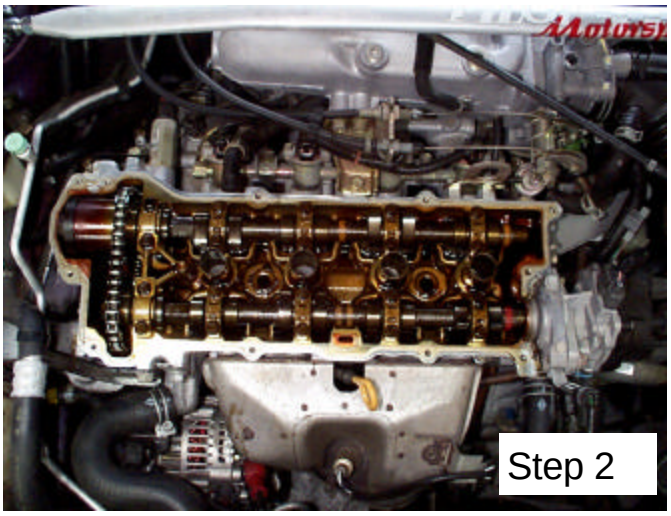
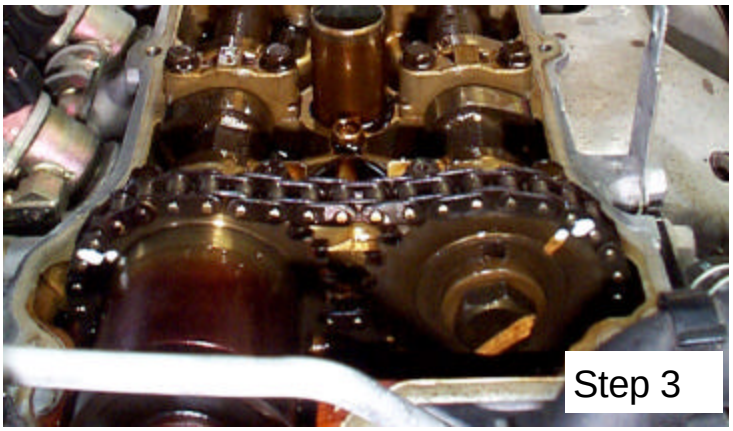
NOTICE: If you do not have the proper tools and know ledge to successfully complete this installation, have a professional Nissan mechanic do it for you.

CAMSHAFT INSTALLATION INSTRUCTIONS FOR NISSAN GA16DE ENGINES



1. It is highly recommended that an oil and filter change be done before installing new cams.
2. Remove the distributor, and valve cover from the engine. Use caution not to drop anything into the engine.
3. With the parking brake on, and the car out of gear (neutral), rotate the crankshaft clockwise until #1 cylinder is at TDC (top dead center) with all of it's valves closed. To insure that this is correct, look at the crank pulley (TDC is the second mark from the left, it will usually be marked with yellow paint). Also check that the cam lobes on #1 cylinder are pointing **away** from the center of the motor, if they are pointing toward the center, rotate the motor one full rotation clockwise. Again check the crank pulley to see that it is on TDC.



4. Carefully mark the chain links that are aligned with the dots on the gears. The dots and the marked links should be exactly the same after installing the new cams. It is impossible for the chain to jump off the lower sprocket because their isn't enough room between the sprocket and cover.

5. Loosen the exhaust cam sprocket bolt only (the intake sprocket will be removed with the cam). Using a 22 M.M. (7/8") wrench or socket on the bolt and a 7/8" open end wrench on the cam hex (in front of the front lobe), break loose but don't remove the bolt.
6. Mark the cam bearing caps if not already marked on both the intake and exhaust sides and note that the arrows are pointing to the front of the engine. Evenly remove the bearing cap bolts **1/2 turn of each bolt at a time** until all are free of tension. Camshafts can break if this is not done during removal and installation. Remove the bearing caps and place them in a clean area in the same order they are removed. Remove the old cams, caution should be taken to insure that they don't bind on the thrust surfaces of the first journal (this is also critical when installing the new cams). First slightly lift the exhaust cam and finish removing the sprocket and bolt (the bolt


Step 6

may not clear the front cover without first lifting it a little) then remove the exhaust cam. Next remove the intake cam and sprocket as an assembly. The chain can be laid in the front cover until reassembly.

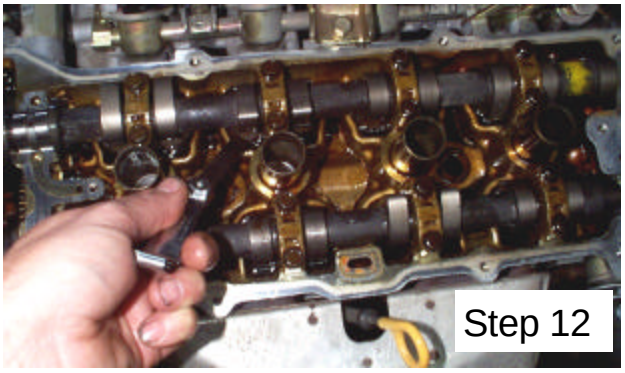
7. Although the new cams have been fully inspected, they must be final cleaned and checked for any damage or burrs that may have occurred during shipping or handling. Remove the intake sprocket and transfer it to the new intake cam (it's the one that **does not** have a distributor drive on the other end). **Make sure that the new intake cam has a special spacer shim already installed on the front of the cam to properly space the intake sprocket**. If this is not on the cam do not install it! Call JWT to get one. Torque the bolt to 85 ft/lbs.


Step 7

8. Measure the thickness of each valve lash shim and write it down in case you need to change it later if the clearance is not within the acceptable range (do not mix them up). Do one shim at a time, returning it to its original position before measuring the next shim.
9. Apply a coating of assembly lube or motor oil to all journals and lobes. Carefully lay the cams in their correct positions. First lay the intake cam and sprocket in place, with the chain aligned to the mark. Next install the exhaust cam. Install the exhaust cam sprocket and bolt finger tight with the chain mark aligned. Reinstall all of the bearing caps (reapply silicone sealant to the distributor mount cap). Evenly tighten 1/2 turn at a time on each bolt until all of the caps are snug (1.4 ft-lb and again to 4.3 ft-lb). The cams can break if this is not followed. Then final torque the bolts from the center bolts outward to 6.7 to 8.7 ft-lb.


Step 8

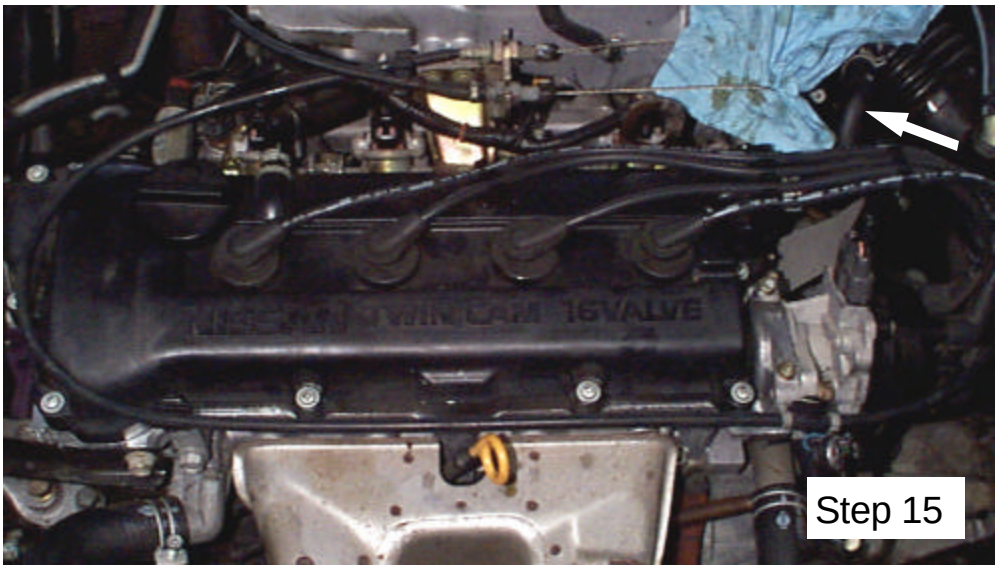
10. Check to see that the exhaust cam sprocket is fully seated against the cam and torque the bolt tight. Always use a 22 m.m. or 7/8" wrench on the cam hex to back up your torque wrench (never use the chain for resistance)! Torque the exhaust cam sprocket bolt to 85 ft-lb. Check that your original chain marks still align with the marks on the sprockets and the lobes still point away from the center of the engine. Reinspect your work carefully.
11. Using a feeler gauge set, measure the shim to cam clearance of each cam lobe and write them down next to the shim thickness dimension you previously recorded. **The intake**


Step 12

clearance is between .005”-.016”, and the exhaust is .010”-.021”. If the clearance is to large, use a shim that is thicker than the original shim by the amount needed to correct the clearance. Shims can be changed without again removing the cams by using the special Nissan tools described in the Nissan manual. Shims are available from your local Nissan dealer if needed. Jim Wolf Technology cams are ground to within .002” of the stock base circle, so if the original cams had proper clearance, changing shims is probably not needed.

GA16DE CAM POSITION AT TDC #1

12. Reinstall the valve cover and distributor. Torque the valve cover bolts first to 2.9 ft-lb and then to 5.8 to 7.2 ft-lb.
13. Temporarily position the distributor in the center of its adjustment range until the break-in is complete and the engine is idled. Reset the ignition timing to factory specification (disconnect the throttle position sensor while setting timing).
14. Cam break-in consists of 15 minutes of 2000 RPM on initial start up. Once you have checked all of your work and started the engine, confirm that the engine sounds normal, if not recheck your work. If all is good, immediately raise the RPM to 2000 RPM and hold it there by sliding a paper towel between the throttle cable and the bell crank until it holds the RPM as shown in the picture. Remove the towel after the run-in period and set the ignition timing. The engine is now ready to drive. Keep the RPM below 4000 RPM for the first 50 to 100 miles.


Step 15

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