The carburetor air ducts consist of a fixed duct riveted to the nose cowling and a flexible duct between the fixed duct and the carburetor air valve housing. The carburetor air ducts normally provide a passage for outside air to the carburetor. Air enters the system through the ram-air intake. The intake opening is located in the slipstream so the air is forced into the induction system giving a ram effect to the incoming airflow. The air passes through the air ducts to the carburetor. The carburetor meters the fuel in proportion to the air and mixes the air with the correct amount of fuel. The throttle plate of the carburetor can be controlled from the cockpit to regulate the flow of air (manifold pressure), and in this way, power output of the engine can be controlled.

Although many newer aircraft are not so-equipped, some engines are equipped with carburetor air temperature indicating systems which shows the temperature of the air at the carburetor inlet. If the bulb is located at the engine side of the carburetor, the system measures the temperature of the fuel/air mixture.

Induction System Icing

A short discussion concerning the formation and location of induction system ice is helpful, even though a technician is not normally concerned with operations that occur when the aircraft is in flight. *[Figure 3-7]* Technicians should know something about induction system icing because of its effect on engine performance and troubleshooting. Even when an inspection shows that everything is in proper working order and the engine performs perfectly on the ground, induction system ice can cause an engine to act erratically and lose power in the air. Many engine troubles commonly attributed to other sources are actually caused by induction system icing.

Induction system icing is an operating hazard because it can cut off the flow of the fuel/air charge or vary the fuel/air ratio. Ice can form in the induction system while an aircraft is flying in clouds, fog, rain, sleet, snow, or even clear air that has high moisture content (high humidity). Induction system icing is generally classified in three types:

- Impact ice
- Fuel evaporation ice
- Throttle ice

Chapter 2 discusses types of icing in more detail.

Induction system ice can be prevented or eliminated by raising the temperature of the air that passes through the system, using a carburetor heat system located upstream near the induction system inlet and well ahead of the dangerous icing zones. This air is collected by a duct surrounding the exhaust manifold. Heat is usually obtained through a control valve that opens

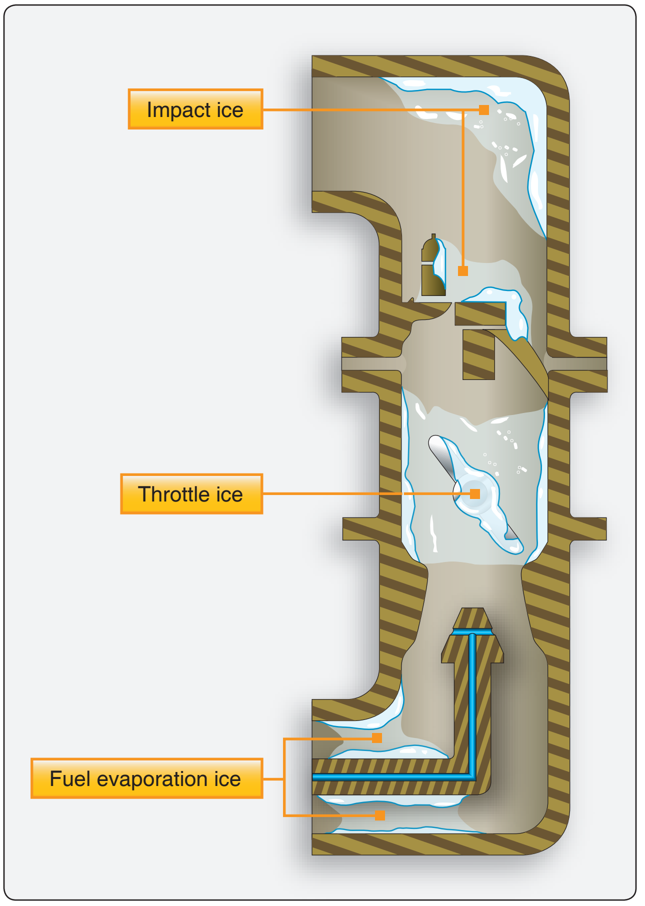

Figure 3-7. *Location of a carburetor heat air valve.*

the induction system to the warm air circulating in the engine compartment and around the exhaust manifold.

Improper or careless use of carburetor heat can be just as dangerous as the most advanced stage of induction system ice. Increasing the temperature of the air causes it to expand and decrease in density. This action reduces the weight of the charge delivered to the cylinder and causes a noticeable loss in power because of decreased volumetric efficiency. In addition, high intake air temperature may cause detonation and engine failure, especially during takeoff and high power operation. Therefore, during all phases of engine operation, the carburetor temperature must afford the greatest protection against icing and detonation.

When there is danger of induction system icing, the cockpit carburetor heat control is moved to the hot position. Throttle ice or any ice that restricts airflow or reduces manifold pressure can best be removed by using full carburetor heat. If the heat from the engine compartment is sufficient and the application has not been delayed, it is only a matter of a few minutes until the ice is cleared.