

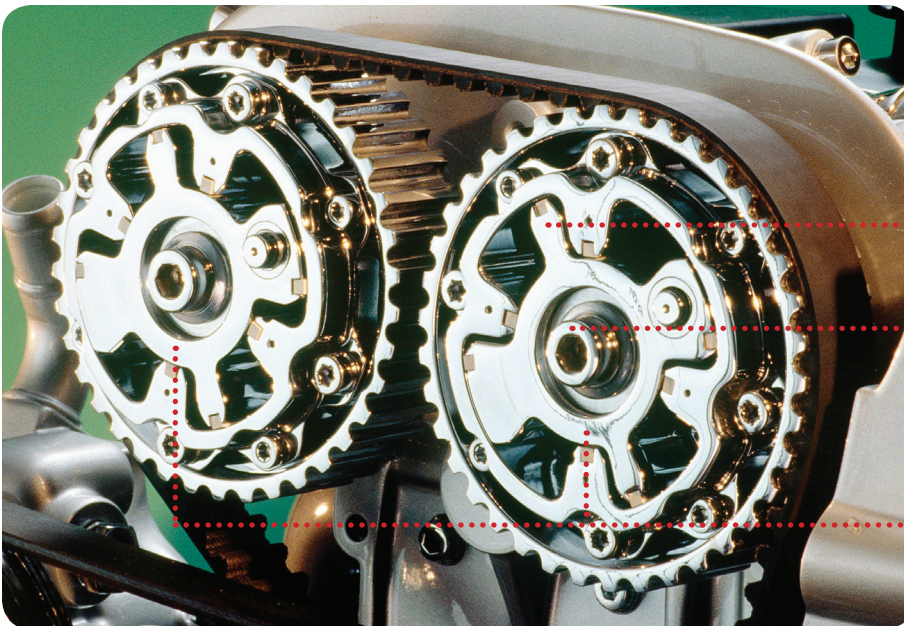


Twin Independent Variable Camshaft Timing (Ti-VCT)

Ti-VCT allows extremely precise, variable control of “valve overlap,” or the window of time in which both the intake and exhaust valves in an engine are open at the same time. By adjusting overlap continuously, an engine can operate at optimum settings for peak fuel economy or power output as conditions demand.

Ti-VCT also facilitates an “internal EGR” effect, reducing NOx (a contributor to smog) and hydrocarbon emissions throughout the engine’s operating range.

Ti-VCT Components



Electronic solenoid valves direct high-pressure engine oil to control vanes in each of the camshaft sprocket housings.

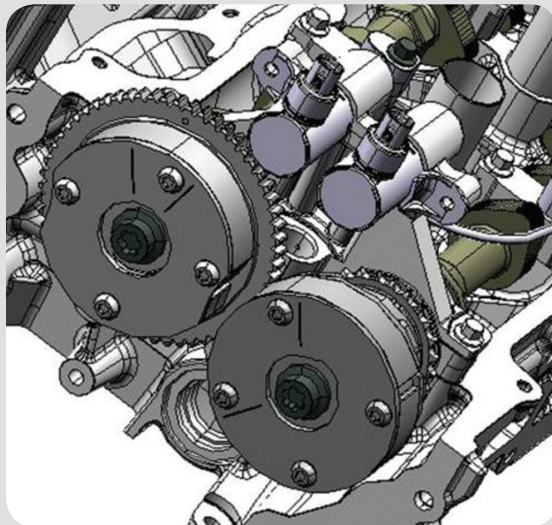
The camshafts can be rotated slightly relative to their initial position, allowing the cam timing to be advanced or retarded based on the oil pressure directed by the solenoid valves.

By using one valve per camshaft, controlled by the Electronic Control Module (ECM), each intake and exhaust cam can be advanced or retarded independently of the other. Competitive systems traditionally operate only on the intake cam.

Some Ti-VCT applications, such as the Mustang GT 5.0-liter V-8, use camshaft torque in addition to pressurized oil for timing control. Using camshaft torque energy provides even faster throttle response and maximizes the use of existing energy for additional fuel economy benefits. Working like a ratchet, the one-way valves allow precise timing of camshaft events, continually optimizing timing to provide maximum output or fuel economy, based on driver input. Camshaft torque actuated Ti-VCT is a Ford innovation, introduced first on the 3.0-liter V-6.

Benefits of Ti-VCT Versus Non-VCT-equipped Engines

- Up to a 7 percent improvement in peak power and a 5 percent improvement in low-speed torque for better acceleration, passing and merging performance.
- Up to a 4.5 percent improvement in fuel economy.
- Reduced NOx and hydrocarbon emissions without compromising idle quality.
- Optimized cold-start operation minimizing cold-start emissions.



Availability

2011 Ford Mustang 3.7-liter V-6 and 5.0-liter V-8, 2011 Ford Edge, 2011 Ford Edge Sport, 2011 Lincoln MKX; additional applications to be announced.

