

Pressurization Systems

field elevation, the outflow valve will close long after the safety valve and the passengers will experience a smoother transition. The second reason is that if you set the selector to cruise altitude, the system will “prerate,” meaning it will think the aircraft is climbing long before it actually does. This will delay normal cabin pressurization longer than necessary and may prove uncomfortable for some passengers.

Once the climb is established and you have passed through 500 feet AGL, reset the aircraft altitude selector to 1000 feet above cruise altitude. As the aircraft climbs, the cabin altitude takes care of itself. The reason for setting 1000 feet above cruise altitude is again passenger comfort. If the controller is set to cruise altitude, the outflow valve will open and close continuously as the cabin pressure makes small fluctuations between too low and too high. With the controller set for an altitude above the actual aircraft altitude, the cabin will never reach the programmed pressure, so the outflow valve will remain at least slightly opened; the result is no bumps. There are no additional requirements for cruise condition. If it is necessary to change altitude, simply select the new altitude plus 1000 feet and climb or descend.

During descent for landing, set the aircraft altitude selector to approximately 500 feet above field elevation and adjust the cabin rate of change to maintain a comfortable cabin rate of descent. It is a good idea to not descend at a rate that will allow the aircraft to catch up to the cabin altitude, otherwise the cabin will depressurize. On the other hand, if you select the field elevation for the cabin altitude, when the gear touches down on the runway the cabin will dump, causing some passenger discomfort. With 500 feet above airport elevation selected, the cabin will depressurize comfortably shortly before landing.

TROUBLESHOOTING

Fortunately, pressurization systems are basically reliable, but things can go wrong. Here are a few thoughts on troubleshooting.

If there is a “bump” felt at rotation on takeoff, an ear-popping event caused by a sudden pressurization, it is probably the result of the outflow valves closing too rapidly, fuselage flex, or a change in airflow over the outlet holes. Normal fluctuations in pressure, depending upon their frequency and magnitude, may not be felt by the occupants, but bumps are usually uncomfortable and can potentially cause structural damage.

If the cabin follows the aircraft’s altitude and rate-of-change shown on the flight instruments, there may be several causes. The first thing to check is the dump switch. If the dump switch is off, the logical choice would be a problem in the landing gear solenoid valve, which is responsible for keeping the safety valve open during ground operations. Try cycling the gear to see if that helps, then try opening the landing gear circuit breaker to bypass the system.

If the down rate is faster than the up rate, but everything else works normally, just make the necessary adjustment manually and have the controller checked out at your next opportunity. The problem probably is a minor leak in the tubing or controller.

Should the cabin rate exceed the selected rate value during the aircraft’s climb to cruise altitude, increase the rate selection or decrease the aircraft’s rate of climb. The obvious