

**CABIN HEAT CONTROLS**

The heater controls are located on the lower section of the right-hand side of the instrument panel. Access can be gained via the throttle/pedestal panel view.

To operate the heater proceed as follows:

1. ECS Master switch ON
2. Heater Temp slide controls- adjust as desired
3. Observe rise in cabin temperature indicator

**Cabin Heating, Ventilating And Defrosting System**

Cabin heating may be obtained from two sources. Warm airflow for cabin usage may be obtained from air heated due to compression in the compressor section of the front and rear engine turbochargers, and/ or a 25,000 BTU /hr combustion heater on the left side of the front engine compartment. The cabin is cooled and ventilated by directing airflow from both front and rear pressurized air sources through heat exchangers and ducting it directly to the cabin outlets. Defrosting airflow, heated or cool, is controlled by a valve and is ducted from the cabin heating and ventilating system to windshield outlets. All controls and switches are on an electroluminescent panel on the right side of the avionics equipment at the lower edge of the instrument panel.

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### Cabin Pressurization Controls



#### PRESSURIZATION CONSOLE

1. Cabin altitude climb rate control
2. Cabin altitude selector
3. Cabin rate of climb indicator
4. Cabin altitude indicator
5. Pressurization master switch
6. Bleed air switch
7. Pressurization dump switch



Access to the pressurization controls is obtained via the ↓ arrow button on the panel view controls on the main instrument panel.

### Cabin Pressurization System

The cabin pressurization controller (see above) consists of a cabin altitude control and cabin rate control. The cabin altitude controller provides for cabin pressurization starting at sea level. The cabin of the Skymaster may be pressurized to a maximum operating differential pressure of 3.50 PSI with a safety relief pressure differential of 3.50 PSI. This will yield approximately an 11,000 foot cabin altitude at a 20,000 foot cruise altitude. The bleed air system provides a continuous supply of air for pressurization.

The cabin pressurization controls maintain the desired differential pressure by increasing or decreasing the air flow out of the cabin through the out flow valve mounted on the aft cabin bulkhead which exhausts through the aft fuselage. The cabin altitude control located on the pressurization console, allows cabin altitude selection up to maximum differential pressure; and cabin altitude rate of change selection to approximately 2000 FPM. The pilot can monitor the pressurization system function by means of the cabin rate of climb indicator, the combination cabin altimeter/ differential pressure gauge, and cabin altitude warning light. The instruments are located on the pressurization console and the light on the top of the main panel view.

The Cabin Altitude warning light will illuminate should the cabin altitude exceed 12,000 feet (approximately).



#### Overview

Familiarity with the pressurization system will aid in developing ones own techniques and the following are only a few tips for improved passenger comfort:

1. Plan the flight.
2. Try to plan the cabin climb rate around 500 to 600 FPM.
3. During the climb phase, it is better for the cabin to reach its cruise altitude before rather than after the airplane.

To explain the function of the various controls and how they apply to a flight condition, the following example is given. Number [ ] references are to the Pressurization Console diagram above. Enlarged illustrations of the Cabin Altitude Selector [2], Rate Of Climb (ROC) Selector [1] and Cabin Altitude/Differential Pressure Indicator [4] can be found at the end of this document.

	<b>CESSNA SKYMASTER 337</b>	<b>Pressurization And ECS System</b>
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## CLIMB

- A flight is planned from airport A, elevation 2,000 feet, to airport B, elevation 3,000 feet.
- It is determined that FL210 will be used for this flight, so that cruise altitude is chosen. Referring to Figure 1, Cabin Altitude VS Airplane Altitude/ Manifold Pressure (MAP) at 3.50 PSI differential pressure, a comfortable cabin altitude of 8,500 feet may be found at the desired cruise altitude of 20,000 feet.
- Before takeoff, set the cabin altitude by rotating the Cabin Altitude Controller [2] to the desired cabin altitude of 1,000 feet above field elevation, or the minimum selection value of 4,000 feet...whichever is less.

### NOTE

For safety/comfort reasons, the Cabin Altitude Controller is locked out of settings in excess of 5,000' above present cabin altitude. So during ground operations this control may not have a great degree of movement. Your final cruise cabin altitude must be selected later, during the climb phase of the flight.

- At this time, the position of the rate control knob is not important since it only affects the rate of cabin altitude change, but it is a good practice to plan the cabin rate of climb prior to takeoff.
- Make sure you switch the cabin pressurization master switch [5] to the ON position.

### Example

For our example a cruise-climb rate of 1,000 FPM from 2,000 feet to 20,000 feet will be used. This flight segment will last 19 minutes. Note that during the first 1,000 feet with sea level controller the cabin and airplane will both climb at 1,000 FPM. This means that 18 minutes of climb still remain after the airplane passes the takeoff selected cabin altitude. The cabin will climb 5,500 feet in the remaining time period. To obtain the desired "ideal" cabin rate of climb, divide 5,500 feet by 18 minutes, obtaining approximately 300 FPM for the cabin altitude controller.

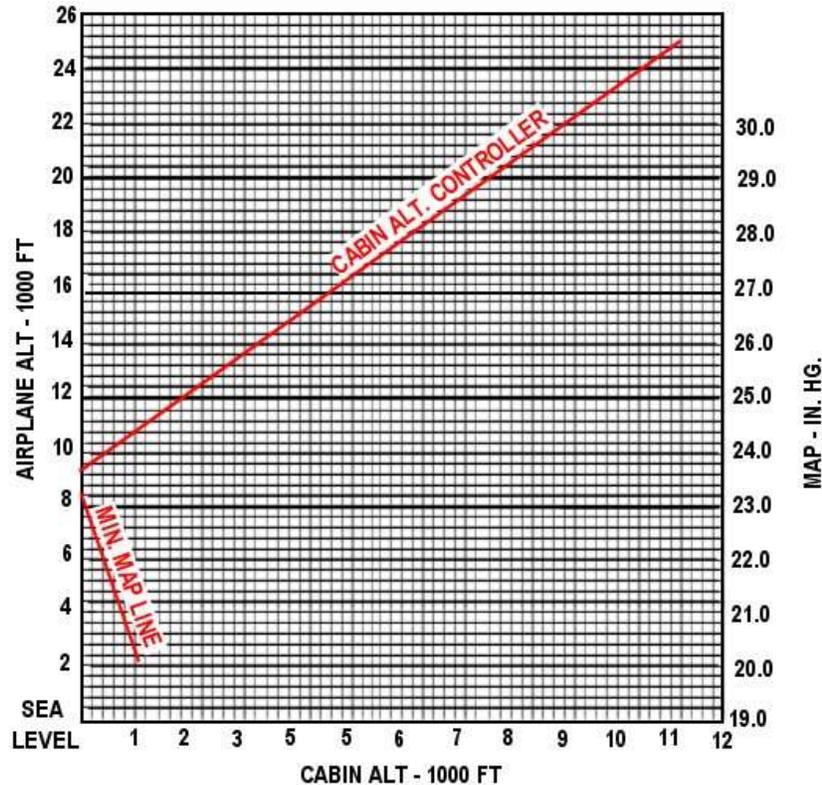


Figure 1

The system will operate more efficiently if the recommended MAP (right hand) is maintained. For example, 29 In. Hg. at 20,000 feet.

**NOTE**

The minimum MAP line (MIN MAP LINE) represents the minimum manifold pressure corresponding to a selected cabin altitude value, read from bottom scale. Certain selected cabin altitudes may be attainable below 20 in-Hg MAP however, excursions in cabin altitude with throttle manipulation may occur.

Takeoff and climb may now be initiated. As the airplane passes through the takeoff selected cabin altitude, the cabin will remain at that altitude. Rotate the cabin altitude knob (outer ring) to the desired 8,500 feet cabin cruise altitude and then rotate the cabin rate control knob until the rate of climb, as calculated is observed on the cabin rate of climb indicator. No further action is required on the part of the pilot except to monitor the system instruments for proper function during the climb. Upon reaching FL210 the cabin altitude should be 8,500 feet, the cabin rate of change should be zero and the cabin differential pressure should be 3.50 PSI.



## CESSNA SKYMASTER 337

### Pressurization And ECS System

#### DESCENT

A similar procedure may be established for descent as for climb. Generally, the first descent segment will be some intermediate altitude. For an example, 11,000 feet will serve as an arbitrary figure. As this clearance is obtained, a descent out of FL210 may be initiated. For our example a descent rate of 1,500 FPM will be used. As the initial descent altitude is 11,000 feet, a reference to Figure 1 will indicate that the cabin may be descended to its minimum selection of 4,000 feet for sea level controller (Le. 1,000 feet above field elevation) as the airplane descends to 11,000 feet. Reference to the Cabin Altitude VS Airplane Altitude/ MAP chart (Figure 1) will aid in determining the minimum manifold pressure to maintain cabin altitude. In the above cases, and for all cabin altitudes above 1,200 feet, approximately 20 in. MAP is that minimum value. The cabin will descend 4,500 feet with sea level controller.

An "ideal" rate of descent is 300 FPM. In light of this fact, approximately 15 minutes for the sea level controller is necessary for the cabin to reach its, selected altitude. Observe that the airplane will take only 7 minutes (at 1,500 FPM) to descend from FL210 to 11,000 feet. Consequently after leveling off at 11,000 feet the cabin will still continue to descend for approximately 8 minutes. Note that it is not necessary for the airplane to remain at 11,000 feet for this period of time. In the 7 minutes spent in descending from FL210 the cabin will already have descended to 6,400 feet. Even if the airplane continued its descent immediately at 1,500 fpm it would "catch-up" with the cabin at 5,100 feet at which point both the cabin and airplane would continue to descend at the same time.

A simple way to ensure the airplane and the cabin reach the same altitude simultaneously is to disregard any time spent at 11,000 feet and assume the airplane would descend directly from FL210 to 4,000 feet. At 1,500 FPM this would mean 11.3 minutes. This would require a 380 FPM cabin rate selection for the airplane to "meet" at 4,000 feet.

#### PRESSURIZATION SAFETY FEATURES

Should the out flow valve fail to maintain differential pressure a safety valve will automatically open when cabin pressure reaches 4.35 PSI. This valve may be electrically opened by the pilot by pressing the guarded NORMAL/DUMP switch [7] on the pressurization console to the **DUMP** position. This will allow the cabin to depressurize rapidly and should be used for this purpose only when an emergency occurs. A squat switch located on the nose gear electrically opens the safety valve when weight is on the nose gear to prevent the aircraft remaining pressurized after landing.

Any further descent may be made without further changes to the cabin altitude controllers as the cabin will be unpressurized.

Reviewing the preceding examples of climb and descent it may be noted that the airplane has flown at altitudes of 20,000 feet without exceeding a cabin altitude of 8,500 feet or a cabin rate of change greater than 500 FPM while in the pressurized mode.

**Warning**  
**The cabin pressurization system cannot operate if the bleed air switch AND the pressurization master switch are not in the ON position!**

**CABIN PRESSURIZATION CONTROLS**



**Cabin Altitude Controller**

The desired cabin altitude corresponds to the planned cruise altitude on the controller.

Once your climb is established you should select a value of 1,000 ft. above your planned cruise altitude. For example, if you will cruise at FL 210 you should set the controller to 22 (x 1,000 = 22,000').

The cabin altitude that will be maintained at that flight level is displayed in the calibrated Desired Cabin Altitude. Any higher cabin altitude/planned cruise altitude may be selected, resulting in a lower differential pressure.

**Cabin Altitude/Differential Pressure Indicator**



**Rate Of Climb (ROC) Selector**

Rate of cabin climb/descent is controlled using the Climb Rate Controller.

-2,000 to +2,000 FPM adjustment range.

