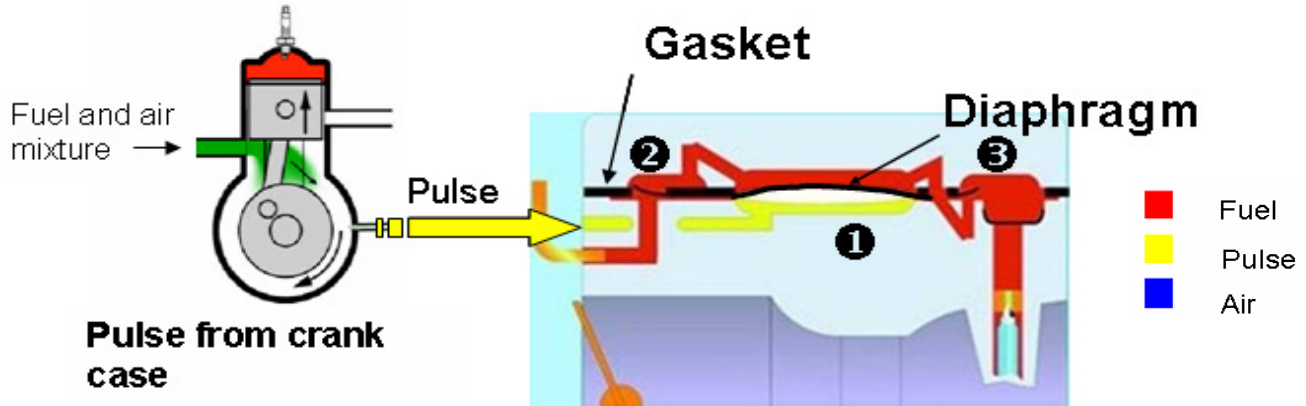


# SYSTEMS AND OPERATION

## /// FUEL PUMP SYSTEM

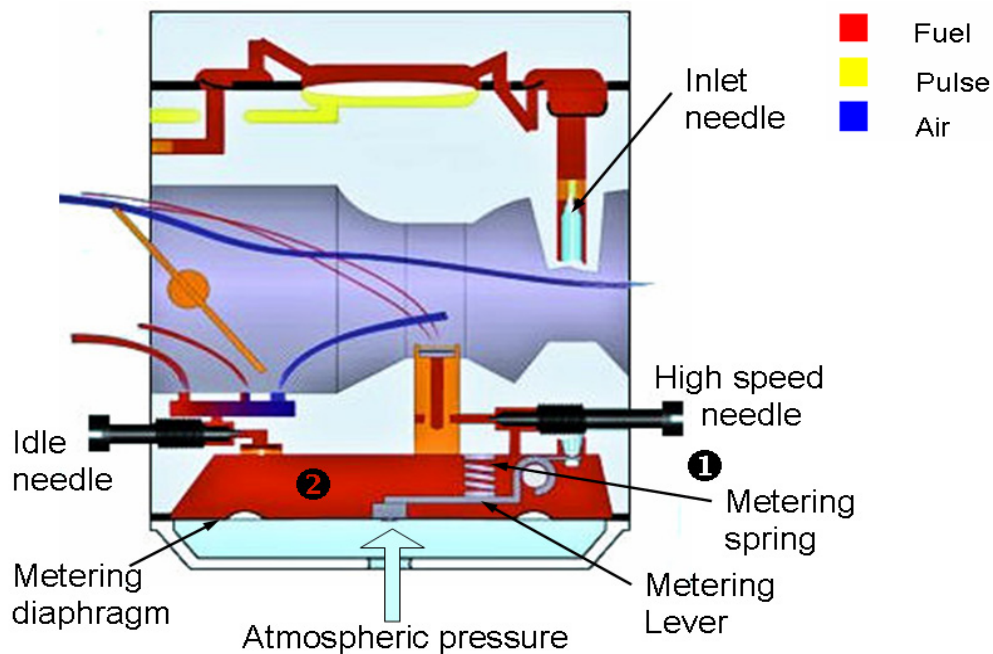
- ❶ The fuel pump on a diaphragm carburetor uses the vacuum and pressure pulse from the engines crankcase to move a diaphragm up and down. The pulse travels from the crankcase through a drilled passage or a hose to the carburetor.
- ❷ As the diaphragm moves up it expands the area in the pump chamber. This creates a vacuum, which draws fuel through a one-way inlet check valve into the chamber.
- ❸ As the diaphragm moves down and compresses the area in the pump chamber the fuel is forced through the one-way outlet check valve to the inlet needle.

It is important to make sure the passage from the engine crankcase to the pump diaphragm is clear and not restricted in any way in order for the pump to operate properly.



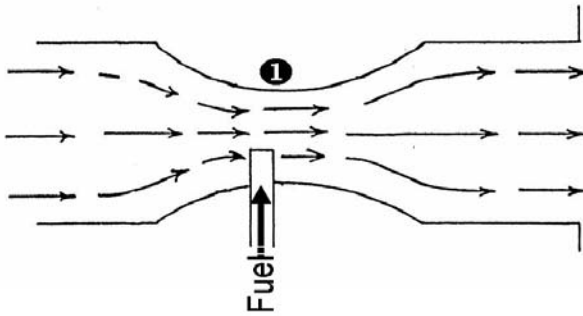
## /// FUEL METERING SYSTEM

The purpose of the metering system is to control fuel flow. It's operation is much like a float and inlet needle on a conventional float bowl carburetor. The main advantage of this system is that it is not affected by the orientation of the engine. The components of the fuel metering system consist of an inlet needle, metering lever, metering spring and metering diaphragm.



- ❶ The pressure of the metering spring against the metering lever holds the inlet needle against its seat and prevents fuel from entering the metering chamber.
- ❷ The metering diaphragm is made of a flexible convoluted material to allow for greater movement. As the engine runs, fuel is being drawn from the metering chamber in the carburetor. This causes the metering diaphragm to move up and contact the metering lever. The pressure of the metering diaphragm against the lever over rides the spring pressure on the inlet needle. The fuel pressure from the pump is then great enough to overcome the spring pressure on the inlet needle and fuel flows into the metering chamber.

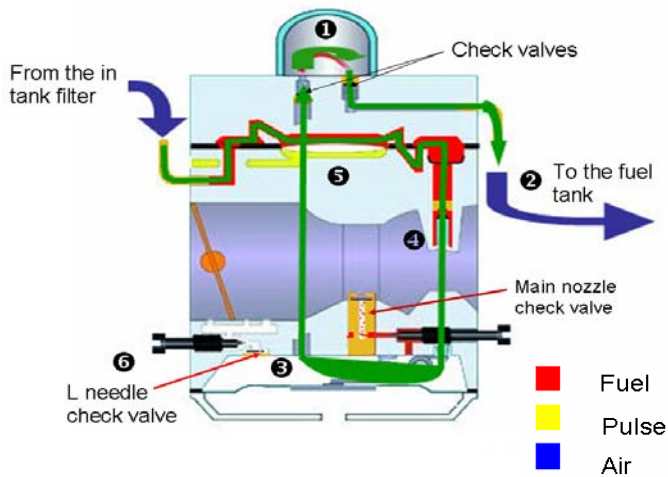
## VENTURI PRINCIPLE OF OPERATION



- 1 A venturi is a constriction of the inside diameter of a tube. The “venturi affect” occurs when airflows through a constriction, the airflow speeds up (velocity increases) and the pressure decreases (vacuum increases) at the point of the smallest diameter.

The Venturi is used to produce low pressure inside the bore of the carburetor. The low pressure pulls fuel into the bore from the metering chamber where it mixes with the air and is drawn into the combustion chamber.

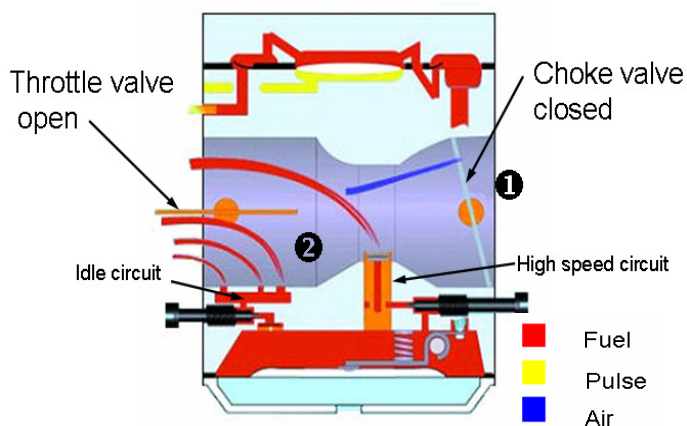
## PRIMER OPERATION



- 5 The open inlet needle causes the vacuum created by the primer to draw fuel from the tank, through the pump, into the metering chamber and up to the primer bulb.
- 6 To prevent air from entering the metering chamber during primer operation there is a one-way check valve in the idle circuit and main nozzle. Every time the primer bulb is depressed this process is repeated causing any old fuel or air that was in the carburetor to be displaced by fresh fuel from the tank. The fresh fuel in the carburetor makes the engine easier to start.

Note that once the metering chamber has been filled with fresh fuel continuing to push on the primer bulb will not help improve the starting of the engine.

## STARTING (CHOKE) OPERATION

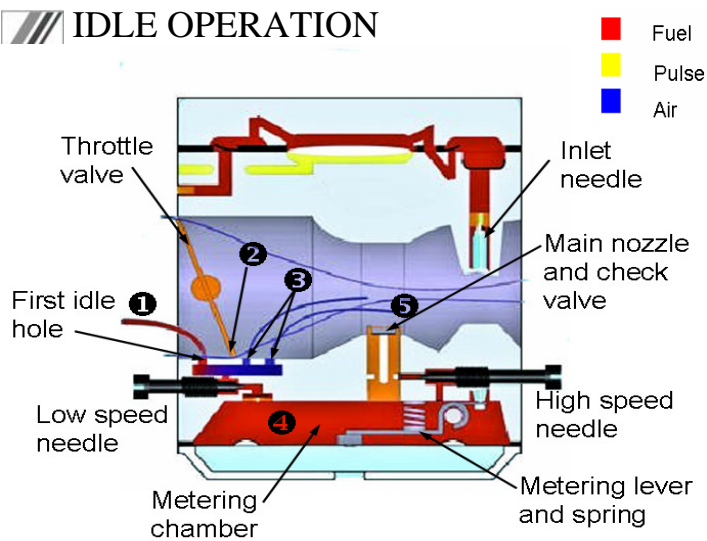


- 1 To start a cold engine the fuel and air mixture entering the engine must be rich. Closing or choking the air inlet of the carburetor using a choke valve accomplishes this. The choke valve allows very little air to enter, causing the engine vacuum to be concentrated inside the venturi of the carburetor.
- 2 The high vacuum draws fuel from the high and low speed fuel circuits creating the very rich fuel and air mixture that is needed to start a cold engine.

The full-choke operation is used to get the engine to fire and start. In most cases the fuel air mixture is too rich to allow the engine to run for a long time before it dies. After the engine starts or “pops” and dies in the full choke position the choke valve is then moved to the half-choke position. The engine is re-started and will continue to run in a rich condition.

After the engine has sufficiently warmed up in the half choke-position the choke valve can be moved to the full open position.

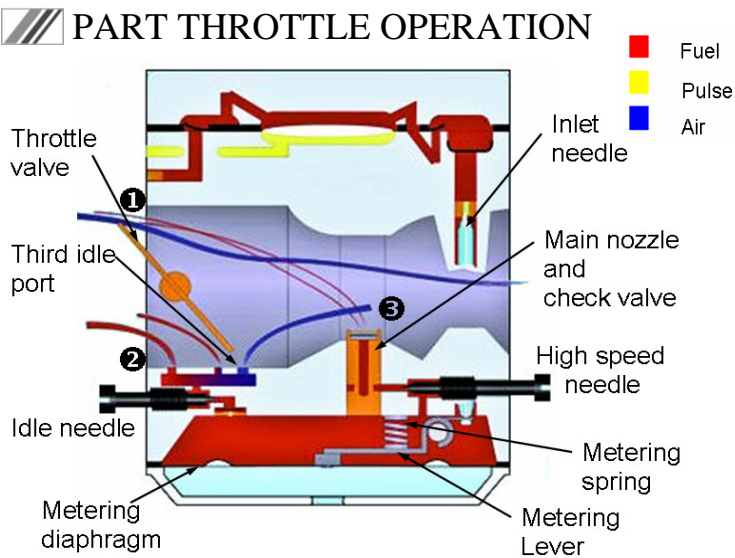
## /// IDLE OPERATION



- 1 At idle, fuel is delivered to the engine through the idle or low speed circuit. This circuit usually consist of two or three holes located along the throttle bore of the carburetor.
- 2 The throttle valve is slightly open allowing a small amount of air to pass through to the engine. This creates a low pressure (vacuum) on the engine side of the throttle valve and atmospheric pressure on the inlet other side of the valve.
- 3 Air enters the secondary holes on the atmospheric side of the throttle valve and mixes with the fuel in the idle pocket creating an emulsified air fuel mixture. The low pressure draws the fuel and air mixture through the first idle hole into the engine.

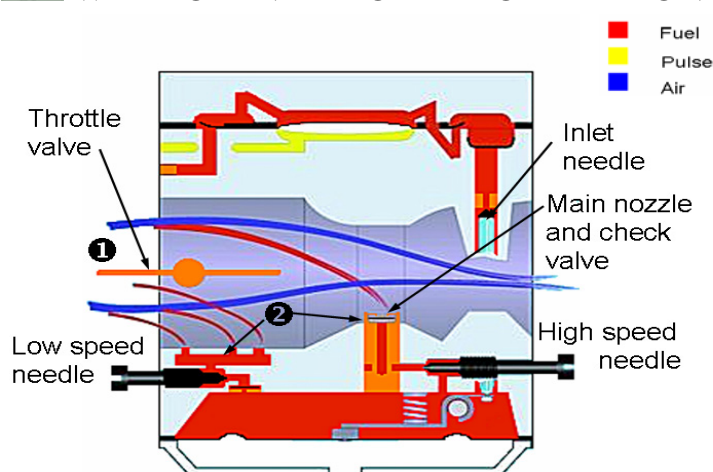
- 4 As the fuel and air mixture is drawn out of idle pocket it creates low pressure in the metering chamber. Atmospheric pressure pushes the metering diaphragm against the metering lever. This releases the spring pressure applied to the inlet needle and allows fuel to flow into the metering chamber.
- 5 The main nozzle check valve is another important component of the idle circuit. This one way check valve located in the main nozzle is under atmospheric pressure at idle. Without it air would flow from the main nozzle into the metering chamber. This will cause an air leak in the metering chamber and there would be no drop in pressure. The diaphragm will not move and the engine will die lean when idling. This check valve also serves the same function during the priming operation.

## /// PART THROTTLE OPERATION



- 1 During part throttle operation or acceleration the throttle valve is opened to allow more air to the engine.
- 2 As airflow increases so must fuel flow to maintain a proper air/fuel mixture. The secondary idle holes are now on the vacuum side of the throttle valve and fuel is drawn through all the idle circuit holes.
- 3 The increased airflow causes vacuum to be applied to the main nozzle. This allows fuel pressure from the metering chamber to overcome atmospheric pressure on the check valve and it begins to flow fuel to the engine.

## /// WIDE-OPEN THROTTLE OPERATION



- 1 The throttle valve is opened completely allowing maximum airflow through the venturi.
- 2 The pressure drop from the venturi increases fuel flow from the main nozzle. Fuel from the main nozzle and idle circuit mixes with the air, entering the combustion chamber and satisfying the requirements of the engine.