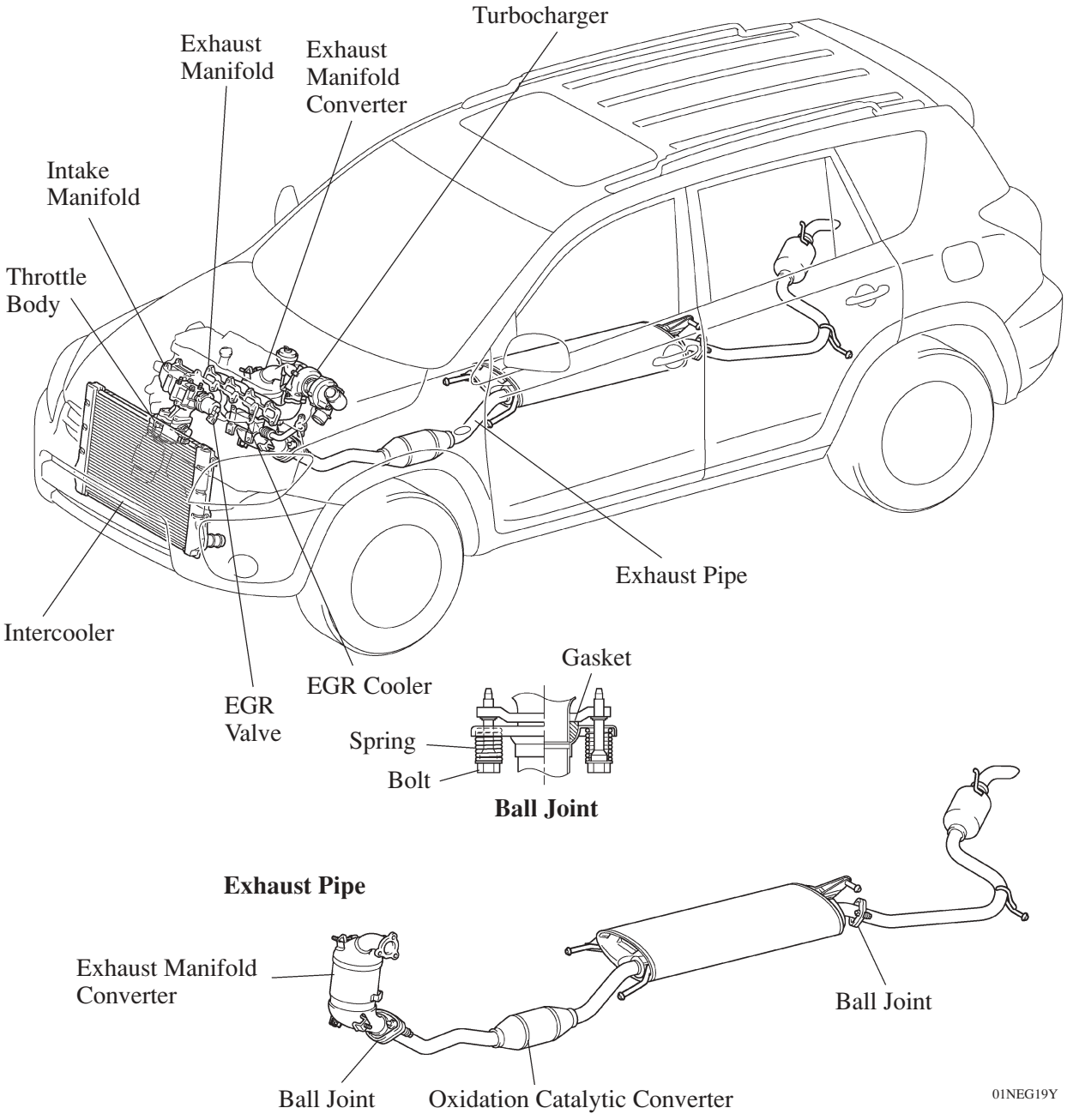
■INTAKE AND EXHAUST SYSTEM

1. General

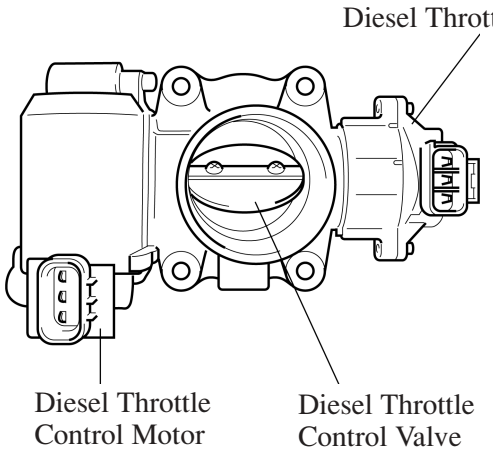
- An air-cooled intercooler is used in order to lower the intake air temperature, ensure high engine performance, and realize cleaner exhaust gas emission.
- A linkless-type throttle body in which the diesel throttle control motor and the diesel throttle position sensor are integrated is used.
- A linear solenoid type EGR valve and a water-cooled type EGR cooler are used to ensure high EGR performance.
- A variable nozzle vane type turbocharger is used.
- Oxidation catalytic converters are used in the exhaust front pipe and the exhaust manifold converter to comply with the EURO IV emission regulations.
- Two ball joints are used to joint the exhaust manifold converter to the exhaust front pipe, and the exhaust front pipe to the exhaust tailpipe. As a result, a simple construction and reliability are realized.



2. Throttle Body

A linkless-type throttle body in which the diesel throttle control motor and the diesel throttle position sensor are integrated is used.

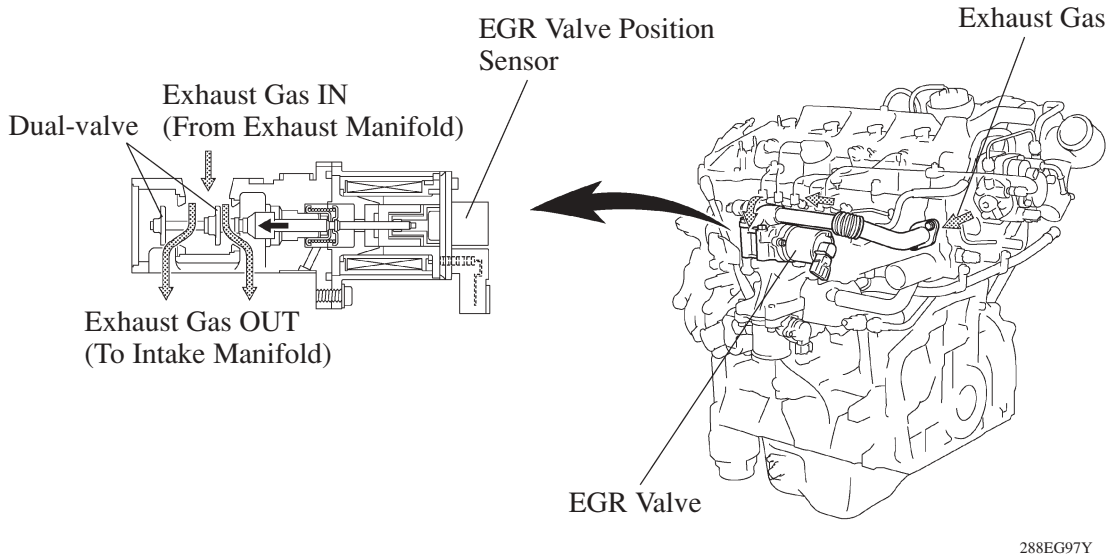
- In the diesel throttle control motor, a rotary solenoid motor is used to control the diesel throttle control valve.
- A non-contact type diesel throttle position sensor is used. For details, see page EG-103.



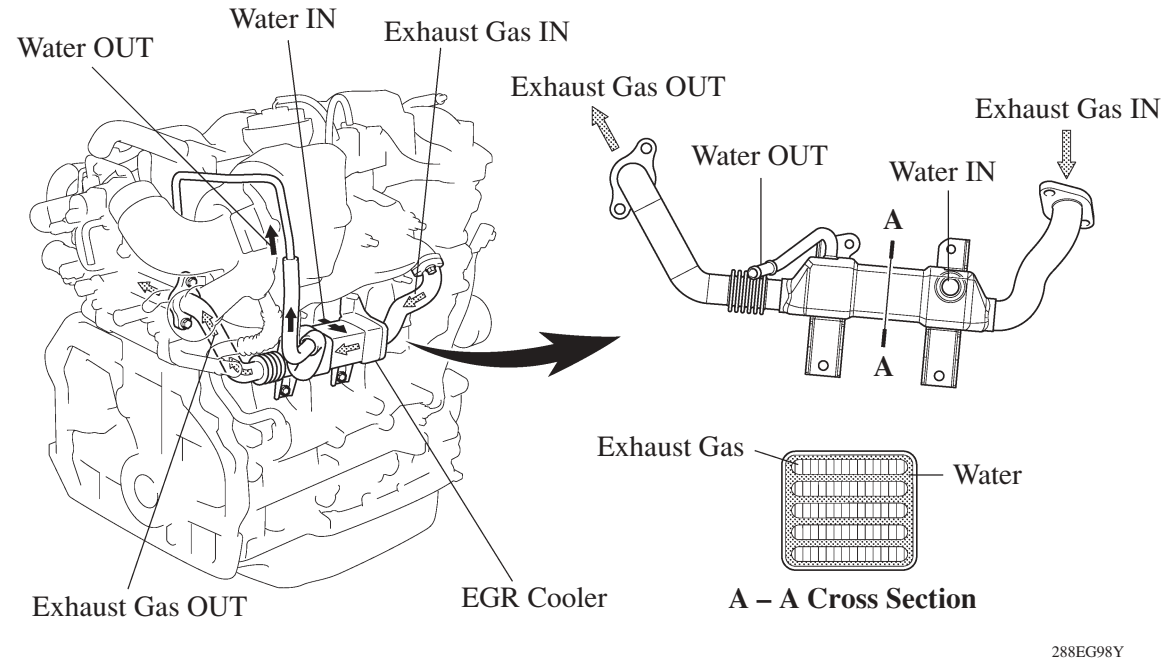
3. EGR Valve and EGR Cooler

- A linear solenoid type EGR valve is used. Also, a dual-valve mechanism is used to cancel the effects of the exhaust pressure during actuation in order to realize quick response.
- An EGR valve position sensor is provided in the EGR valve. This sensor enables EGR valve control at a higher level of precision by detecting the amount of lift of the EGR valve.
- In the EGR cooler, water flows around the five-layered gas passage to cool down.

▶ EGR Valve ◀



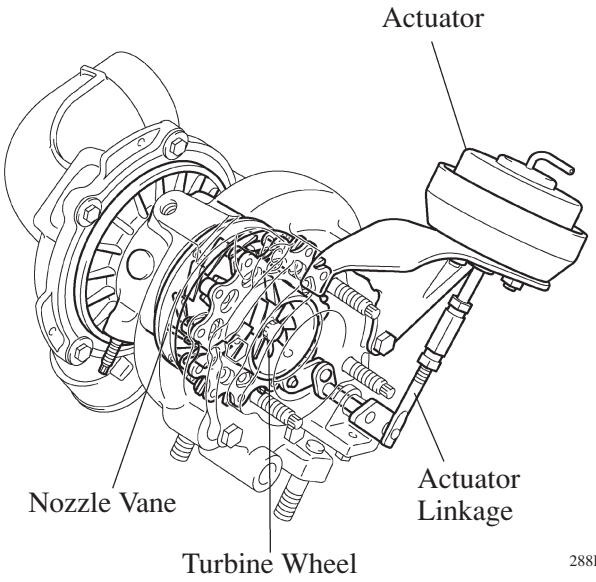
▶ EGR Cooler ◀



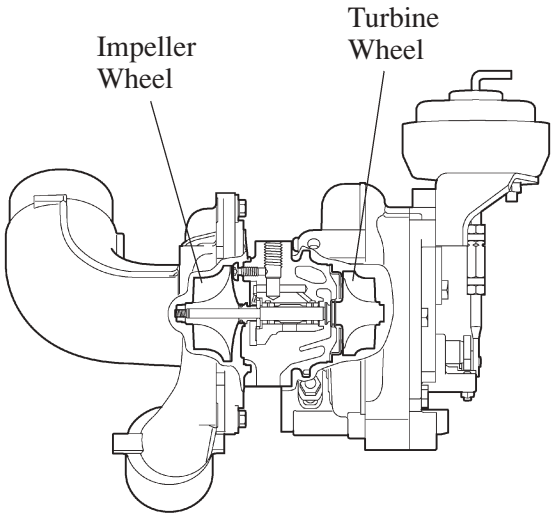
4. Turbocharger

General

- The variable nozzle vane type turbocharger drives the vacuum type actuator according to engine condition, and controls the nozzle vane in order to realize high engine output, low fuel consumption and low emissions.
- The turbocharger is cooled by the engine oil.

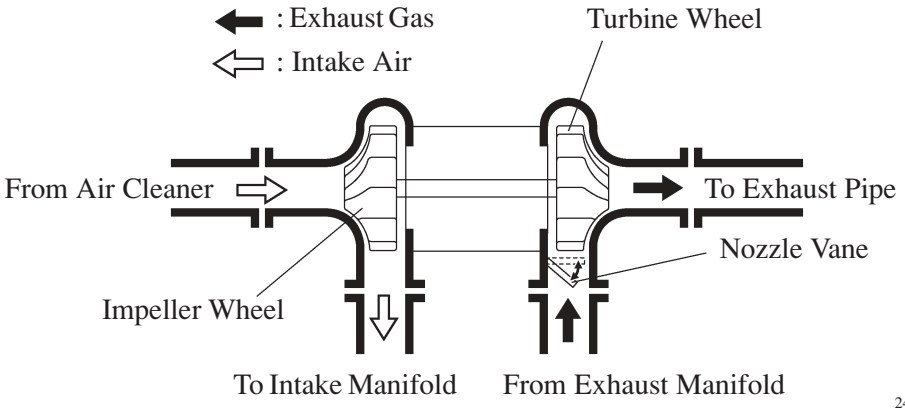


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- The exhaust gas from the exhaust manifold goes through the nozzle vane inside the turbocharger housing, and flows to the exhaust pipe through the turbine wheel. The speed of the turbine wheel (supercharging pressure) differs depending on the flow velocity of the exhaust gas going through the turbine wheel, and the flow velocity of the exhaust gas is controlled by the opening of the nozzle vane. In such a time like idling, the exhaust gas is less and the nozzle vane is fully closed, but as there is a slight clearance between the vanes, the exhaust gas flows through this clearance to the exhaust pipe. Therefore, there is no bypass.

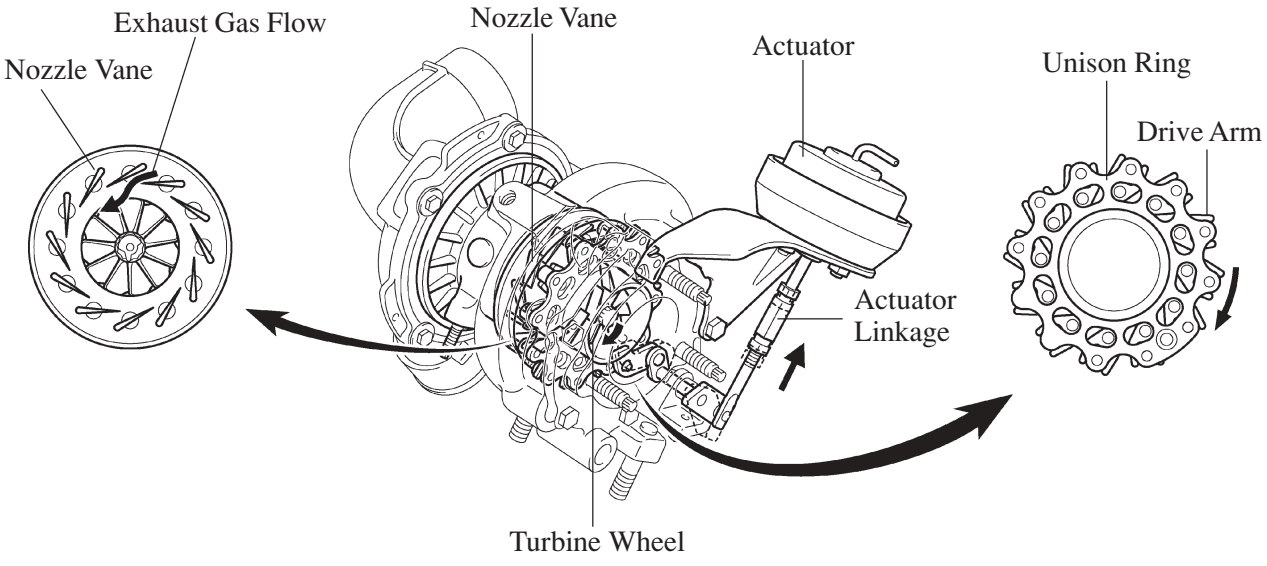


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Operation

1) At Low Load Range or Low Speed Range

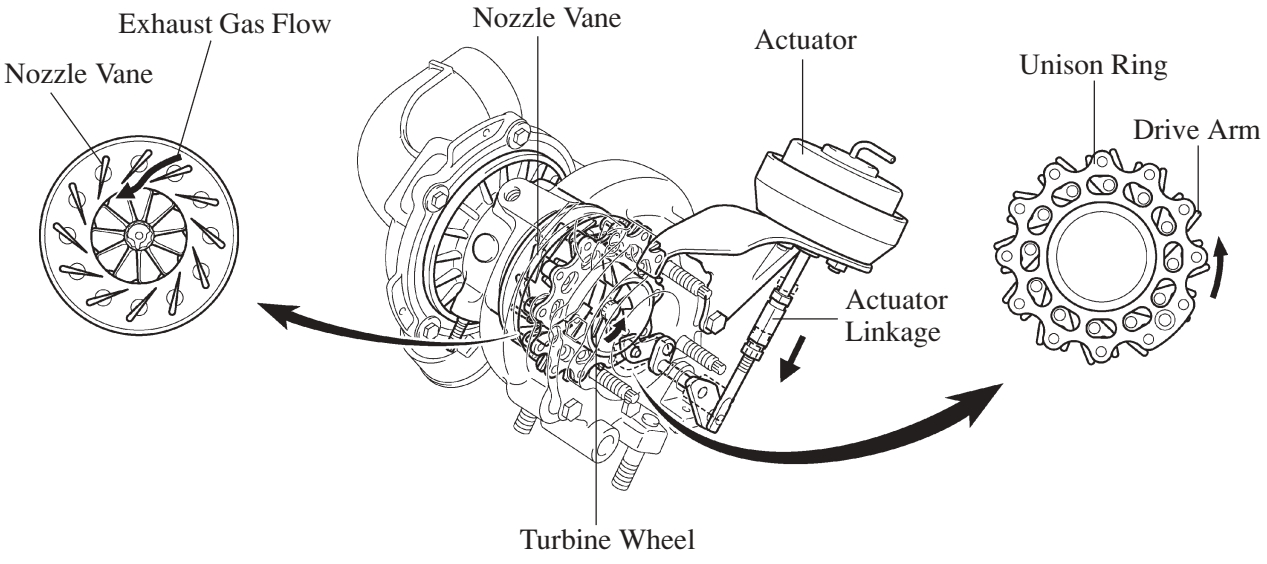
When the engine is running in a low load range or a low speed range, the actuator pulls up the actuator linkage. The actuator linkage is connected to the unison ring. At the same time, the drive arms installed in the unison ring move to change the nozzle vane angle toward closing direction. As a result, the flow velocity of the exhaust gas to the turbine increases, and the engine torque will be improved.



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2) At High Load Range or High Speed Range

When the engine is running in a high load range or a high speed range, the actuator pulls down the actuator linkage. With this, the drive arms move and this opens the nozzle vane and holds the specified supercharging pressure. Thus, lowering the exhaust gas back pressure and improving the output and fuel consumption.



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