

# centerline products

## ALFA ROMEO CAMSHAFT TIMING AND INSTALLATION

**These instructions are a supplement to your shop manual.**

Included in this document is a cam-timing template. Follow the instructions for the template to check the timing marks on the front camshaft bearing caps. If necessary, scribe new timing marks onto the cam caps.

To install the camshafts, start by putting the engine to Top Dead Center (TDC) - #1 cylinder. TDC #1 is when the #1 cylinder piston is at the top of its stroke, and the #1 camshaft lobes are pointing to the outside of the engine (intake lobe pointing toward the intake manifold, exhaust lobe to the exhaust manifold). TDC is the "P" mark on the crankshaft pulley. Make sure the timing pointer on your engine is really pointing to TDC. It is best to use a TDC gauge to check this. Adjust the pointer if necessary.

Remove the original camshafts following the instructions in your Alfa shop manual. Transfer the two camshaft sprockets to the new cams to be installed. Inspect the cam followers for wear. If there are any irregularities or crazing on the tappet surface (where the lobe hits), replace the tappets.

If the cylinder head is on the bench, install the cams and adjust the valves before installing the head onto your car. Be aware that when the cams are installed open valves will extend below the surface of the head. Do not lay the head down on its surface, as valves will be bent.

Lubricate the camshafts journals, lobes, and cam followers liberally. Do not turn the cams dry for any reason. If necessary, the cam journals can be cleaned up with some emery cloth and your thumb

If the head is on the car, after disconnecting the timing chain, turn the crankshaft counterclockwise 90 degrees to get plenty of valve-to-piston clearance. Now you can remove and replace the cams, as well as turn each cam independently for ease of valve adjustment, without hitting a piston with a valve. After the valves are adjusted, line the cams up with the timing marks on the cam caps. Turn the crankshaft clockwise to TDC. Following the instruction in your shop manual, adjust the camshaft timing and chain tension, tighten the cam nuts, and install the small bolts and lock nuts.

When adjusting the chain tension, use a large screwdriver and pry on the chain tensioner to remove all slack in the chain. Remove the screwdriver! The only tension on the chain should be what is provided by the tension spring. Tighten the tensioner nut. Some Alfa shop manuals for 750/101 and 105 cars say to turn the engine over with the starter motor with the chain tensioner loose. Do not do this! The chain will jump teeth on a sprocket and valves will be bent.

Turn the engine over clockwise (this is direction of rotation) by hand several times, rechecking cam timing and chain tension until you are confident everything is correct. If the engine does not turn over smoothly and binds, stop and find the problem. Do not force the engine to turn.

If you wish to check piston-to-valve clearance, this can be done using the clay method or by using 0.095" rosin-core solder. Run a long piece of solder down the spark plug hole and under the valve to be measured, rotate the engine by hand in the direction of rotation. The valve will squeeze the solder against the piston. It can then be removed and measured to determine rotating clearance. Intake clearance should be a minimum of 0.065", exhaust 0.075". This is suggested if the head has been milled more than 0.040", especially if big valves are used, or cam lift is higher than 11mm.

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Start the car. For camshaft break-in, a mellow drive is suggested, keeping the engine above 2500 rpm. It is best to not let the engine idle for a long period of time. A short drive first, then do final fuel and ignition adjustments.

Drive the car with Vigor!

### Camshaft Timing Template

Cut out the intake and exhaust templates along the heavy black lines. The templates fit in the front two cam bearing caps when removed from the engine. The templates are used to mark the various lobe centers required for installation of different camshafts. The original cams fitted to your Alfa's engine are timed with the original marks on the cam bearing caps. New cams may have different lobe centers. Check the lobe centers on the lobe spec card. Then fit the templates on the caps and scribe a new cam timing mark on the cap if the lobe center is different from the original. Save the templates for future use.

