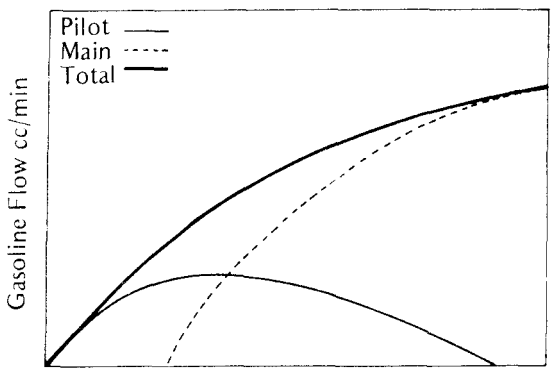
The pilot system determines the operation of the carburetor from 0 to % throttle opening. At small throttle openings, almost no fuel is drawn through the main system due to insufficient air flow. Instead, the fuel is drawn through the main and pilot jets as a sreult of the low pressure (suction) brought about by the demand for air by the engine and the limited but relatively fast flow of air past the pilot outlets. The almost closed position of the butterfly valve restricts the carburetor bore air flow, preventing it from relieving the low pressure created by the engine around the pilot outlets. The venturi effect (the narrower the air passage, the faster the flow of air) at the engine side of the butterfly valve further reduces the low pressure.

The supply of the fuel and air in the pilot system is shown in Fig. 399. At idling, fuel passes through the main jet and is metered by the pilot jet. It mixes with air metered by the pilot air jet, and flows through the pilot passage. The pilot screw controls flow to the pilot outlet, where the mixture enters the carburetor bore, and is drawn into the engine. As the butterfly valve begins to open, its position extends the low pressure area to the pilot bypass outlets, allowing fuel to "bypass" part of the pilot passage and go directly to the carburetor bore. In this way, the supply of fuel increases sufficiently with engine need.

Fig. 400 shows throttle opening versus fuel flow for the main and pilot systems. If there is trouble in the pilot system, starting and low speed running are affected. The transition from pilot to main system is not smooth as the throttle is opened, causing a drop in engine efficiency. Pilot system trouble might be due to maladjustment; a dirty or loose pilot jet or pilot air jet; or clogging of the main jet, pilot passage, pilot outlet, or pilot bypass outlets.

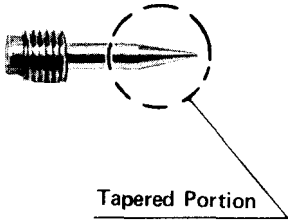
Flow Characteristic (400)



Cleaning and replacement (See cautions Pg. 114)

Remove the diaphragm and pilot screw. Wash the main jet, pilot jet, and pilot air jet with a high flash-point solvent; and blow them clean with compressed air. Use compressed air to clean the pilot passage and pilot air jet passage.

Check that the pilot screw tapered portion is not worn or otherwise deformed. If it is, replace the screw.



Main System

Fig. 402 shows the main system, which consists of the main jet 6 , needle jet 9 , jet needle 4 , vacuum piston 2 , main air jet 5 , diaphragm 1 , spring 7 , and air vent 3 . Fig. 403 shows the supply of fuel and air in the main system.

From about *1/4* throttle opening, the air flow past the jet needle outlet is sufficient to cause fuel to be drawn through the main system. The fuel passes through the main jet, and then part of it goes through the pilot jet as in the pilot system. The rest of the fuel passes straight up through the needle jet and into the carburetor bore, where it is atomized by the air flow to the engine.

The needle jet has holes to admit the air metered by the main air jet. This air mixes with the fuel in the needle jet to prepare the fuel for better atomization in the carburetor bore.

The lower part of the jet needle is tapered and extends down into the needle jet. It is fixed to the vacuum piston, and thus rises up in the needle jet as the vacuum piston rises. From the time the vacuum piston starts rising, about *1/4* throttle, until it reaches most of the way up in the carburetor bore, the fuel is metered primarily by the jet needle taper. As the jet needle rises, the needle-to-jet clearance increases, thereby increasing the amount of fuel that can pass up through the jet.

The vacuum piston is attached to the diaphragm and rises only between 1/4 and 3/4 throttle. Through the hole in the bottom of the piston, the air pressure in the bottom of the piston, the air pressure in the chamber above the diaphragm is reduced by engine intake vacuum. The air vent maintains atmospheric pressure in the chamber under the diaphragm. As engine speed increases, air pressure in the upper chamber decreases. The difference between this pressure and atmospheric pressure in the lower chamber becomes greater. The force of the spring and the weight of the piston are overcome, and the piston rises to an extent corresponding to this pressure difference. The diaphragm is made of rubber and absorbs the vibration caused by engine intake pulsing to prevent the vacuum piston from wearing.