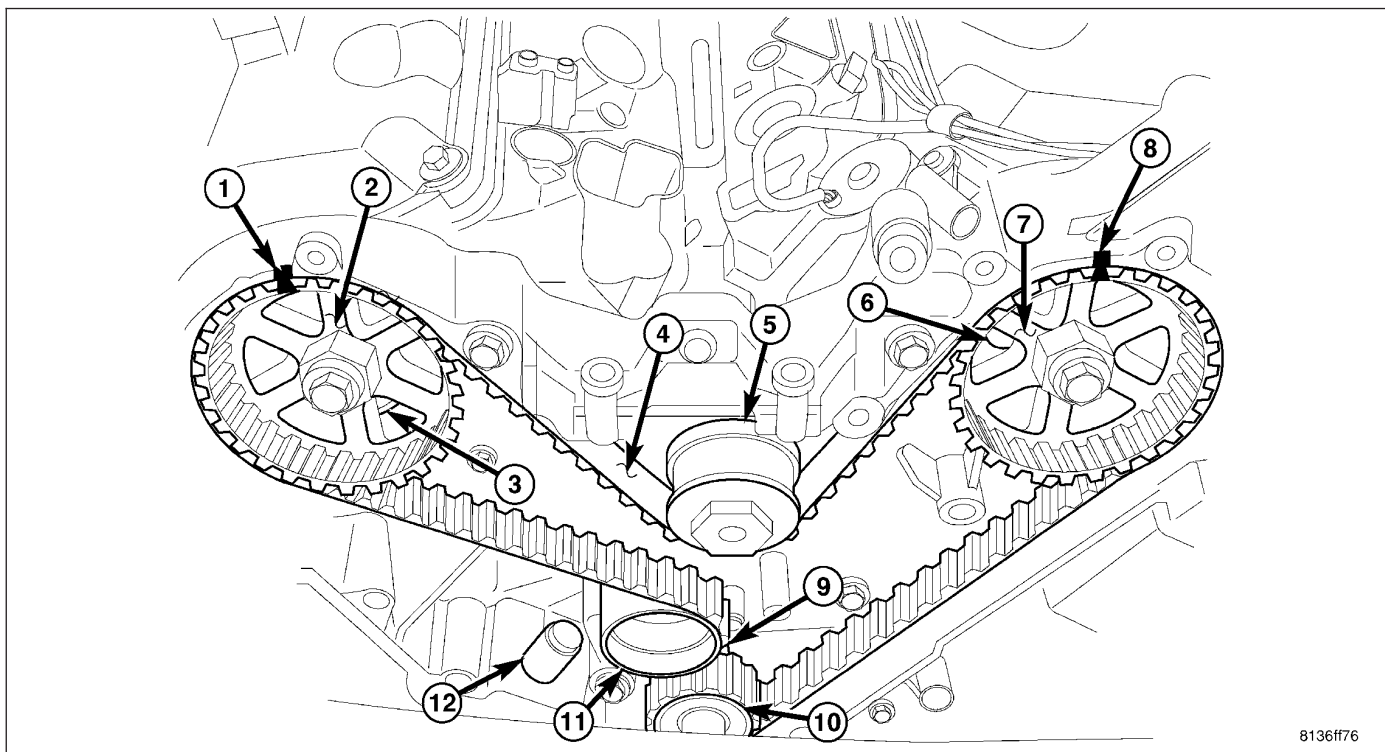
- Holding the tensioner pulley (11) against the belt, install the tensioner into the housing and tighten to 28 N·m (250 in. lbs.). Each camshaft sprocket mark should remain aligned the cover marks.
- When tensioner is in place pull retaining pin to allow the tensioner to extend to the pulley bracket.
- Rotate crankshaft sprocket 2 revolutions and check the timing marks on the camshafts and crankshaft. The marks should line up within their respective locations. If marks do not line up, repeat procedure.

**NOTE:** If camshaft gears have been removed and timing is correct, counterhold and tighten the camshaft gears to final torque specification (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT/CHAIN AND SPROCKETS - INSTALLATION).

- Install the front timing belt cover (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT / CHAIN COVER(S) - INSTALLATION).
- Tighten the rocker arm assemblies and install the cylinder head covers (Refer to 9 - ENGINE/CYLINDER HEAD/ROCKER ARM / ADJUSTER ASSY - INSTALLATION).
- Connect negative battery cable.

## CAMSHAFT SPROCKETS

**CAUTION:** The camshaft sprockets are keyed and not interchangeable from side to side because of the camshaft position sensor pick-up.



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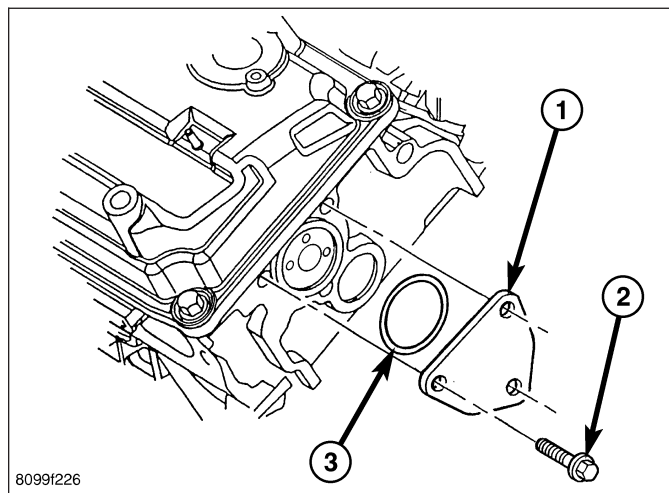
**TIMING GEAR ALIGNMENT**

- 1 - RIGHT CAMSHAFT GEAR ALIGNMENT MARK
- 2 - RIGHT CAMSHAFT GEAR
- 3 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - RIGHT
- 4 - TIMING BELT
- 5 - WATER PUMP PULLEY
- 6 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - LEFT

- 7 - LEFT CAMSHAFT GEAR
- 8 - LEFT CAMSHAFT GEAR ALIGNMENT MARK
- 9 - CRANKSHAFT GEAR ALIGNMENT MARK
- 10 - CRANKSHAFT GEAR
- 11 - TIMING BELT TENSIONER PULLEY
- 12 - TIMING BELT TENSIONER

1. Install camshaft sprockets onto the camshafts. Install **NEW** sprocket attaching bolts into place. The 255 mm (10 in.) bolt is to be installed in the left camshaft and the 213 mm (8 3/8 in.) bolt is to be installed into the right camshaft. **Do not tighten the bolts; tightened at later step.** Camshaft sprocket (2, 7) marks (1, 8) should be aligned with the marks on the cover at both sprockets.
2. Install the camshaft thrust plates (1) and o-ring (3). Tighten bolts (2) to 28 N·m (250 in. lbs.).
3. Install the timing belt starting first at the crankshaft sprocket (10), then to remaining components in a counterclockwise direction.
4. Install the belt around the last sprocket. Maintain tension on the belt as it is positioned around the tensioner pulley (11). Each camshaft sprockets mark should still be aligned with the rear cover marks.

**NOTE:** For timing belt tensioner reset procedure, (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT AND SPROCKETS - TIMING BELT - REMOVAL).



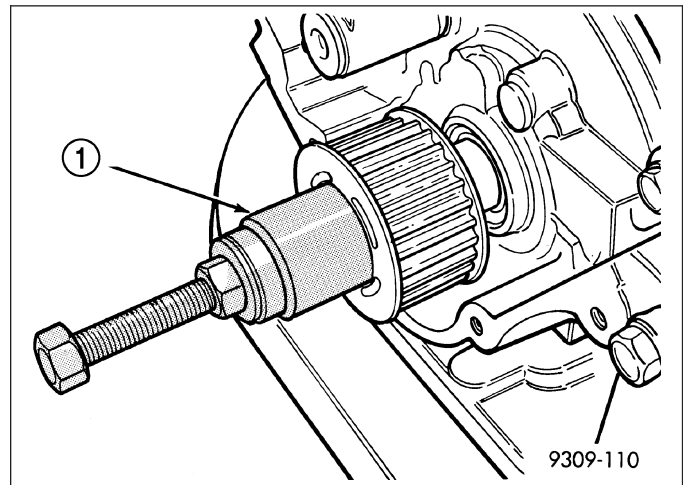
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5. Hold the tensioner pulley against the belt and install the reset (pinned) timing belt tensioner into the housing. Tighten attaching bolts to 28 N·m (250 in. lbs.).
6. Remove tensioner retaining pin to allow the tensioner to extend to the pulley bracket.
7. Using a dial indicator, position the number 1 piston at TDC.
8. Hold the camshaft sprocket hex with a 36 mm (1 7/16 in.) wrench and tighten the camshaft bolts to the following:
  - Right side = 102 N·m (75 ft. lbs.) +90° turn
  - Left side = 102 N·m (75 ft. lbs.) +90° turn
9. Remove dial indicator and install spark plug.
10. Remove Special Tools 6642.
11. Install front timing belt cover (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT / CHAIN COVER(S) - INSTALLATION).

## CRANKSHAFT SPROCKET

**CAUTION:** To ensure proper installation depth of crankshaft sprocket, Special Tool 6641 must be used.

1. Install crankshaft sprocket using Special Tools 6641 (1) and C-4685-C1.
2. Install timing belt (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT/CHAIN AND SPROCKETS - INSTALLATION).



## TENSIONER - TIMING BELT & PULLEY

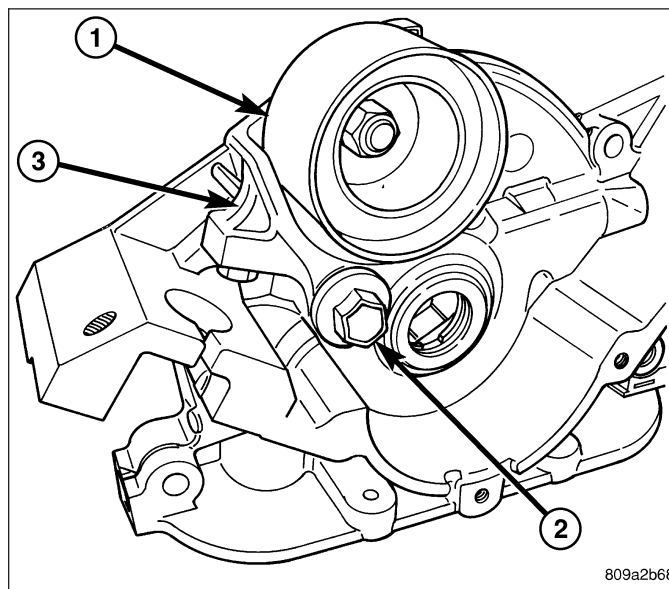
### REMOVAL

#### TENSIONER

1. For timing belt tensioner removal procedure (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT AND SPROCKETS - REMOVAL - TIMING BELT)

#### TENSIONER PULLEY ASSEMBLY

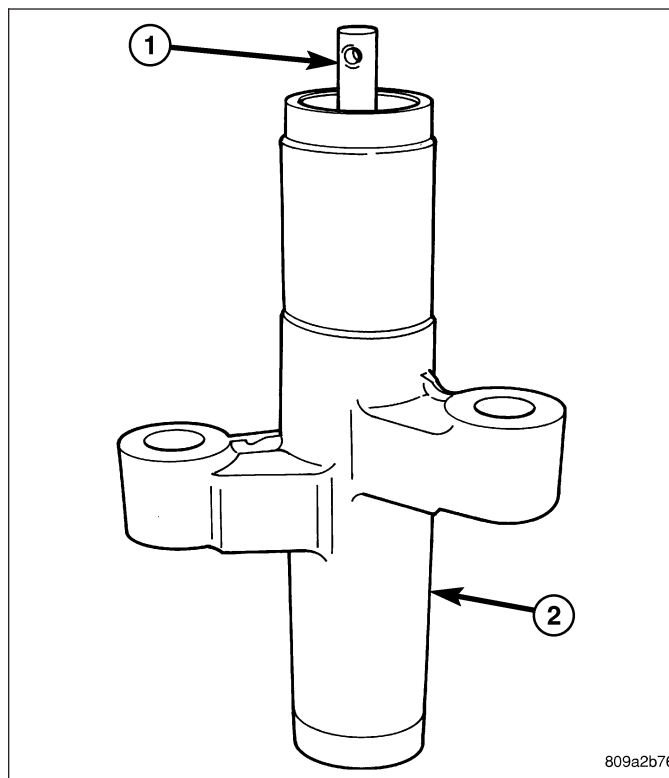
1. Remove the timing belt. (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT AND SPROCKETS - REMOVAL - TIMING BELT)
2. Remove the timing belt tensioner pulley (1) and bracket (3) assembly by unscrewing the pivot bolt (2) from the oil pump housing.



## INSPECTION

### TENSIONER

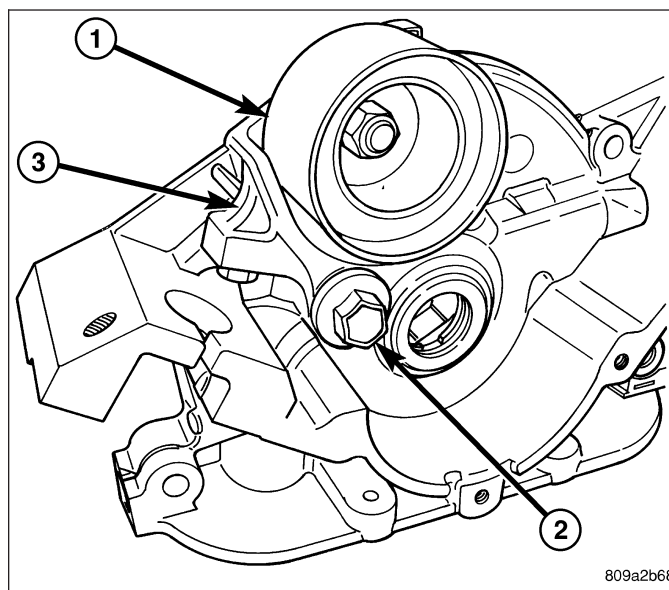
1. Inspect hydraulic tensioner (2) for fluid loss around the plunger (1) seal. Replace tensioner if leaking.



### TENSIONER PULLEY ASSEMBLY

**NOTE:** The tensioner pulley (1), bracket (3), and pivot bolt (2) is serviced as an assembly.

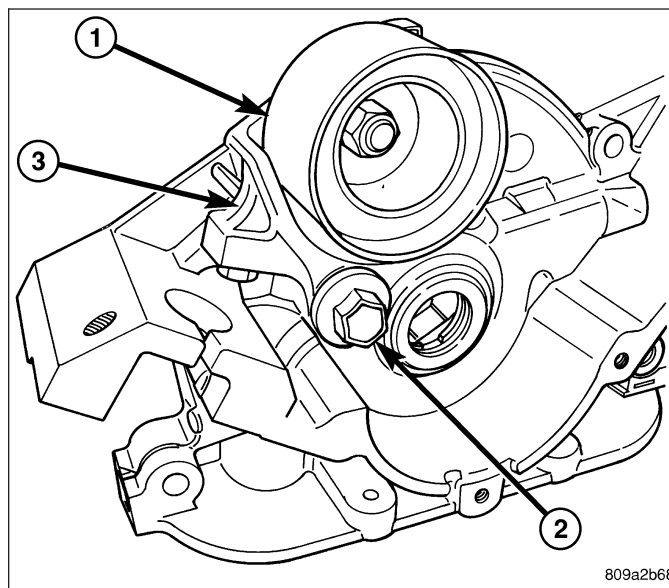
1. Inspect pulley (1) for free movement. Replace if pulley is loose, seized, or rough turning.
2. Inspect pulley bearing and seal. Replace if damaged.
3. Inspect pivot bolt (2) for free movement in assembly housing. Replace assembly if seized or excessive looseness.



## INSTALLATION

### TENSIONER PULLEY ASSEMBLY

1. Install the timing belt tensioner pulley (1) assembly. Tighten the pivot bolt (2) to 61 N·m (45 ft. lbs.).
2. Install the timing belt. (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT AND SPROCKETS - INSTALLATION - TIMING BELT)



### TENSIONER

1. For timing belt tensioner installation procedure (Refer to 9 - ENGINE/VALVE TIMING/TIMING BELT AND SPROCKETS - INSTALLATION - TIMING BELT).