

## 2.18. PRESSURIZATION SYSTEM

The cabin pressure control system (CPCS) is an electropneumatic system normally operated by a digital-electronic controller; a completely independent manual control is also provided.

The air necessary to pressurize the cabin is supplied by the environmental control system (ECS) or by the emergency pressurization system. Two valves control the cabin pressure, regulating the discharge of the air from the cabin to the outside.

The emergency circuit, consisting of a shutoff valve and of a bulkhead check valve, is fed by bleed air supplied by the engine through a check valve and a flow limiting venturi.

The bleed air is collected into a pressure manifold that provides air also for the CPCS ejector, for the pressurization of the hydraulic tank, for the operation of the main wing and engine ice protection systems and for the door sealing.

The door sealing consists of two separate chambers, one inside the other, independently fed by a pressure regulated air supply. Two pressure switches, one for each seal tube, control the DOOR SEAL amber caution light located on the annunciator panel. When the entrance door is secured and the seal is properly inflated the caution light goes off. If just one or both the seal tubes are not inflated the caution light remains on.

When the emergency bleed air is required, the emergency poppet type solenoid driven shut-off valve is open and the air flows directly to the cabin through the bulkhead check valve.

This valve prevents reverse flow from the cabin in case of a rupture of the emergency pipe, downstream the shut-off valve.

The CPCS consists of a controller, a selector, a differential pressure switch, a manual controller, a vacuum regulator, two outflow control valves and an ejector, which furnishes a low pressure level to the primary safety/outflow valve.

The cabin pressure controller contains the electronic circuits and components to obtain an automatic pressure control, including continuous self test functions and normal positive pressure control.

The controller generates the electrical signal to operate the primary outflow valve: to sense the differential pressure two ports are provided, one open in the cabin and the other connected to the airplane static source.

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On the pressure selector panel it is possible to set the cabin rate of climb (knob R), the barometric correction (knob B) and the cabin altitude (knob A): a fault indication lamp is also provided.

The cabin Δp switch senses the difference between the cabin and the ambient pressure.

The primary outflow/safety valve has a normal operating setting at  $9.0 \pm 0.1$  psid and a maximum at  $9.3 \pm 0.1$  psid for the primary and at  $9.6 \pm 0.1$  psid for the safety valve.

Both primary and secondary safety/outflow valves are equipped with an altitude limit control set to  $13000 \pm 500$  ft, a negative pressure relief and independent static ports connected to the ambient in a position that does not allow any ice accretion.

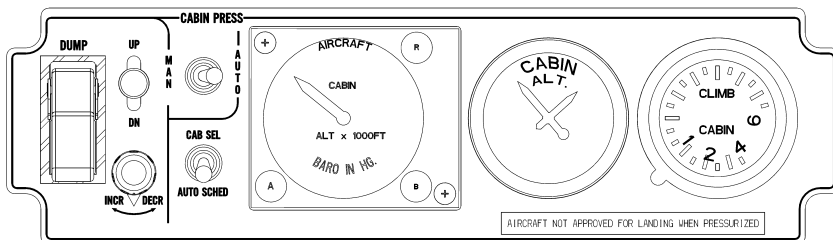
When the cabin altitude is higher than 9500 ft or the differential pressure exceeds 9.4 psid, the CAB PRESS red warning light illuminates on the annunciator display.

The secondary safety/outflow valve is connected to the manual controller, which allows the control of the cabin altitude and rate of climb when the manual mode is selected.

The system is provided with a cabin pressure dump device. The pressure shall rapidly decrease down to the altitude limiter set of  $13000 \pm 500$  ft.

The cabin pressurization system control switches and gauges are grouped in the CABIN PRESS panel located in the lower right portion of the instrument panel.

The system can be operated in automatic mode (switch to AUTO) or, as a back up, in manual mode (switch to MAN).



**Figure 2.18-1. Cabin Pressurization Controls and Indicators**

When the AUTO mode is selected, two additional modes of operation are possible: one is a fully automated control (AUTO SCHED) which utilizes a pre-programmed relationship between cabin and aircraft altitudes; the other is a crew selection dependent control (CAB SEL). The two modes can be accomplished at any time, either on the ground or during flight.

The action required to the crew when operating in AUTO SCHED are:

- select the pressure altitude of the destination airport using the knob A;
- select proper barometric correction before landing using the knob B;
- verify, on the cabin altitude gauge, that cabin is depressurized before landing.

When operating in CAB SEL mode the required operations are:

- select the cruise altitude as desired with the knob A;
- set the barometric correction with knob B to 29.92 in Hg;
- set the cabin rate of climb with knob R;
- re-select cruise altitude for flight plan variation;
- verify on the cabin altitude gauge that cabin is depressurized before landing.

At the discretion of the airplane operator or if an electrical failure has occurred to the automatic controller, the cabin pressure control can be attained with the manual controller.

In this case the required actions by the crew are:

- place the mode switch to MAN;
- set the toggle switch to the detented UP or DN position to obtain respectively an increment or a reduction of cabin altitude as required to control the cabin pressure;
- regulate the rate of cabin climb with the knob as desired (rates from 50 to 3000 fpm are possible).

Electrical power for operating the system is delivered from the right dual feed bus through the CABIN PRESS 3-ampere circuit breaker on the copilot circuit breaker panel.

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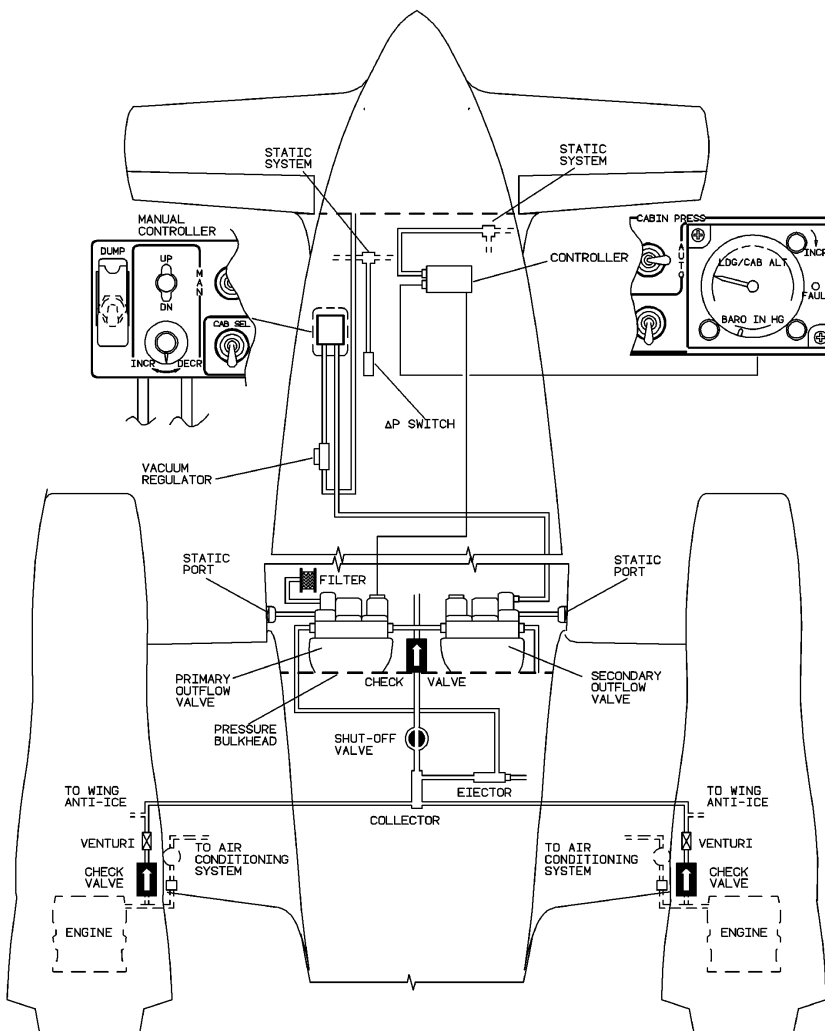


Figure 2.18-2. Cabin Pressurization System