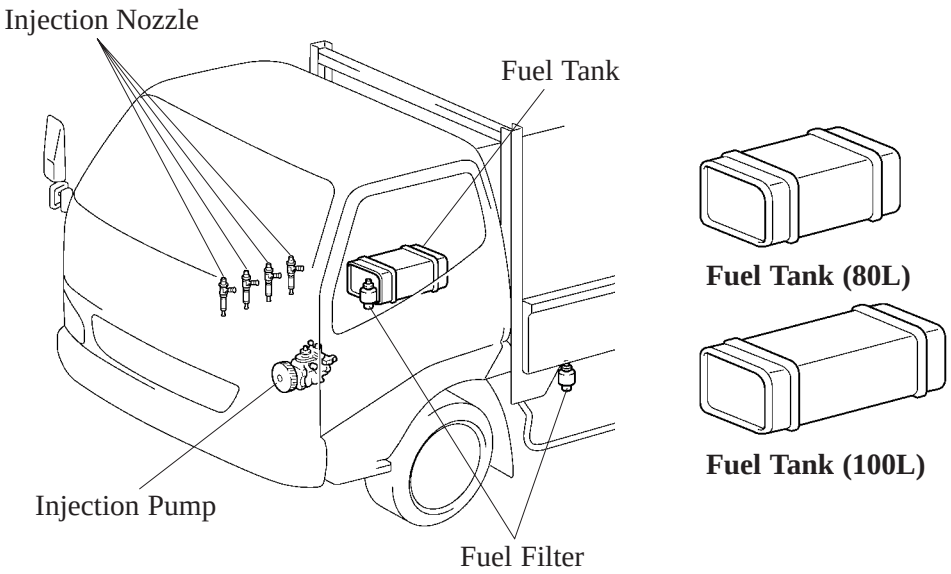
■FUEL SYSTEM

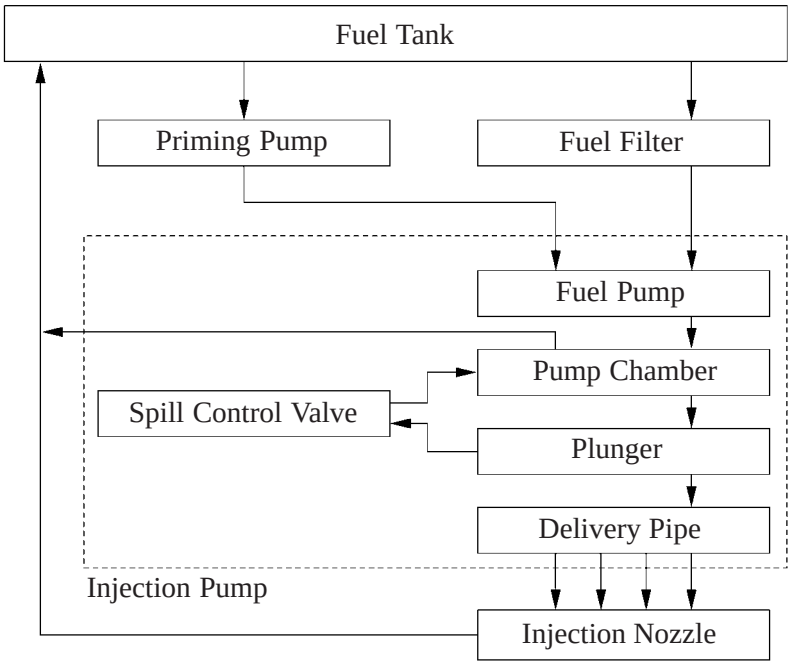
1. General

- The injection pump and injection nozzles have been matched to the 15B-FTE engine in order to realize high power output, low exhaust emissions, and low fuel consumption.
- The fuel tanks are mounted near the center of the vehicle on the right side. Fuel tanks with two different capacities have been made available to accommodate the body shape.
- A fuel filter with a built-in sedimenter has been adopted. It is mounted either in front of or behind the fuel tank, or on the left side of the vehicle.

▶ Layout of Main Components ◀



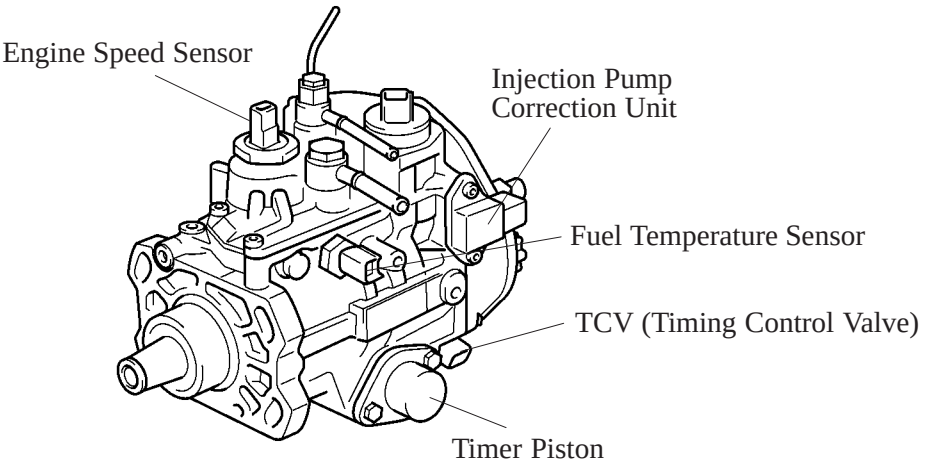
▶ System Diagram ◀



2. Type V4 Injection Pump

General

- The 15B-FTE engine uses a V4 injection pump. This pump contains four opposing plungers that generate high pressure and distribute fuel to the four cylinders. It is a compact and lightweight pump that generates an extremely high pressure of approximately 130 MPa (1326 kgf/cm^2).
- All the attributes such as the fuel injection timing and the fuel injection volume are controlled electronically in order to realize high power output, low exhaust emissions, and low fuel consumption. Furthermore, the discharge of black smoke and white smoke has been reduced in all driving ranges.

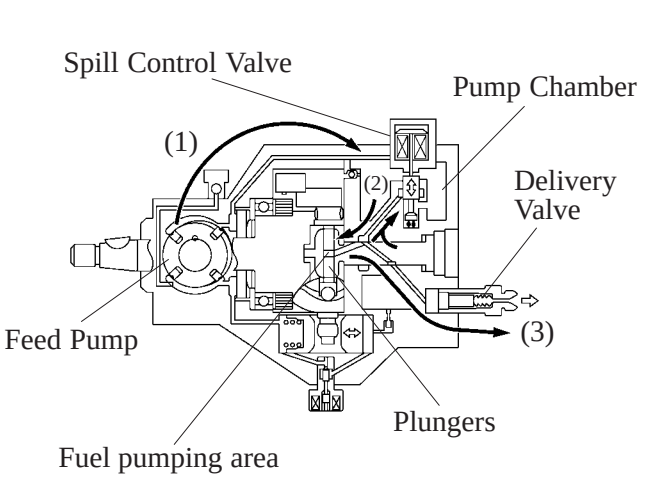


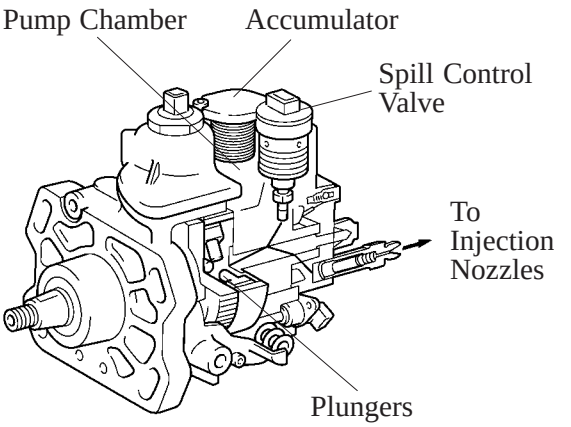
Service Tip

The injection pump is lubricated and cooled by the fuel. Therefore, use only the type of fuel that is prescribed.

Operation

1. The feed pump draws fuel from the fuel tank and sends it to the pump chamber of the injection pump.
2. The spill control valve opens, allowing the fuel to enter the fuel pumping area (rotor area).
3. The spill control valve closes and the drive shaft rotates. Thus, the four plungers compress the fuel that is enclosed in the rotor area. As a result, the fuel travels via the delivery valve to the injection nozzles, from which the fuel is injected.
4. The spill control valve opens, thus reducing the pressure in the rotor area. As a result, the injection nozzles close, thus ending the injection of fuel.





Function of Main Components

1) Spill Control Valve

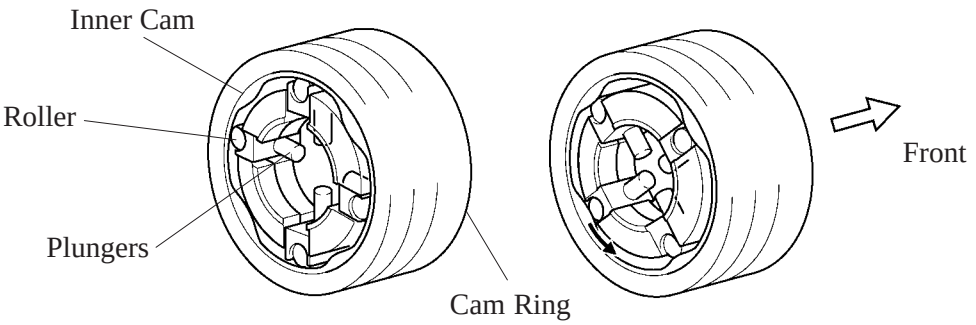
- This valve, which is provided in the passage that connects the pump chamber and the high-pressure area, turns ON and OFF during the suction of fuel and the ending of injection.
- The signals from the engine ECU are converted into high voltage by the EDU (Electronic Driving Unit) in order to actuate the spill control valve.

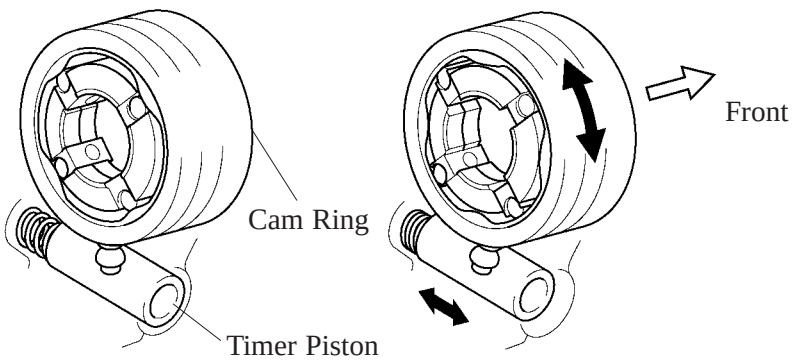
2) High Pressure Area (Inner Cam Mechanism)

- This area consists of a cam ring, driveshaft, roller, and plunger.
- As the driveshaft rotates the inner cam, the plunger moves along the inner surface of the inner cam, thus resulting in the suction and compression of fuel.

3) Timer Piston

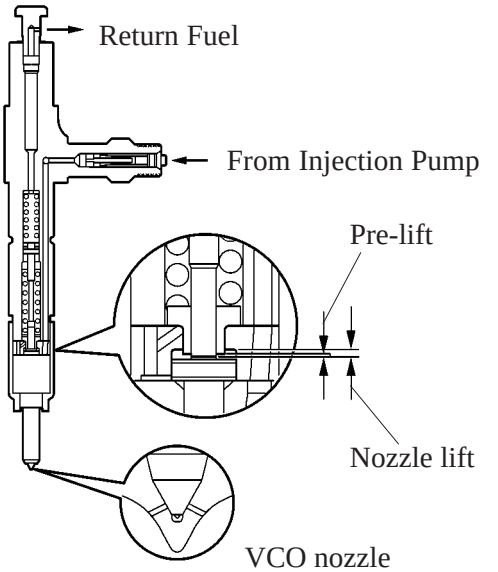
- The timer piston is coupled with the cam ring. Therefore, the cam ring rotates reciprocally with the movement of the timer piston.
- The movement of the cam ring causes the position (or the angle) of the inner cam to change in relation to the driveshaft. As a result, the position in which the plunger starts to compress fuel (which determines the fuel injection starting timing) changes.
- The timing control valve actuates the timer piston.
- The engine ECU sends signals (which have been calculated in accordance with the accelerator position, engine speed, and atmospheric pressure) to the timing control valve in order to optimally control the fuel injection timing from the time the engine is cold until it is operating under high-load conditions.





3. Injector

A small-diameter, 2-spring type VCO nozzle* that supports high-pressure injection has been adopted. A VCO (Valve Covered Orifice) that is effective in reducing white smoke and exhaust odor has been combined with a high-flow nozzle in which the flow resistance has been significantly improved. To improve combustion, the orifice has been made smaller to atomize fuel into finer particles. The amount of pre-lift has been reduced to a small 0.04mm in order to reduce the combustion sound. In addition, a construction that allows the needle to seat gently has been adopted to improve durability.



*: When the atomization of a VCO nozzle is tested on a nozzle tester, a pass-fail judgment must be made carefully because the nozzle could create a wide spray or a clogged orifice spray pattern.

4. Fuel Filter

A fuel filter with a built-in sedimentor has been adopted. When the water in the sedimentor portion reaches a certain level, the level warning switch turns ON, causing the warning light to illuminate in the combination meter.

