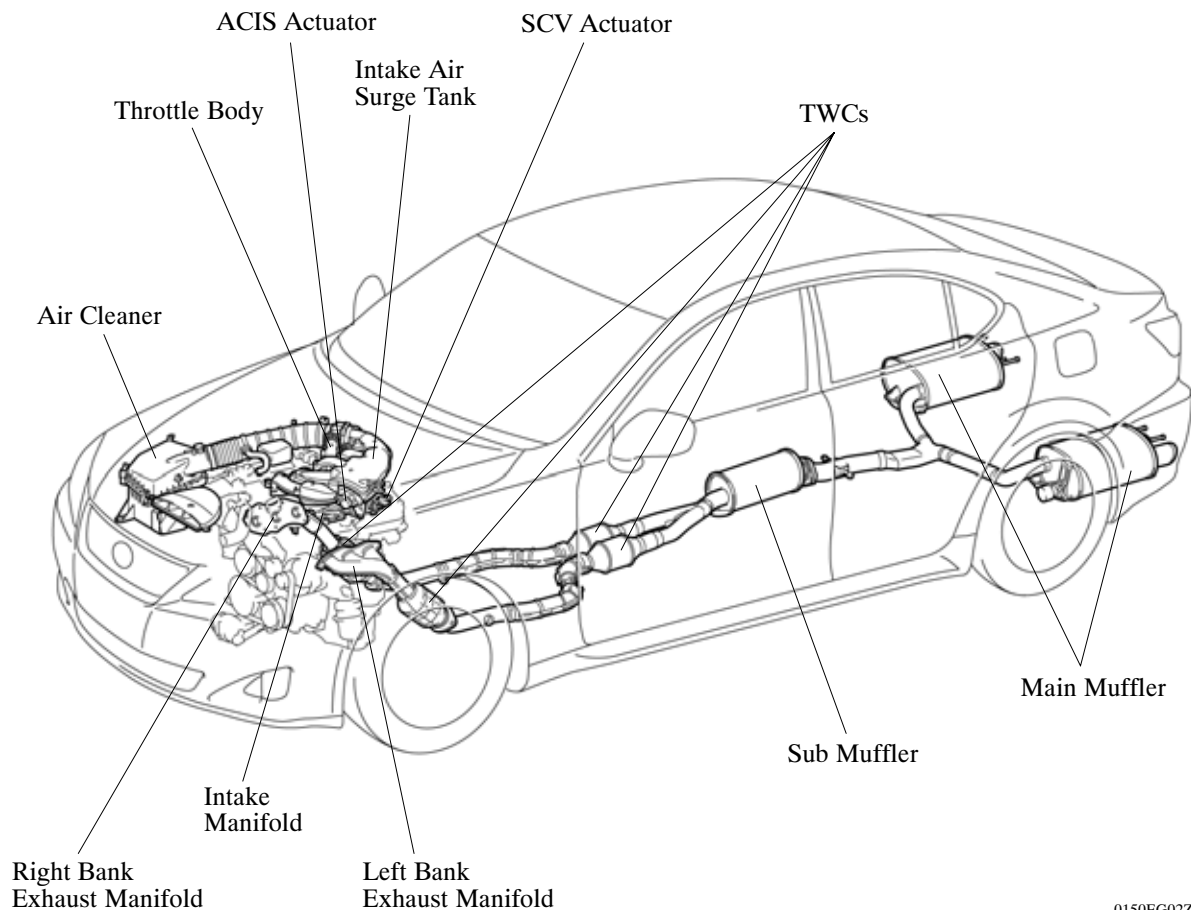


■ INTAKE AND EXHAUST SYSTEM

1. General

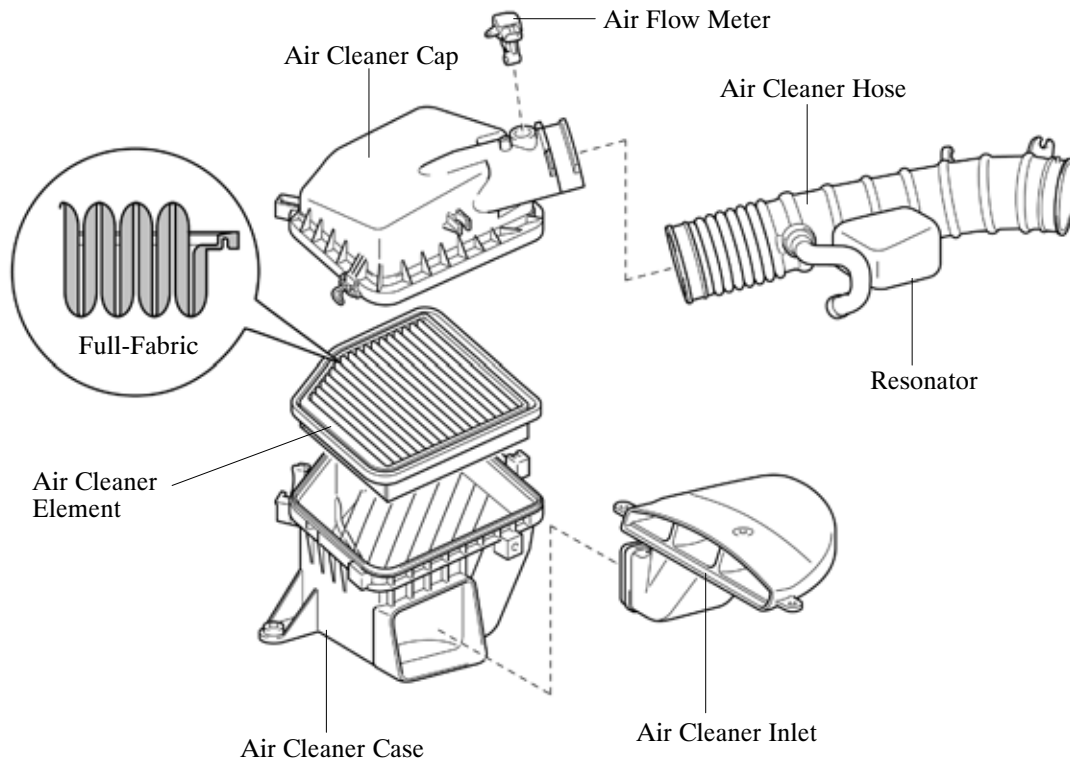
- A cable-less type throttle body is used and it realizes excellent throttle control.
- An intake air surge tank made of plastic is used.
- A stainless steel exhaust manifold and exhaust pipes are used for weight reduction.
- The ETCS-i (Electronic Throttle Control System-intelligent) is used to ensure excellent throttle control in all operating ranges. For details, [see page EG-62](#).
- The ACIS (Acoustic Control Induction System) is used to improve the engine performance in all speed ranges. For details, [see page EG-71](#).
- Electronic Swirl Control Valves (SCV) are provided in the intake manifold. For details, [see page EG-73](#).
- TWCs (Three-Way Catalytic Converters) are provided in the exhaust manifold of each bank and also in the front exhaust pipe.



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2. Air Cleaner

- A full-fabric type air cleaner element that does not contain an outer frame or rubber seal is used.
- A resonator has been provided in the air cleaner hose to reduce the sound level of the intake air.

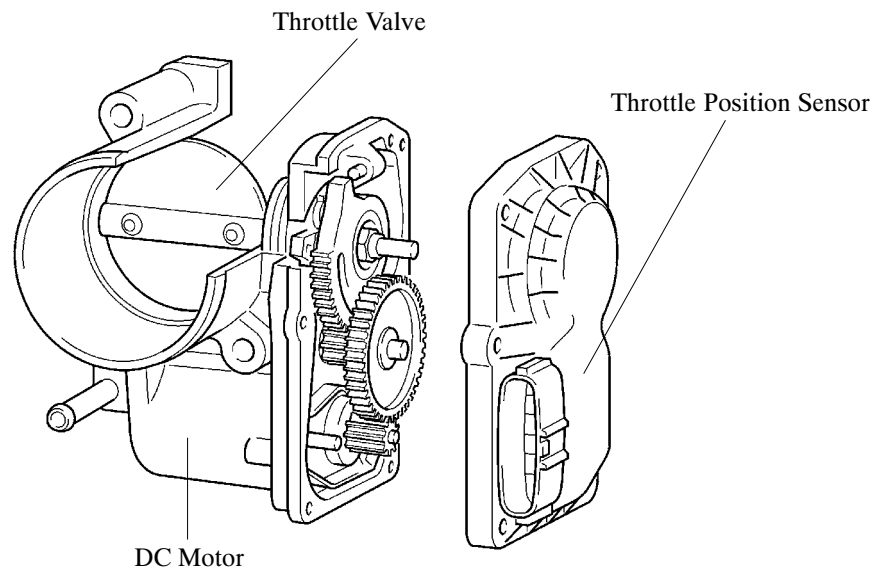


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3. Throttle Body

A cable-less type throttle body in which the throttle position sensor and the throttle control motor are integrated is used. It realizes excellent throttle valve control. For details, [see page EG-57](#).

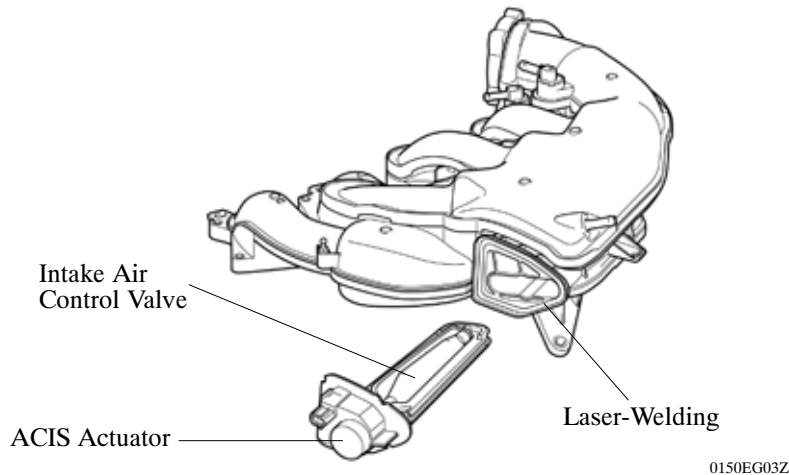
- In the throttle control motor, a DC motor with excellent response and minimal power consumption is used. The Engine ECU performs the duty ratio control of the direction and the amperage of the current that flows to the throttle control motor in order to regulate the throttle valve angle.



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4. Intake Air Surge Tank

- The intake air chamber is made of plastic to realize a lightweight construction.
- The intake air surge tank consists of upper and lower section and contains an intake air control valve. This valve is activated by ACIS (Acoustic Control Induction System) and is used to alter the intake pipe length to improve the engine performance in all speed range. For details, [see page EG-71](#).
- The ACIS actuator uses an electric actuator and is laser-welded onto the intake air chamber. Many of the components are made of plastic for weight reduction.



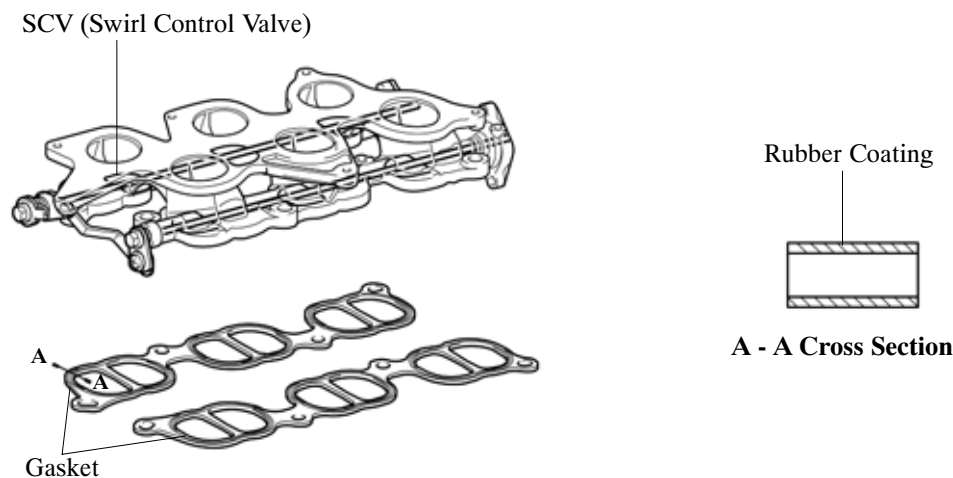
—REFERENCE—

Laser-Welding:

In laser-welding, a laser-absorbing material (for the intake air chamber) is joined to a laser-transmitting material (for the ACIS actuator). Laser beams are then irradiated from the laser-transmitting side. The beams penetrate the laser-transmitting material to heat and melt the surface of the laser-absorbing material. Then, the heat of the laser-absorbing material melts the laser-transmitting material and causes both materials to become welded.

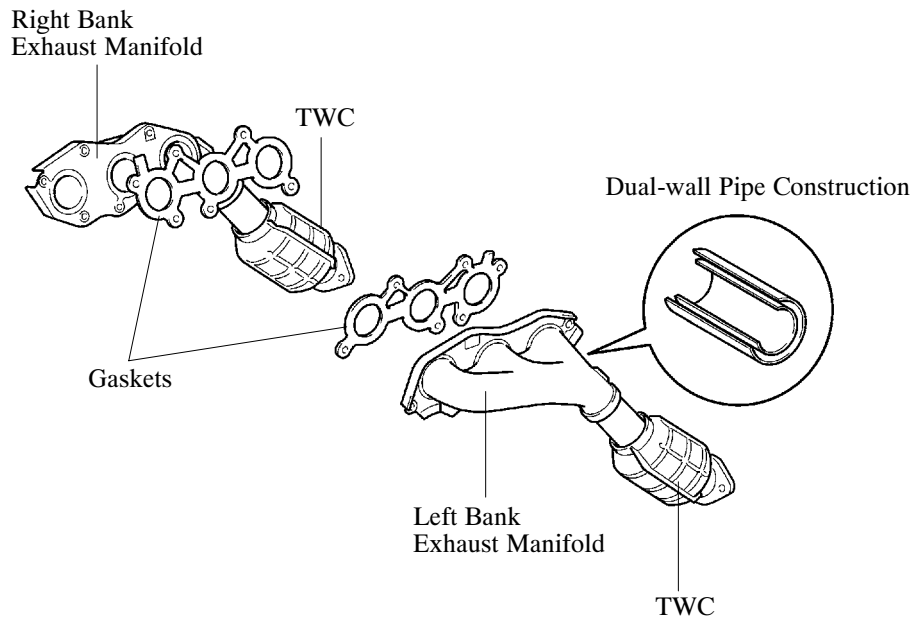
5. Intake Manifold

- A light weight aluminum alloy is used for the intake manifold.
- The intake manifold gaskets have a rubber coating applied onto their surfaces, and they provide superior durability.
- A SCV (Swirl Control Valve) is provided in the intake manifold to stabilize combustion while the coolant temperature is low. The valve is operated (opened or closed) to achieve higher engine torque output at low engine speeds.



6. Exhaust Manifold

- A stainless steel exhaust manifold with an integrated TWC (Three-Way Catalytic converter) is used for warm-up of the TWC and for weight reduction.
- An ultra thin-wall, high-cell density, ceramic type TWC is used. One of this type of TWC is incorporated for each of the right and left banks.
- This TWC enables an improvement in the reduction of exhaust emissions by optimizing the cell density and the cell wall thickness.
- A two layer type (dual-wall pipe) exhaust manifold is used. This reduces noise, improves heat resistance, and accelerates the warm-up of the catalyst immediately after the engine is started, thus reducing exhaust emissions.



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7. Exhaust Pipe

- The exhaust pipes are made of stainless steel for improved rust resistance.
- A thin-wall, ceramic type TWC is used.
- Dual main mufflers are used to ensure engine performance and reduce exhaust noise.
- A ball joint is used to join the exhaust front pipe and exhaust tail pipe. As a result, in-vehicle sound has been muffled, vibration has been minimized, and weight reduction has been realized.
- A long tail mechanism is used in the main mufflers to aim at reducing exhaust noise while the engine is running in the low speed range.

