Oxygen System

The oxygen system typically utilizes two 115 cubic ft oxygen cylinders to provide sufficient emergency oxygen. A smaller walkaround bottle is also available.

Regulators on each oxygen bottle reduce pressure to approximately 70 PSI. A check valve in the output line of each regulator isolates each bottle from the other in case of leakage or system rupture. Typical installation is in the nose section with access through the nose bay doors. On **non-tail tank equipped aircraft**, however, they may be in the tail section with access through the rear equipment bay. Typical servicing port locations are in the servicing door in the nose beside the crew oxygen servicing port for forward mounted bottles or in the APU service panel for aft mounted bottles.

If the bottle overpressurizes and pressure exceeds 2,602 ±264 PSI, the HP stage's relief valve ruptures to release bottle contents overboard. If the LP stage fails and pressure exceeds 130 ±14.5 PSI, its relief valve ruptures to release bottle contents overboard. If the HP valve ruptures, oxygen flows through the overboard discharge line and dislodges a green indicator disc on the right forward fuselage.

Crew Oxygen Masks

Each crew member has an EROS quick-donning, diluter-demand oxygen mask that has a built-in regulator and microphone. Supplied with an undiluted source of oxygen, each mask also provides smoke inhalation protection. The masks stow in a quick-access box on each crew member's side panel.

Each mask stowage box has a door-operated shutoff valve. Pulling the mask from its stowage box opens the doors and shutoff valve to supply oxygen to the mask. After oxygen begins flowing to the mask, the box flow indicator changes to yellow. Closing the box door after removing the mask does not shut off oxygen flow.

A control unit on the copilot's side console controls the system. A pressure switch on the output line of each regulator activates the NO SMOKING sign and aural alert whenever the masks are deployed. If the **optional EROS mask** is installed for the third crew member, it connects to the passenger oxygen system supply line ahead of the passenger control panel/regulator.

Also, a smoke clearing system is optionally available to provide oxygen to passengers at any altitude. Rotating the passenger oxygen control knob to MANUAL and positioning the O_2 smoke clearing lever to ON causes oxygen to flow to the masks.

A CREW SUPPLY CABIN/NORMAL toggle valve is on the copilot's outboard side console. When toggled from NORMAL to CABIN, the valve allows oxygen from the cabin oxygen system to be utilized by the crew in the event of crew oxygen depletion. Check valves prevent passenger use of crew oxygen.

NOTE: The Canadair installed crew oxygen system is retained and is unchanged except for the supply select valve mentioned above.

Pressing the mask inflation control plates admits oxygen into the mask harness. The harness then inflates to assist placement over the user's head. After the mask is placed over the face, releasing the inflation control plates deflates the harness to create a snug, air-tight fit.

With the mask flow selector in the N (normal) position, the mask's regulator provides oxygen diluted with cabin air. As cabin altitude increases, the ratio of oxygen to cabin air increases until at approximately 30,000 ft, the mask provides 100% oxygen. Placing the flow selector in the 100%/PUSH position provides 100% oxygen regardless of cabin altitude.

The regulator provides 100% oxygen at positive pressure to assist breathing between 36,000 and 45,000 ft cabin altitude or if the flow selector is in 100%/PUSH and the EMERGENCY ON/OFF button in the ON position.

After oxygen is no longer required, moving the mask stowage box RESET/TEST handle forward closes the shutoff valve and stops oxygen flow to the mask.

Passenger Distribution

The passenger cabin oxygen system on the Challenger is not a production item, but individualized by the completion center for each aircraft. Refer to the AFM for the specific aircraft for operational instructions and limits.

On a typical installation, oxygen flows under pressure from the oxygen cylinder(s) to the passenger oxygen shutoff valve. With the valve in the CREW ONLY position, oxygen does not flow to the passenger oxygen distribution lines.

Placing the shutoff valve in the CREW AND PASSENGER position opens the shutoff valve; oxygen then flows to the normally closed oxygen solenoid valve.

If cabin altitude exceeds 13,000 ±500 ft with the passenger oxygen control panel selector knob in the AUTO position, an aneroid controlled pressure switch supplies power to the oxygen solenoid valve. The valve opens and oxygen flows under pressure to the passenger oxygen masks. The initial pressure surge to the passenger oxygen mask boxes releases their door latches. The masks drop and hang by a lanyard. Pulling on the lanyard releases a pin so oxygen can flow to the passenger mask.

Selecting the MAN position bypasses the oxygen solenoid valve so oxygen can flow to the passenger mask boxes. The masks drop and oxygen is available to the passengers.

Placing the selector in the OFF position stops the flow of oxygen to the passenger masks.

Oxygen System

Power Source	Crew oxygen bottle(s) Passenger oxygen bottle(s) Battery bus
Distribution	Crew oxygen system and masks Passenger oxygen system and masks
Control	Crew mask oxygen regulators Aneroid switch (13,000 ±500 ft) Passenger oxygen shutoff valve Passenger oxygen AUTO/MAN/OFF selector
Monitor	Bottle pressure gages Oxygen system annunciators
Protection	Bottle overpressure relief valves