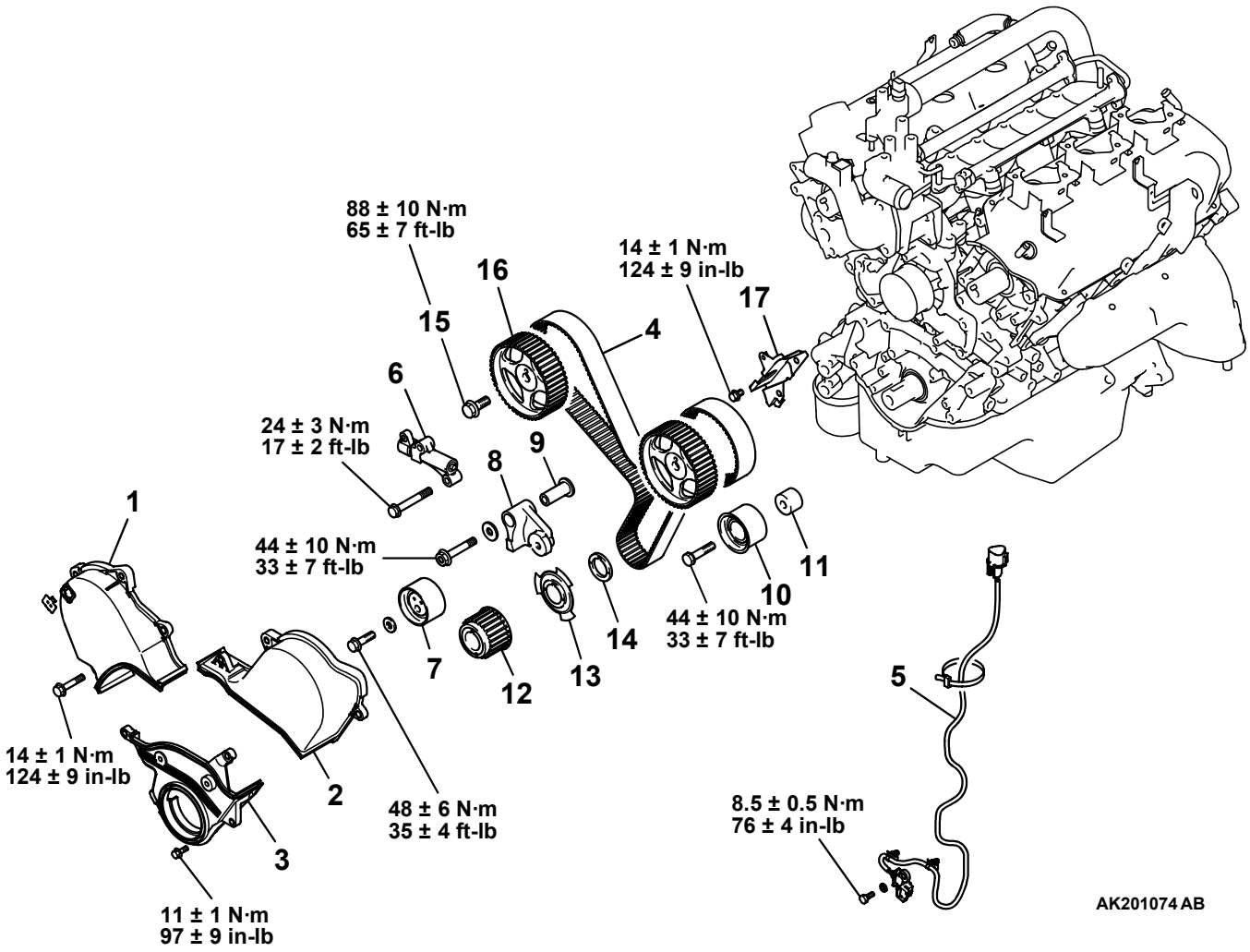
TIMING BELT

REMOVAL AND INSTALLATION

M1113001900403



REMOVAL STEPS

1. TIMING BELT FRONT UPPER COVER, RIGHT
2. TIMING BELT FRONT UPPER COVER, LEFT
3. TIMING BELT FRONT LOWER COVER
<<A>> >>D<< 4. TIMING BELT
5. CRANKSHAFT POSITION SENSOR
>>C<< 6. AUTO-TENSIONER
7. TENSIONER PULLEY

REMOVAL STEPS (Continued)

8. TENSIONER ARM
9. SHAFT
10. IDLER PULLEY
11. IDLER PULLEY SPACER
>>B<< 12. CRANKSHAFT SPROCKET
13. CRANKSHAFT SENSING BLADE
>>B<< 14. CRANKSHAFT SPACER
<<B>> >>A<< 15. CAMSHAFT SPROCKET BOLT
16. CAMSHAFT SPROCKET
17. TIMING BELT REAR COVER

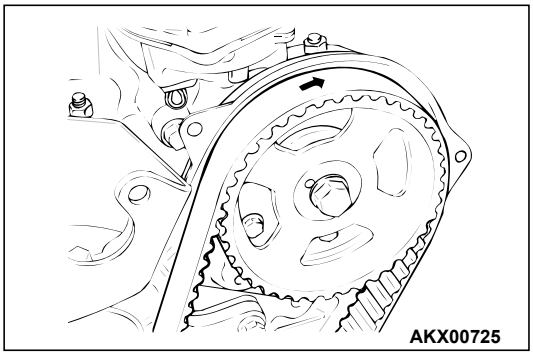
Required Special Tool:

- MB990767: End Yoke Holder
- MD998715: Pins
- MD998767: Tensioner Pulley Wrench
- MD998769: Crankshaft Spacer

TSB Revision

REMOVAL SERVICE POINTS

<<A>> TIMING BELT REMOVAL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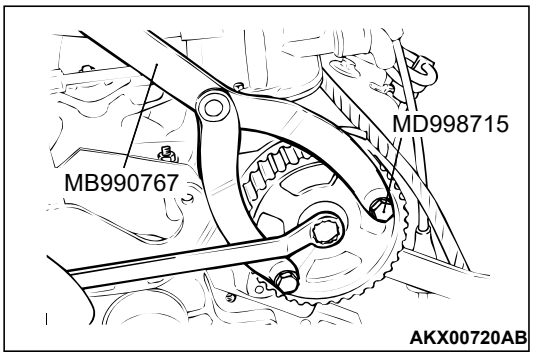
⚠ CAUTION

Water or oil on the belt shortens its life drastically, so the removed timing belt, sprocket, and tensioner must be kept free from oil and water. Do not immerse parts in cleaning solvent.

Mark the belt running direction for reference in reinstallation.

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

<<B>> CAMSHAFT SPROCKET BOLT REMOVAL



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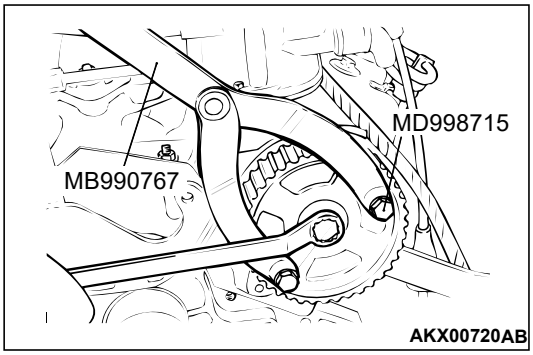
Use special tools MB990767 and MD998715 to prevent the camshaft sprocket from turning, and then loosen the camshaft sprocket bolt.

INSTALLATION SERVICE POINTS

>>A<< CAMSHAFT SPROCKET BOLT INSTALLATION



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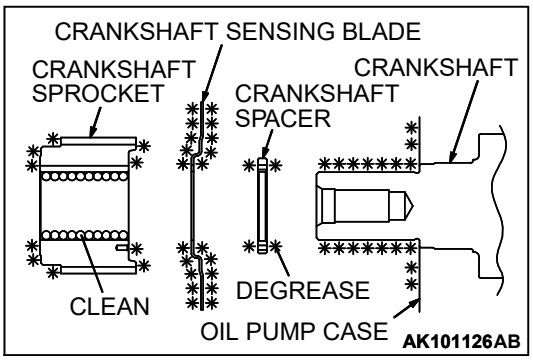
Use special tools MB990767 and MB998715 to prevent the camshaft sprocket from turning, and then tighten the camshaft sprocket bolt.

Tightening torque: 88 ± 10 N·m (65 ± 7 ft-lb)

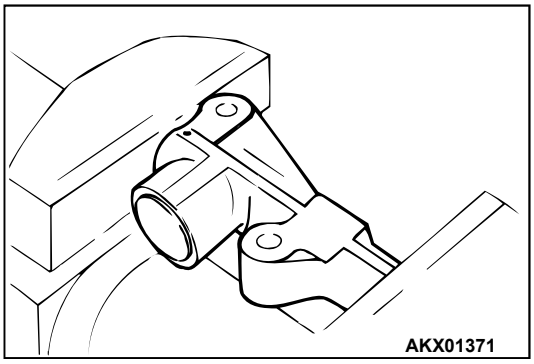
>>B<< CRANKSHAFT SENSING BLADE/CRANKSHAFT SPACER/CRANKSHAFT SPROCKET INSTALLATION



1. Clean the hole in the crankshaft sprocket.
2. Clean and degrease the mating surfaces of the crankshaft sprocket; sensing blade; and spacer.

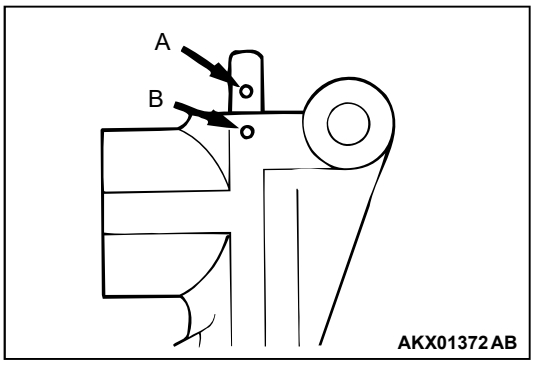
NOTE: Degreasing is necessary to prevent decrease in friction between the mating surface due to presence of oil.

>>C<< AUTO-TENSIONER INSTALLATION



If the auto-tensioner rod is fully extended, set it in the retracted position with the following procedure.

1. Set the auto-tensioner in a vice.

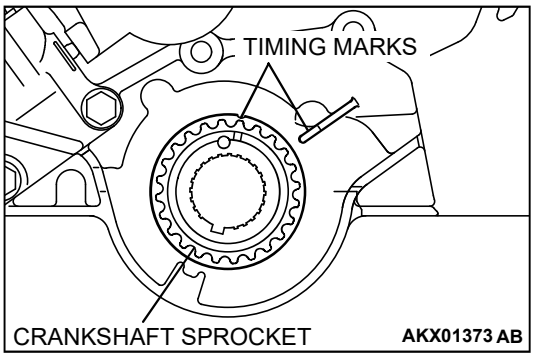


2. Slowly close the vice to force the rod in until the set hole (A) of the rod is lined up with the set hole (B) of the cylinder.
3. Insert a wire [1.4 mm (0.06 inch) in diameter] into the set holes.
4. Remove the auto-tensioner from the vice.

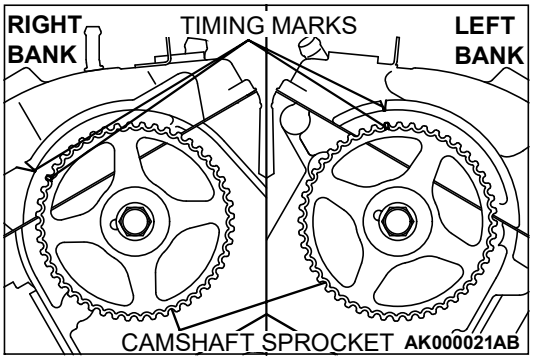
>>D<< TIMING BELT INSTALLATION

⚠ CAUTION

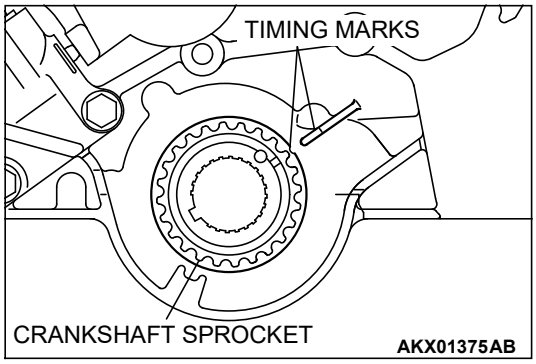
If the camshaft sprocket is rotated with the piston at the top dead center on the compression stroke of the number 1 cylinder, the valve and piston might interfere.



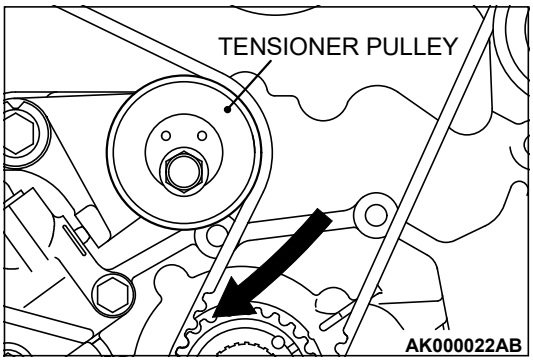
1. Move the timing mark of the crankshaft sprocket three teeth to slightly lower the piston below the top dead center on the compression stroke of the number 1 cylinder.

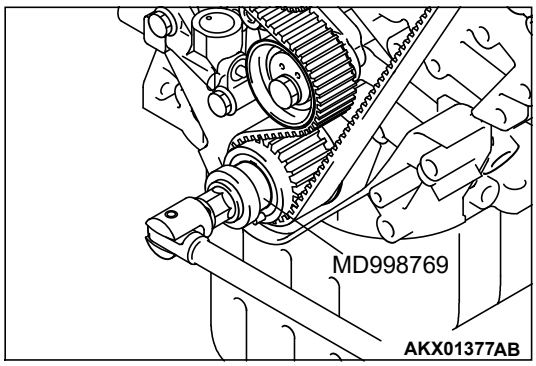


2. Line up the timing marks of the left bank camshaft sprockets.
3. Line up the timing marks of the right bank camshaft sprockets.

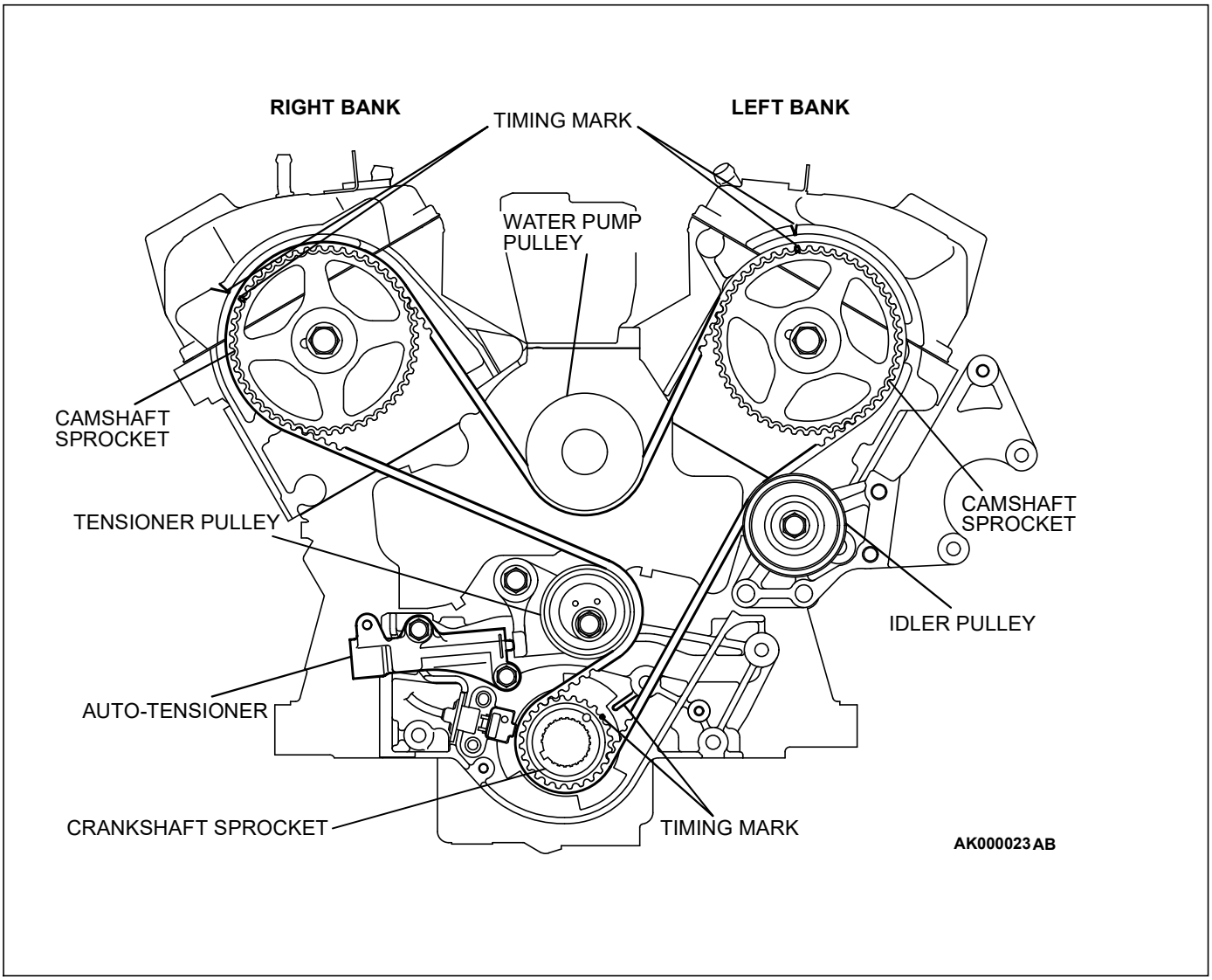


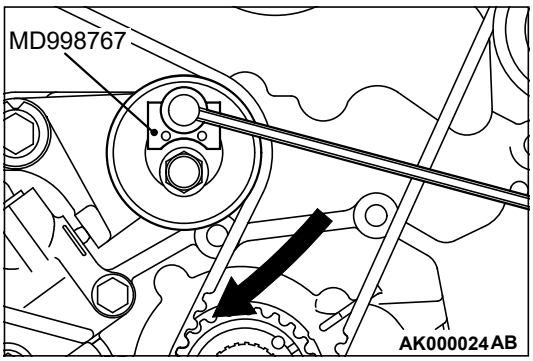
4. Line up the timing marks of the crankshaft sprockets.
5. Install the timing belt on each sprocket in the following sequence.
   (1) Install the timing belt on the crankshaft sprocket and then on the idler pulley, while tightening it to prevent slackness.
   (2) Line up the timing marks of the left bank camshaft sprockets.
   (3) Install the timing belt on the water pump pulley, while taking up the slack.
   (4) Install the timing belt on the right bank camshaft sprocket.
   (5) Install the timing belt on the tensioner pulley.
6. Lightly press the tensioner pulley against the belt and temporarily tighten the center bolt.
7. Check to see that the timing marks of all the sprockets are in a alignment.





8. Using special tool MD998769, rotate the crankshaft a quarter of a turn counterclockwise. Then rotate it back clockwise to verify that all the timing marks are in alignment.

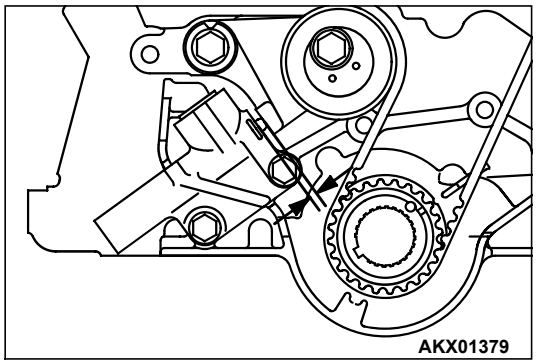




9. Mount special tool MD998767 and torque wrench on the tensioner pulley.
10. Torque it to 4.4 N·m (39 in-lb) with the torque wrench.
11. While holding the tensioner pulley in position, tighten the center bolt to the specified torque.

    Tightening torque: 48 ± 6 N·m (35 ± 4 ft-lb)

12. Rotate the crankshaft two turns clockwise and leave it alone for approximately five minutes.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13. Check to see whether the metal wire inserted when the auto-tensioner was installed can be removed without any resistance.
    If the metal wire can be removed without any resistance, it means that the belt has a proper tension. Therefore, remove the metal wire. In this condition, check that the projection of the rod of the auto-tensioner is within the standard value.
    Standard value: 4.8 – 5.5 mm (0.19 – 0.21 inch)
14. If the metal wire offers resistance when removed, repeat the previous steps (9) through (12) until a proper belt tension is obtained.

INSPECTION

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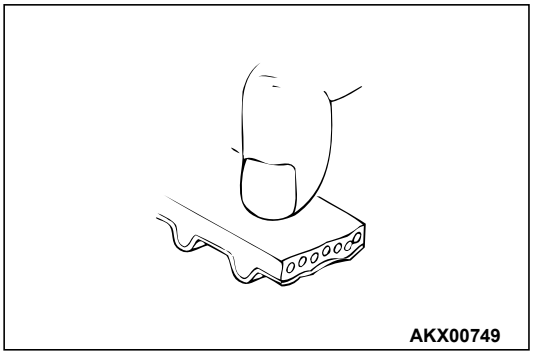
TIMING BELT

Replace the belt if any of the following conditions exist.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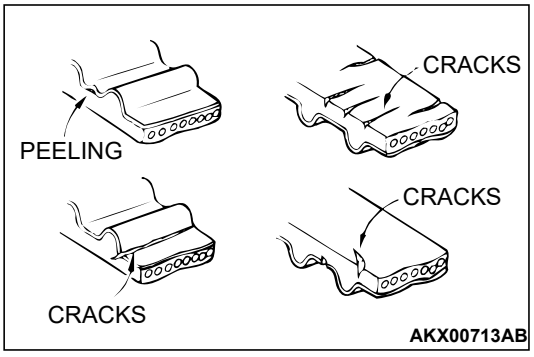
1. Hardening of rubber backing.
   Back side is glossy without resilience and leaves no indent when pressed with fingernail.



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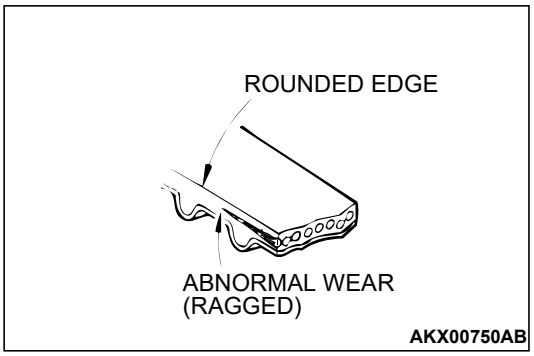
2. Cracks on rubber back
3. Cracks or peeling of canvas
4. Cracks on tooth bottom
5. Cracks on belt



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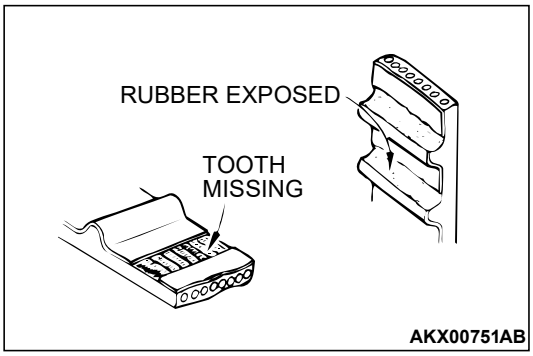
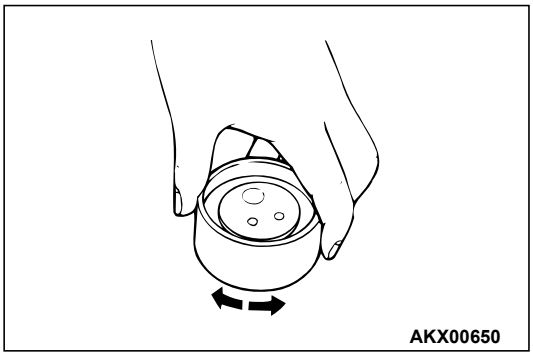
6. Abnormal wear of belt sides. Normal wear is indicated if the sides are sharp as if cut by a knife. Abnormal wear is indicated if the sides are ragged.

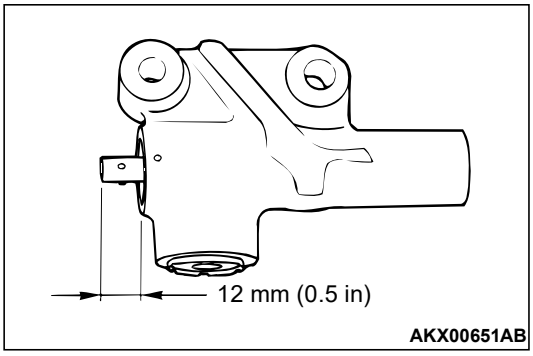


7. Abnormal wear on teeth.
8. Missing tooth.



TENSIONER PULLEY AND IDLER PULLEY

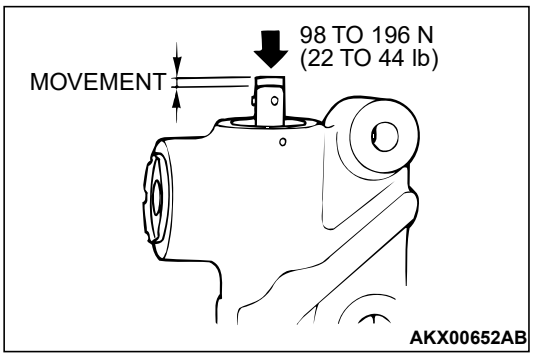
Turn the pulley. If it does not rotate smoothly, or develops noise or excessive play, replace the pulley.



AUTO-TENSIONER

1. Check for oil leaks. If oil leaks are evident, replace the auto-tensioner.
2. Check the rod end for wear or damage and replace the auto-tensioner if necessary.
3. Measure the rod protrusion. If it is out of specification, replace the auto-tensioner.

   Standard value: 12 mm (0.5 inch)



4. Press the rod with a force of 98 to 196 N (22 to 44 pounds) and measure the movement of the rod.
   If the measured value is out of the standard value, replace the auto-tensioner.

   Standard value: 1.0 mm (0.03 inch) or less