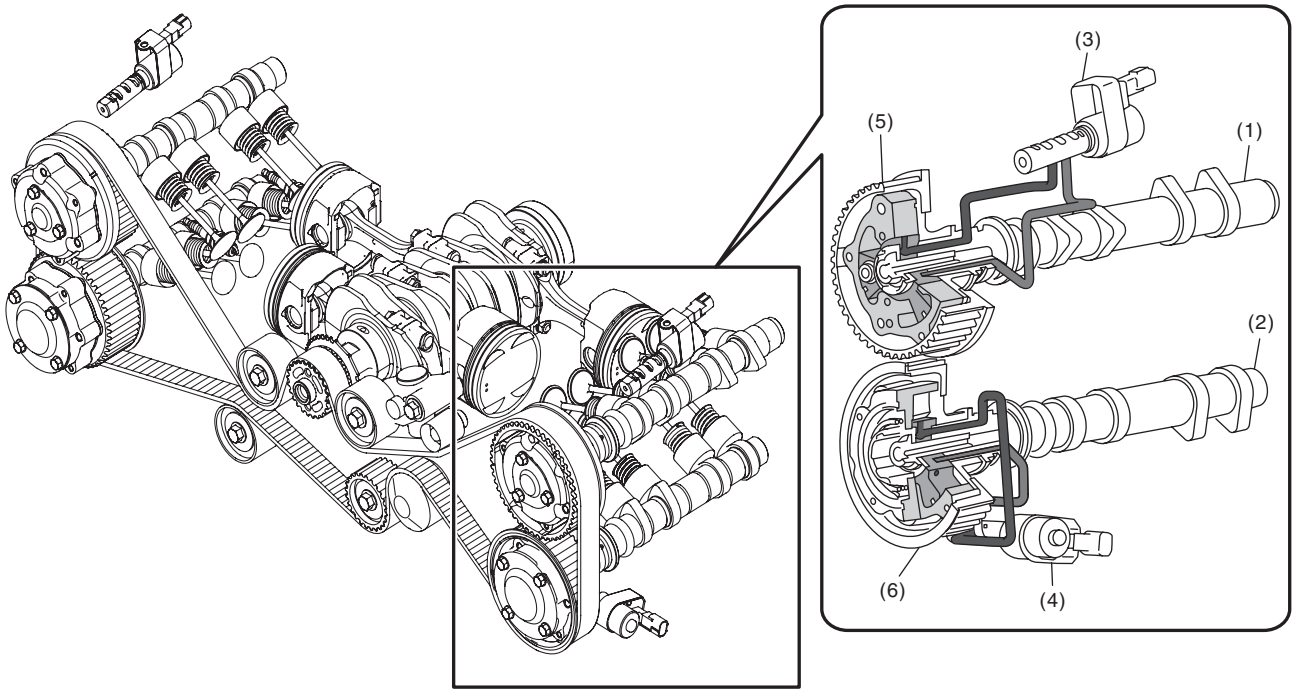
14.Dual AVCS (Active Valve Control System) (From ’08MY)

A: GENERAL

The dual AVCS (Active Valve Control System) changes the camshaft phase angle in relation to the camshaft sprocket to optimize valve timing of the intake and exhaust valves, improving torque in a low and medium speed range, output performance in a high speed range, emission performance, and fuel efficiency.

- The ECM determines the best camshaft angle in relation to the crankshaft angle based on engine speed, vehicle speed, throttle angle, and other relevant parameters.
- Under the control of the ECM, the oil flow control solenoid valve moves its spool to change the phase angle between the camshaft sprocket and camshaft successively by switching the oil path designed between the advance angle chamber and the retard angle chamber.

B: COMPONENT



ME-03631

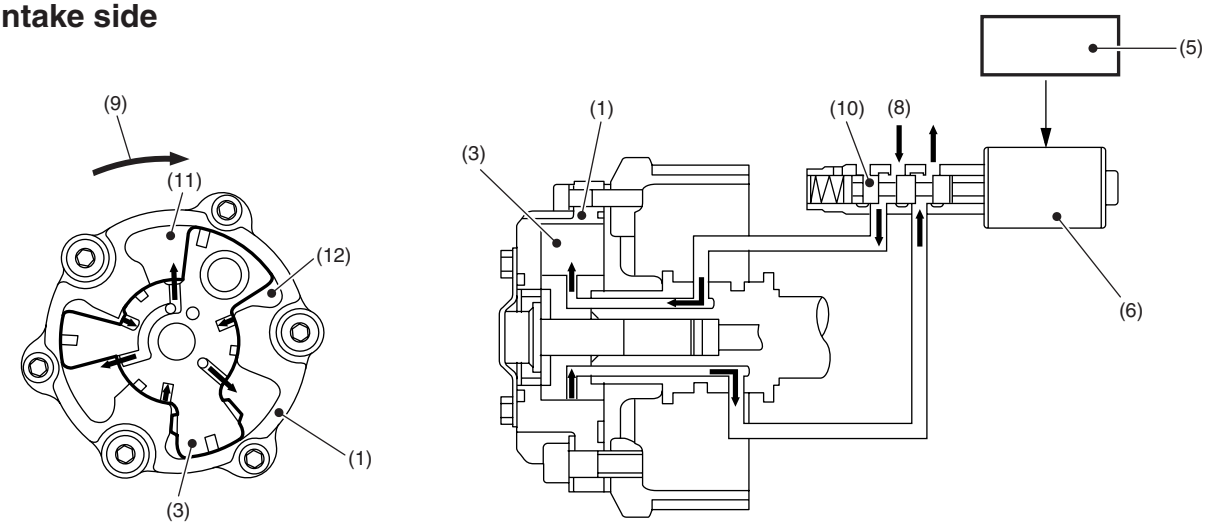
(1) Intake camshaft
(2) Exhaust camshaft
(3) Intake oil flow control valve
(4) Exhaust oil flow control valve
(5) Intake variable valve timing controller
(6) Exhaust variable valve timing controller

C: OPERATION

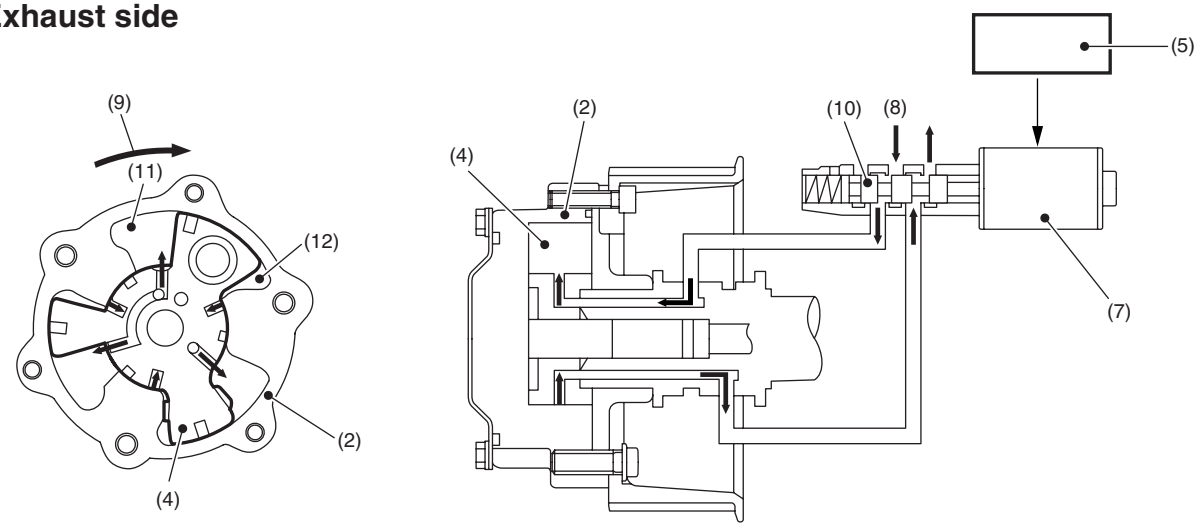
1. ADVANCEMENT IN PHASE ANGLE

The oil flow control solenoid valve applies oil pressure to the advance angle chamber of the camshaft sprocket by moving its spool in response to an advance angle signal from the ECM. As the pressure is applied, the camshaft that is attached to the vanes rotates in the phase angle advance direction in relation to the camshaft sprocket.

Intake side



Exhaust side



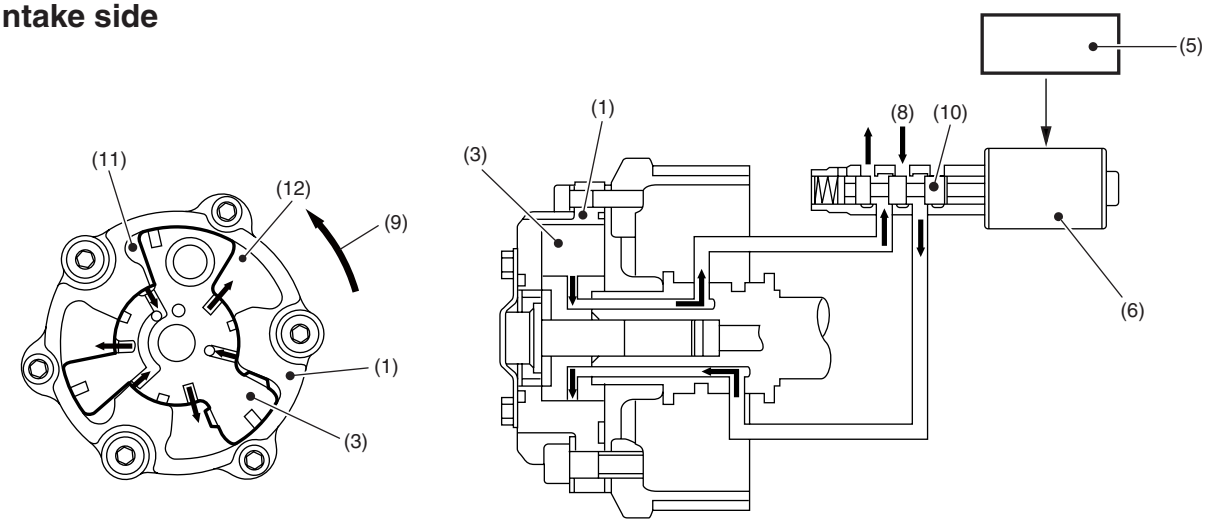
ME-03632

(1) Intake variable valve timing controller (attached to the intake camshaft sprocket)
(2) Exhaust variable valve timing controller (attached to the exhaust camshaft sprocket)
(3) Vane (attached to intake camshaft)
(4) Vane (attached to exhaust camshaft)
(5) ECM
(6) Intake oil flow control solenoid valve
(7) Exhaust oil flow control solenoid valve
(8) Oil pressure
(9) Rotates in direction of advance angle
(10) Spool
(11) Advance angle chamber
(12) Retard angle chamber

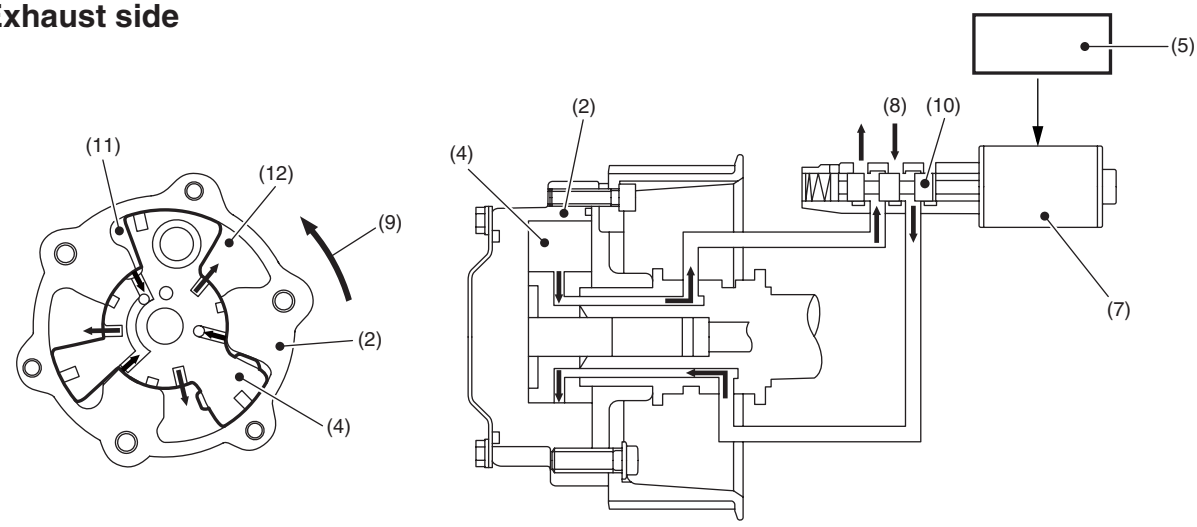
2. RETARD IN PHASE ANGLE

The exhaust oil flow control solenoid valve applies oil pressure to the retard angle chamber of the camshaft sprocket by moving its spool in response to an retard angle signal from the ECM. As the pressure is applied, the camshaft that is attached to the vanes rotates in the phase angle retard direction in relation to the camshaft sprocket.

Intake side



Exhaust side



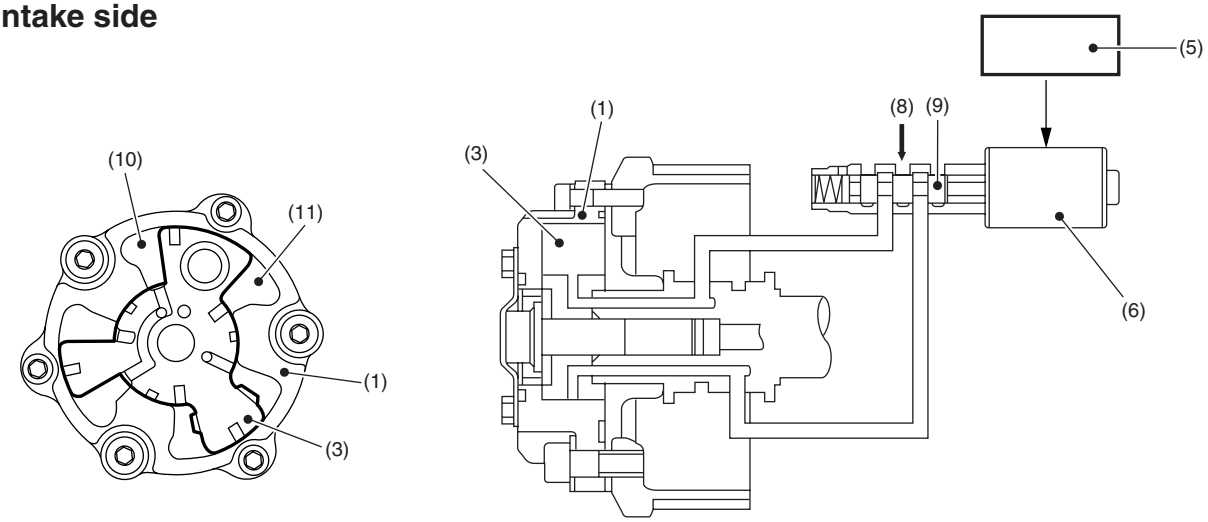
ME-03633

(1) Intake variable valve timing controller (attached to the intake camshaft sprocket)
(2) Exhaust variable valve timing controller (attached to the exhaust camshaft sprocket)
(3) Vane (attached to intake camshaft)
(4) Vane (attached to exhaust camshaft)
(5) ECM
(6) Intake oil flow control solenoid valve
(7) Exhaust oil flow control solenoid valve
(8) Oil pressure
(9) Rotates in direction of retard angle
(10) Spool
(11) Advance angle chamber
(12) Retard angle chamber

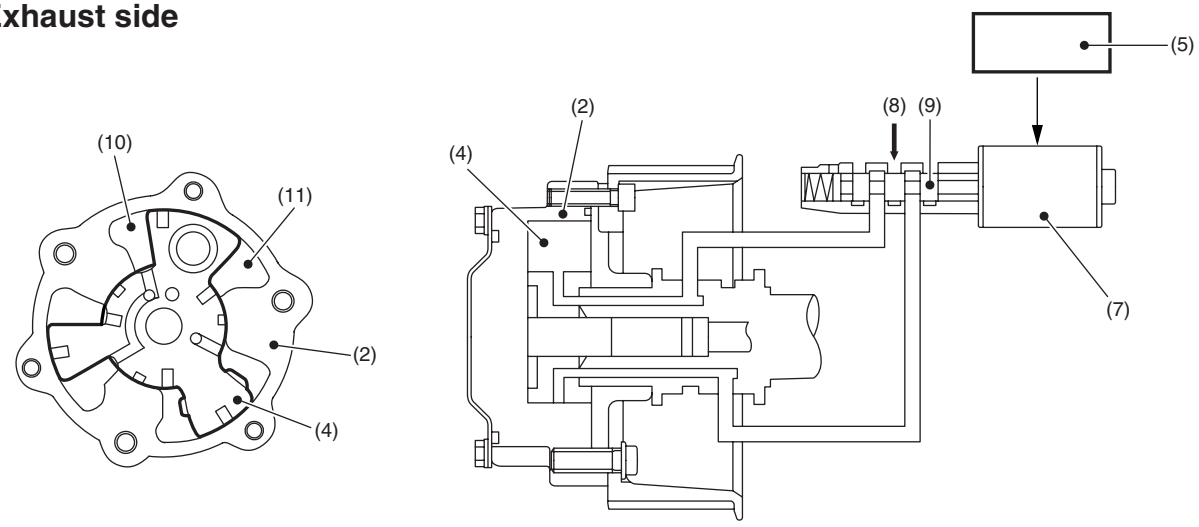
3. CONSISTENT PHASE ANGLE IS RETAINED

When the ECM commands a signal preventing a change in phase angle, the oil flow control solenoid valve move its spool to block oil pressure that is applied to both chambers. Therefore the oil pressure in the chambers are held and the phase angle is retained.

Intake side



Exhaust side



ME-03634

(1) Intake variable valve timing controller (attached to the intake camshaft sprocket)
(2) Exhaust variable valve timing controller (attached to the exhaust camshaft sprocket)
(3) Vane (attached to intake camshaft)
(4) Vane (attached to exhaust camshaft)
(5) ECM
(6) Intake oil flow control solenoid valve
(7) Exhaust oil flow control solenoid valve
(8) Oil pressure
(9) Spool
(10) Advance angle chamber
(11) Retard angle chamber