Camshaft Timing Tools
Application: GM 3.4L V6 DOHC Engines

Camshaft timing is correct when the bank-to-bank cam timing relationship is 180°. When timed correctly, camshaft flats will be facing down on one bank, and facing up on the opposing bank or, in other words, 180° apart.

Setting Camshaft Timing

⚠️ CAUTION: To prevent personal injury, wear eye protection that meets ANSI Z87.1 and OSHA standards.

1. Remove spark plugs.
2. Manually turn crankshaft until timing mark on front cover is aligned with timing mark on crankshaft pulley.

Note: At this time, the timing mark on the intermediate shaft is aligned with the mark on the front cover, because it is connected to the timing chain sprocket; if not, this problem must be repaired before setting camshaft timing. See Figure 1.

Figure 1
Removing Camshaft Sprockets (Timing Belt Removed)

1. Use sprocket holder (J38614) to rotate both camshaft sprockets counterclockwise (CCW) so machined flats on camshaft are facing UP.
2. Remove oil from bolt hole.
3. Install both camshaft hold-downs (J38613A) as shown in Figure 2, and torque bolts to 22 ft. lbs. (30 N·m).
4. Use sprocket holder to prevent camshaft from turning and damaging hold-downs, and remove camshaft sprocket bolts.
5. Use sprocket remover (J38616) to remove camshaft sprockets.
6. Remove flat rings from camshaft sprocket bores.
7. Inspect camshaft: replace camshaft if it is worn, deformed, or grooved; inspect nose of camshaft for brinelling caused by flat ring. (Pressure marks are acceptable.)

Camshaft Timing Procedure

1. Install flat rings into camshaft sprocket bores.
2. Install camshaft sprockets, but do not tighten. Camshaft sprockets must rotate freely with camshaft hold-downs in place.
3. Remove timing belt tensioner.
4. Install timing belt around sprockets, idler pulleys, and tensioner pulley: Start timing belt installation at intermediate shaft sprocket, working counterclockwise (CCW) when looking at front of engine. Do not allow any slack in timing belt as you work around sprockets. See Figure 3.
5. Install pulley, and torque bolt to 37 ft. lbs. (50 N·m).
6. Install tensioner and side plate. Note: Ensure tensioner shaft ball is seated in cup of tensioner pulley arm. Torque retaining bolts to 18 ft. lbs. (24 N·m).
7. Install a torque wrench on square cast lug of tensioner pulley, and torque to 89 in. lbs. (10 N·m). This rotates tensioner into timing belt to set initial belt tension. Remove torque wrench. Important: Sprockets must rotate freely on camshafts with camshaft hold-downs installed.
8. Rotate crankshaft clockwise (CW) three revolutions to seat timing belt and set belt tension. Align crankshaft harmonic balancer with TDC mark on front cover. Important: Do NOT reverse engine rotation; reversing engine rotation may cause belt to jump time on other sprockets.
9. Starting with right bank sprockets, seat lock ring by holding sprockets with sprocket holder, and tighten right bank sprocket bolts to 44–66 ft. lbs. (60–90 N·m). This seats sprocket to camshaft. Lock ring is seated when ring edge is flush with sprocket hub.

Important: If it takes MORE OR LESS THAN 44–66 FT. LBS. (60–90 N·m) to seat lock ring flush with sprocket hub, replace shim ring and lock ring. Inspect camshaft nose for brinelling, and inspect bolt threads for burrs or foreign material.
10. Tighten right bank sprocket bolts to 96 ft. lbs. (130 N·m).
11. Remove camshaft hold-down from right bank.
12. Rotate crankshaft clockwise (CW) one revolution, and realign harmonic balancer mark to TDC. Note: Camshaft flats on right bank should be facing DOWN, and flats on left bank should be facing UP (held by J38613A). Do NOT reverse engine rotation.
13. Tighten left bank sprocket bolts to running torque (44–66 ft. lbs; 60–90 N·m); inspect shim ring and lock ring seating; tighten sprocket bolts to 96 ft. lbs. (130 N·m).
14. Remove camshaft hold-down from left bank.