G550 Pressurization System

Pressurized Baggage Compartment

Aft Secondary Bulkhead

Aft Primary Bulkhead

Pressurized Cabin

10.17 PSI

TROY
G550 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
G550 Pressurization System

Cool, conditioned, dehumidified air

Exhausted overboard via the TROV

Cabin air replaced with fresh air every two (2) minutes
G550 Pressurization System

Three (3) Operational Modes

Auto

Auto

Semi

Auto

Semi

Fault

Manual

Two (2) Modes

Flight

Landing

Three (3) TROV Electrical Actuators (Motors)

Channel 1

L'Ess DC

28 VDC

E-INV

115 VAC

Channel 2

R Main AC

Manual

L'Ess DC
PSI Limits

NORMAL

FL510
10.17 psi
6,000' Cabin

MAX 1
10.28

MAX 2
10.48

Cabin Differential - 10.17
Cabin Differential - 10.28
Cabin Differential - 10.48

W W
PsI LiMits

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)
Cabin Pressure Controller (CPC)

- Brains of the system
- Microprocessor located in REER that makes all logical decisions
- Receives input from:
  - MAU 1
  - MAU 2
  - MAU 3

- 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
  - Cycling main or baggage door
  - Selecting/de-selecting [MANUAL] mode
**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

  4950' ← CPC 1 ↔ 2 → 5300'

- If they differ by \(\geq 310'\) they compare themselves with the **CPAM**

  4950' ← CPC 1 ↔ 2 → 5300'

- \(\geq 310'\) than **CPAM** causes that channel to fail

  CPC 1
AUTO MODE

- Fully automated
- Uses input from the Multifunction Control Display Unit (MCDU)

- Flight
- Landing

- Requires AC Power

MCDU

ADS 1
ADS 2
ADS 3
AUTO
AUTO
SEMI
SEMI MODE

- Semi-Automatic

- Crew enters data in the Cabin Pressure Control Panel (CPCP)

- 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

![CPCP Diagram]
If channels 1 and 2 are inoperative, manual mode is required.

- 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
Landing Mode

During descent:

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

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

3. CPC uses data from to calculate descent rate.

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

Power Sources

Channel 1

ESS DC

28 VDC → E-INV → 115 VAC

Channel 2

MAIN AC

MANUAL

ESS DC
THrust RECOVERY OUTFLOw VALVE (TROV)

L IDG
APU GEN
R IDG

ESS AC

115VAC
TROV Motor 1

E-INV

L ESS DC

R ESS DC

AUX TRU

L Stby AC

R Stby AC

HMG

EMERGENCY
THrust Recovery Outflow Valve (TROV)

L IDG  APU GEN  R IDG

HMG

L MAIN BATT  L ESS DC  TROV MANUAL

EMERGENCY
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**: 1\textsuperscript{st} chamber opens at: 10.28 Psi.  2\textsuperscript{nd} chamber opens at: 10.48 Psi.

2. **Negative Differential Pressure Relief**:

3. **Ground Pressurization Limiting**: PRV opens fully 60 seconds > Landing.
**Pressurization Profile**

- **Fl 510**
  - 10.17 PsI
  - Altitude: 50,000 ft

- **6,000 ft**
  - Altitude: 30,000 ft

- **1,000 below cruise**
  - Altitude: 25,000 ft

- **Taxi out**
  - > 9 kts
  - Flight
  - 500' below field elev
  - @ 300' FPM

- **Weight on wheels (WOW)**
  - TROU fully open -> 30 sec
  - PRV fully open -> 60 sec

- **1,000 below cruise**
  - Landing
  - 250' below field elev
  - @ 300' FPM
EMERGENCY DESCENT MODE (EDM)

1. AUTOPILOT ON
2. AT OR ABOVE 40,000' MSL
3. CABIN PRESSURE LOW

1. MAN 340 KCAS
2. ALTITUDE SELECTOR 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>AUTO</td>
<td>SL - 7,500'</td>
<td>&gt; 8,000'</td>
</tr>
<tr>
<td>AUTO</td>
<td>7,500 - 9,500'</td>
<td>&gt; 10,000'</td>
</tr>
<tr>
<td>SEMI</td>
<td>9,500' - 14,000'</td>
<td>&gt; 14,500'</td>
</tr>
<tr>
<td>SEMI</td>
<td>&gt; 14,000'</td>
<td>&gt; 15,500</td>
</tr>
<tr>
<td>FAULT</td>
<td>N/A</td>
<td>8,000'</td>
</tr>
<tr>
<td>MANUAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Passenger Oxygen Masks

- Certified to 40,000'
- Drop automatically at a cabin altitude of 14,750' ± 250' or 15,750' ± 250' with switch (15,000') selected on
Static Ports

Located on the right side of the fuselage

MAX 1

10.28

MAX 2

10.48

PRV
Questions, comments or errors?

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Thank you!