

VARIABLE VALVE TIMING SYSTEM

MECHANICAL

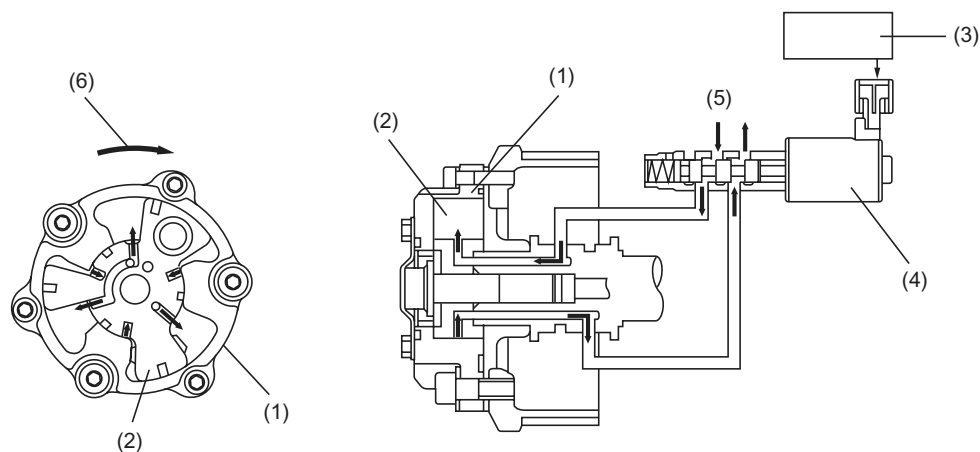
10. Variable Valve Timing System

This engine has a variable valve timing system, which adjusts the opening and closing timings of the intake valves optimally by continuously changing the phase angle of the camshaft sprocket relative to the camshaft.

- The ECM determines the optimal cam angle relative to the crank angle by making reference to the engine speed, vehicle speed, throttle opening and other relevant parameters.
- Under the control of the ECM, the oil flow control valve moves its spool to switch the hydraulic passage to/from the advance and retard chambers that are formed in the camshaft sprocket to change continuously the phase angle between the camshaft sprocket and camshaft.

A: PHASE ANGLE ADVANCES

In response to an advance signal from the ECM, the oil flow control valve moves its spool such that hydraulic pressure is applied to the advance chamber in the camshaft sprocket. The sprocket is then turned in the direction in which its phase angle advances relative to the camshaft.



ME-00747

- (1) Variable valve timing controller (attached to camshaft sprocket)
- (2) Vane (attached to intake camshaft)
- (3) ECM
- (4) Oil flow control valve
- (5) Oil pressure
- (6) Turns in advance direction

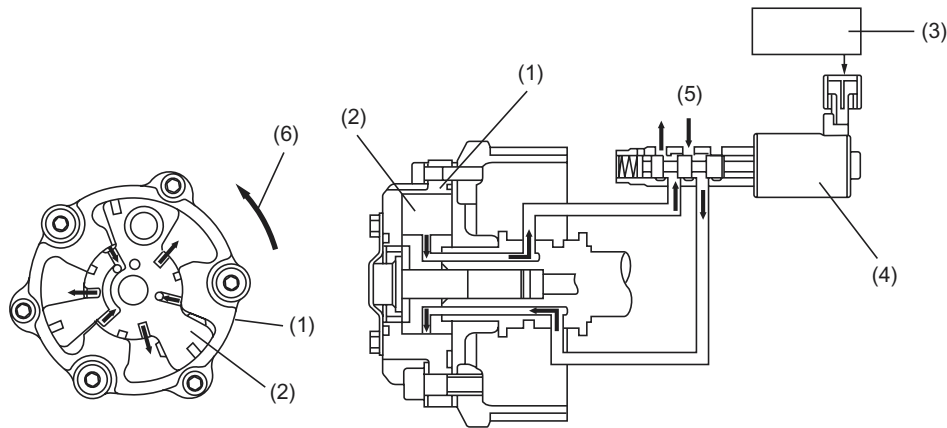
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B: PHASE ANGLE RETARDS

In response to a retard signal from the ECM, the oil flow control valve moves its spool such that hydraulic pressure is applied to the retard chamber in the camshaft sprocket. The sprocket is then turned in the direction in which its phase angle retards relative to the camshaft.



ME-00748

- (1) Variable valve timing controller (attached to camshaft sprocket)
- (2) Vane (attached to intake camshaft)
- (3) ECM
- (4) Oil flow control valve
- (5) Oil pressure
- (6) Turns in retard direction

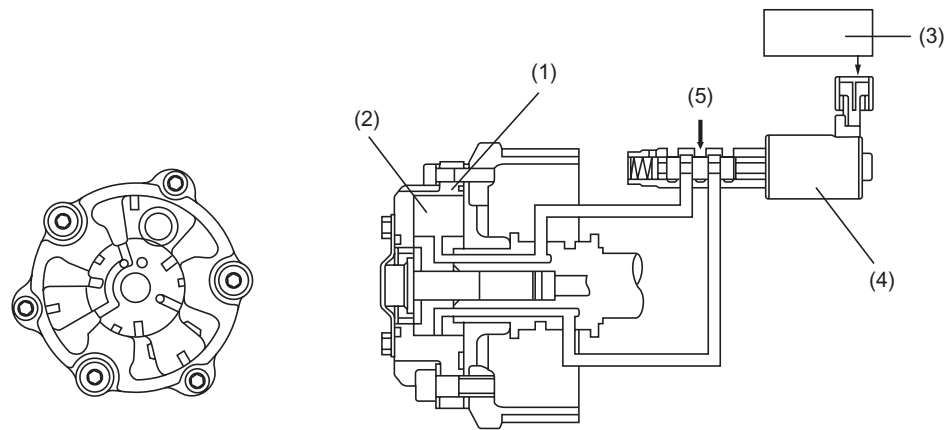
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C: A CERTAIN PHASE ANGLE IS RETAINED

When the ECM issues a signal to keep the phase angle unchanged, the oil flow control valve moves its spool to the position at which the hydraulic pressures to/from both the chambers are blocked. The pressures in the chambers are thus maintained, so the phase angle does not change and the intake valves' opening and closing timings also remain unchanged.



ME-00749

- (1) Variable valve timing controller (attached to camshaft sprocket)
- (2) Vane (attached to intake camshaft)
- (3) ECM
- (4) Oil flow control valve
- (5) Oil pressure

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