

CorkSport

MAZDA PERFORMANCE



CorkSport FS series 2.0L Exhaust Camshaft Installation Instructions

Please read the full instructions before proceeding with this installation.

Tools and Supplies Required

- 10mm Wrench and Socket 3/8 and 1/4 drive
- 12mm Wrench and Socket 3/8 drive
- 14mm Wrench and Socket 3/8 drive
- 1/4 and 3/8 Drive Ratchet
- 1/2" Drive Torque Wrench Ft/Lbs
- 1/2" Drive Air Impact Wrench
- 1/2" Drive 21mm Socket
- 1/2" Drive Ratchet
- 1/2" Drive 2" Long Extension
- 10" Adjustable wrench
- Sharpie Marker of Equivalent
- Long Needle Nose Pliers
- 3/8" Drive Torque Wrench In/Lbs
- Safety Glasses
- New Valve Cover Gasket
- Cam Seals
- Assembly Lube
- Silicone Sealant
- Factory Service Manual
- Thread Locker (Red)
- Floor Jack
- Jack Stands
- Timing Light

Contents

- CorkSport Exhaust Cam Shaft
- 23 Page Installation Instructions

WARNING:

Before you start make sure your car is completely cooled off. Failure to do this can result in severe burns.

WARNING:

THESE INSTALLATION INSTRUCTIONS ARE FOR EXPERIENCED MECHANICS ONLY. Engine damage may result from faulty installation.

NOTE: These instructions were written using a 2001 Mazda Protégé and may differ on earlier model FS 2.0l engines.

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NOTE: For earlier model distributor drive engines, there is an addendum added at the end of these instructions for each step that requires different instructions.

NOTE: These instructions are intended to be used as a guide during the installation of this product. We recommend a factory service manual is available for reference. Installation should take about 2 1/2 hours.

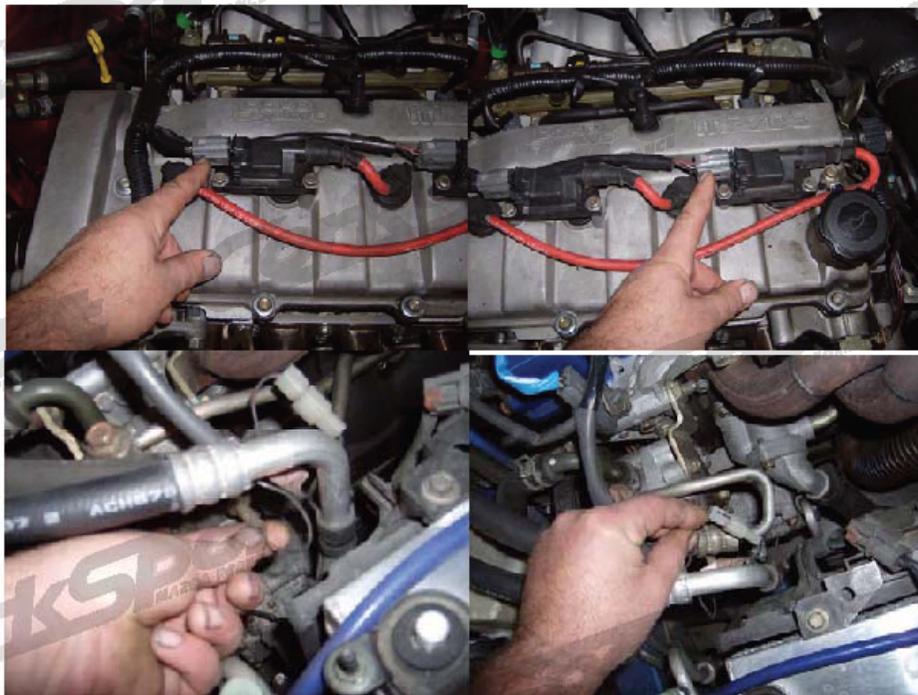
TIP: Mazda Recommends timing replacement in 60,000 mile intervals. If your timing belt has not been replaced in over 60,000 miles, or you are close to this interval, we recommend that you replace it during installation of this product. These instructions do not cover the replacement of the timing belt.

WARNING: Follow the instructions of your jack and jack stands or serious injury or death could result.

Step 1: Jack up right front of vehicle and place securely on jack stands. Remove right front wheel and tire.

Step 2: Unplug wiring harness from coil packs, camshaft position sensor, crankshaft position sensor, A/C compressor, and power steering pump and move harness out of way.

NOTE: Distributor drive engines please refer to addendum 2B.



Pictures continued on next page.

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Step 3: Remove two (2) 10mm head bolts from each coil pack and remove coil packs with their high tension leads from valve cover.

NOTE: Distributor drive engines please refer to addendum 3B.

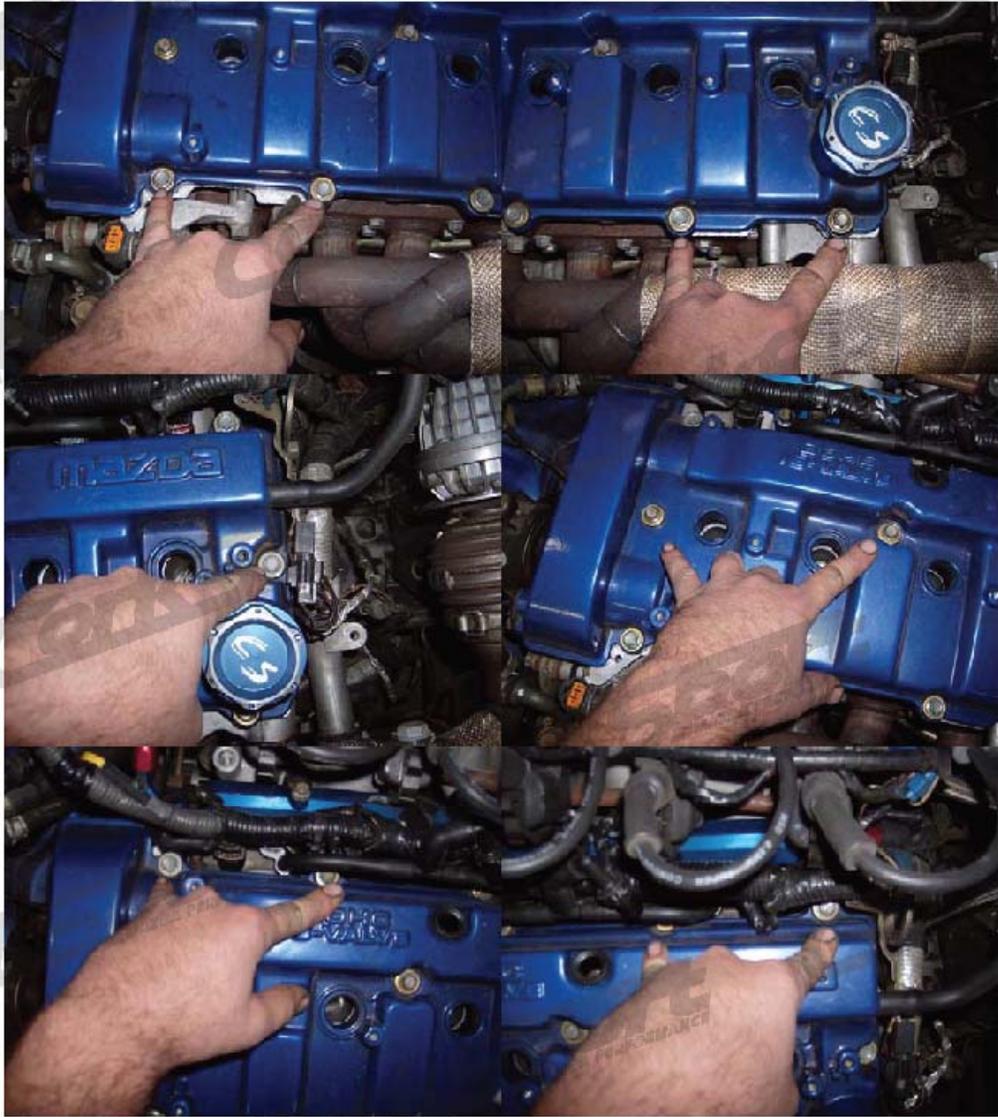


Step 4: Remove the PCV from valve cover. Remove the crank case vent hose from valve cover. Remove the eleven (11) 10mm head bolts from the valve cover and remove valve cover.



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Step 5: With a ½" drive ratchet, extension and 21mm socket, rotate the crankshaft clockwise until the "T" and the "E" on the cam gears face each other and the yellow mark on the crank pulley lines up with the "T" on the front timing belt cover.

NOTE: Distributor drive engines please refer to addendum 5B.

NOTE: The cam gears on our test vehicle are after market, the factory ones will look different from these, however, removal and installation is the same.



Step 6: Loosen the 14mm head pivot bolt on the power steering pump. Loosen the 14mm head hold down nut on the power steering pump bracket. Loosen the 14mm head tension bolt till the power steering- A/C belt is loose enough to be removed.



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Step 7: Loosen the four (4) 10mm head nuts on the water pump pulley. Loosen the 14mm head pivot bolt on the lower bracket of the alternator. Loosen the 12mm head bolt on the alternator hold down bracket. Loosen the 12mm head belt tensioning bolt till the belt is loose enough to be removed and remove belt. After belt is removed, remove the four (4) 10mm head bolts from the water pump pulley and remove pulley.



Step 8: Remove the four (4) 10mm head bolts from the plastic upper timing belt cover and remove cover.

NOTE: The valve cover should have already been removed prior to this step, the picture is just to reference to cover that needs to be removed.



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Step 9: Remove the 21mm head bolt from the center of the crank pulley and remove pulley.



Step 10: Remove the four (4) 10mm head bolts from the plastic lower timing belt cover and remove cover.

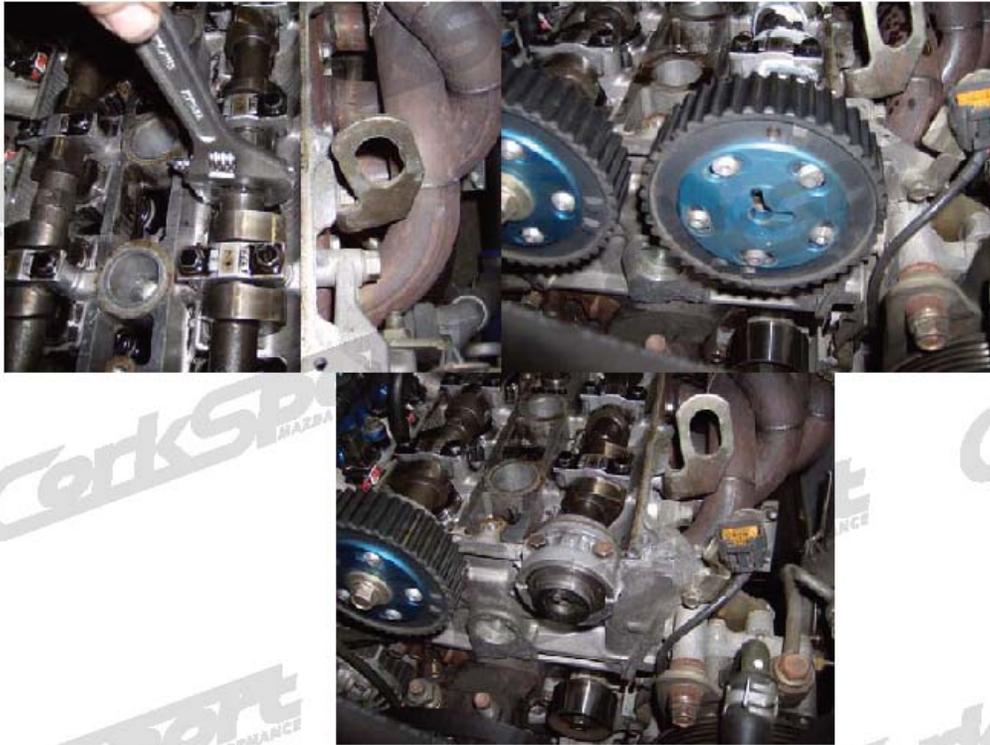


Step 11: Remove the timing belt tensioner spring from its upper peg using long nose needle nose pliers and remove timing belt from cam gears.

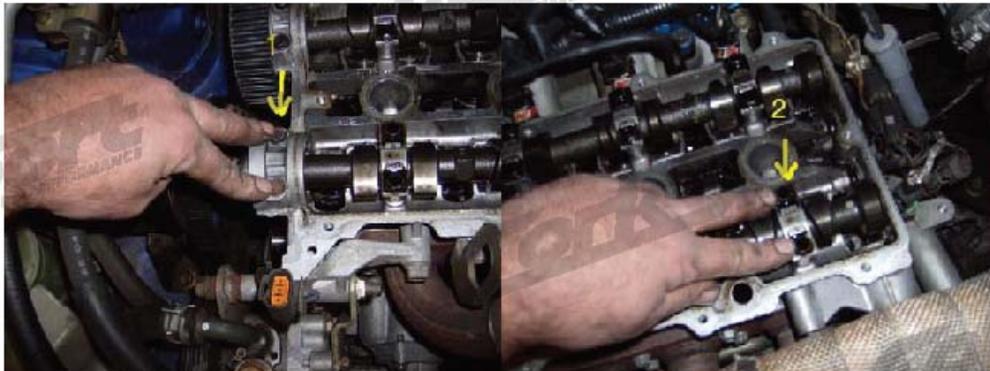


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Step 12: With an adjustable wrench hold camshaft on hex portion and loosen the 14mm head bolt from center of cam gear. Note position of cam gear on camshaft then remove gear.

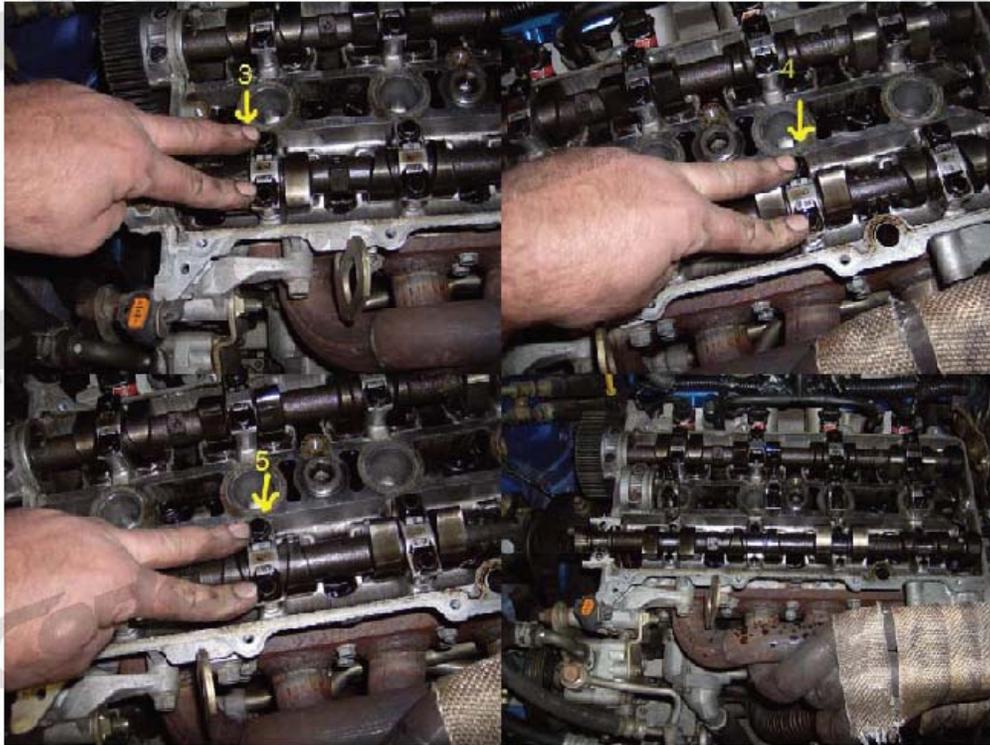


Step 13: Note the numbers on the camshaft bearing caps and the direction they face. Loosen the 10mm head bolts from the camshaft caps. Start from the outer caps and work to the center cap. Remove caps.

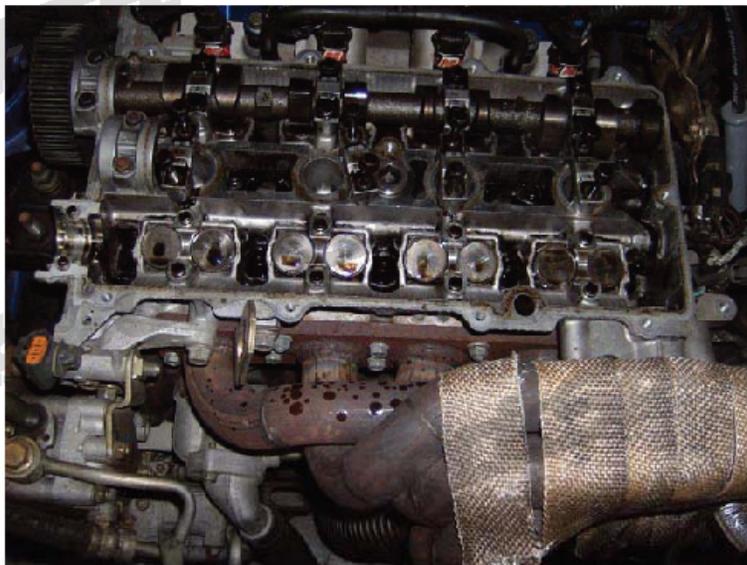


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Step 14: Remove camshaft with its seal from head.

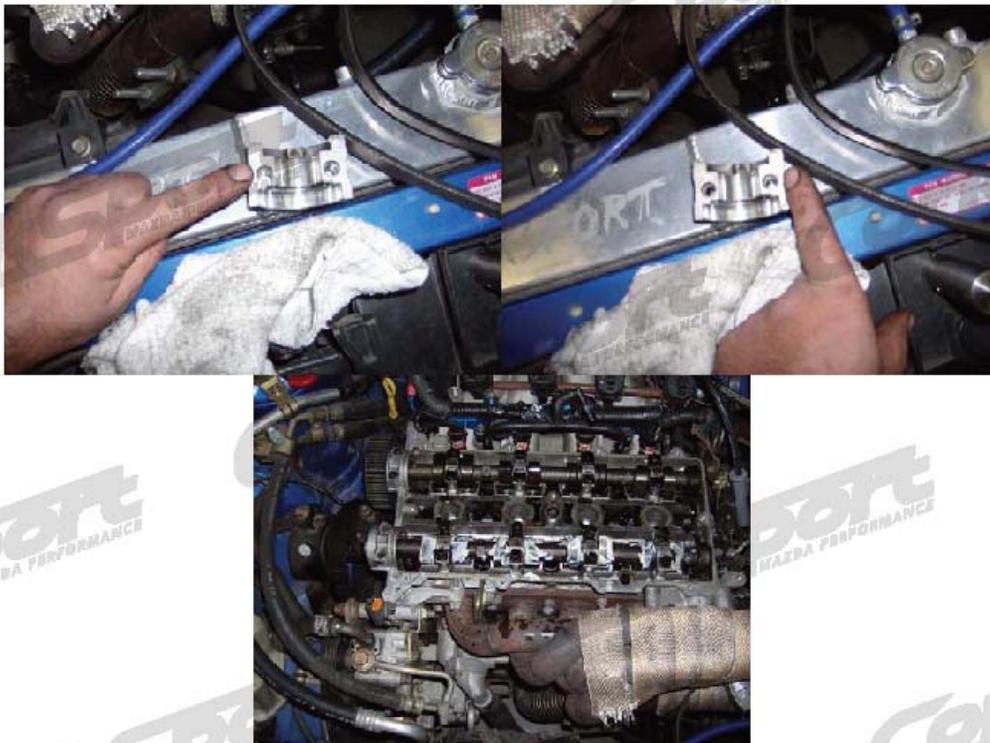


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Step 15: Apply assembly lube liberally to all camshaft bearing and lobe surfaces. Install new cam seal onto camshaft and place camshaft in head making sure dowel pin is up.



Step 16: Apply small amount of silicone sealant to flange surface of front cam cap and install all cam caps in the order and direction noted when removed and tighten from the center cap outward in 2-3 steps. Tighten to 100-125in/lbs.



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Step 17: Install camshaft gear onto camshaft in position noted when removed. Install original 14mm head bolt and using an adjustable wrench on the hex portion of the camshaft to hold, tighten 14mm head bolt to 37-44ft/lbs.



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WARNING: The following instructions are a guide only. Refer to the factory service manual for your vehicle to make sure engine timing is correct.

Step 18: Make sure timing marks on crankshaft gear are lined up. Position timing belt onto idler pulley and up onto exhaust camshaft gear. The camshaft will need to be rotated clockwise until the timing mark is just above the horizontal plane of the head for the belt to go on. Then rotate the camshaft slightly counter-clockwise until belt is snug against idler pulley and timing mark on gear is lined up horizontal with head surface. Now, rotate intake camshaft counter clockwise until timing mark on intake camshaft gear is aligned with the timing mark on exhaust camshaft gear and place belt onto gear. With adjustable wrench, hold tension on intake camshaft in a counter clockwise direction and replace tensioner spring on its peg. Rotate crank shaft 2 full revolutions clockwise and make sure all timing marks are aligned. If not you will have to start over.

NOTE: Please see step 18B in the addendum for distributor reinstallation.



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Step 19: Replace lower plastic timing cover with its original four (4) 10mm head bolts.



Step 20: Reinstall crankshaft pulley and its original 21mm head bolt and tighten bolt to 116-122ft/lbs



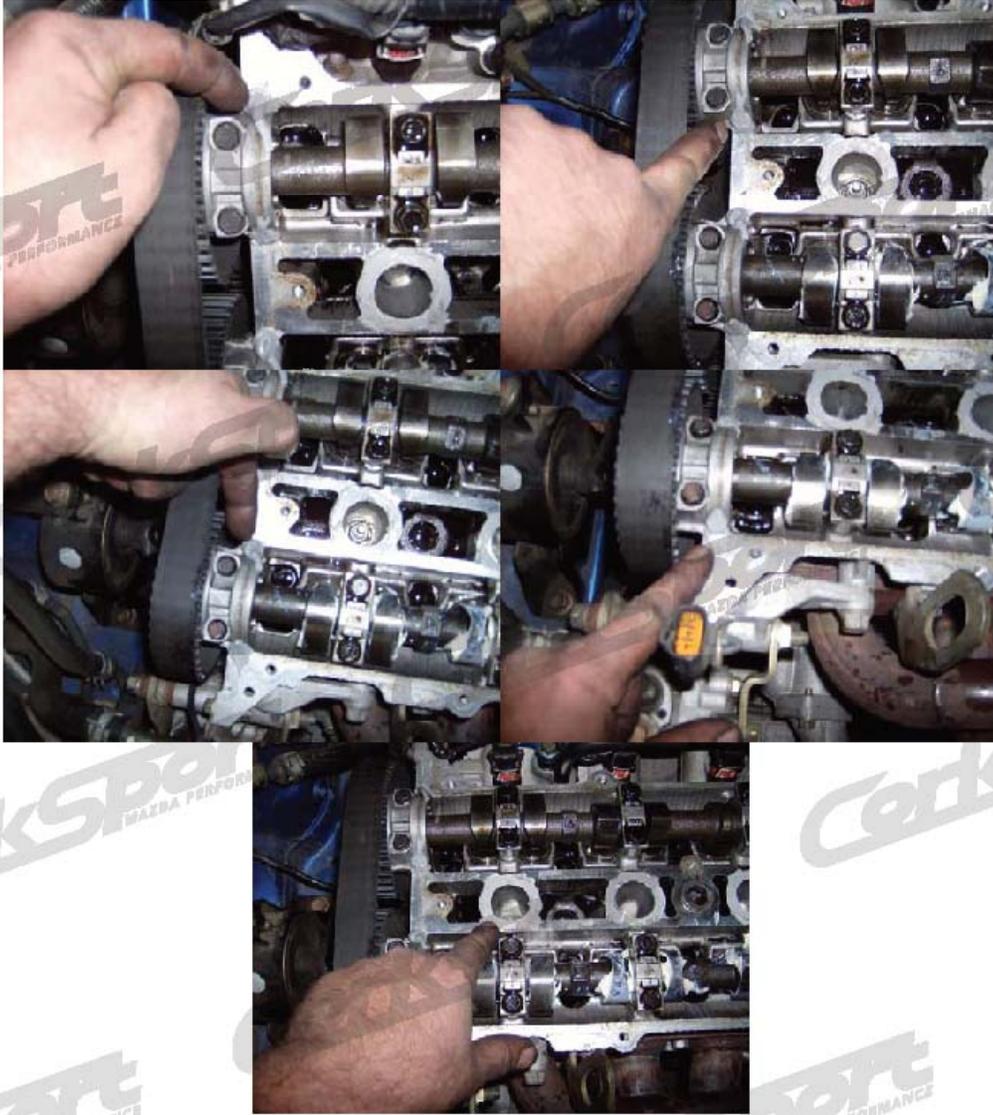
Step 21: Reinstall upper plastic timing cover with its original four (4) 10mm head bolts.

NOTE: The valve cover should have already been removed prior to this step, the picture is just to reference to cover that needs to be removed.



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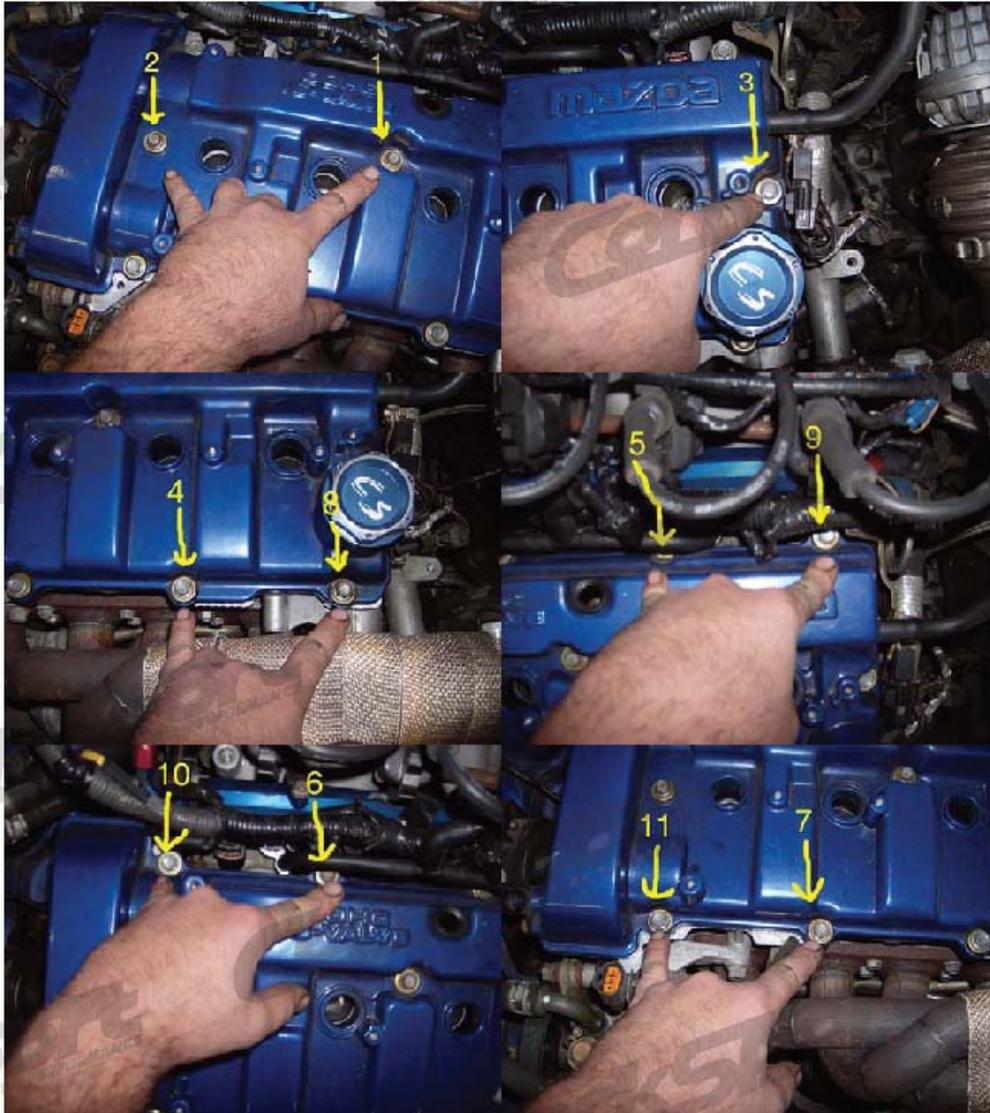
Step 22: Apply silicone sealant to corners of front camshaft caps and around spark plug holes



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Step 23: Install new valve cover gasket into valve cover and reinstall valve cover with its original 11 10mm head bolts. Tighten bolts to 61-95in/lbs.

NOTE: Tightening sequence of valve cover bolts are numbered in the pictures.



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Step 24: Reinstall PCV and crankcase vent tube to valve cover.



Step 25: Reinstall water pump pulley with its original four (4) 10mm head bolts. Reinstall water pump/alternator belt and tighten.



Step 26: Reinstall power steering/A/C belt and tighten.



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Step 27: Reinstall coil packs with their high tension leads and two (2) each 10mm head bolts. Reconnect coil pack electrical plugs.

NOTE: Distributor drive engines please refer to addendum 27B.



Step 28: Reconnect cam sensor, crank sensor, power steering and A/C plugs.

NOTE: Distributor drive engines please refer to addendum 28B.



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Step 29: Replace wheel and tire and remove vehicle from jack stands.

Step 30: Check oil level and make sure oil is full on dipstick. Start up vehicle and verify that oil pressure light on instrument panel shuts off. Once verified, bring engine rpm's up to 2500 and hold for 15 minutes. After 15 minutes you may let vehicle idle. Check that your vehicle timing is to the vehicle manufactures recommendations, with a timing light. On 1998 and newer FS engines, if your timing is not at manufactures recommendations your timing belt is not set correctly and will need to be resolved prior to test driving. Pre 1998 FS engines have a distributor to adjust timing, however, if timing can not be adjusted to specifications the timing belt will need to be adjusted.

Troubleshooting:

After camshaft break in is complete and timing is verified, you may test drive the vehicle. There should be no abnormal lifter rattling noises or pinging. If there is abnormal lifter rattling noises, pre 1998 vehicles may need hydraulic lash adjuster replacement and vehicles after 1998 may need mechanical lash adjuster shim adjustment. If pinging occurs, let off of throttle immediately and drive easy to a safe location to double check timing. If timing is still correct, super unleaded fuel may be required or an error was made during installation of the camshaft.

NOTE: CorkSport recommends changing the oil and filter 500 miles after installation.

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ADDENDUM for Distributor Drive Engines

Please follow all previous instructions unless an alternative is referenced..

Step 2B: Unplug wire harness from crank position sensor and unclip the harness from the power steering pump hoses and set the harness aside. Remove two (2) 10mm head bolts from the power steering lines to the valve cover.



Step 3B: Remove spark plug wires from valve cover by using a slight twisting and pulling motion. Disconnect coil wire from coil and remove two (2) Phillips head screws from distributor cap. Remove cap and set aside.



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Step 5B: With a ½" drive ratchet, extension and 21mm socket, rotate the crankshaft clockwise until the "T" and the "E" on the cam gears face each other and the yellow mark on the crank pulley lines up with the "T" on the front timing belt cover. Make a mark on the distributor in line with the center of the rotor with a sharpie or equivalent marker. Unplug the wire harness from the distributor and remove the 12mm hold down bolt. Using a twisting and pulling motion, remove distributor from head.



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Step 18B: After timing marks on cam gears and the crank shaft are aligned properly and timing belt is reinstalled, Reinstall distributor making sure that mark that was made on distributor realigns with the center of the rotor when the distributor is fully seated. Also, the hold down bolt should be roughly centered in the slot of the distributor when installed and the mark for the rotor is lined up. Rotate engine 2 full revolutions and double check that all timing marks line up including one on the distributor. Reinstall the distributor cap with original two (2) screws, reattach coil wire to coil and reconnect distributor harness plug.



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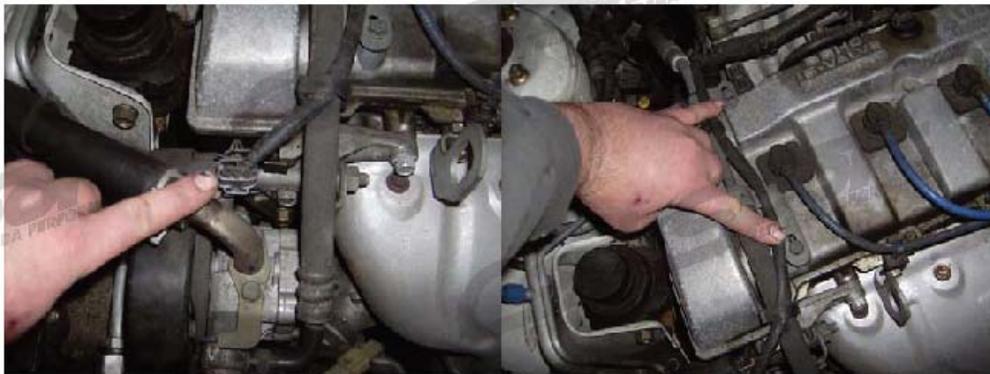
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Step 27B: Reinstall plug wires into valve cover.



Step 28B: Reinstall power steering lines onto valve cover with their original two (2) 10mm head bolts. Reconnect crank shaft position sensor and re-clip harness to power steering lines.



NOTE: please proceed to step 29 and troubleshooting after previous step is complete.

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