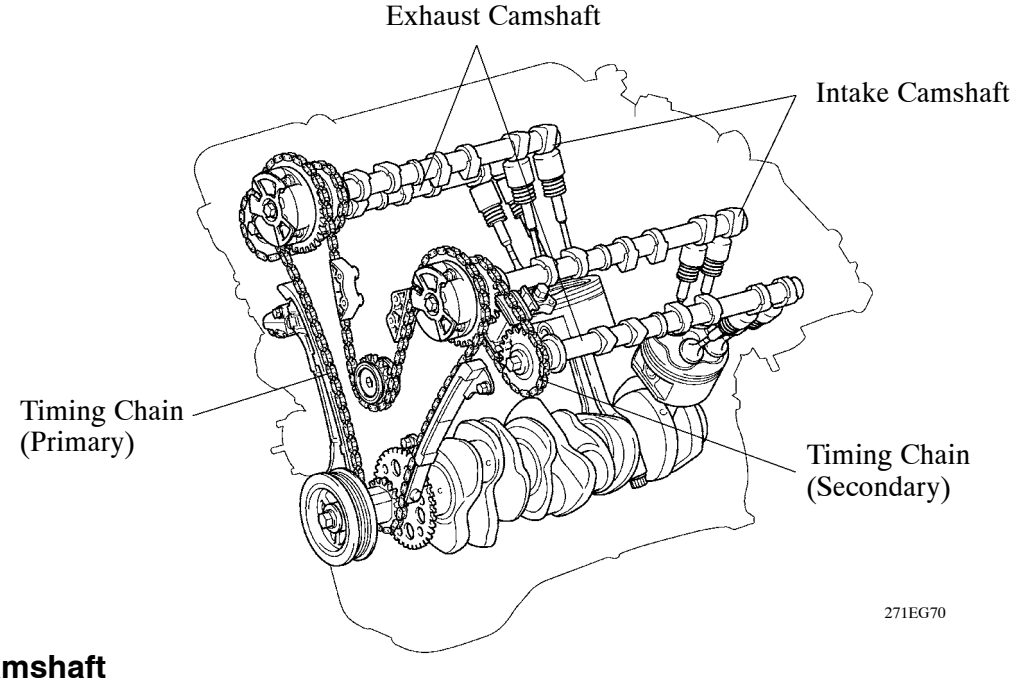
■VALVE MECHANISM

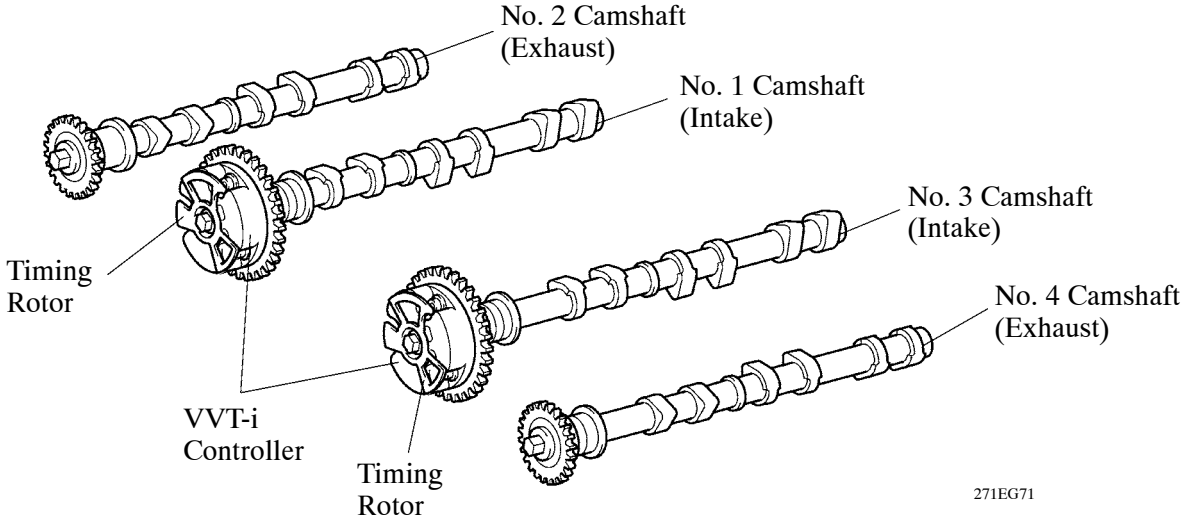
1. General

- Each cylinder has two intake valves and two exhaust valves. Intake and exhaust efficiency is increased by means of the larger total port areas.
- The valves are directly opened and closed by four camshafts.
- The intake camshafts are driven by the crankshaft via the primary timing chain. The exhaust camshafts are driven by the intake camshaft of the respective bank via the secondary timing chain.
- The VVT-i system used for the intake camshaft achieves excellent fuel economy, higher engine performance and reduction of exhaust emissions.



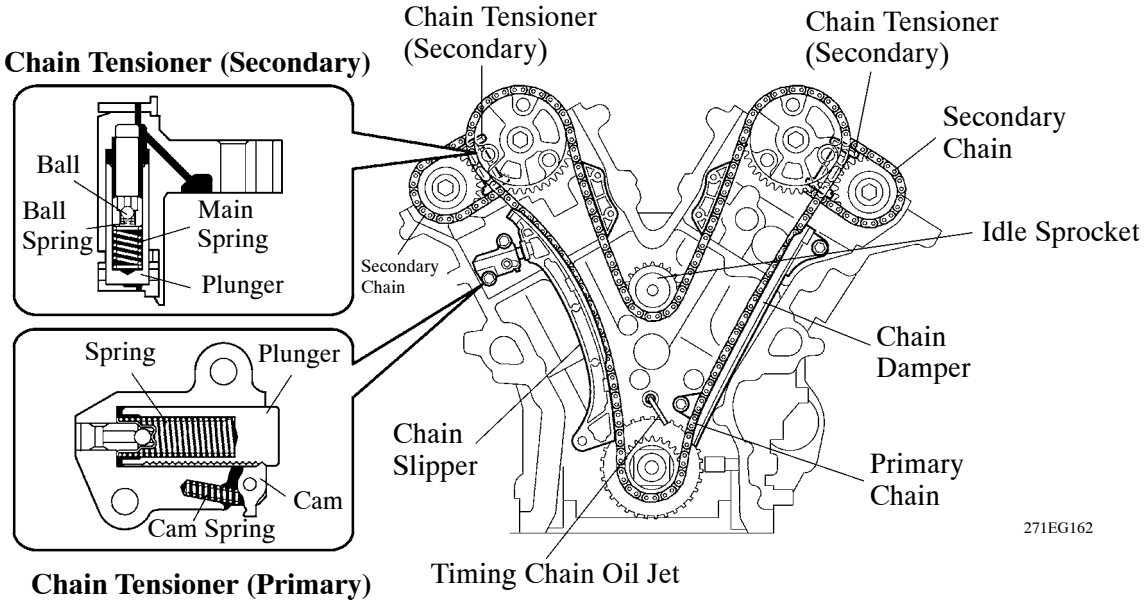
2. Camshaft

- The camshafts are made of cast iron alloy.
- In conjunction with the use of the VVT-i system, an oil passage is provided in the intake camshaft in order to supply engine oil 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.
- To detect the intake camshaft position, a timing rotor is provided in front of the VVT-i controller. This timing rotor, which is secured to the intake camshaft, is used by the VVT sensor to detect the actual position of the intake camshaft.



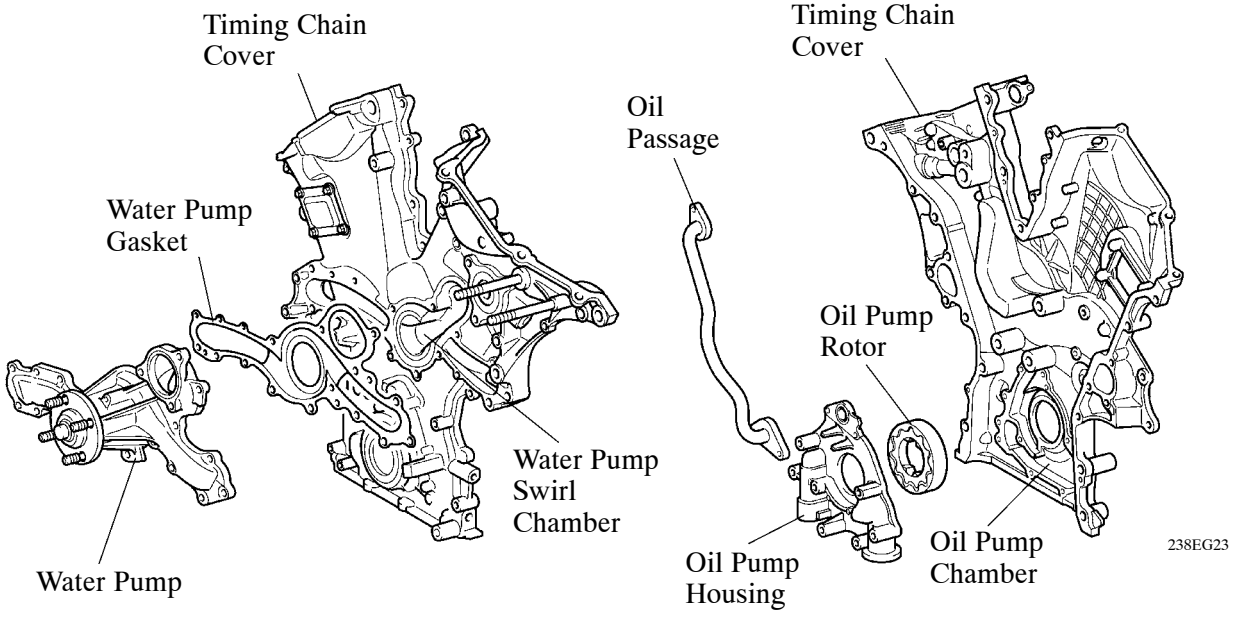
3. Timing Chain and Chain Tensioner

- Both the primary and secondary timing chains use roller chains with a pitch of 9.525 mm (0.375 in.).
- The timing chain is lubricated by timing chain oil jet.
- The primary chain uses one timing chain tensioner and each of the secondary chains for the right and left banks uses one timing chain tensioner.
- Both the primary and secondary chain tensioners use oil pressure and a spring to maintain proper chain tension at all times. They suppress noise generated by the timing chains.
- The chain tensioner for the primary chain is the ratchet type non-return mechanism.



4. Timing Chain Cover

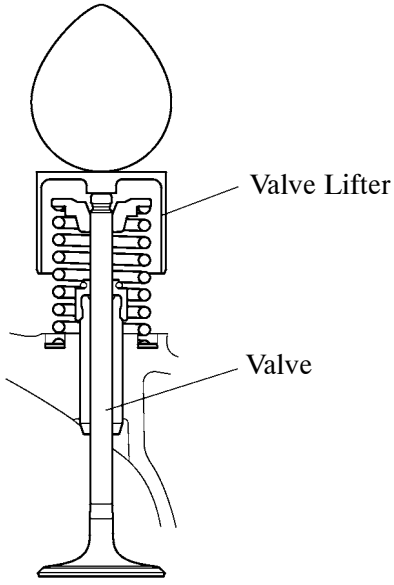
The timing chain cover has an integrated construction consisting of the cooling system (water pump and water passage) and the lubrication system (oil pump and oil passage). Thus, the number of parts has been reduced to reduce weight.



View from Front Side **View from Back Side**

5. Intake and Exhaust Valve and Valve Lifter

- Valve lifters with shim-less valve adjustment are used for weight reduction.
- Because the valve face diameter of the intake valves is greater than that of the exhaust valves, these valves contribute to improving intake efficiency.



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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 0.02 mm (0.0008 in.), from 5.06 mm (0.1992 in.) to 5.74 mm (0.2260 in.).