



BOEING 737 NEXT GENERATION **737**

### Course overview

- Airplane General
- Air Systems
- Warning Systems, Communications, Ice & Rain Protection
- Electrical
- Engines, APU, Fuel System
- Hydraulics, Flight Controls, Landing Gear, Brakes
- Flight Instruments & Displays
- Automatic Flight
- Flight Management, Navigation
- Normal Operations

BOEING 737 NEXT GENERATION **737**  
AIR SYSTEMS

### Topics

<p><b>Bleed air system</b></p> <ul style="list-style-type: none"> <li>- Overview</li> <li>- Controls &amp; Indicators</li> <li>- Schematic &amp; components</li> <li>- Normal operations</li> <li>- Isolation valve</li> <li>- Wing body overheat</li> </ul> <p><b>Air conditioning system</b></p> <ul style="list-style-type: none"> <li>- Overview</li> <li>- Controls &amp; Indicators</li> <li>- Equipment cooling</li> <li>- Air distribution</li> <li>- Temperature control</li> <li>- Non-normal conditions</li> </ul>	<p><b>Pressurization System</b></p> <ul style="list-style-type: none"> <li>- System components</li> <li>- Controls &amp; Indicators</li> <li>- Cabin pressure control</li> <li>- Pressurization outflow</li> <li>- Auto mode operation</li> <li>- Normal operations</li> <li>- Non-normal conditions</li> </ul>
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BOEING 737 NEXT GENERATION **737**  
AIR SYSTEMS

### Bleed air system

**Overview**

**Feladata:**  
Összegyűjteni és továbbítani a bleed air-t azon rendszerek részére, melyek hasznosítják.

**Bleed air források:**

- Engines
- APU
- External air cart

**Bleed air-alapú rendszerek:**

- Air conditioning & pressurization (légkondicionálás és nyomásszabályozás)
- Wing & engine thermal anti-ice (szárny és hajtómű jegesedésgátló rendszer)
- Engine starting (hajtómű indítás)
- Hydraulic reservoirs pressurization (hidraulikus tartályok nyomásszabályozása)
- Water tank pressurization (víztartály nyomásszabályozása)

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### Bleed air system

**Controls & Indicators (fwd overhead panel)**

**AIR COND. & BLEED AIR CONTROLS PANEL**

- DUAL BLEED light
- ISOLATION VALVE switch
- WING-BODY OVHT light
- ENG BLEED switch
- APU BLEED switch
- DUCT PRESS indicator
- OVHT TEST switch
- BLEED TRIP OFF light
- TRIP RESET switch

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### Bleed air system


Diagram illustrating the bleed air system components and flow paths, including: STARTER VALVE, ISOLATION VALVE, BLEED AIR VALVE, BLEED TRIP SENSORS, CONDENSING ENGINES OPERATING & SUPPLYING AIR CONDITIONING PACKS, BLEED AIR, FROM FRONT ENGINE, EXTERNAL AIR CONNECTION, WATER TANK, TO HYD RESV AIR CONNECTION, BLEED AIR DUCT, and APU BLEED AIR VALVE.

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### Bleed air system

#### Normal Procedures

- Two-pack APU ground operations
- External air cart connection
- After engine start
- No-engine bleed takeoff & landing




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### Bleed air system

#### Normal Procedures

Two-pack APU ground operations

APU BLEED ... **ON**  
LEFT PACK ... **AUTO**  
ISOLATION VALVE ... **OPEN**  
RIGHT PACK ... **AUTO**




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### Bleed air system


#### Normal Procedures

External air cart connection



BATTERY ... **ON**

RECIRC FAN ... **AUTO**  
ISOLATION VALVE ... **OPEN**  
APU BLEED ... **OFF**  
PACKS ... **AUTO**




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### Bleed air system

#### Normal Procedures

After engine start

PACKS ... **AUTO**  
APU BLEED ... **OFF**  
ISOLATION VALVE ... **AUTO**



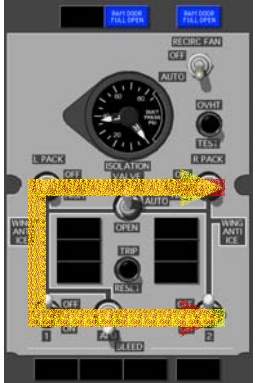
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AIR SYSTEMS

### Bleed air system

#### Normal Procedures

No-engine bleed takeoff & landing



Before takeoff / during descent  
RIGHT PACK ... **AUTO**  
ISOLATION VALVE ... **CLOSED**  
LEFT PACK ... **AUTO**  
LEFT ENGINE BLEED ... **OFF**  
APU BLEED ... **ON**  
RIGHT ENGINE BLEED ... **OFF**



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AIR SYSTEMS

### Bleed air system

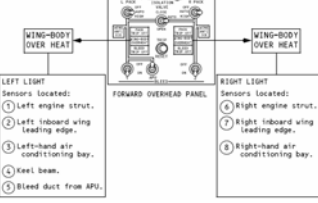
#### Wing-Body Overheat

**Kiváltó körülmény:**  
Szivárgás a bleed air duct rendszerben  
Szenzorokon keresztül jut el az információ az air cond. and bleed air control panel-en található WING-BODY OVERHEAT annunciator lámpákhoz.

LEFT LIGHT Sensors located:  
① Left engine strut.  
② Left inboard wing leading edge.  
③ Left-hand air conditioning bay.  
④ Keel beam.  
⑤ Bleed duct from APU.

RIGHT LIGHT Sensors located:  
⑥ Right engine strut.  
⑦ Right inboard wing leading edge.  
⑧ Right-hand air conditioning bay.



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### Air conditioning system Overview

Levegő kondicionálását végzi *air conditioning pack*eken keresztül, melyekből a levegő a fedélzeten valamint a nyomásszabályozó rendszer által kerül felhasználásra.

A levegőforrások azonosak a bleed air forrásokkal (engines, apu, external air cart).

**Air conditioning pack**

- Ram air system
- Heat exchangers
- Air cycle machine
- Water separator
- Mixing chamber

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### Air conditioning system Controls & indicators

(fwd overhead panel)

- 1 Air temperature source selector
- 2 DUCT OVERHEAT light
- 3 Cabin temperature selectors
- 4 RAM DOOR FULL OPEN light
- 5 Air conditioning pack switch
- 6 Air mix valve indicator
- 7 Air temperature indicator
- 8 Recirculation fan switch
- 9 PACK TRIP OFF light
- 10 TRIP RESET switch

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### Air conditioning system Controls & indicators

Equipment cooling

(fwd overhead panel)

- 1 Equipment cooling supply switch
- 2 Equipment cooling supply off light
- 3 Equipment cooling exhaust switch
- 4 Equipment cooling exhaust off light

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### Air conditioning system Equipment cooling

Overboard exhaust valve  
OPEN if A/C on GND or diff press low inflight

E&E Bay

Circuit breaker panels

Forward cargo bay

Cockpit panels

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### Air conditioning system Air distribution

TO RIGHT SIDEWALL RISER

LEFT SIDEWALL RISER

RIGHT PACK TRIP OFF

RIGHT DUCT OVERHEAT

MIX MANIFOLD

FROM LEFT PACK

FROM RIGHT PACK

GROUND PRECONDITIONED AIR SOURCE

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### Air conditioning system Temperature control

CONT CABIN AIR TEMP PASS CABIN

AIR MIX VALVE SUPPLY DUCT AIR MIX VALVE

COLD HOT

AIR TEMP INDICATOR

AUTO NORMAL

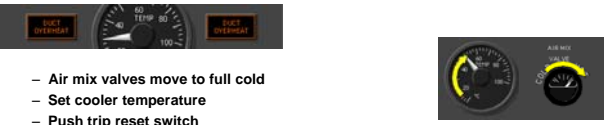
COOL F.F.S. IN. WASH. WASH.

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## Air conditioning system

### Non-normal conditions

#### Duct overheat



- Air mix valves move to full cold
- Set cooler temperature
- Push trip reset switch

Amennyiben a duct hőmérséklet gyorsan elkezd nőni, vagy az air mix valve FULL HOT állásba vált, az adott hőmérsékletszabályzó egység üzemekeptelen.

Teendők:


- A kapcsolódó temperature selector MANUAL üzemmódba állítása

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## Air conditioning system

### Non-normal conditions

#### Pack trip off




- Air mix valves move to full cold
- Pack valve closes
- Select higher temp on TEMP SELECTOR
- Press TRIP RESET switch

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## Pressurization system

### System components



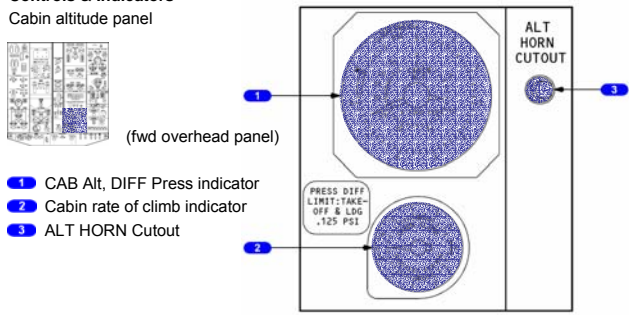
- 2 digital cabin press. Controllers
- Overboard exhaust valve
- 2 positive press. safety relief valves
- Outflow valve
- Negative press. safety relief valve

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## Pressurization system

### Controls & Indicators

#### Cabin altitude panel

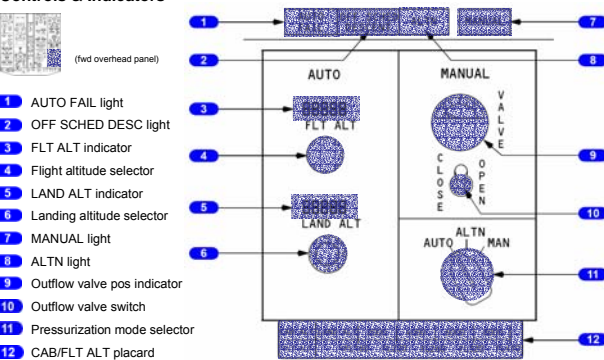


- 1 CAB Alt, DIFF Press indicator
- 2 Cabin rate of climb indicator
- 3 ALT HORN Cutout

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## Pressurization system

### Controls & Indicators



- 1 AUTO FAIL light
- 2 OFF SCHED DESC light
- 3 FLT ALT indicator
- 4 Flight altitude selector
- 5 LAND ALT indicator
- 6 Landing altitude selector
- 7 MANUAL light
- 8 ALTN light
- 9 Outflow valve pos indicator
- 10 Outflow valve switch
- 11 Pressurization mode selector
- 12 CAB/FLT ALT placard

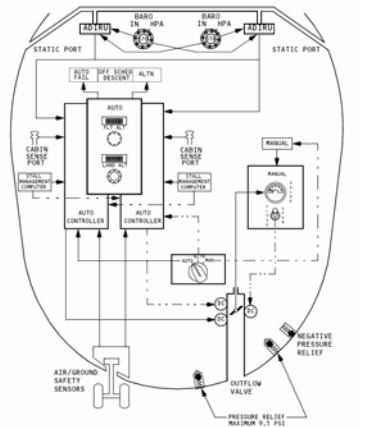
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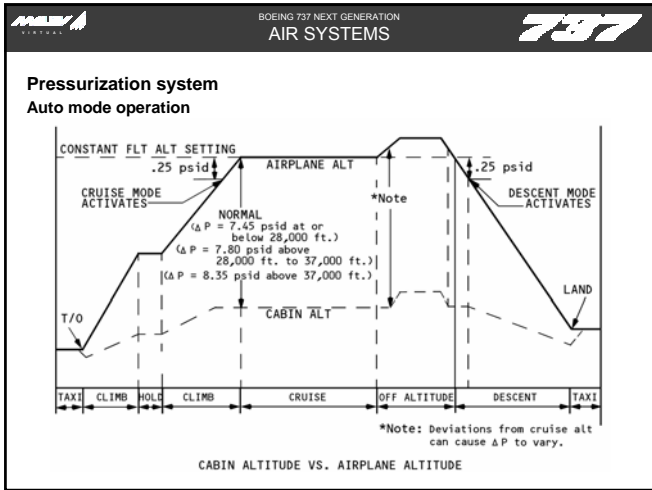
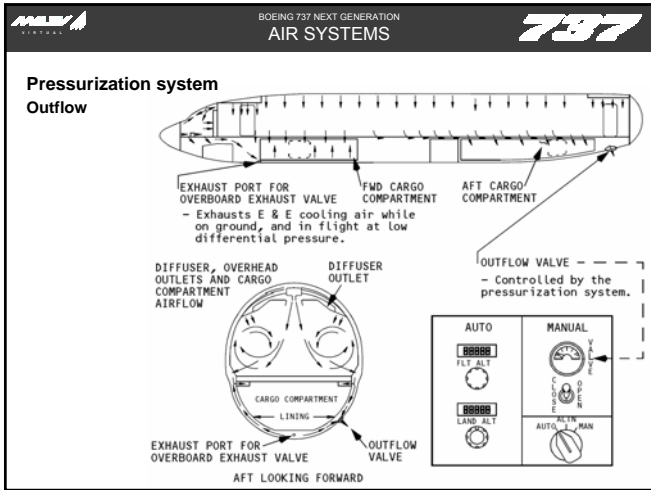
## Pressurization system

### Cabin pressure control

#### Üzemmódok

- **AUTO** (Automatic)  
Automatikus nyomásszabályozás; normál üzemetetés.
- **ALTN** (Alternate)  
Automatikus nyomásszabályozás; alternatív rendszer.
- **MAN** (Manual)  
Manuális vezérlés egyenáramú motor segítségével.





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### Pressurization system Normal operations

**Preflight**

1. Set **FLT ALT** to desired cruise altitude
2. Set **LAND ALT** to destination airport elevation MSL
3. Verify **PRESS MODE SEL** in **AUTO**

**Post-flight**

No action required by flight crew

AUTO MANUAL  
FLT ALT  
LAND ALT  
AUTO ALT  
MAN

CAB ALT	LAND ALT	2000	4000	6000	8000
FLT ALT		FL160	FL220	FL260	FL320 FL410

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### Pressurization system Non-normal conditions

- Off schedule descent
- Diversion to an alternate airport
- Single controller failure
- Dual controller failure
- Cabin altitude higher than limits

**Off schedule descent** (OFF SCHED DESC light illuminates)  
Pressure controller begins cabin altitude descent to 300 feet below departure airport elevation. Climbing will revert the system to normal operations.

**Diversion to an alternate airport**  
The new airport's field elevation must be set in the **LAND ALT** selector for the pressurization system to properly control cabin altitude descent.

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### Pressurization system Non-normal conditions Single controller failure

Set **PRESS MODE SEL** to **ALTN**

AUTO MANUAL  
FLT ALT  
LAND ALT  
AUTO ALT  
MAN

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### Pressurization system Non-normal conditions Dual controller failure

Set Press Mode Control to **MANUAL**

Determine cabin altitude for present level.

Toggle outflow valve switch to reach desired cabin altitude.

AUTO MANUAL  
FLT ALT  
LAND ALT  
AUTO ALT  
MAN

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### Pressurization system

**Non-normal conditions**  
Cabin altitude higher than limits



ALT HORN CUTOFF

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### Köszönöm a figyelmet!

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