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

10.69 PSI

TROV

Exhausted overboard via the TROV

Cabin air replaced with fresh air every two minutes

L Pack

R Pack

ECS
G650 Pressurization System

Three (3) Operational Modes

Auto
Auto
Auto

Auto
Semi
Semi

Fault
Manual
Manual

Two (2) Modes

Flight
Flight

Landing
Landing

Three (3) TROV Electrical Actuators (Motors)

Channel 1
Auto1/Semi1

L ESS DC

28 VDC

CPC
Static Inverter

115 VAC

Channel 2
Auto2/Semi2

R Main AC

Manual

L ESS DC
PSI Limits

**Normal**

FL510
10.69 psi
4850' Cabin

**Max 1**

Cabin Differential - 10.80

**Max 2**

Cabin Differential - 11.00
MAX 3

-0.25

MAX 4

0.3

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:

```
  ADS
  ↓
CPC
  ↓
AUTO
  ↓
AUTO
  ↓
SEMI
  ↓
1 2
```

- 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 manual mode

- 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 \( \geq 310' \), 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 Mode

- Flight Landing
- LANDING LANDING

- Requires AC Power

ADS 1
ADS 2
ADS 3

AUTO AUTO

SEMI

MCDU
SEMI MODE

- Semi-Automatic

- Crew enters data in Standby Multifunction Controller (SMC)

- Crew selects Flight Mode during Taxi Out

- Crew selects Landing Mode during descent

- 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.

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

- Crew uses the MAN HOLD knob.

- Requires LESS Power.

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

**FLIGHT**

**FLIGHT**

**LANDING**

**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, **FLIGHT** mode is entered automatically.

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

3. **CPC** uses data from descent rate to calculate.

4. Normally up to **300 FPM** to **250 ft** 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

\[ \text{L IDG} \quad \text{APU GEN} \quad \text{R IDG} \]

\[ \text{L MAIN AC} \quad \text{R MAIN AC} \]

\[ \text{L ESS TRU} \quad \text{CPC 1} \quad \text{TROV MOTOR 1} \quad \text{TROV MOTOR 2} \]

\[ \text{L ESS DC} \quad \text{STATIC INVERTER} \quad \text{115VAC} \quad \text{28VDC} \]
THrust Recovery Outflow Valve (TROV)

- L IDG
- APU GEN
- R IDG
- L ESS DC
- Static Inverter
- 115 VAC
- TROV Motor 1

28 VDC → L ESS DC

RAT GEN

RAT

Emergency

RAT GEN

L MAIN BATT

L ESS DC

Emergency

TROV Manual
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:**

3. **Ground Pressurization Limiting:**
   - PRV opens fully after 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 Elevation
@ 300′ FPM

1,000 below cruise

Landing

250′ below Field Elevation
@ 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

1. MAN SPD 340 KCAS
2. Altitude preselect 15,000’
3. HDG 90° turn to the left

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>N/A</td>
</tr>
<tr>
<td>Manual</td>
<td>8,000'</td>
<td>≥ 8,000'</td>
</tr>
<tr>
<td>Auto</td>
<td>&gt; 14,000'</td>
<td>≥ 15,500'</td>
</tr>
<tr>
<td>Semi</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'** 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 **FL 250** 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

PRV

Feeds PRV 10.8 PSID Relief

Feeds PRV 11.0 PSID Relief

MAX 1

MAX 2

PRV

CPAM

G650_pressurization_system 25 / 26 6/7/18
Questions, comments or errors?
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Thank you!