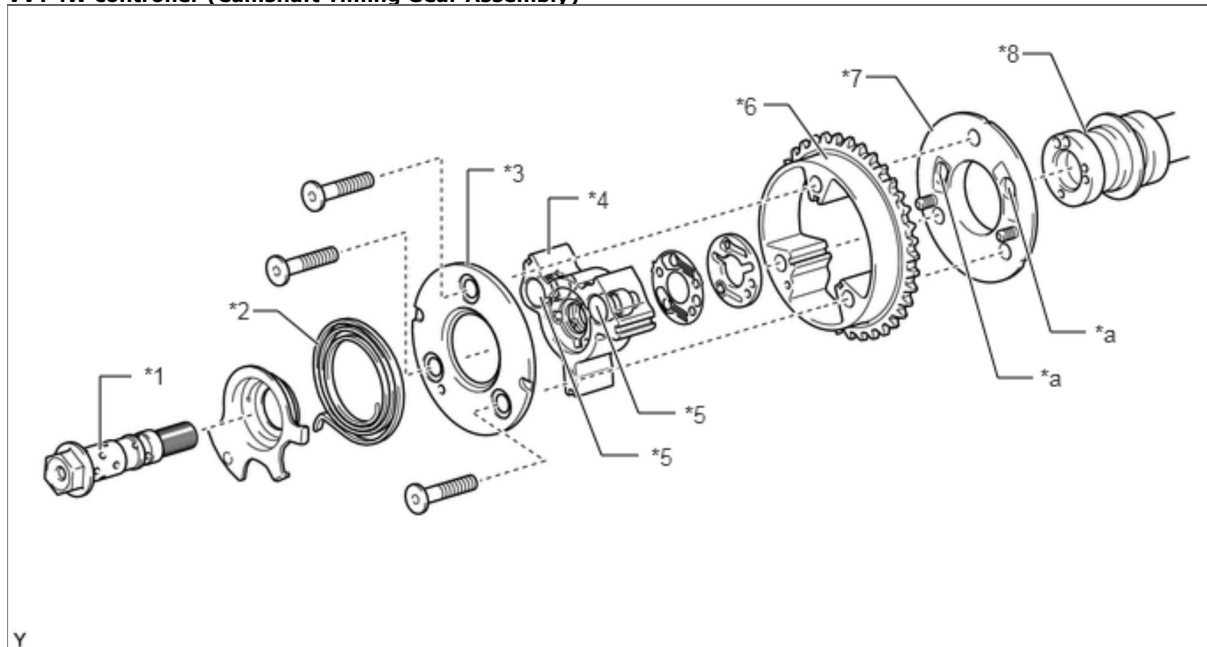
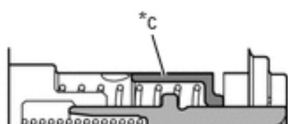


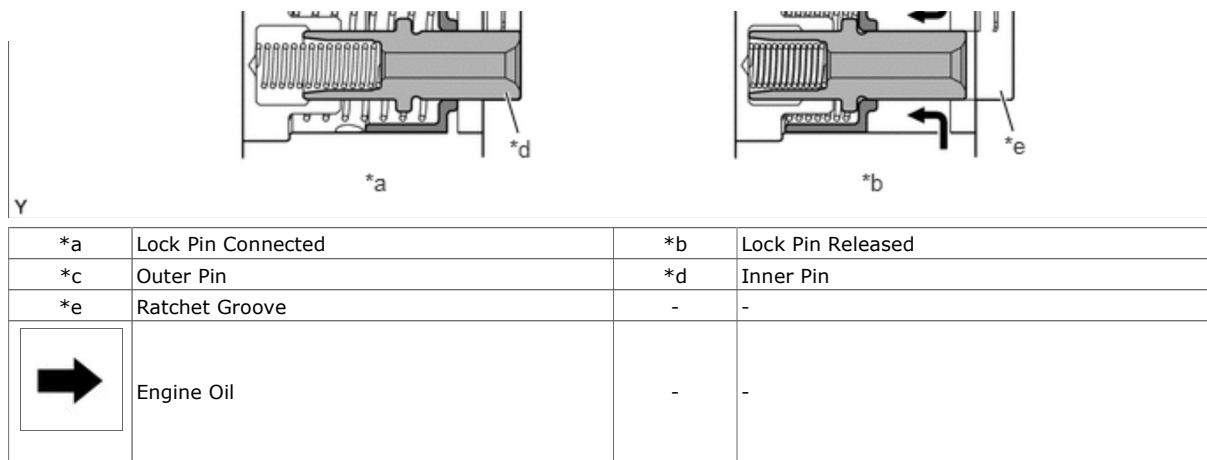
[Print](#)[Exit](#)**6AR-FSE ENGINE MECHANICAL ENGINE UNIT DETAILS VVT-iW CONTROLLER****CONSTRUCTION**

- a. A 4-blade vane type VVT-iW controller (camshaft timing gear assembly) is used on the intake side.
- b. 2 lock pins are used to lock the vane during the intermediate phase of the VVT-iW operation range.
- c. An assist spring, which assists torque in the advanced direction, is used so that the vane returns to the intermediate phase in response the intake camshaft (camshaft) torque fluctuations to securely connect the 2 lock pins. As a result, engine startability is ensured when starting the engine (when cranking) after the engine was stopped in the retarded operation state.
- d. An oil control valve is built into the camshaft timing gear bolt, which secures the vane to the intake camshaft (camshaft). As a result, the controlled oil passage is shortened to improve response performance and operation at low temperatures. The oil control valve switches the oil passage when pressed by the cam timing oil control solenoid assembly. Oil passage switching is controlled to continuously change the intake camshaft (camshaft) phase.
- e. The oil control valve has a structure which allows independent control of when the 2 lock pins are connected and released, separate from the advance control and retard control. As a result, a lock operation can be performed during the intermediate phase of the VVT-iW operation range.

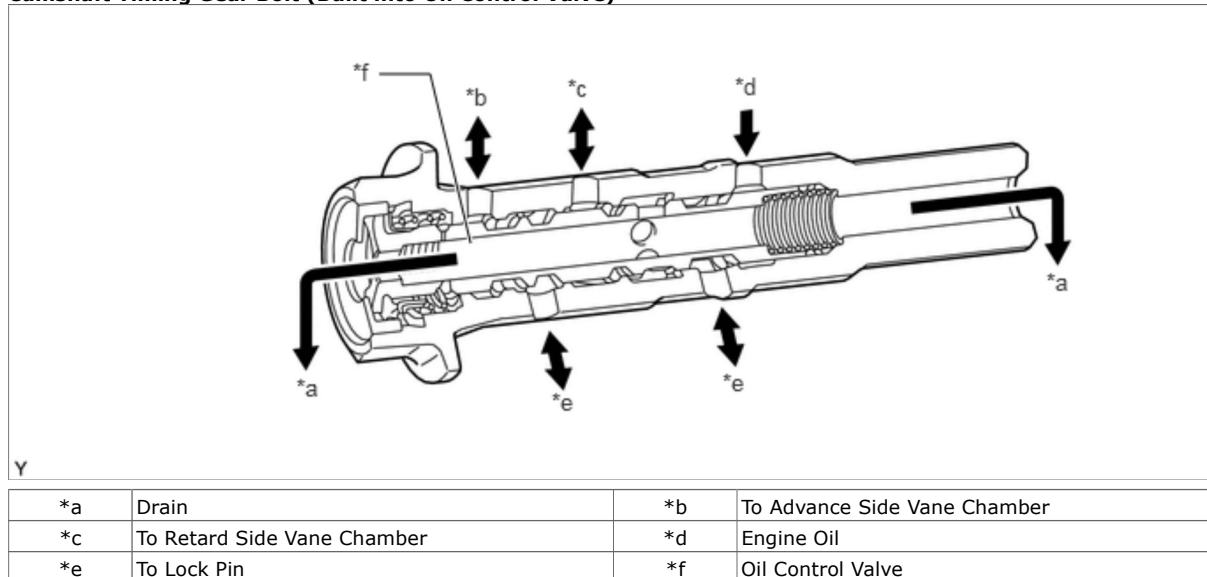
**VVT-iW controller (Camshaft Timing Gear Assembly)**

*1	Camshaft Timing Gear Bolt	*2	Assist Spring
*3	Camshaft Timing Gear Cover FR	*4	Vane (Fixed on Intake Camshaft (Camshaft))
*5	Lock Pin	*6	Housing (Sprocket)
*7	Camshaft Timing Gear Cover RR	*8	Intake Camshaft (Camshaft)
*a	Ratchet Groove	-	-

**Lock Pin**



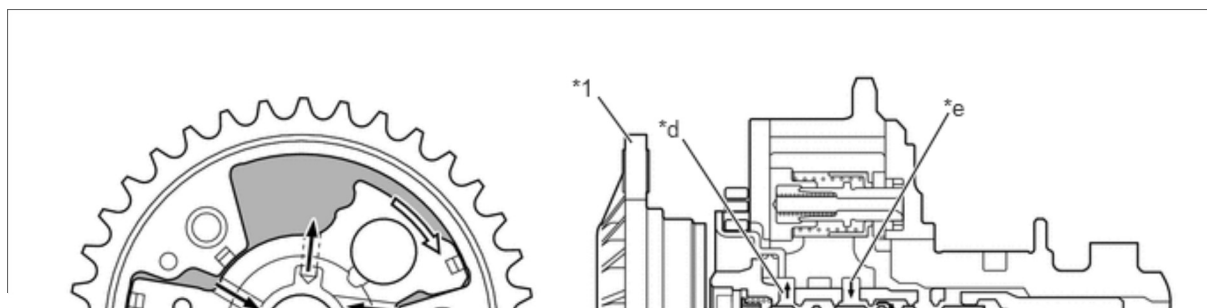
### Camshaft Timing Gear Bolt (Built into Oil Control Valve)

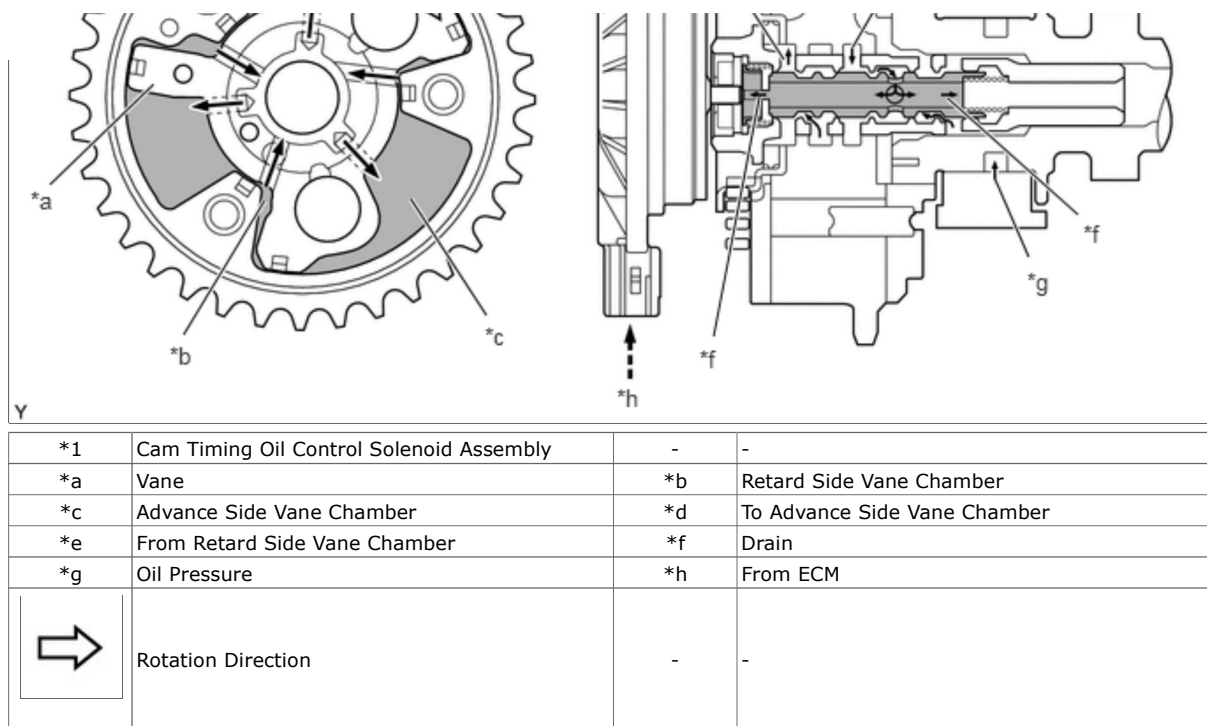


## OPERATION

### a. Advance

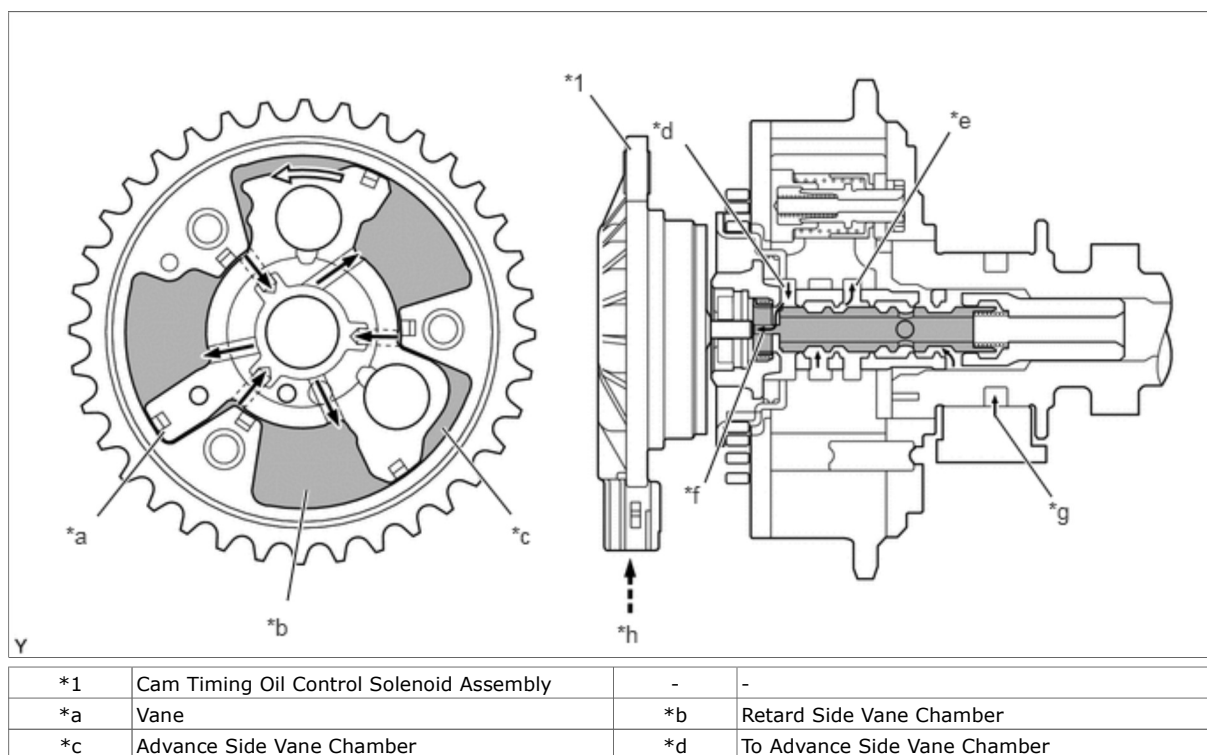
- i. The cam timing oil control solenoid assembly operates according to the advance signal from the ECM. When the oil control valve reaches the position shown in the following illustration, the advance side vane chamber of the VVT-iW controller (camshaft timing gear assembly) is affected by oil pressure and the vane inside the VVT-iW controller (camshaft timing gear assembly) rotates in the advanced direction. The intake camshaft (camshaft) fixed to the vane also rotates to the advanced side.






#### b. Retard

- i. The cam timing oil control solenoid assembly operates according to the retard signal from the ECM. When the oil control valve reaches the position shown in the following illustration, the retard side vane chamber of the VVT-iW controller (camshaft timing gear assembly) is affected by oil pressure and the vane inside the VVT-iW controller (camshaft timing gear assembly) rotates in the retarded direction. The intake camshaft (camshaft) fixed to the vane also rotates to the retarded side.



*e	From Retard Side Vane Chamber	*f	Drain
*g	Oil Pressure	*h	From ECM
	Rotation Direction	-	-

**c.** Hold

- i.** The ECM calculates the target advanced angle according to driving conditions and performs control. After setting the target timing, timings are maintained by the neutral oil control valve as long as driving conditions do not change. As a result, unnecessary engine oil discharge is suppressed while valve timings are aligned to the desired target position.

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