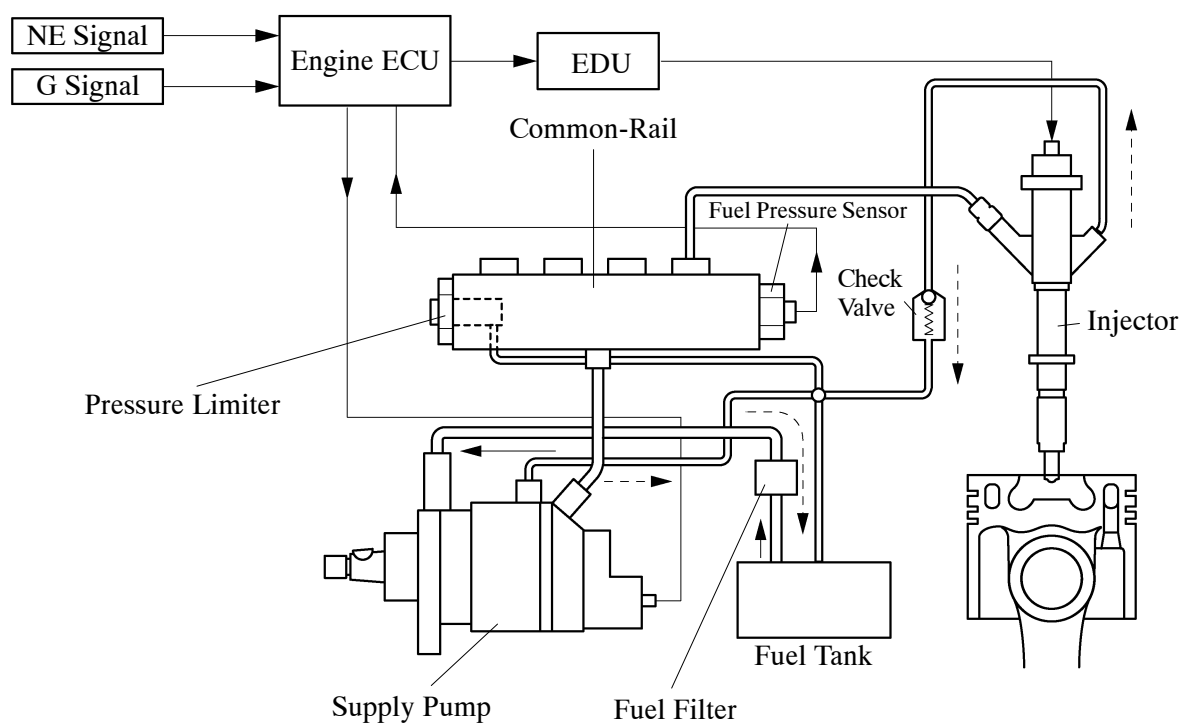


## ■ FUEL SYSTEM

### 1. General

- A common-rail type fuel injection system is used in the fuel system of the 1KD-FTV engine.
- Consisting of a supply pump, common-rail, electric control injector, and fuel pipe, this system effects optimal control for combustion by controlling the fuel pressure, injection volume, and the injection timing via the engine ECU and EDU (Electronic Driver Unit).

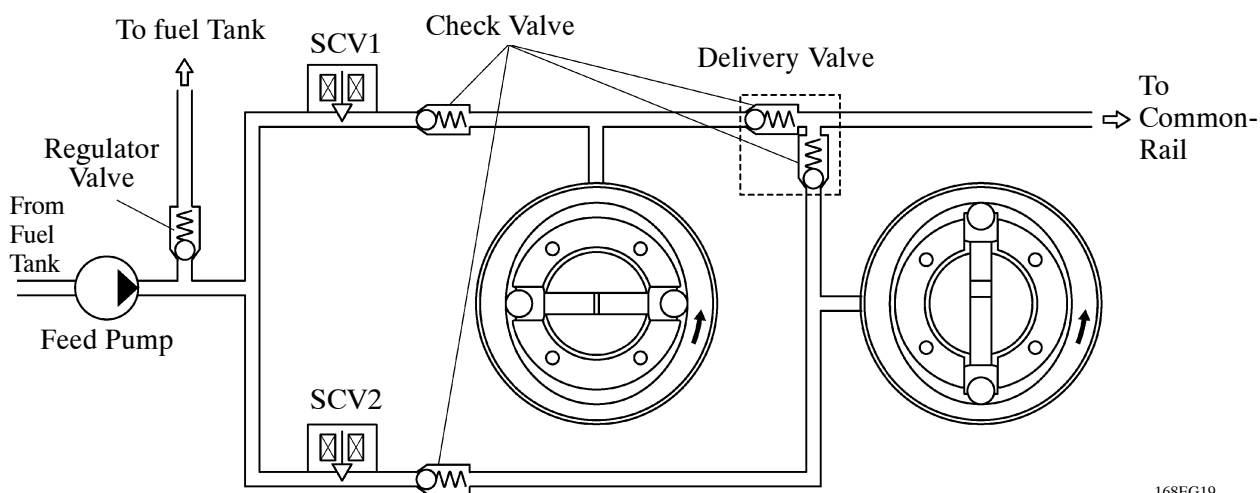
#### ► System Diagram ◀



## 2. Supply Pump

### General

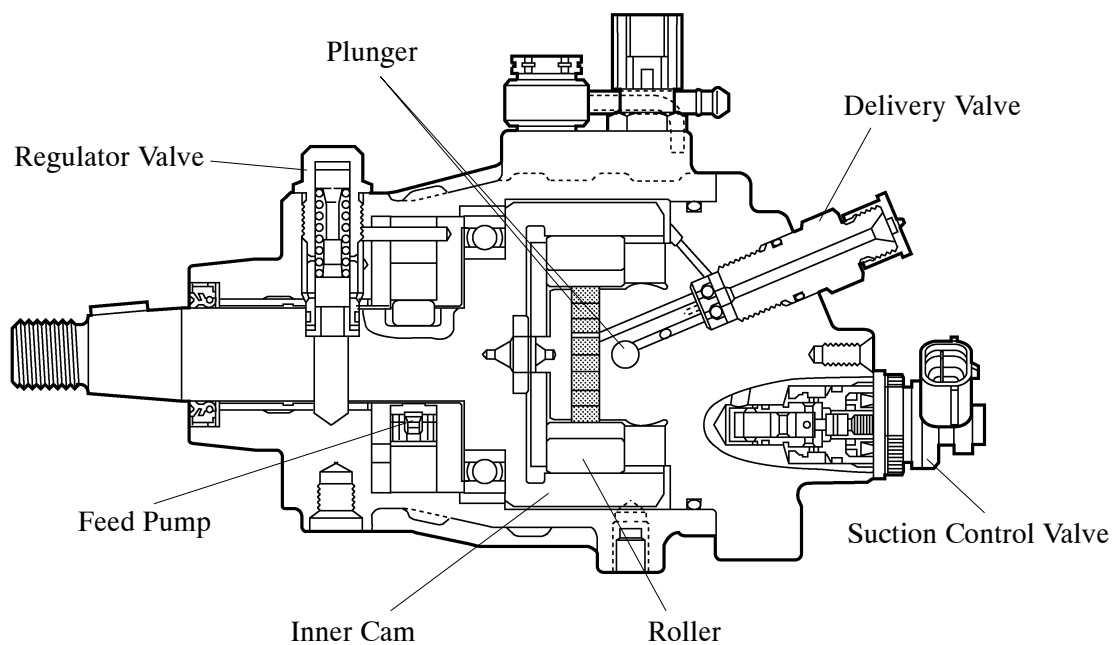
- An electric control type supply pump is used for the common-rail system.
- The supply pump is a tandem type that has two functions, fuel suction and fuel delivery. This pump achieves both the high-pressure pumping of fuel and the reduction of driving torque fluctuation.
- A SCV (Suction Control Valve) that controls the amount of fuel drawn in supply pump during the suction stroke is used.



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### Construction

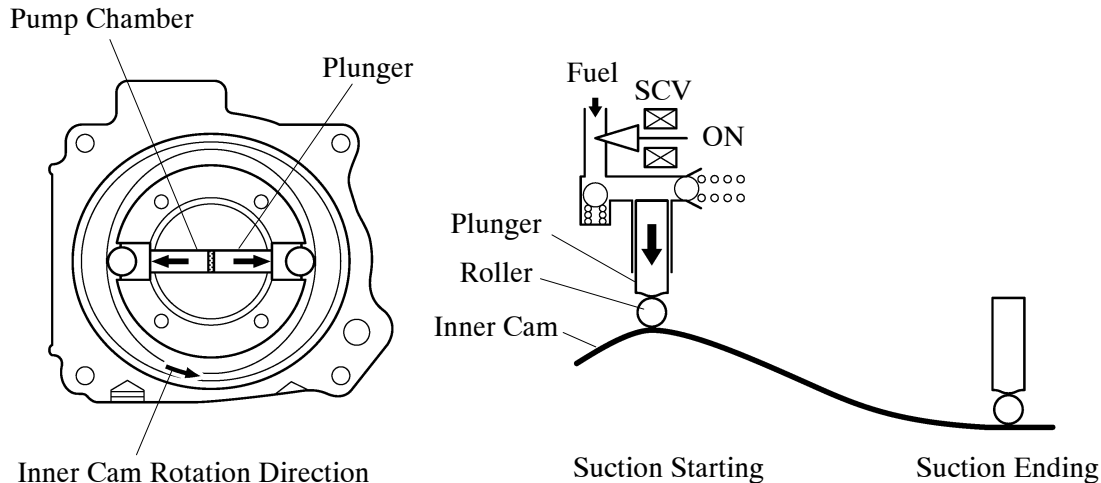
The supply pump consists of an inner cam, roller, and plunger.



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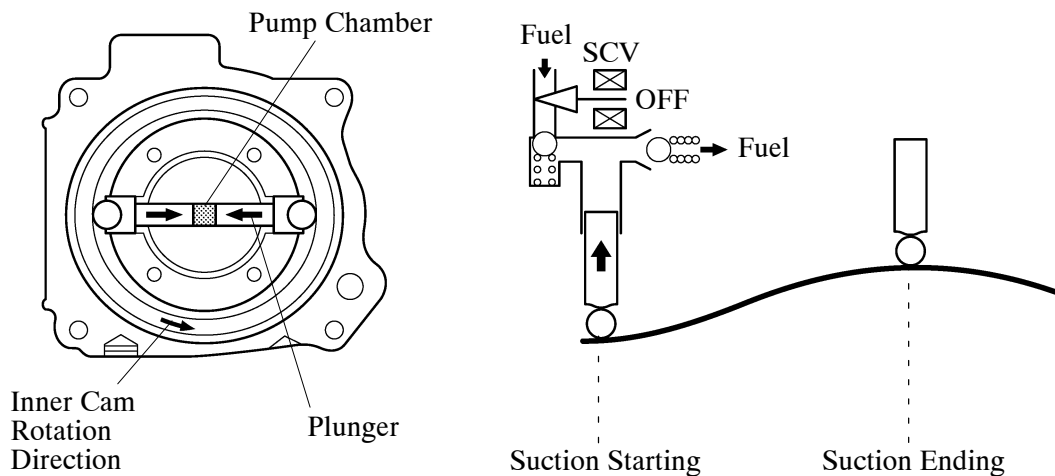
## Operation

- The plunger becomes positioned at the shorter diameter of the inner cam. When the inner cam rotates from this position, the suction stroke starts as the plunger expands with the fuel pressure created by the feed pump.



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- The plunger becomes positioned at the longer diameter of the inner cam. When the inner cam rotates from this position, the pumping stroke starts as the plunger is pushed by the inner cam.

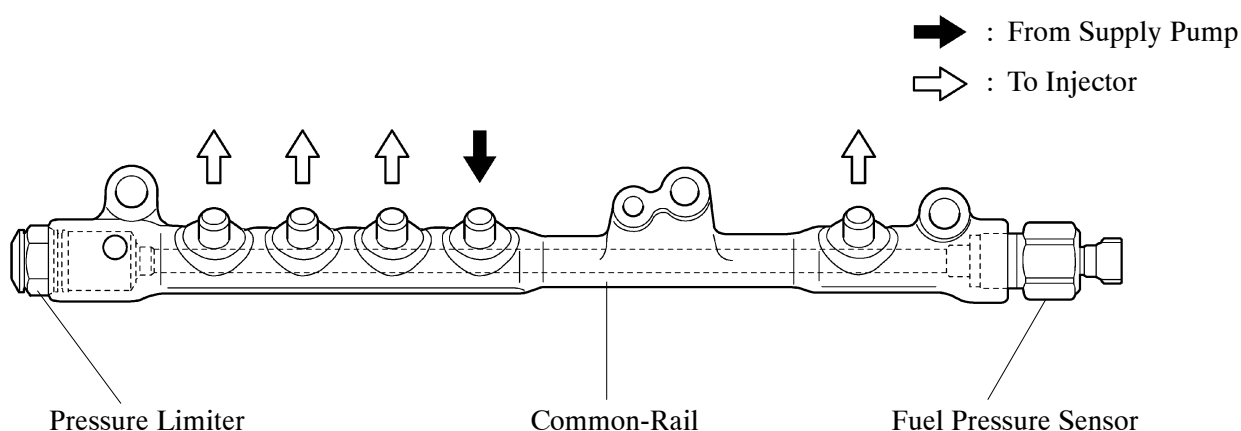


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- The suction and pumping of fuel is effected by repeating these strokes. However, because the volume of fuel drawn in by the plunger is regulated by the engine ECU via SCV, the plunger stops upon having drawn in the regulated amount of fuel. Thereafter, the inner cam resumes pumping. To regulate the volume of fuel drawn in by the plunger, the engine ECU calculates the target common-rail pressure in accordance with the vehicle driving conditions and controls the SCV so that the target value is achieved by the output of the fuel pressure sensor.

### 3. Common-Rail

- By storing fuel at a high pressure (20 to 135 MPa), the peak torque during the pumping of fuel under high load conditions has been restrained, thus reducing the vibration and noise of the fuel injection system.
- The fuel pressure sensor senses the fuel pressure and outputs the resultant signal to the engine ECU.
- When the pressure in the common-rail is abnormally high, the pressure limiter leaks the fuel to the fuel tank to reduce pressure.



195EG64

#### Service Tip

- Fuel pressure sensor has its sealing portion (plastic-deformed) in order to keep sealing performance, so do not reuse it after disassembling.
- Do not disassemble the pressure limiter because its operating pressure has been adjusted after assembly.
- If parts that affect the alignment has been changed, make sure to replace the injection pipe with a new one as well. The parts that require the replacement of a pipe are listed below.

Injection Pipe : Injector, Common- Rail, Cylinder Head

Fuel Inlet Pipe : Supply Pump, Common-Rail, Cylinder Block, Gear Case, Cylinder Head, Head Gasket

For details, refer to the 1KD-FTV Engine Repair Manual (Pub. No. RM992E)

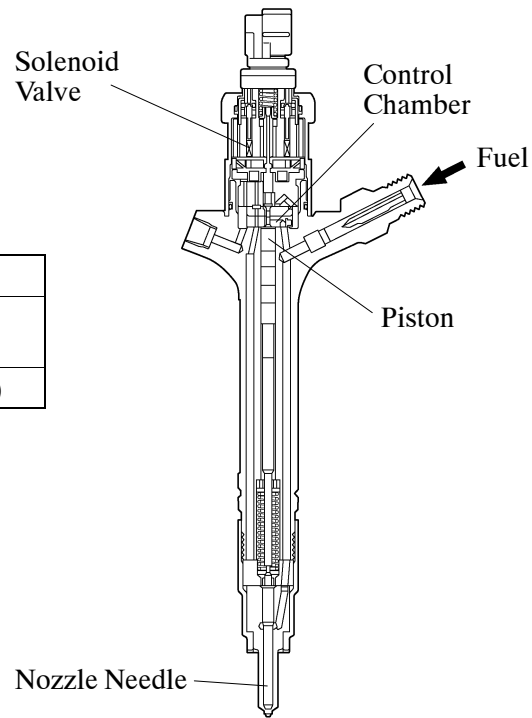
## 4. INJECTOR

### General

- An injector consists of a nozzle needle, piston, and solenoid valve.
- High voltage (125 V) is used particularly when the valve is open in order to open the nozzles.

### ► Specifications ◀

Injection Hole		7
Injection Pressure	During Idling	20 MPa (204 kgf/cm <sup>2</sup> )
	Maximum	135 MPa (1377 kgf/cm <sup>2</sup> )



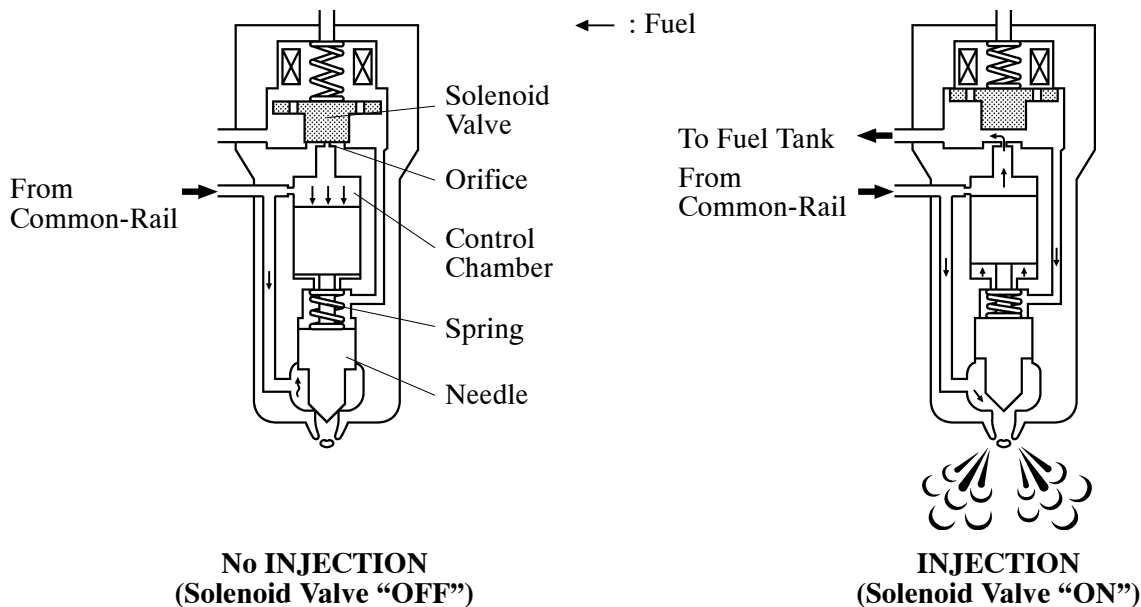
### Operation

210EG05

As the solenoid valve opens in accordance with the signal from the EDU, the control chamber pressure decreases, causing the needle valve to open and allowing the fuel to be injected.

As the solenoid valve turns OFF and closes orifice in accordance with the signal from the ECU, the control chamber pressure increases, causing the needle valve to close and ending the injection.

The solenoid valve turns ON/OFF in accordance with the signal from the EDU to effect the control of the injection timing, injection, and pilot injection.



233EG09

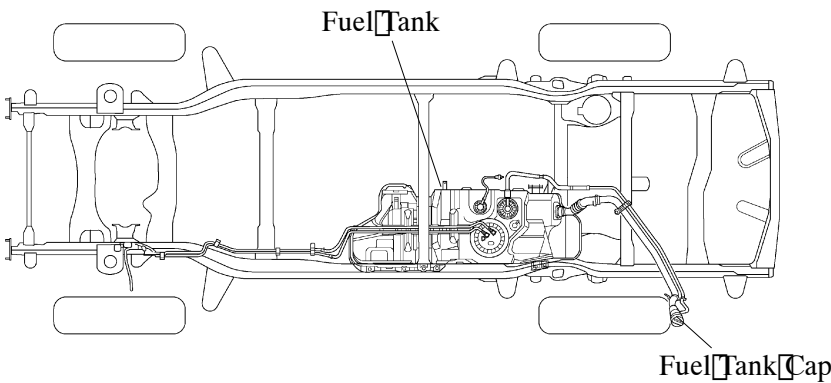
5.FUEL TANK

General

- On the 5-door model new and Cruiser/Land Cruiser Prado with the KD-FTV engine, the fuel tank has been located in the center of the vehicle.  
On the 3-door model, the fuel tank has been located in the rear of the vehicle, just as in the previous model.
- To improve evaporative emission performance, the new model has adopted the following items:
  - A multiplex layer plastic fuel tank has been adopted on the 5-door model.
  - A tether has been provided on the fuel tank cap to prevent the cap from being lost, which results in preventing the leakage of fuel or the evaporative gas.
- The quick-turn type fuel tank cap has been adopted to improve usability.

► Specifications ◀

Model		New	Previous
Fuel Tank Capacity liter (US qts, Imp. qts)	5-Door	95 (100.4, 83.6)	87 (91.9, 76.6)
	3-Door	87 (91.9, 76.6)	←



5-Door Model

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Fuel Tank

A multiplex layered plastic fuel tank consists of six layers of four types of materials.  
For details, refer to the 3RZ-FE Engine Fuel Tank Section on page EG-8.

EG