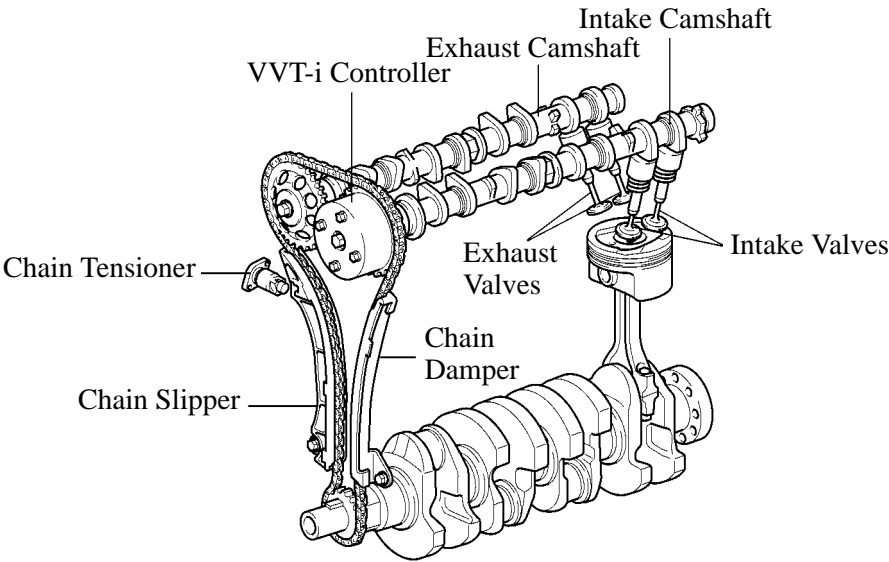


■ VALVE MECHANISM

1. General

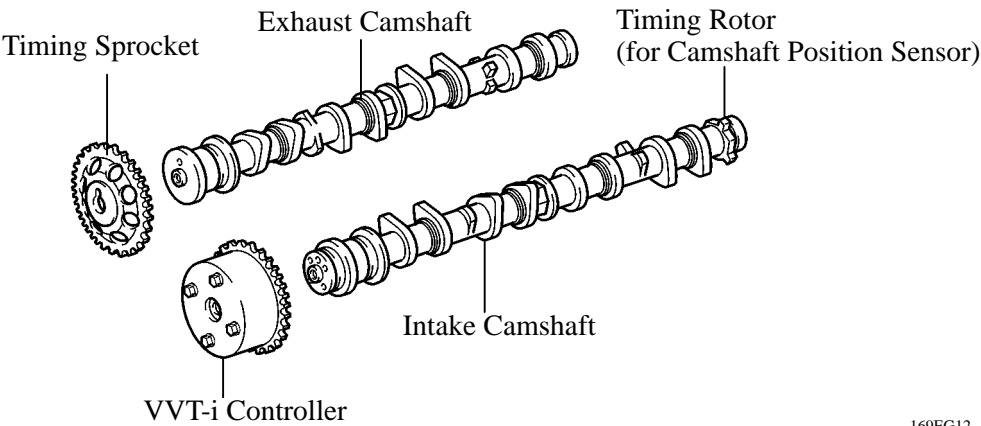
- Intake and exhaust efficiency has been increased due to the larger total port areas.
- The shimless type valve lifter is used.
- The intake and exhaust camshafts are driven by a timing chain.
- The VVT-i system is used to achieve low fuel consumption, higher engine performance and reduce exhaust emissions. For details of VVT-i control, refer to page EG-36.



169EG11

2. Camshaft

- An oil passage is provided in the intake camshaft in order to supply engine oil pressure to the VVT-i system.
- A VVT-i controller has been installed on the front of the intake camshaft to vary the timing of the intake valves.



169EG12

– Change (from '02 Corolla) –

The valve timing (cam profile) of the intake camshaft has been changed for the low-to medium-speed range.

Model		'03 Corolla Matrix	'02 Corolla
Valve Timing (IN)	Open	2° – 42° BTDC	5° – 48° BTDC
	Close	50° – 10° ABDC	55° – 12° ABDC

### 3. Valve Lifter

Along with the increase in the amount of valve lift, the valve adjusting shims have been discontinued and a shimless type of valve lifter is used. This valve lifter increases the cam contact surface.

#### Service Tip

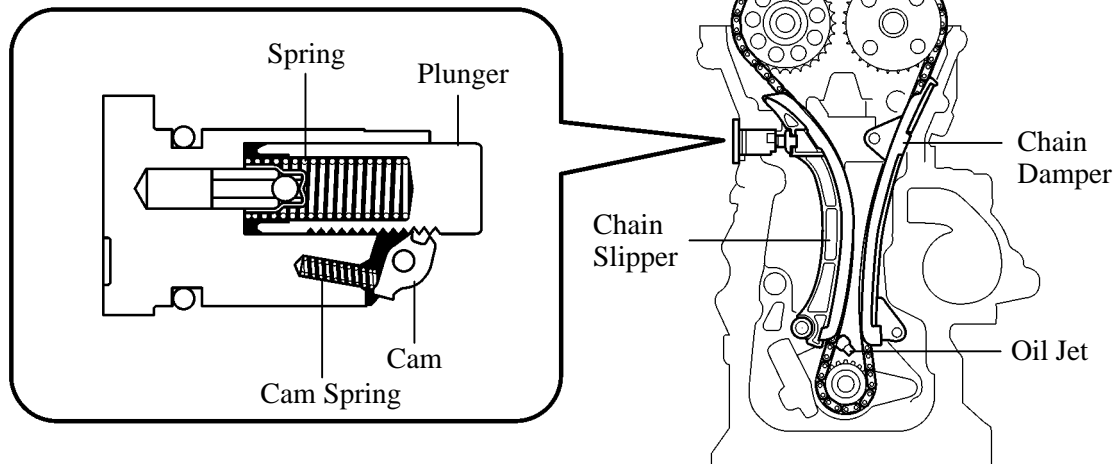
The adjustment of the valve clearance is accomplished by selecting and replacing the appropriate valve lifters. Adjusting valve lifters are available in 35 increments of 0.020 mm (0.0008 in.), from 5.060 mm (0.1992 in.) to 5.740 mm (0.2260 in.).

For details, refer to 2003 Corolla Matrix Repair Manual (Pub. No. RM940U).

### 4. Timing Chain and Chain Tensioner

- A roller chain with an 8 mm pitch has been used to make the engine more compact.
- The timing chain is lubricated by an oil jet.
- The chain tensioner uses a spring and oil pressure to maintain proper chain tension at all times. The chain tensioner suppresses noise generated by the timing chain.
- A ratchet type non-return mechanism is also used.
- To achieve excellent serviceability, the chain tensioner is constructed so that it can be removed and installed from the outside of the timing chain cover.

**Chain Tensioner**



216EG23