FIGURE 11–1 Camshaft rotation during advance and retard.

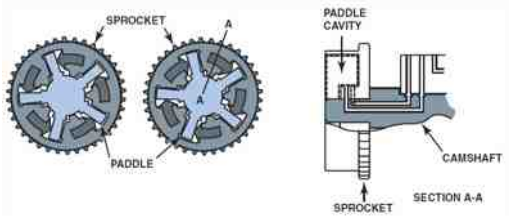

FIGURE 11–2 The camshaft is rotated in relation to the camshaft by the PCM to provide changes in valve timing.

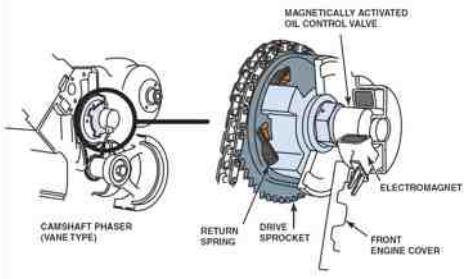

FIGURE 11–3 Spline cam phaser assembly.

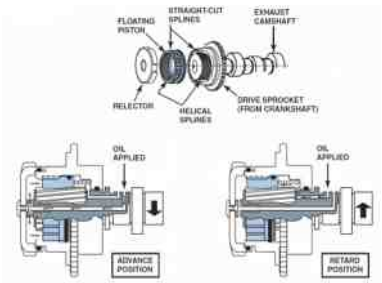

FIGURE 11–4 A spline phaser.

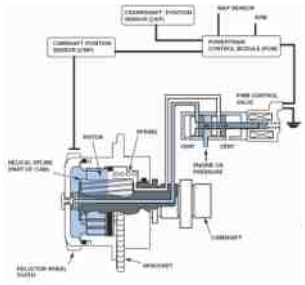

FIGURE 11–5 The screen(s) protect the solenoid valve from dirt and debris that can cause the valve to stick. This fault can set a P0017 diagnostic trouble code (crankshaft positioncamshaft position correlation error.)

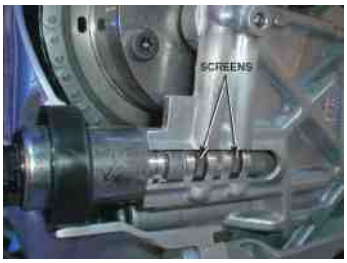

FIGURE 11–6 A vane phaser is used to move the camshaft using changes of oil pressure from the oil control valve.

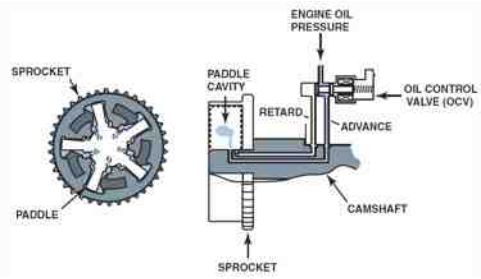

FIGURE 11–7 A magnetically controlled vane phaser.

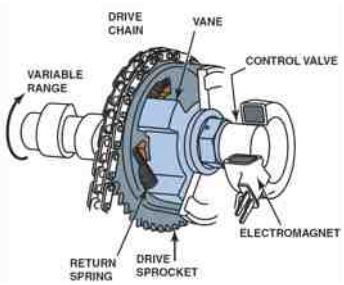

FIGURE 11–8 When the PCM commands 50% duty cycle, the oil flow through the phaser drops to zero.

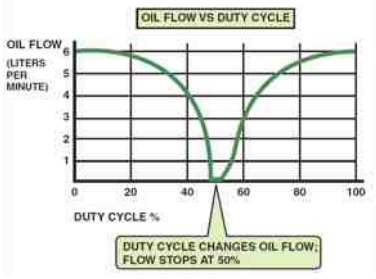

FIGURE 11–9 A camshaft position actuator used in a cam-in-block engine.

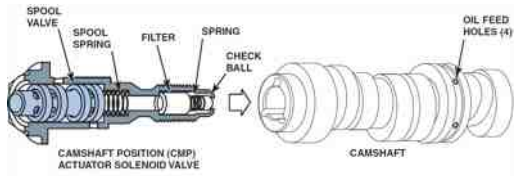

FIGURE 11–10 A plastic mock-up of a Honda VTEC system that uses two different camshaft profiles; one for low-speed engine operation and the other for high speed.

FIGURE 11–11 Engine oil pressure is used to switch cam lobes on a VTEC system.

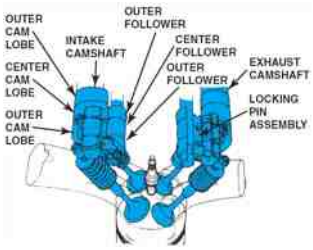

FIGURE 11–12 A typical variable cam timing control valve. The solenoid is controlled by the engine computer and directs engine oil pressure to move a helical gear, which rotates the camshaft relative to the timing chain sprocket.

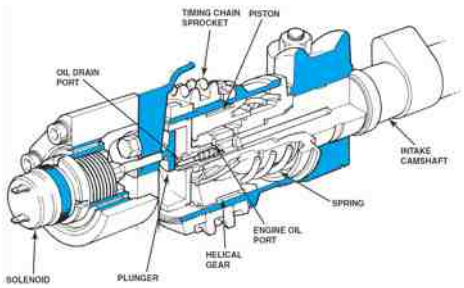

FIGURE 11–13 The schematic of a variable valve timing control circuit, showing that battery power () is being applied to the variable valve timing (VVT) solenoid and pulsed to ground by the PCM.

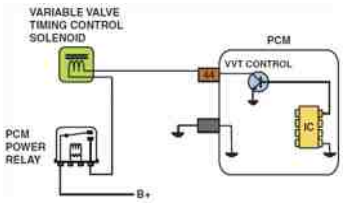

FIGURE 11–14 A variable valve timing solenoid being controlled by applying voltage from the PCM.

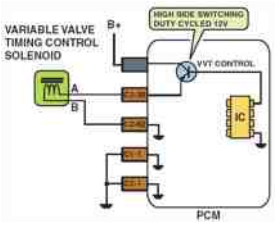

FIGURE 11–15 Oil pressure applied to the locking pin causes the inside of the lifter to freely move inside the outer shell of the lifter, thereby keeping the valve closed.

FIGURE 11–16 Active fuel management includes many different components and changes to the oiling system, which makes routine oil changes even more important on engines equipped with this system.

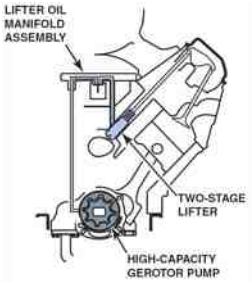

FIGURE 11–17 The driver information display on a Chevrolet Impala with a 5.3 liter V-8 equipped with active fuel management. The transition between 4-cylinder mode and 8-cylinder mode is so smooth that most drivers are not aware that the switch is occurring.