Automotive Engines 10th

Chapter 28 Variable Valve Timing and Displacement Systems

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1. What is a key component of the variable displacement system?

2. What diagnostic trouble codes are associated with the variable valve timing (VVt) system?

3. What is the advantage of varying the exhaust camshaft timing?

4. What sensors does the powertrain control module (PCM) monitor to determine the best camshaft timing?

5. Why must the engine oil be changed regularly on an engine equipped with variable valve timing (VVT)?

6. What is the advantage of varying the intake camshaft timing?

Answer Key
Testname: ENGINES 10 SHORT28

1. The key component of this process is the use of two-stage hydraulic valve lifters. When the computer determines that the cylinder can be deactivated, oil pressure is delivered to a passage, which depresses a pin and allows the outer portion of the lifter to follow the contour of the cam while the inner portion remains stationary, keeping the valve closed.
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2. Typical VVT-related DTCs include the following:
   P0011—Intake cam position is over advanced bank 1
   P0012—Intake cam position is over retarded bank 1
   P0013—Exhaust camshaft position actuator
   P0014—Exhaust camshaft too far advanced
   P0021—Intake cam position is over advanced bank 2
   P0022—Intake cam position is over retarded bank 2
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3. An engine that uses VVT on the exhaust only is used to create an EGR affect, thereby eliminating the need for an exhaust gas recirculation (EGR) valve. In this system, the exhaust valve is retarded when the engine is operating at part throttle. This delays the closing of the exhaust valves which allows exhaust gases to be trapped in the combustion chamber.
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4. The PCM uses the following sensors to determine the best position of the camshaft for maximum power and lowest possible exhaust emissions:
   - Engine speed (RPM)
   - MAP sensor
   - Crankshaft position (CKP) sensor
   - Camshaft position (CMP) sensor
   - Barometric pressure (BARO) sensor

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5. A lack of regular oil changes can cause the screen to become clogged, thereby preventing proper operation. A rough idle is a common complaint because the spring may not be able to return the camshaft to the idle position after a long highway trip.
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6. Changing the intake camshaft timing results in improved engine performance. This is due to commanding the intake valve to close earlier in the compression stroke, resulting in less of the air/fuel charge being pushed back into the intake port (reversions). The result is improved low-speed torque that the engine can produce.
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