G650 Pressurization System

Pressurized Baggage Compartment

Pressurized Cabin

Aft Secondary Bulkhead

Aft Primary Bulkhead

10.69 psi

TROY
G650 Pressurization System

The pressurization system controls cabin pressure by modulating:

Thrust Recovery Outflow Valve (TROV)

Cabin air exiting vessel via:

Thrust Recovery Outflow Valve (TROV) =

Optimum Cabin Pressure
G650 Pressurization System

Cool, conditioned, dehumidified air

Exhausted overboard via the TROV

Cabin air replaced with fresh air every two minutes
G650 Pressurization System

Three (3) Operational Modes

Two (2) Modes

Three (3) TROV Electrical Actuators (Motors)

Channel 1
AUTO 1/SEMI 1
LESS DC

Channel 2
AUTO 2/SEMI 2
MAIN AC

Fault
MANUAL

FLIGHT
Flight
LANDING

FLIGHT
Landing
LANDING

28 VDC

CPC
Static Inverter
115 VAC
PSI Limits

Normal

10.69 psi
4850' Cabin

FL510

Cabin Differential - 10.80

Max 1

10.8

W

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
Cabin Pressure Controller (CPC)

- Brains of the system
- Microprocessor located in the REER that makes all logical decisions
- Receives input from:
  
  ![Diagram of CPC, ADS, MAUs, AUTO, SEMI, channels 1 and 2]

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

- **CPC**

**Channels change by:**

- Removing power

**Main Batteries**

- Cycling main or baggage door

- Selecting/de-selecting **Manual** mode

- **CPC** location

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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 $\geq 310'$, they compare themselves with the CPAM

- $\geq 310'$ 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

- ADS 1
  - ADS 2
  - ADS 3

- AUTO
- SEMI
- AUTO
SEMI MODE

- Semi-Automatic

- Crew enters data in Standby Multifunction Controller (SMC)

- Flight

- 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
**MANUAL MODE**

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

- 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.
**Landing Mode**

**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', mode resumes.

3. CPC uses data from descent rate.

4. Normally up to 300 FPM to 250' below landing field elevation in 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

L ESS TRU

L ESS DC

28V DC

STATIC INVERTER

115V AC

CPC 1

TROV MOTOR 2

TROV MOTOR 1
THrust Recovery Outflow Valve (TROV)

L IDG  APu GEN  R IDG  

CPC 1

L ESS DC  28 VDC  Static Inverter  115 VAC  TROV Motor 1

RAT GEN  RAT  EMERGENCY

L MAIN BATT  L ESS DC

TROV Manual

RAT GEN  RAT

EMERGENCY
Rotor Burst/Pressurization

Aft Secondary Bulkhead

Aft Primary Bulkhead

Pressurized Baggage Compartment

Pressurized Cabin

10.69 PSI

TROV
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 PSI

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

FL 510
10.69 psi
50,000'

4,850'

+500 fpm

-300 fpm

TAXI OUT
> 9 kts:

Flight

500' below
Field ELEV

@ 300' FPM

1,000 BELOW CRUISE

LANDING

250' 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
2. AT OR ABOVE 40,000' MSL
3. CABIN PRESSURE LOW CAS

1. MAN SPD 340 KCAS
2. ALTITUDE PRESELECT 15,000'
3. HDG 90° TURN TO THE LEFT

Guidance Panel Locked

4. A/T ENGAGES, IF NOT ALREADY ENGAGED, AND RETARDS THRUST LEVERS TO IDLE
5. AIRPLANE DESCENDS TO 15,000' AT MMO/VMO
6. AT 15,000' SPEED CHANGES TO 250 KCAS

EDM CAN BE DISCONNECTED BY THE PILOT WITH THE A/P DISCONNECT BUTTON
# Cabin Pressure Low Trip Points

<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>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>
<tr>
<td>Auto</td>
<td>&gt; 14,000'</td>
<td>≥ 15,500'</td>
</tr>
</tbody>
</table>
Oxygen Requirements/Operations

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

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

Above 35,000' 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'.

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' (15,750' ± 250' 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

CPAM

MAX 1

MAX 2
Questions, comments or errors?

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Thank you!