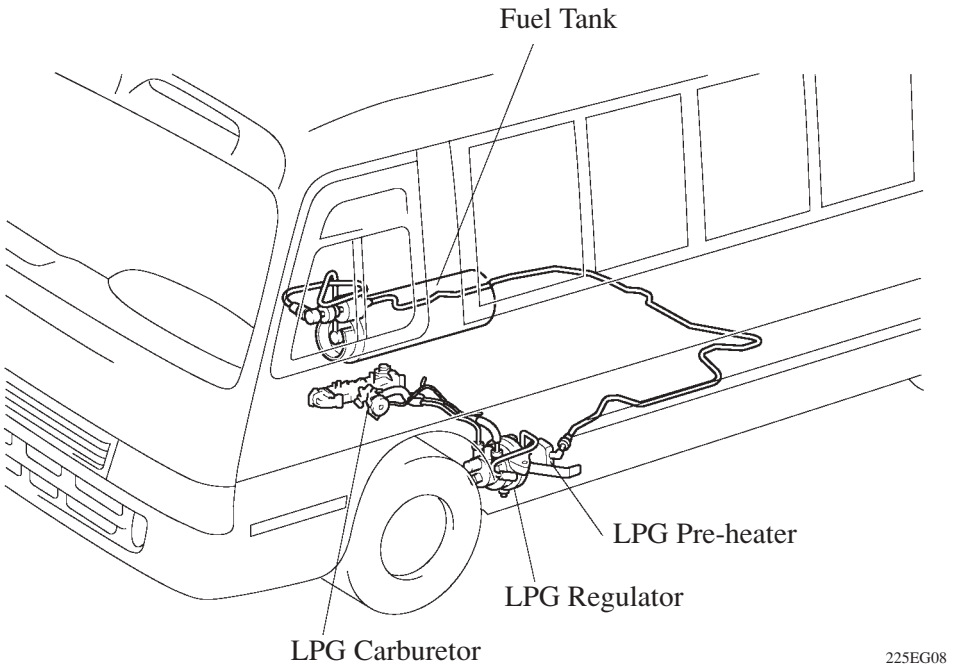
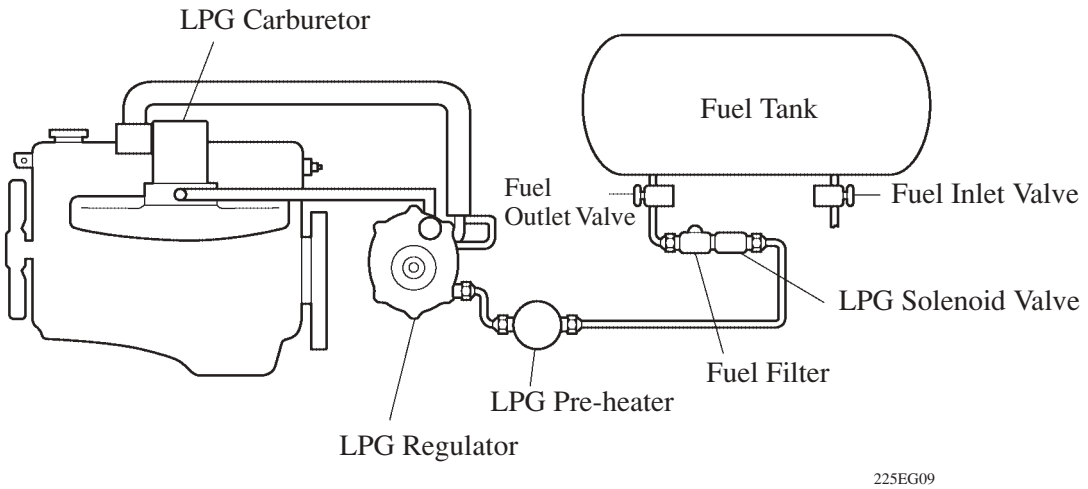
■FUEL SYSTEM

1. General

- The LPG regulator and LPG carburetor have been adopted to control the air fuel ratio optimally.
- The various safety mechanisms have been adopted to the fuel tank.

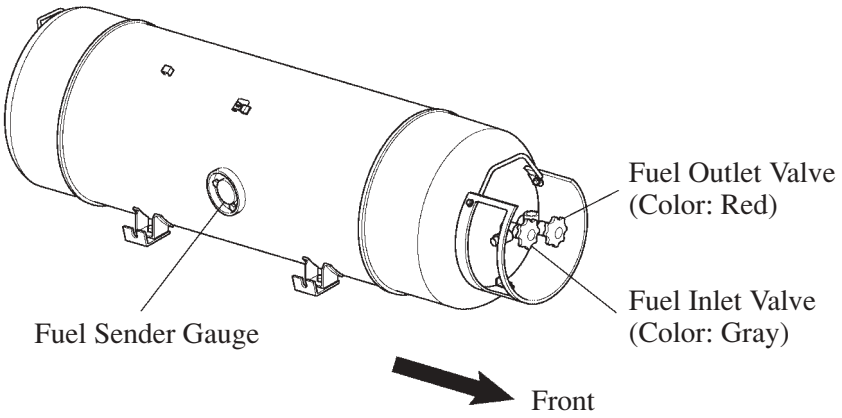




2. Fuel Tank

General

- The fuel inlet valve, fuel outlet valve, and fuel sender gauge have been adopted to the fuel tank.
- The safety mechanism that has over fill check valve, safety valve, and EFV (Excess Flow Valve).
- The fuel tank with a capacity of 122-liter has been adopted.



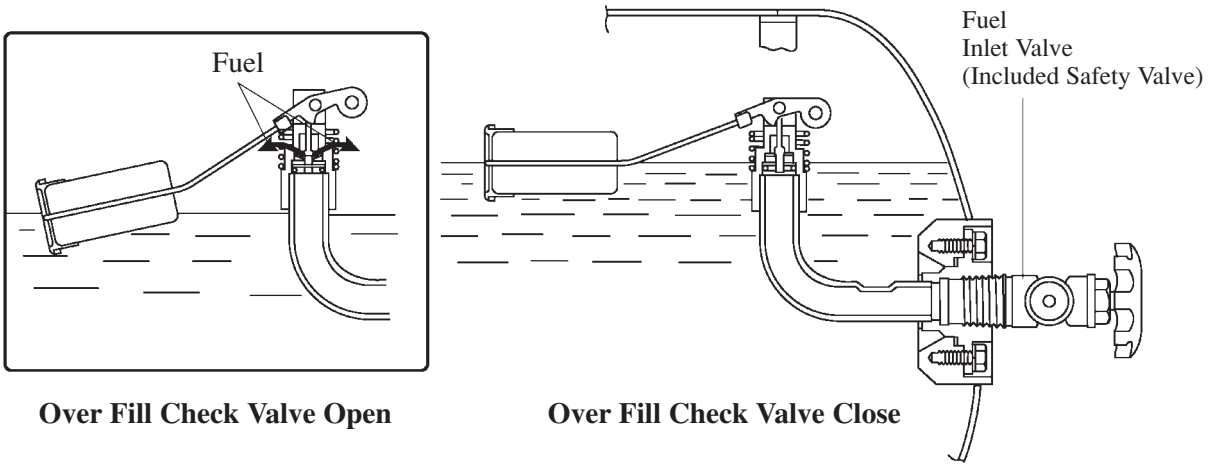
225EG10

Service Tip

When the fuel tank is removed, the fuel inlet valve and the fuel outlet valve are closed for sure.

Over Fill Check Valve and Safety Valve

- An overfill check valve has been provided in the fuel tank.
  When the float ascends to a prescribed position during fueling, the overfill check valve closes to keep the fuel level within 76.5 to 85.0% of the fuel tank capacity.
- When the internal pressure in the fuel tank reaches a prescribed value, the safety valve built into the fuel inlet valve operates to release the internal pressure of the fuel tank into the atmosphere.

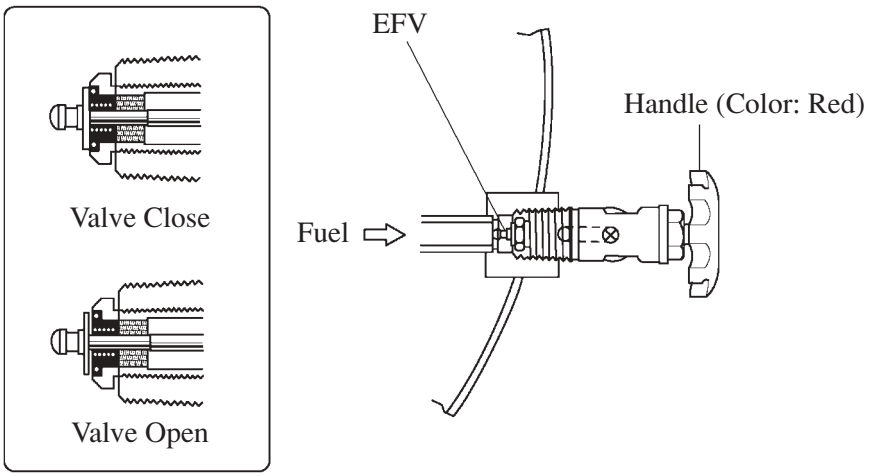


Over Fill Check Valve Open **Over Fill Check Valve Close**

225EG11

EFV (Excess Flow Valve)

The EFV is built into the fuel outlet valve. The EFV operates with the rise in the fuel discharge pressure when the fuel pipe breaks or the fuel flows out suddenly.
Thus, this valve prevents the fuel from flowing out of the fuel tank.



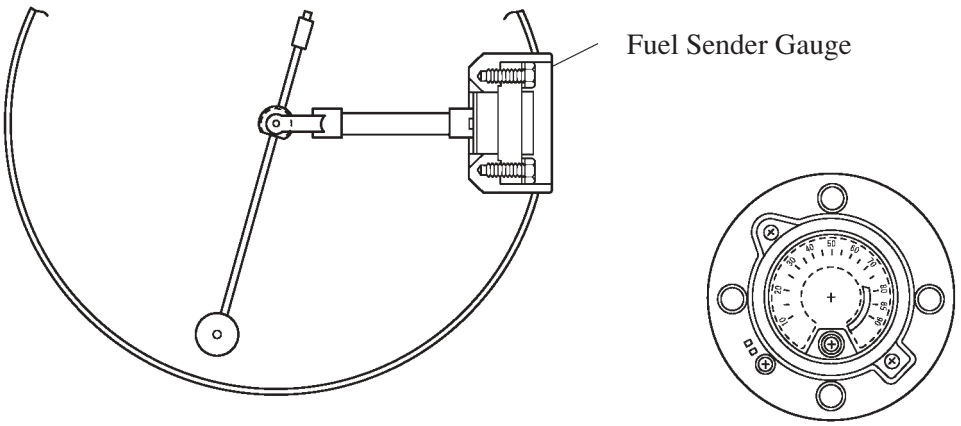
225EG12

Service Tip

After the EFV operates, the action of the EFV is canceled by fully closing the handle of the fuel outlet valve.

Fuel Sender Gauge

A fuel sender gauge that indicates the volume of the LPG in the fuel tank has been provided.
This gauge indicates in "%" the ratio of the LPG volume to the total fuel tank capacity.
The measured LPG volume is then transmitted to the combination meter in the form of electric signals.

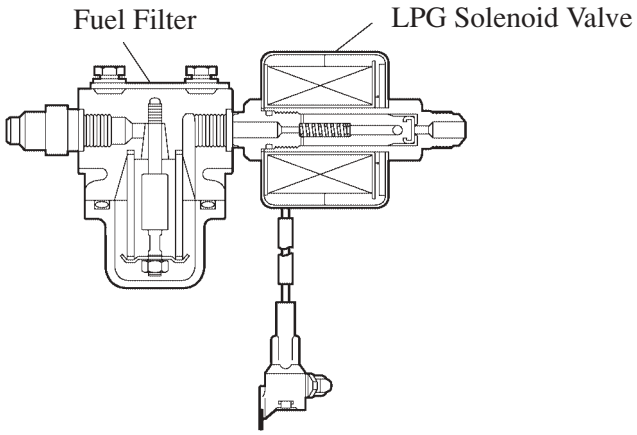


Fuel Tank Cross Section **Fuel Sender Gauge**

225EG13

3. LPG Solenoid Valve and Fuel Filter

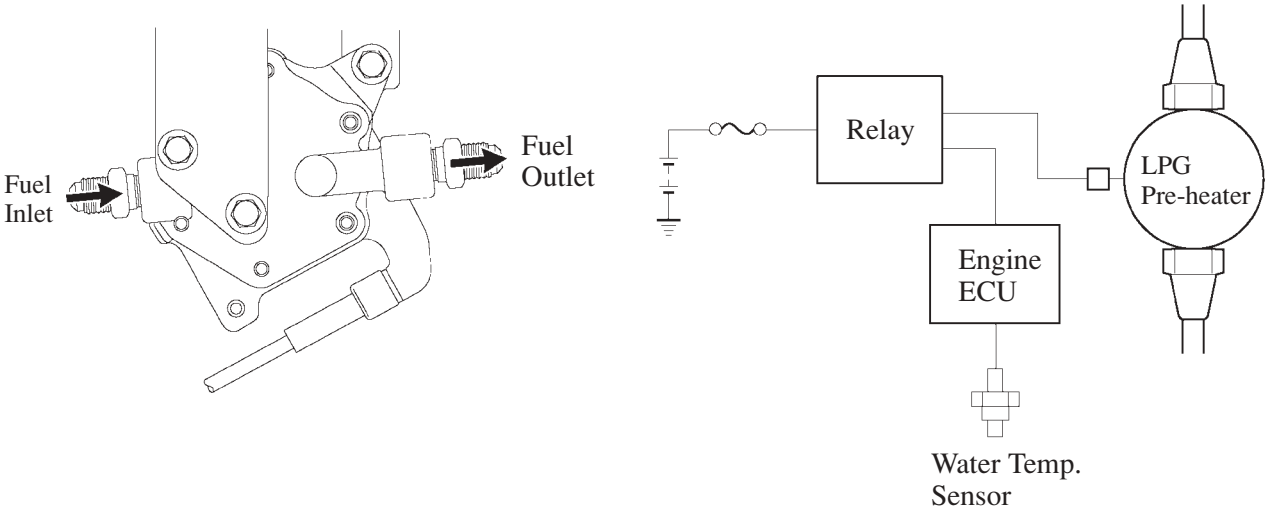
- An LPG solenoid valve is provided between the fuel outlet valve and the LPG regulator in order to open and close the fuel passage.
- A fuel filter is provided immediately upstream of the LPG solenoid valve to filter the fuel.



225EG14

4. LPG pre-heater

When the water temperature is low, the engine ECU applies current to the LPG pre-heater (PTC Heater Type) in order to pre-heat the fuel, thus promoting the atomization of the fuel that is introduced into the LPG regulator.

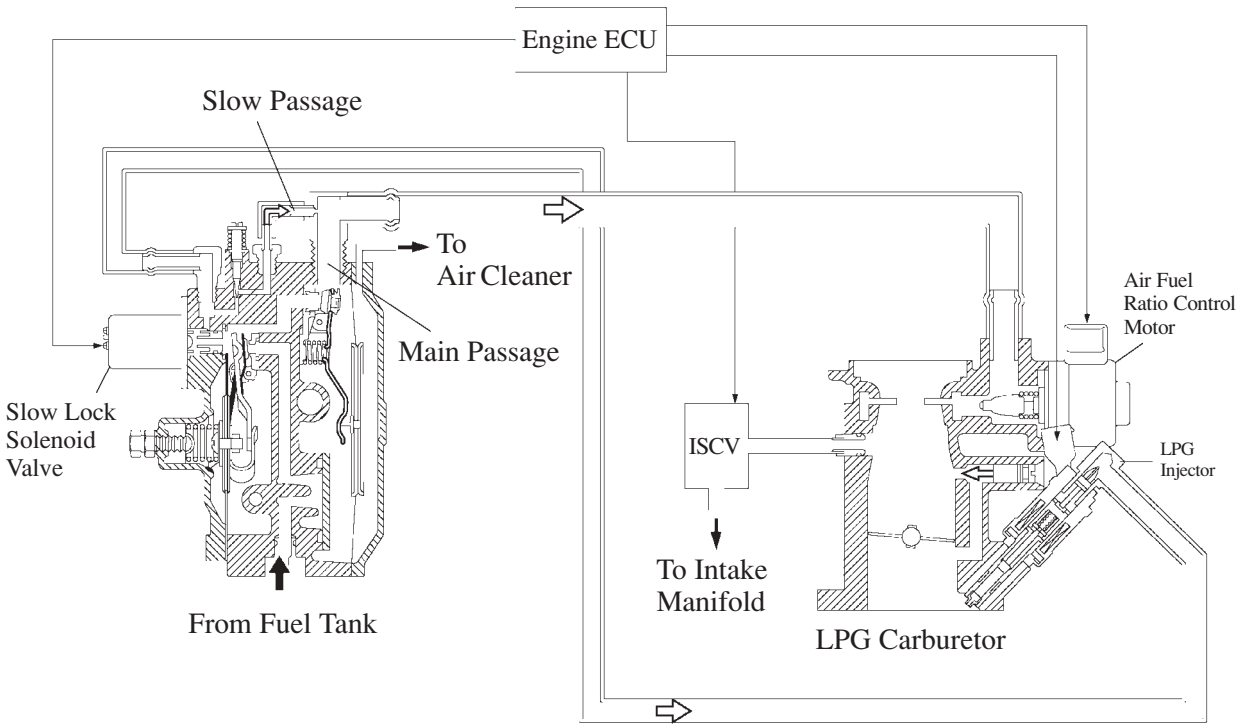


225EG15

5. LPG Regulator and Carburetor

General

- In the 1BZ-FPE engine, fuel is supplied in the following manner: the LPG regulator atomizes the fuel from the fuel tank, and the LPG carburetor mixes the fuel with the intake air.
- An LPG injector and an air-fuel ratio control motor have been adopted to enable the engine ECU to regulate the fuel. As a result, the precision of the air-fuel ratio control has been improved.
- A slow lock solenoid valve has been provided in the LPG regulator to open and close the slow passage.
- An ISCV (Idle Speed Control Valve) has been provided separately from the LPG carburetor to regulate the engine speed at idle.

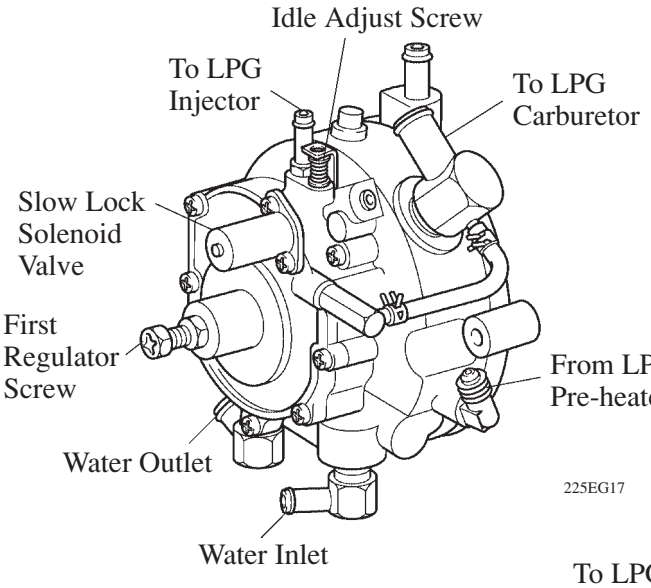


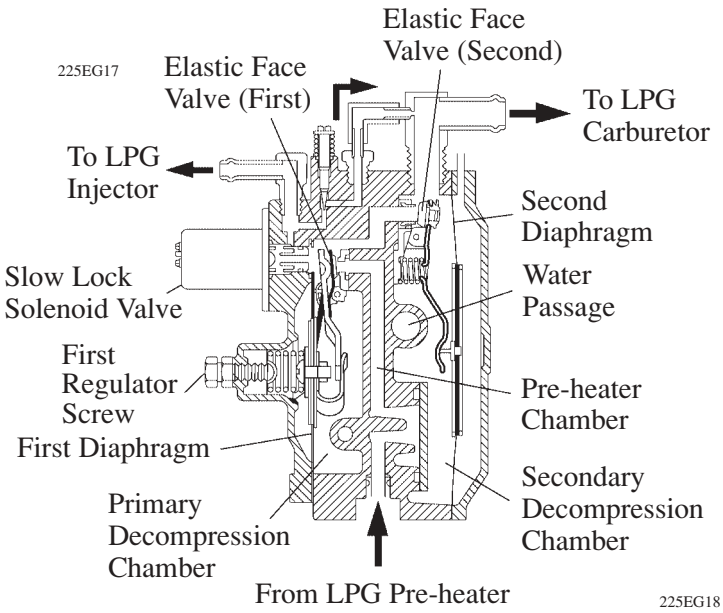
225EG16

Construction

1) LPG Regulator

- The LPG regulator consists of a pre-heater chamber, primary decompression chamber, and secondary decompression chamber.
- The fuel that flows into the LPG regulator becomes heated by the engine coolant in the pre-heater chamber. The fuel's vapor pressure pushes open the elastic face valve (first). Then, the pressure enters the primary decompression chamber where it becomes decompressed and atomized.
- When the pressure in the primary decompression chamber reaches a prescribed value, the first diaphragm closes the elastic face valve (first), in order to keep the pressure constant.
- The vacuum of the LPG carburetor acts on the secondary decompression chamber via the main passage. This creates a vacuum in the secondary decompression chamber, causing the second diaphragm to push the second valve lever, which opens the elastic face valve (second). Thus, the fuel flows into the secondary decompression chamber.
- When the pressure in the secondary decompression chamber approaches the atmospheric pressure, the elastic face valve (second) closes in order to maintain the secondary decompression chamber below the atmospheric pressure.



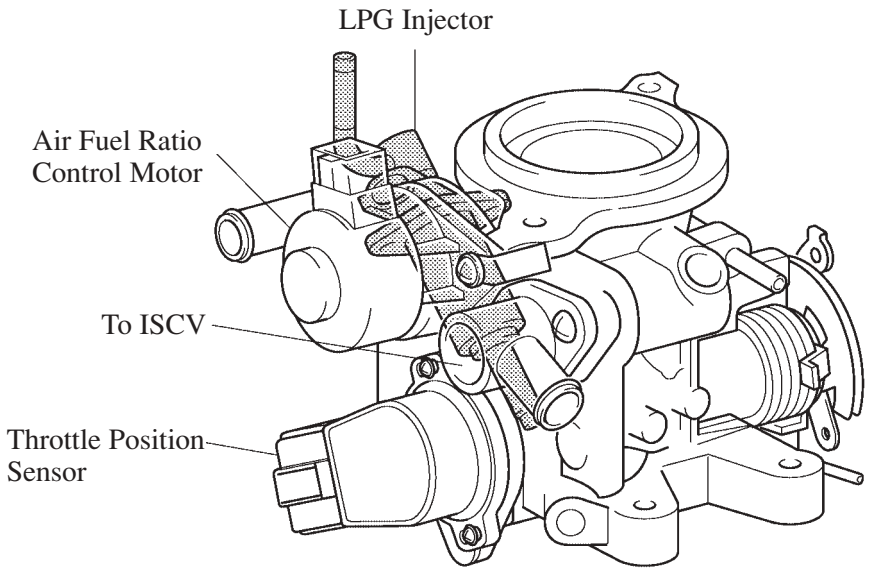


Service Tip

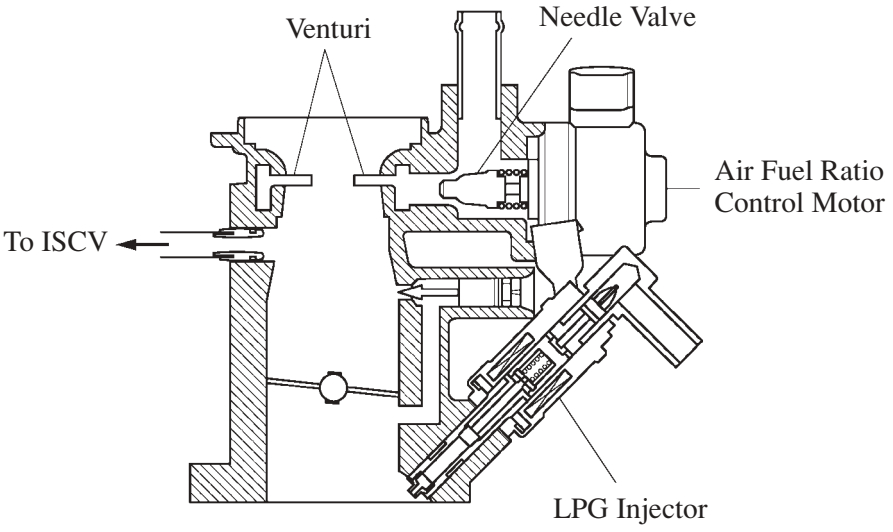
The pressure in the primary decompression chamber can be adjusted by operating the first regulator screw. The engine speed at idle can be adjusted by operating the idle adjust screw.
For details, refer to the 1BZ-FPE Engine Repair Manual Supplement (Pub. No. RM943E).

2) LPG Carburetor

- The LPG carburetor consists of an air-fuel ratio control motor and LPG injector.
- The fuel that is sent by the LPG regulator passes through the venturi area and is then fed into the intake manifold.
- An air-fuel ratio control motor is provided mid-stream of the fuel passage. The needle valve at the tip moves in accordance with the signals from the engine ECU to vary the flow volume of the fuel.
- The LPG injector injects auxiliary fuel in order to regulate the air-fuel ratio.



225EG19

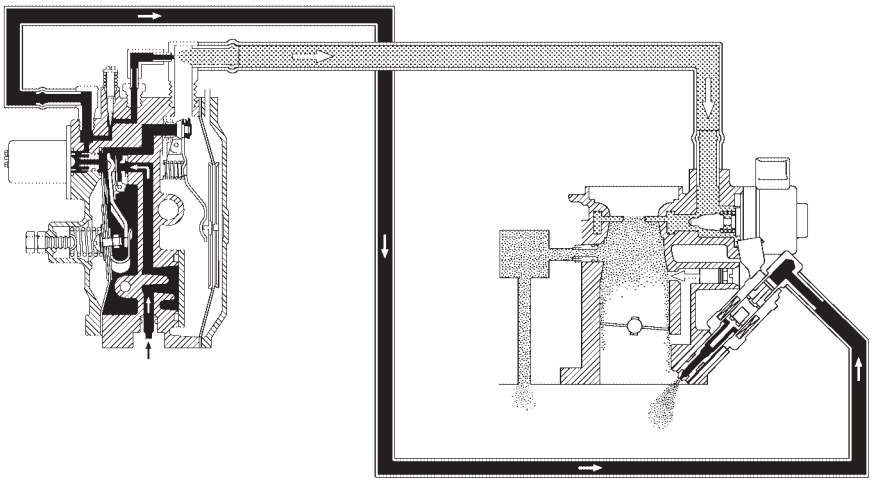


225EG20

Operation

1) During idling or light load driving

When the venturi vacuum pressure in the carburetor is low, most of the fuel is fed through the slow passage. Then, the LPG injector injects the amount of fuel that lacks in relation to the stoichiometric air-fuel ratio in order to regulate the air-fuel ratio.

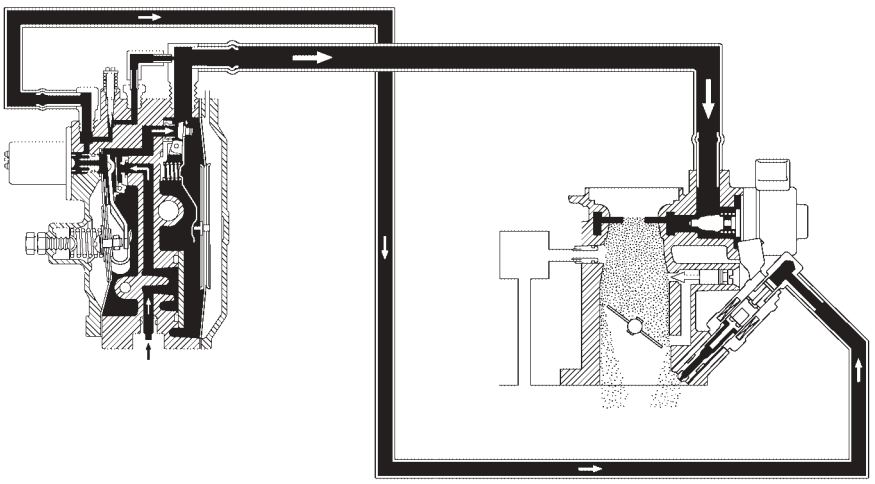


225EG21

2) Other driving conditions

When the venturi vacuum pressure becomes high, the fuel is fed through the main and slow passages. Under medium-load conditions, most of the fuel is fed through the main passage. Then, to regulate the air-fuel ratio, the LPG injector injects the amount of fuel that is lacking in relation to the stoichiometric air-fuel ratio.

The fuel flow volume of the LPG injector becomes fixed under heavy-load conditions, and the air-fuel ratio control motor varies the flow volume of the main passage in order to regulate the overall injection volume.



225EG22