G650 Pressurization System

Pressurized Baggage Compartment

Aft Secondary Bulkhead

Aft Primary Bulkhead

10.69 psi

Pressurized Cabin

TROY
The Pressurization System controls cabin pressure by modulating the Thrust Recovery Outflow Valve (TROV) in order to achieve and maintain an optimum cabin pressure of 10.69 psi and a cabin altitude of 4,850' at FL510.
G650 Pressurization System

Cool, conditioned, dehumidified air

10.69 Psi

TROV

Exhausted overboard via the TROV

Cabin air replaced with fresh air every two (2) minutes
G650 Pressurization System

Three (3) Operational Modes

Auto

Auto

Auto

Semi

Semi

Manual

Fault

Two (2) Pressurization Modes

Flight

Flight

Landing

Landing

Three (3) TROV Electrical Actuators (Motors)

Channel 1

Channel 2

Auto 1/Semi 1

Auto 2/Semi 2

LESS DC

LESS DC

28VDC

115VAC

CPC

Static Inverter

L Main AC

Manual

Manual
PSI Limits

NORMAL

FL510
10.69 psi
4850' Cabin

Cabin Differential - 10.88

MAX 1

10.8

Cabin Differential - 11.00

MAX 2

11.0
MAX 3

MAX 4

MAX 0.3 psi during taxi, takeoff and landing so as to allow opening of emergency exit doors (EED) and main entrance door (MED).

5th and 6th windows

EED
Cabin Pressure Controller (CPC)

- Brains of the system
- Microprocessor located in the REER that makes all logical decisions
- Receives input from:

![Diagram of CPC system]

- Two (2) channels in AUTO and SEMI
- One channel active per leg and the other as watch dog
Cabin Pressure Controller (CPC)

- Channels change by:
  - Removing power
    - Main Batteries
      - Left
      - Right
  - Cycling main or baggage door
  - Selecting/de-selecting
    - Fault Mode
    - Manual

- Location
Cabin Pressure Acquisition Module (CPAM) (Arbitrator)

- Self-contained unit with a dedicated connection to:
  - The aircraft static pressure lines
  - Independent cabin pressure sensor

- Located at the bottom of REER

- Channels compare cabin pressure data with each other

- If they differ by > 310', they compare themselves with the CPAM

- > 310' than CPAM causes that channel to fail
**Auto Mode**

- Fully automated
- Uses input from the multifunction control display unit (MCDU)
- Flight modes are automatic
- Requires AC power

**Diagram:**
- ADS 1
- ADS 2
- ADS 3
- Auto
- Semi
SEMI MODE

- Semi-Automatic
- Crew enters data in Standby Multifunction Controller (SMC)

Flight    Flight
|
|

Landing    Landing

Modes are automatic

- Requires AC power
- QFE operations
  - High elevation airports
  - Airports not in database
  - Failure of Auto

ADS 1  
ADS 2
ADS 3

Auto

Semi

SMC
If channels 1 and 2 are inoperative, MANUAL mode is required.

Cabin Altitude
Cabin Rate
Cabin Differential

Cabin Pressure Manual

Crew manages TROV

Crew manually controls the outflow valve (TROV) in order to climb, maintain, and descend the cabin.

Crew uses the MAN HOLD knob.

Requires LESS DC Power.

Cabin Pressure Acquisition Module provides data.
**FLIGHT MODE**

**DURING TAXI OUT:**

1. FMS ground speed > 9 KTS, or
2. Power Lever Angle (PLA) ≥ 15°, or
3. Manually selected by the crew

Aircraft begins pressurizing to **500’ below field elevation at 300 FPM (MAX 0.30 psi)**

**CAUTION:** If returning to the ramp deselect in order to depressurize the cabin prior to opening the main door.
During descent:

1. Crossing **1,000 feet** below cruise altitude, mode is entered automatically.

2. If the aircraft levels off for > **3 minutes** above **25,000 feet**, mode resumes.

3. CPC uses data from descent rate.

4. Normally, up to **300 FPM** to **250 feet** below landing field elevation in auto, auto, semi.
THRUST RECOVERY OUTFLOW VALVE (TROV)

- Located on right side of fuselage
- Controlled by CPC in AUTO/SEMI
- Controlled by crew in MANUAL
- Shutter-type door that deflects cabin air aft "creating" thrust

- Three (3) electrical actuators (motors)
THRUST RECOVERY OUTFLOW VALVE (TROV)

NORMAL

L IDG  APU GEN  R IDG

L MAIN AC  R MAIN AC

L ESS TRU  R ESS TRU

L ESS DC

28V DC  STATIC INVERTER  115V AC

CPC 1

TROV Motor 2

TROV Motor 1
In the event of catastrophic engine damage (rotor-burst) affecting the baggage compartment, the aft secondary bulkhead, and the physical location of the TROV, ensures cabin pressurization is not affected.
Pressure Relief Valve (PRV)

Located on right side of fuselage

1. **Positive Differential Pressure Relief:**
   - 1st chamber opens at: 10.8 PSI
   - 2nd chamber opens at: 11.0 PSI

2. **Negative Differential Pressure Relief:**
   - -0.25

3. **Ground Pressurization Limiting:**
   - PRV opens fully 60 seconds > Landing
**PRESSURIZATION PROFILE**

- **FL 510:** 10.69 psi
- **50,000 ft:**
- **4,950 ft:** +500 fpm
- **-300 fpm**

**TAXI OUT**
- > 9 KTS:
  - **Flight**
  - **500 ft below Field Elev**
  - @ **300 fpm**

**1,000 BELOW CRUISE**
- **Landing**
  - **250 ft below Field Elev**
  - @ **300 fpm**

**WEIGHT-ON-WHEELS (WOW)**
- **TROV fully open** > **30 sec**
- **PRV fully open** > **60 sec**
Emergency Descent Mode (EDM)

1. Autopilot ON
   Aircraft Altitude > FL400
   Cabin Pressure Low CAS Message

2. Autotrottles engage if disengaged
   - Trottles retarded to idle
   - FMA Power display on PFD → FLCH

3. GP Lateral Mode - deselected
   - FMA Lateral display on PFD → EDM
   - Command 90° Left Turn

4. GP Vertical Mode - FLCH
   - FMA Vertical display on PFD → IAS with ASEL

5. GP Speed Mode - MAN
   - VMO (340 knots) displays on speed window

6. Altitude - 15,000' in preselect window
- **Flight Mode Annunciator (FMA)**

  ![FMA Diagram]

  - 340
  - AP 1
  - AT 1
  - 15,000

- **Guidance Panel (GP)**

  ![GP Diagram]

  - SPEED
  - IAS 340
  - HEADING
  - HDG 270
  - ALTITUDE
  - FT 15,000
  - MAN
  - * HDG: 90° LEFT TURN
  - FLCH

- **Level Off**

  - FMA VERTICAL display on PFD → ASEL → ALT
  - FMA Speed display on PFD → 340 → 250

- **Canceling EDM:**

  - AP disconnect button, or
  - Deselect on GP
<table>
<thead>
<tr>
<th>Mode</th>
<th>Landing Field Elevation</th>
<th>Cabin Altitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAULT</td>
<td>N/A</td>
<td>8,000'</td>
</tr>
<tr>
<td>MANUAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MANUAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUTO</td>
<td>&gt; 14,000'</td>
<td>≥ 15,500'</td>
</tr>
<tr>
<td>AUTO</td>
<td>9,500' - 14,000'</td>
<td>≥ 14,500'</td>
</tr>
<tr>
<td>SEMI</td>
<td>7,500' - 9,500'</td>
<td>≥ 10,000'</td>
</tr>
<tr>
<td>SEMI</td>
<td>Sea Level - 7,500'</td>
<td>≥ 8,000'</td>
</tr>
</tbody>
</table>
Oxygen Requirements/Operations

Above **41,000 feet**, one pilot must be on oxygen - FAR 91

Crew and passenger masks **not approved** for use above **40,000 feet** cabin altitude.

Above **35,000 feet**, one pilot must be on oxygen if the other pilot leaves the cockpit - FAR 91.

Passenger masks **will not** provide sufficient oxygen above **34,000 feet**.

Above **FL250** crew masks must be in the quick donning position which allows donning within five (5) seconds.

Automatic deployment of passenger oxygen masks at **14,750 ± 250 feet** (15,750 ± 250 feet with **HIGH ALT**).

See AFM 01-35-10 to determine required oxygen quantity for departure.
STATIC PORTS

Located on the right side of the fuselage

Feeds PRV 10.8 PSID Relief

Feeds PRV 11.0 PSID Relief

PRV

Feeds CPAM
Questions, comments or errors...please send me an email: ivan.luciani@gmail.com

Thank you!