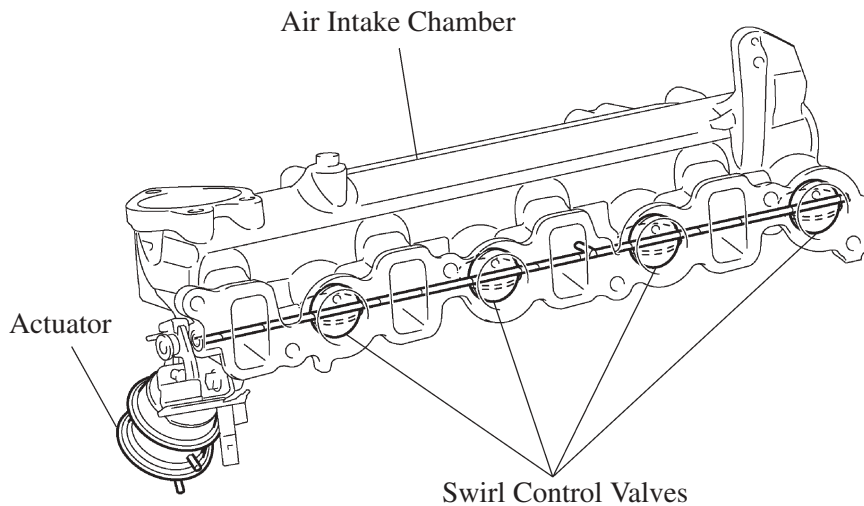


## 5. Intake and Exhaust System

### Intake Manifold

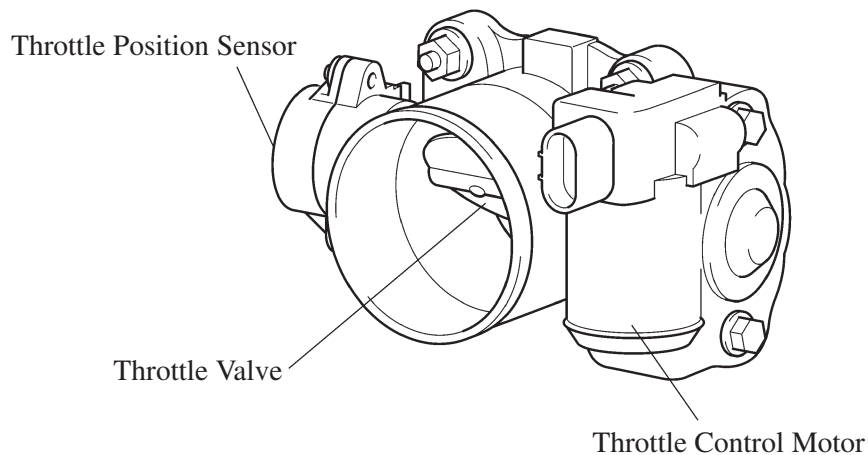
The actuator for the swirl control valves has been changed from the two-stage to a three-stage switching type. For details of swirl control valve control, [see page 29](#).



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### Throttle Body

- A throttle control motor is changed from the step motor type to the rotary solenoid type.  
The throttle body equipped with a rotary solenoid type throttle control motor is used to realize high EGR performance and to reduce the vibration when the engine is stopped. The rotary solenoid type throttle control motor makes the throttle valve respond quickly.  
For details of EGR control system and throttle control, [see pages 28 and 29](#).
- A throttle position sensor has been newly added in the throttle body.



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## EGR Cooler and Bypass Switching Valve

A water-cooled EGR cooler with a bypass, and a bypass switching valve have been newly added.

- If EGR gas is cooled down in the EGR cooler with light engine load and low water temperature, compression air temperature decreases. To prevent this, the EGR gas passage is switched by the EGR cooler bypass switching valve.
- The EGR cooler is comprised of the six-layered heat exchanger tube.

