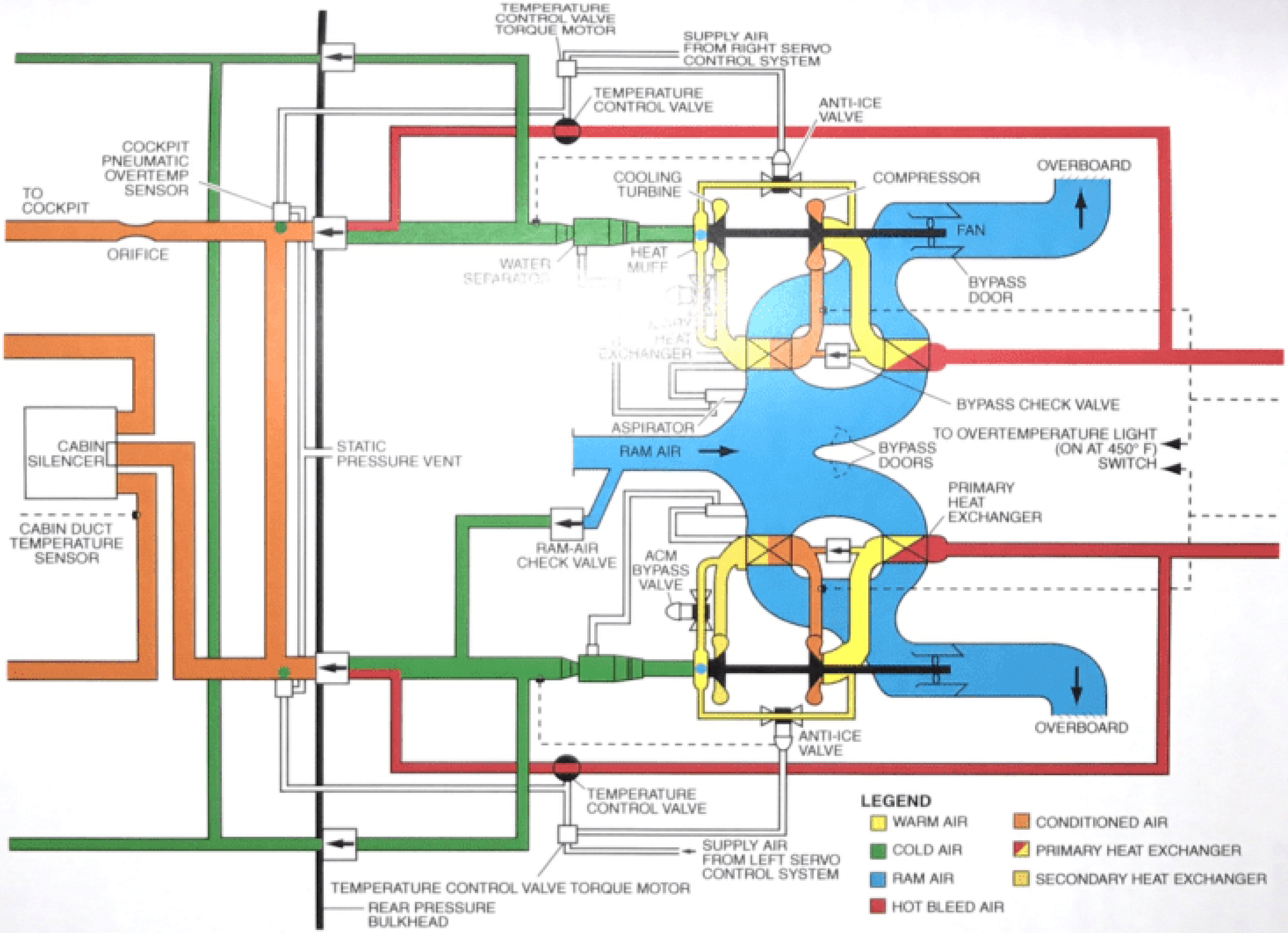

Figure 11-5. Refrigeration Unit

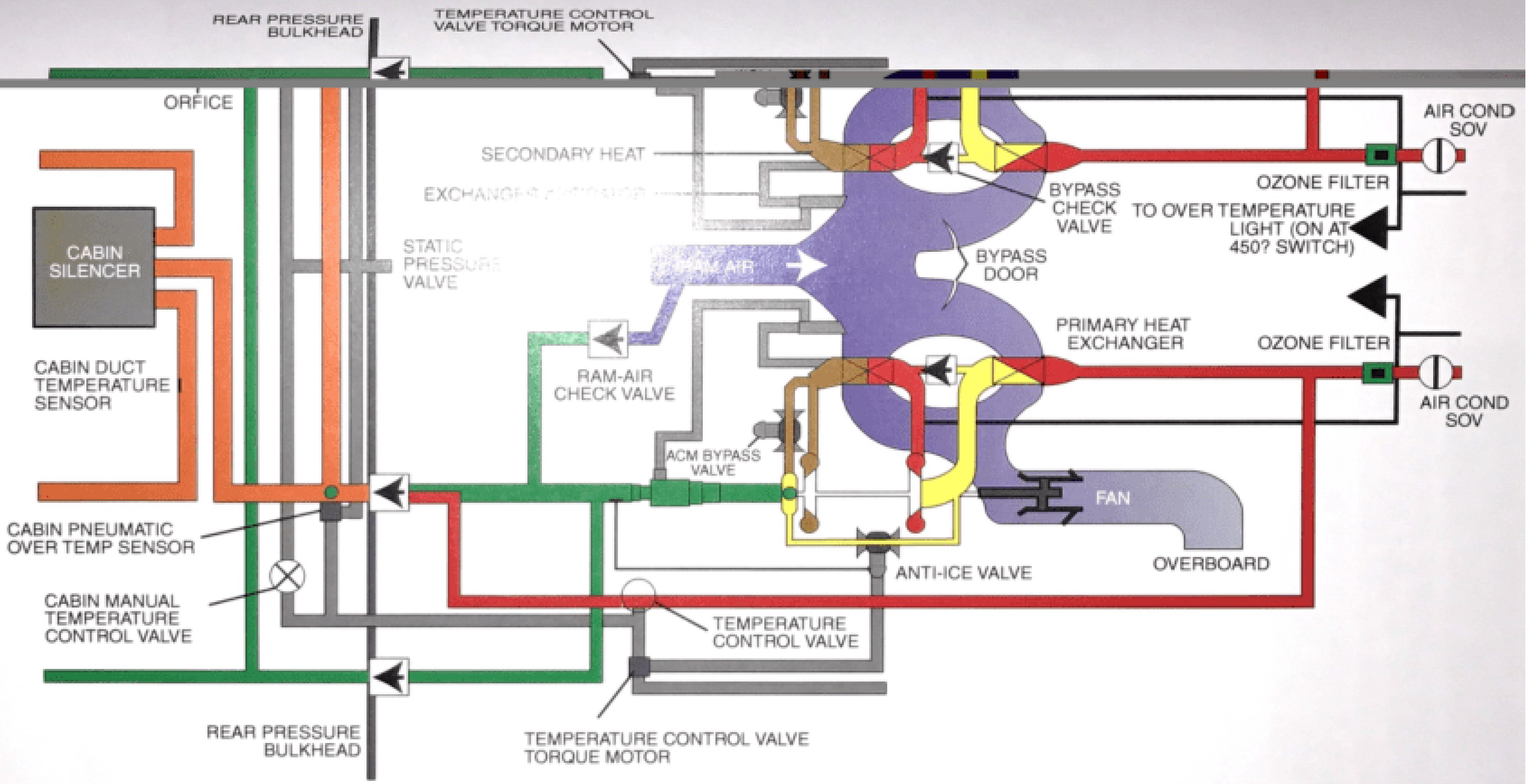

Figure 11-2. Air-Conditioning System

AIR CONDITI

SYSTEM DESCRIPTION AND OPERATION

GENERAL

During normal in-flight operation, hot compressed air is supplied from the bleed-air manifold (Figure 11-1). This air, which is temperature and pressure-controlled, can be obtained from either or both engines at the selection of the crew. Cooling is provided by air cycle cooling equipment (Figure 11-2), consisting of a primary heat exchanger, a secondary heat exchanger, and an air cycle machine, which are capable of reducing the temperature of the air from the bleed-air manifold to values above freezing. Humidity reduction is accomplished by a mechanical

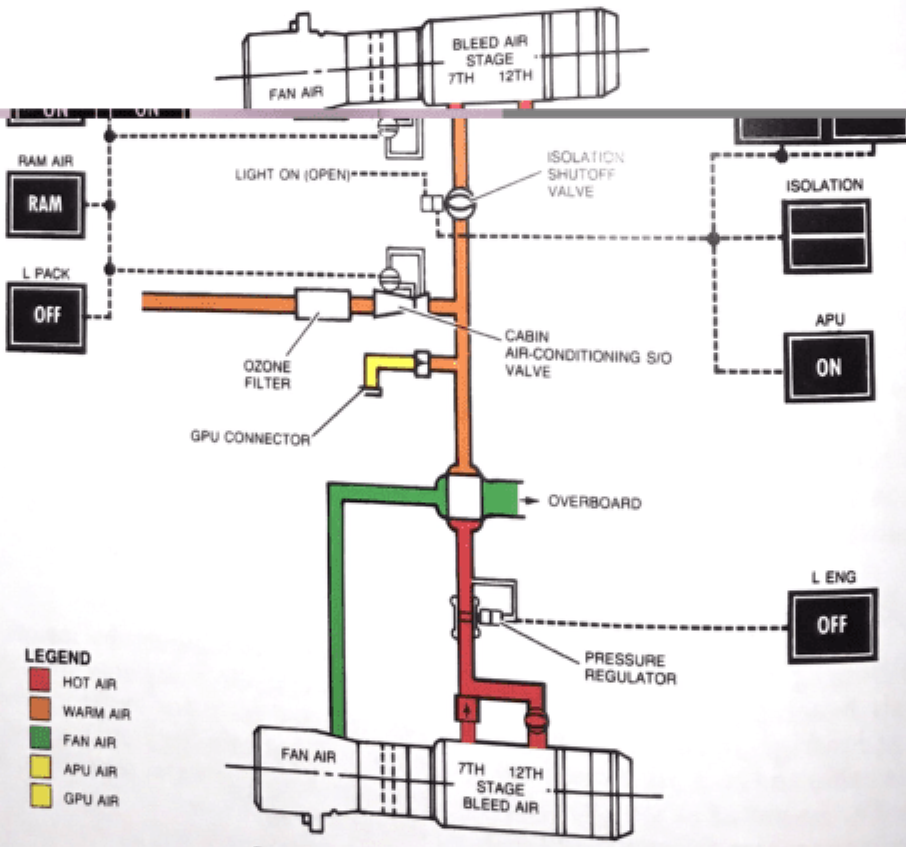

Figure 11-1. Bleed-Air Manifold

water separator. Temperature control of the occupied areas is accomplished by varying the amounts of hot bleed air which bypasses the cooling equipment. Separate temperature control is provided for the cabin and the cockpit with controls located on the overhead panel in the cockpit. A manual system provides additional control over the system in the event of … conditioning is provided by the APU supplying the bleed-air manifold. Ground operation of the air-conditioning system is essentially the same as in flight, with the addition of ram-air flow across the heat exchangers induced by cooling fans. Provisions are also made for an external air connection for use with an external ground source of bleed air for the bleed-air manifold.

Should either or both engines be operating, the crew may select either or both engines as a supply of hot compressed air for the bleed-air manifold and thus the air-con…

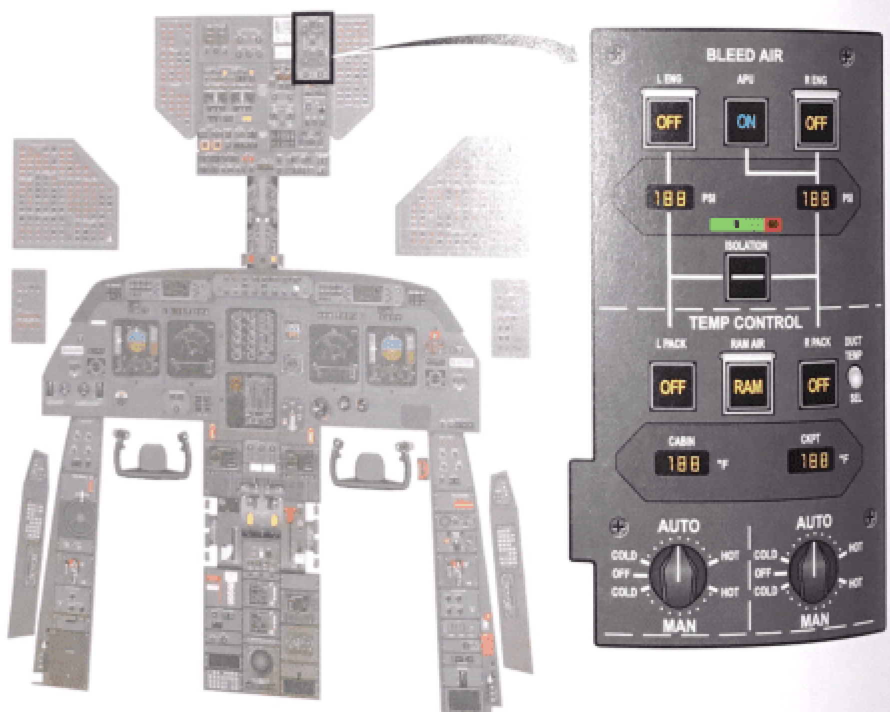

Figure 11-3. ISOLATION Valve Switch

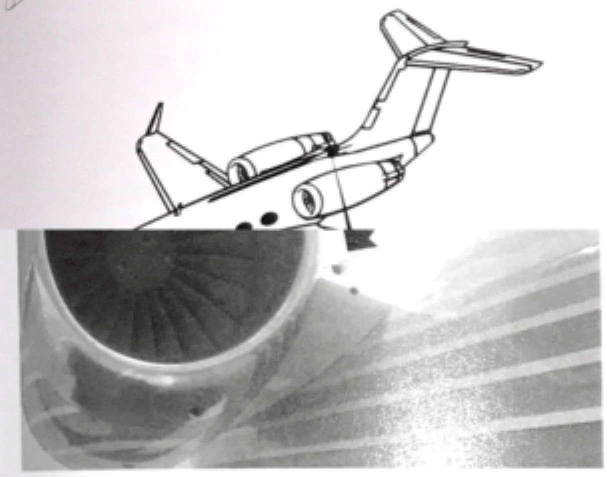

Figure 11-4. Dorsal Fin R[illegible] Inlet

AIR CONTROL COMPONENTS

Bleed-Air Manifold

The bleed-air manifold is used as the source of bleed air for the air-conditioning system. This air is available from one or both engines, the APU, or an external air supply (ground use only).

The bleed-air manifold delivers air to using systems, one being the air-conditioning system. The air temperature is approximately 400°F at a maximum of approximately 40 psig. The air is delivered to the air-conditioning shutoff and flow-regulating valves (shutoff valves) through T-fittings in the bleed-air manifold in the tail compartment.

Air-Conditioning Shutoff and Flow-Regulating Valves

These valves serve two functions in the air-conditioning system:

- As a shutoff valve for the air-conditio air from entering the air-conditioning system and ending operation of the system. With a source of air in the bleed-air manifold and the shutoff solenoid deenergized, the valve butterfly moves toward the open position and airflow starts again. This valve functions as a flow-regulating device to maintain a maximum of 28 ppm airflow.

Electrical shutoff solenoid energizing causes the valve to be pressurized to the fully closed position. There are several ways to energize the solenoid and close the valve:

- Place the RAM AIR switch to RAM.
- Place the right or left PACK control switch off.
- When on the ground, aircraft SNs 1156 and subsequent and those with ASC 135, selecting the START or CRANK MASTER switch ON will close the left valve.
- On the ground, the discharge side of either ACM compressor has reached 450°F.
- When on the ground, depress either engine starter switch.

TEMPERATURE CONTROL SYSTEM

It is the position of the temperature control valve (Figure 11-5) which determines compartment temperature by mixing hot and refrigerated air to attain the desired compartment temperature.

In order to control the compartment temperature, the position of the appropriate temperature control valve must be varied accordingly.

General

The dual selector (see Figure 11-3) is used to automatically or manually set a desired cabin or cockpit temperature. Both are physically and operationally independent from the other and are installed in the cockpit overhead.

Operation

The selector provides automatic and manual temperature control selection by rotation of the control knob clockwise and counterclockwise from the 9 o'clock OFF position. The control functions are obtained through approximately 330° rotation of the selector shaft. There is a detent region of approximately 20 to 30° at the OFF position, within which no signal is applied to the temperature control valve from either the manual selector or the temperature controller. Rotating the shaft out of this detent area in a clockwise direction places the temperature control system in the automatic mode of operation at the minimum selectable temperature (60°F). Further clockwise rotation through 150° of rotation linearly increases the selected temperature to the maximum value (80°F).

Rotation of the selector knob out of the detent area in the counterclockwise direction places the temperature control system in the manual, although still electric, mode of operation with the temperature control valve fully closed. Further rotation of the knob through 150° in the counterclockwise direction progressively opens the valve to the fully open position, thereby increasing the temperature.

Some aircraft have been outfitted with addi-

Cabin/Cockpit Temperature Control Valve

The temperature control valve is a two-inch diameter pneumatic modulating butterfly valve. With no pneumatic pressure applied to its diaphragm chamber, an internal spring mechanism maintains the butterfly in the closed position. The valve requires pneumatic pressure to open the butterfly and the amount of opening is controlled by varying the pneumatic pressure applied. The pneumatic control pressure (left servo control system) originates at a T-fitting upstream of the valve. Duct pressure is then routed to a servo air pressure regulator and torque motor.

Some aircraft have been outfitted with additional manual temperature controls located aft of the baggage door. These pneumatic controls are dependent on a minimum 3 psid cabin pressure for opening of the temperature control valves.