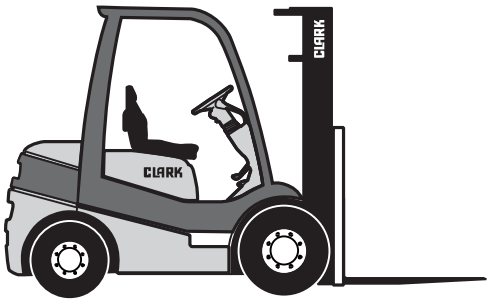
SERVICE MANUAL

C15/18/20s L
C15/18/20sC L

[PSI 4G63 Engine]

Rated Capacity : 1500 - 2000kg



Part No. 8121699
Book No. SM 995 (Rev 1.3)
Aug. 2018

CLARK MATERIAL HANDLING INTERNATIONAL
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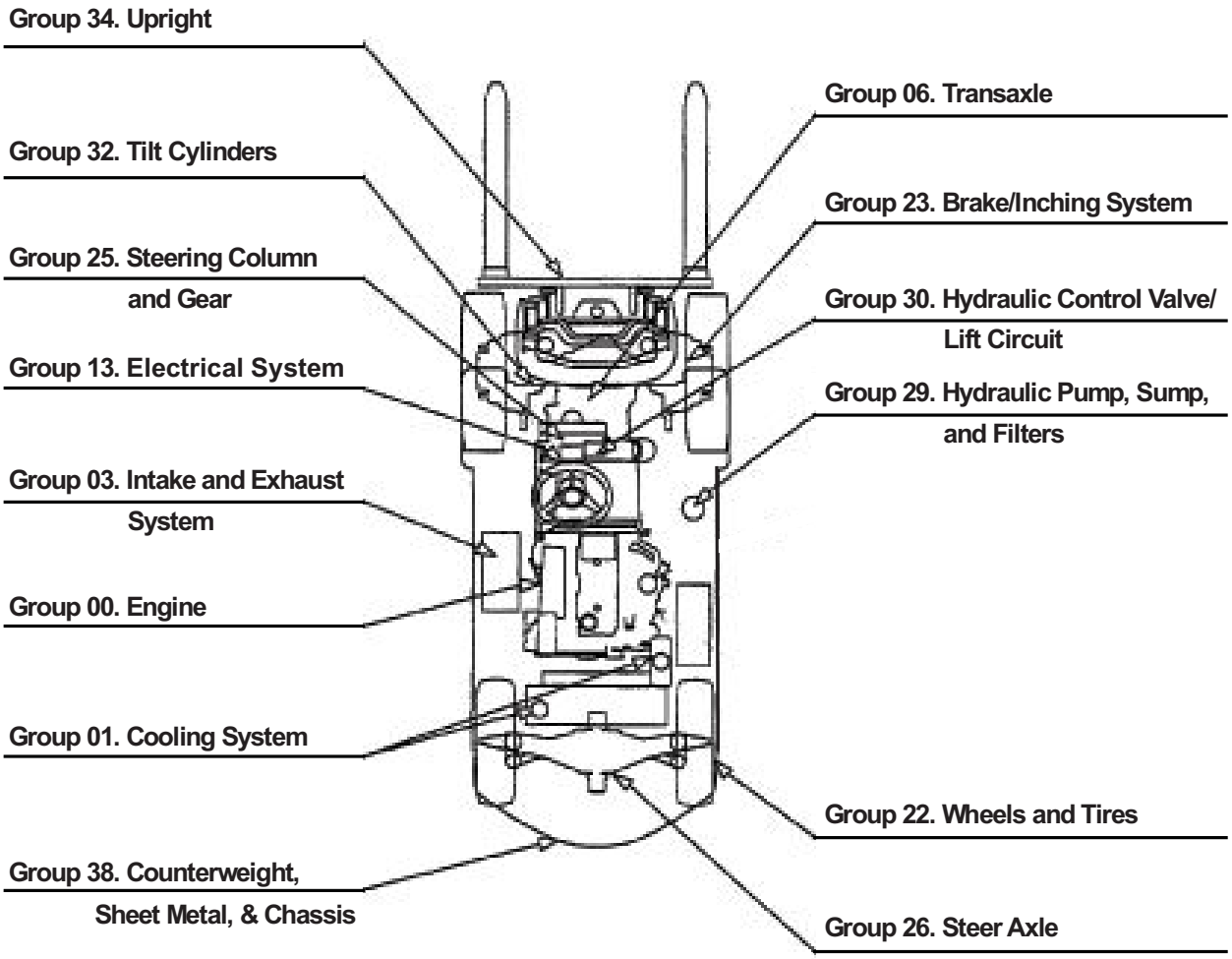
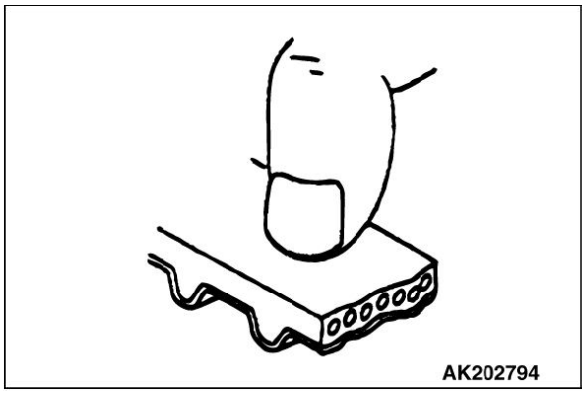


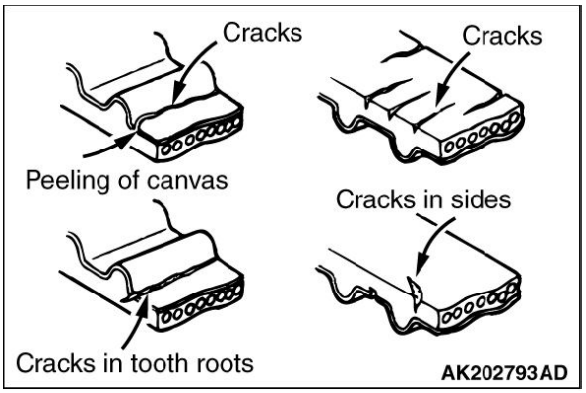


INSPECTION

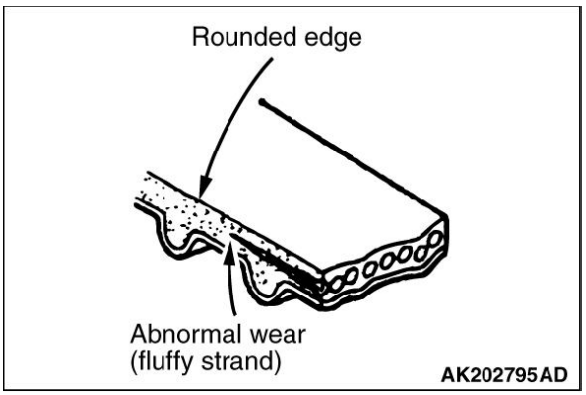
TIMING BELT

Replace the belt if any of the following conditions exist:

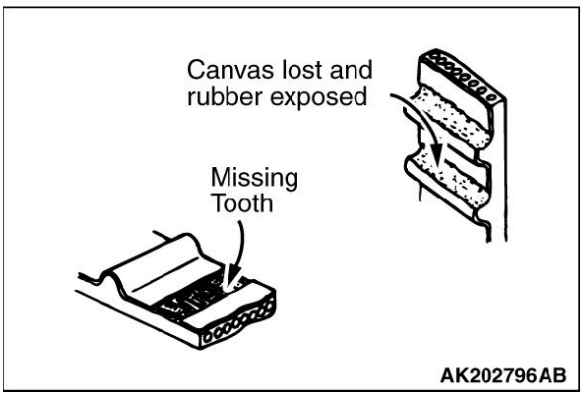
1. Hardening of rubber backing. Back side should be glossy without resilience and leave no indent when pressed with fingernail.



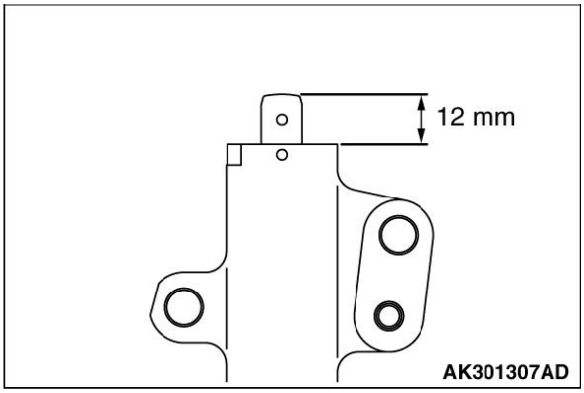
2. Cracks on rubber back.
3. Cracks or peeling of canvas.
4. Cracks at bottom of ribs.
5. Cracks on belt sides.



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.

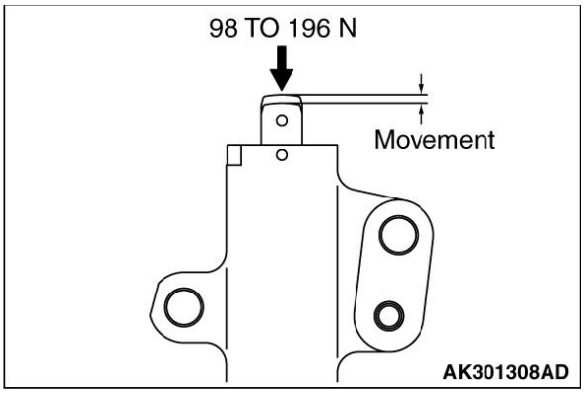


7. Abnormal wear on teeth.
   Initial stage:
   Canvas worn (fluffy canvas fibers, rubbery texture gone, white discoloration, canvas texture indistinct)
   Final stage:
   Canvas worn, exposing rubber (tooth width reduced)
8. Missing tooth.



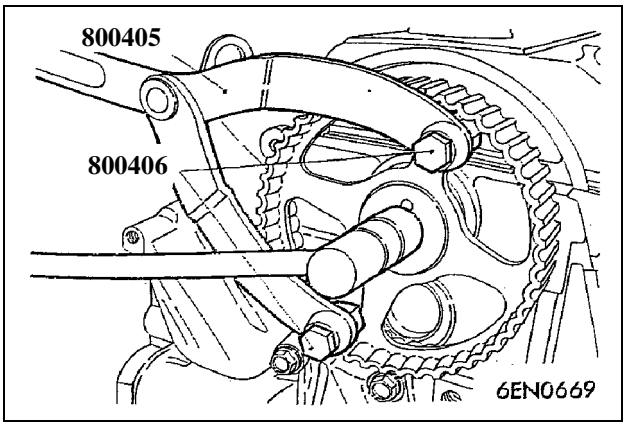
AUTO TENSIONER

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



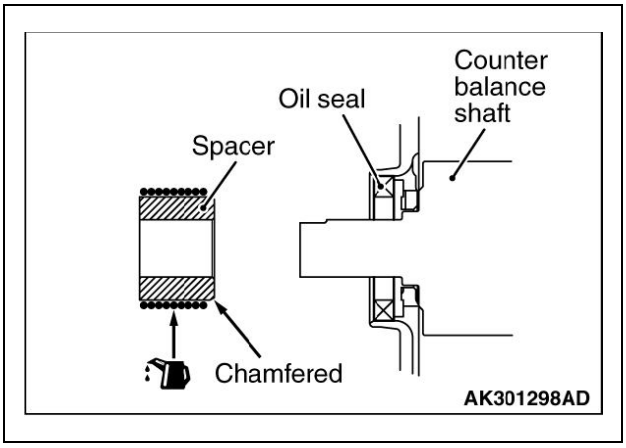
4. Press the rod with a force of 98 to 196 N and measure the movement of the rod.
   If the measured value is out of the standard value, replace the auto-tensioner.
   Standard value: 1.0 mm or less

INSTALLATION SERVICE POINTS



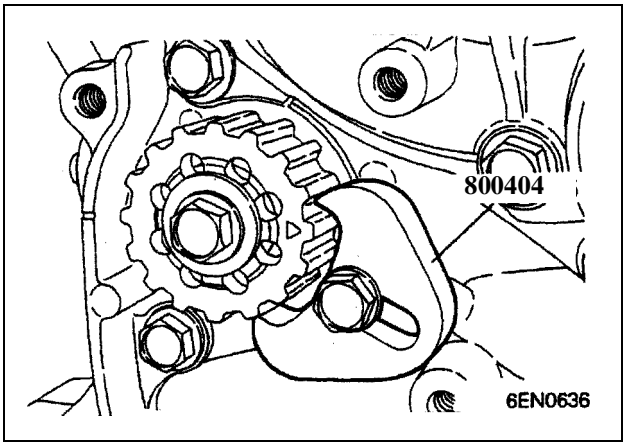
>>A<< CAMSHAFT SPROCKET INSTALLATION

1. Using special tools to prevent the camshaft sprocket from rotating.
   - End yoke holder (800405)
   - Pulley holder pin (800406)
2. Tighten the camshaft sprocket bolt to the specified torque.
   Tightening torque: 88 ± 10 N·m



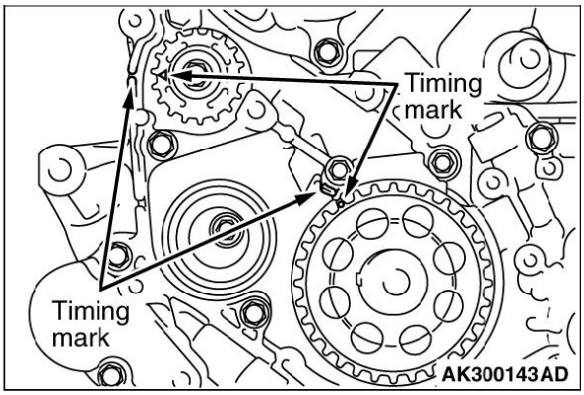
>>B<< SPACER INSTALLATION

1. Apply a thin coat of clean engine oil to the lip area of the oil seal.
2. Install the spacer with the chamfered end facing toward the oil seal.



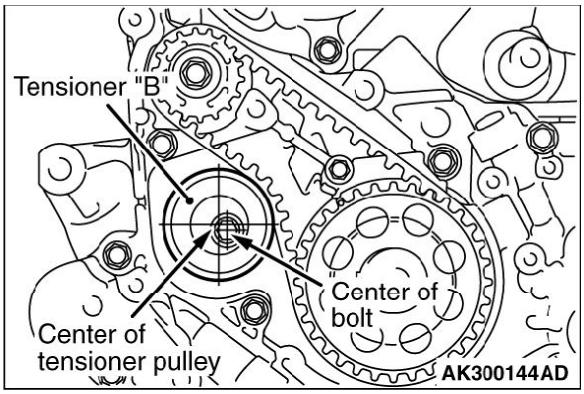
>>C<< COUNTERBALANCE SHAFT SPROCKET INSTALLATION

1. Install the counterbalance shaft sprocket and screw on the bolt.
2. Install special tool Sprocket stopper (800404) as shown in the illustration to lock the counterbalance shaft.
3. Tighten the bolt, and then remove the special tool.
   Tightening torque: 45 ± 3 N·m

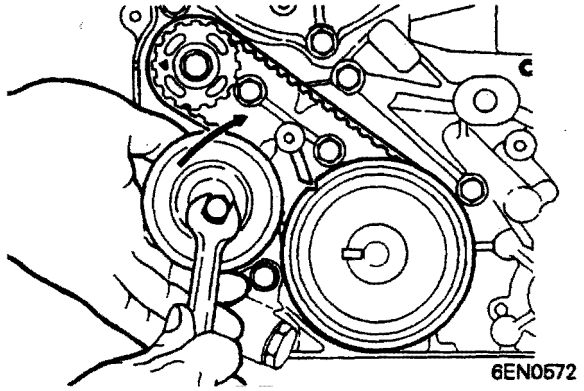


>>D<< BALANCE SHAFT BELT "B" INSTALLATION

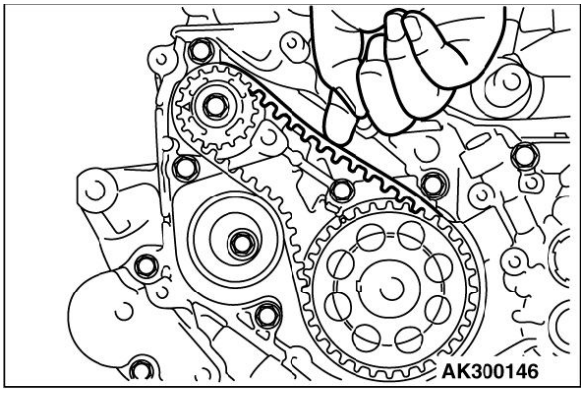
1. Align timing marks on the crankshaft sprocket "B" and counterbalance shaft sprocket with the marks on the front case.



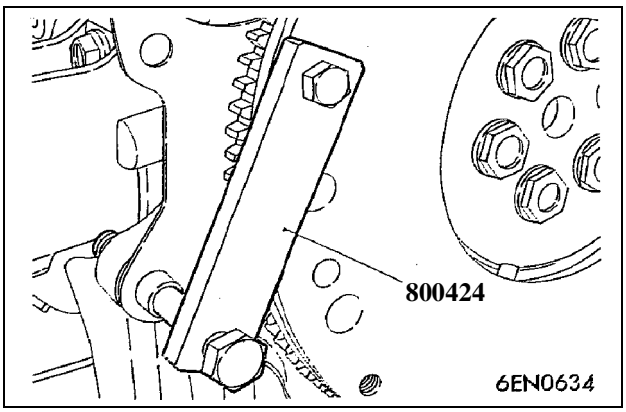
2. Install the BALANCE SHAFT belt "B" on the crankshaft sprocket "B" and counterbalance shaft sprocket. There should be no slack on the tension side.
3. Make sure that the tensioner pulley center and the bolt center are positioned as shown in the illustration.



4. Move tensioner "B" in the direction of the arrow while lifting with your finger to give sufficient tension to the tension side of BALANCE SHAFT belt. In this condition, tighten the bolt to secure tensioner "B." When the bolt is tightened, use care to prevent the tensioner pulley shaft from turning with the bolt. If the shaft is turned with the bolt, the belt will be over tensioned.
   Tightening torque: 19 ± 3 N·m

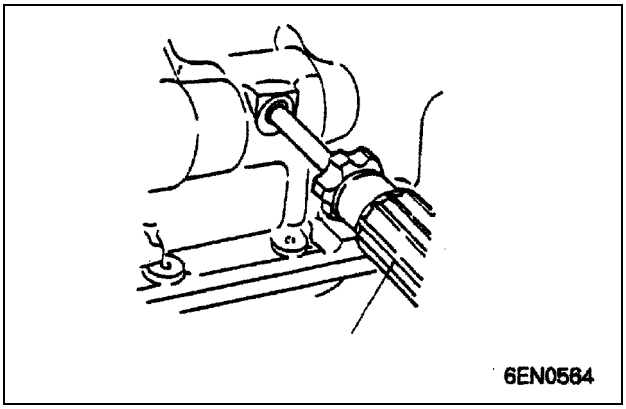


5. Check that timing marks on the sprockets are aligned with the timing marks on the front case.
6. With your index finger, press the midway of span on the tension side of BALANCE SHAFT belt "B." The belt must deflect 2-3 mm for new install and 5-7 mmif reusing existing belt.



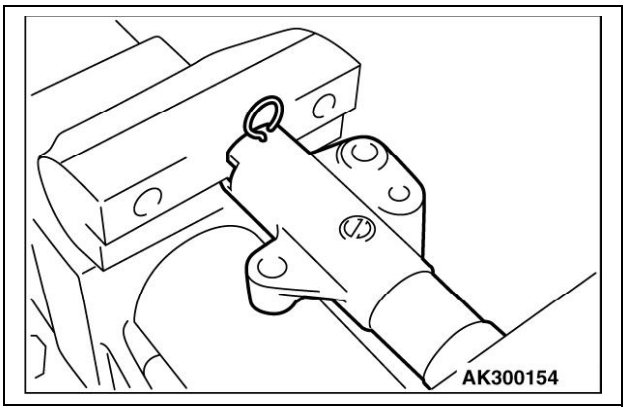
>>E<< CRANKSHAFT BOLT INSTALLATION

1. Tighten the crankshaft bolt to the specified torque.
   Tightening torque: 162N·m



>>F<< OIL PUMP SPROCKET INSTALLATION

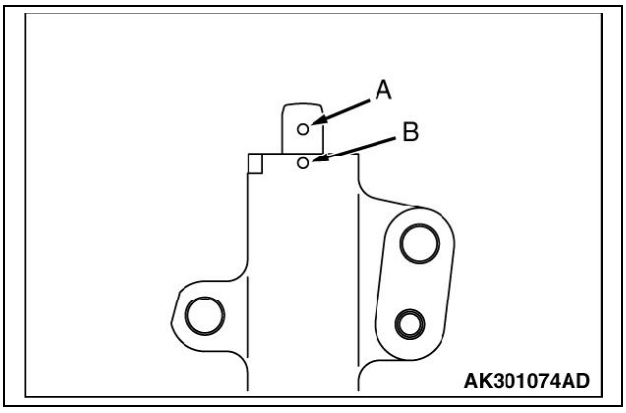
1. Insert a Phillips head screwdriver (shank diameter 8 mm) through the plug hole on the left side of the cylinder block to block the left counterbalance shaft.
2. Install the oil pump sprocket.
3. Apply a thin coat of engine oil to the seating surface of the nut.
4. Tighten the nut to the specified torque.
   Tightening torque: 54 ± 5 N·m



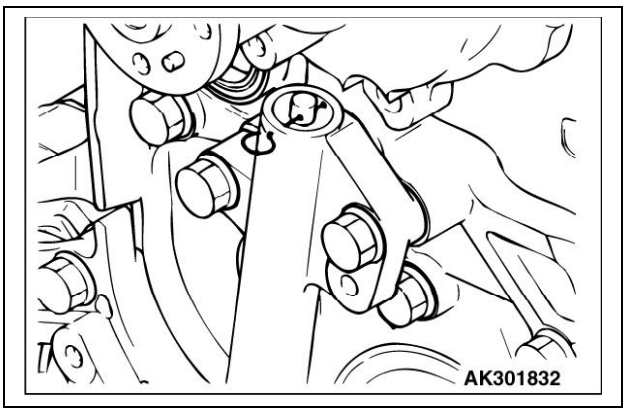
>>G<< AUTO-TENSIONER INSTALLATION

If the auto-tensioner rod is fully extended, reset it as follows:

1. Clamp the auto-tensioner in a vise with soft jaws.
2. Push in the rod little by little with the vise until the set hole A in the rod is aligned with hole B in the cylinder.



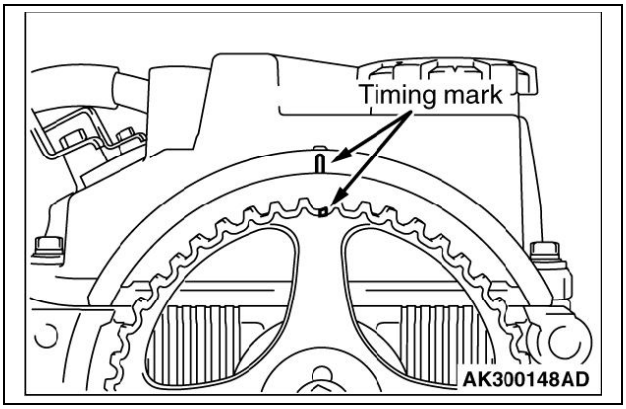
3. Insert a wire (1.4 mm in diameter) or a 1/16” allen wrench into the set holes. This auto-tensioner setting wire will be used during timing belt alignment.
4. Unclamp the auto-tensioner from the vise.



5. Install the auto-tensioner onto the front case and tighten to the specified torque.

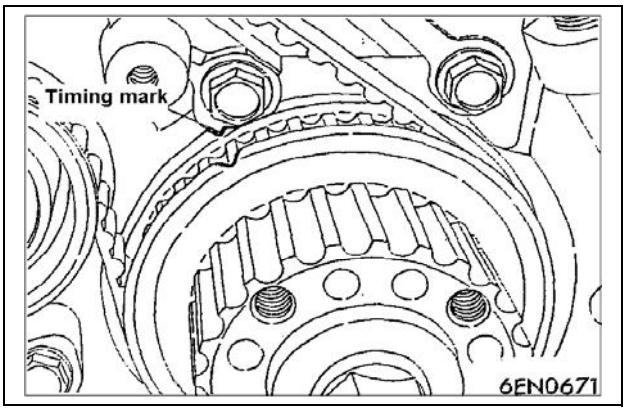
NOTE

Leave the wire installed in the auto- tensioner.
Tightening torque: 24± 3 N·m

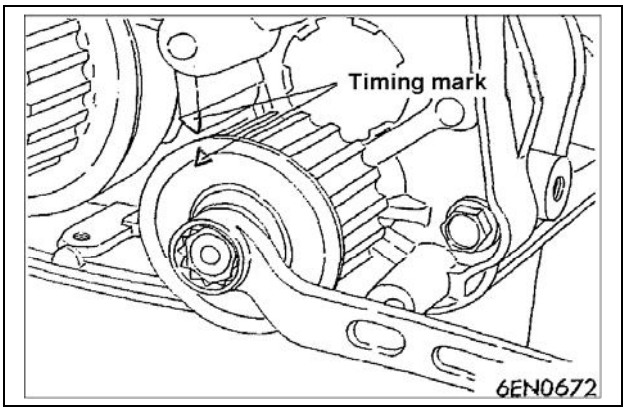


>>H<< TIMING BELT INSTALLATION

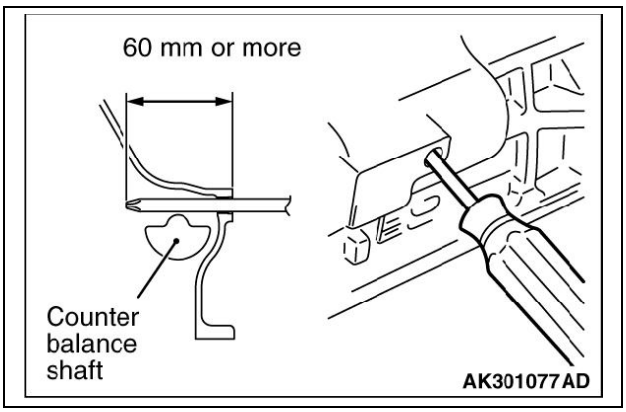
1. Align the timing mark on the camshaft sprocket with the timing mark on the rocker cover.



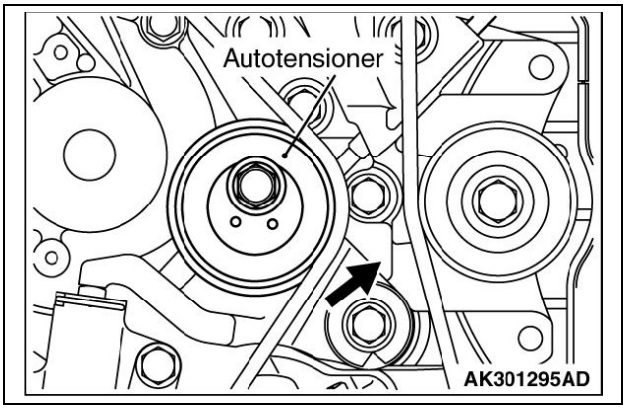
2. Align the timing mark on the crankshaft sprocket with the timing mark on the front case.



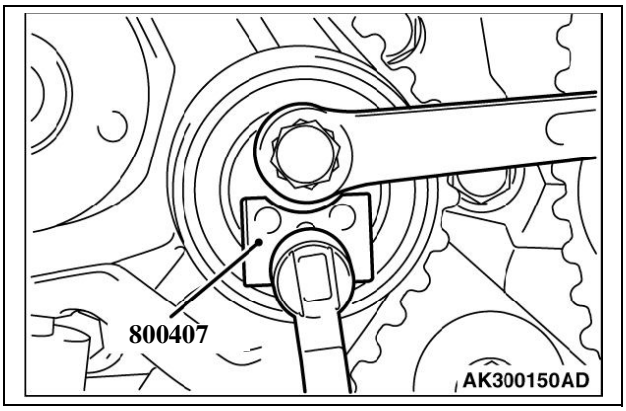
3. Align the timing mark on oil pump sprocket with its mating mark.



4. Remove the plug on the cylinder block and insert a Phillips head screwdriver (shank diameter 8 mm) through the hole.
   If it can be inserted as deep as 60 mm or more, the timing marks are correctly aligned.
   If the inserted depth is only 20 to 25 mm, turn the oil pump sprocket one turn and realign the timing marks. Then check to ensure that the screwdriver can be inserted 60 mm or more. Keep the screwdriver inserted until the timing belt is completely installed.



5. Install the timing belt on the crankshaft sprocket, oil pump sprocket, idler pulley, camshaft sprocket, and tensioner pulley in that order.
6. Lift up the tensioner pulley in the direction of the arrow and tighten the center bolt.
7. Check that all timing marks are aligned.
8. Remove the screwdriver inserted in step 4 and install the plug.
9. Turn the crankshaft a quarter turn counterclockwise. Then, turn it clockwise until the timing marks are aligned again.

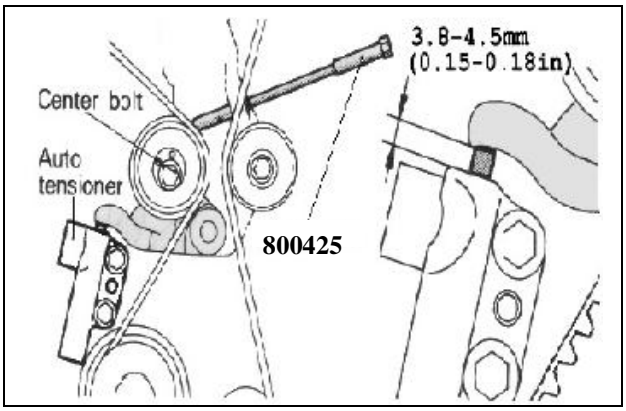


10. Install special tool Tension pulley socket wrench (800407), socket wrench and torque wrench, onto the tensioner pulley, and loosen the tensioner pulley center bolt.

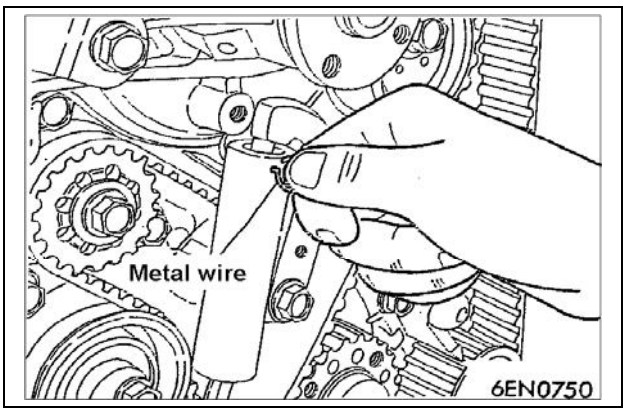
NOTE

Use a torque wrench that can measure 0 to 5.0 N·m.

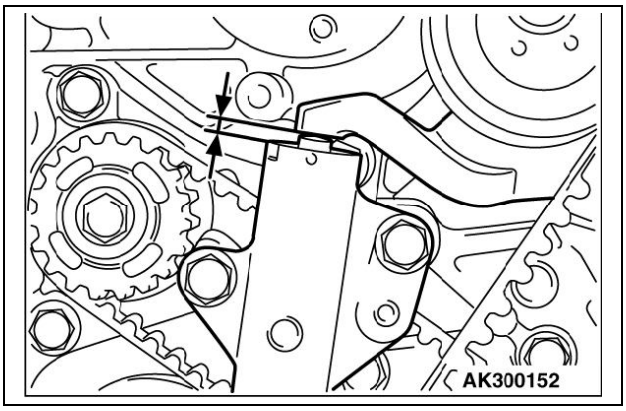
11. Torque to 2.9–3.0 N·m with the torque wrench.
12. Holding the tensioner pulley with special tool Tension pulley socket wrench (800407) and torque wrench tighten the center bolt to specification.
    Tightening torque: 48 ± 5 N·m



13. Rotate special tool Set screw (800425) until it contacts the tensioner arm. Slowly rotate Set screw until hole in auto tensioner push rod aligns with hole in auto tensioner body.



14. The wire inserted at the auto-tensioner installation is pulled out and then the special tool Set screw (800425) is removed by hand.
15. Give two clockwise turns to the crankshaft. Wait for 15 minutes, and then proceed with the following inspection steps.



16. Check to see whether the metal wire (removed in step 14) can be reinserted and removed without any resistance. If the metal wire can be inserted and removed without any resistance, it means that the belt has proper tension. Therefore, remove the metal wire. Check that the rod protrusion of the auto-tensioner is within the standard value.
    Standard value: 3.8 - 4.5 mm
17. If the metal wire offers resistance when removed, repeat the previous steps 9 through 14 until the standard value is obtained as measured by the rod projection of the auto-tensioner rod.