Embraer E145 Cockpit Panels

The following pages depict the various instrument panels located in the cockpit of the Embraer E145 Regional Jet. Along with these depictions are text box captions that describe the function of most of the buttons and switches that control the various systems on the aircraft. Keep in mind that as aircraft modifications occur, such as ADs, Service Bulletins, etc., the captions may become inaccurate or incomplete.

The captions are not all inclusive and are intended as a supplemental study aid to be used in conjunction with the appropriate approved aircraft systems and operations manuals. Because space is limited for the captions the use of acronyms and abbreviations is necessary. The table that follows lists the acronyms and abbreviations used that may not be readily discernable by the reader.

Warning and Disclaimer
Every effort has been made to make this information as accurate as possible, but no warranty or fitness is implied. The information provided is on an “as is” basis. The author shall have neither liability or responsibility to any person or entity with respect to any loss or damages arising from the information contained herein. - Captain Bill de Groh

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<th>Meaning</th>
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<tr>
<td>&amp;</td>
<td>and</td>
<td>CCW</td>
<td>Counter-clockwise</td>
</tr>
<tr>
<td>_x</td>
<td>Multiplier (4x = 4 times)</td>
<td>Cmd</td>
<td>Command</td>
</tr>
<tr>
<td>&lt;</td>
<td>Smaller/Less/Below</td>
<td>Cmpt.</td>
<td>Compartment</td>
</tr>
<tr>
<td>&gt;</td>
<td>Greater/More/Above</td>
<td>Com</td>
<td>Communication</td>
</tr>
<tr>
<td>A</td>
<td>Ampere</td>
<td>CVR</td>
<td>Cockpit Voice Recorder</td>
</tr>
<tr>
<td>A/C</td>
<td>Aircraft</td>
<td>CW</td>
<td>Clockwise</td>
</tr>
<tr>
<td>A/I</td>
<td>Anti-ice</td>
<td>DAP</td>
<td>Digital Audio Panel</td>
</tr>
<tr>
<td>ABV</td>
<td>APU Bleed Valve</td>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>AC</td>
<td>Alternating Current</td>
<td>DCP</td>
<td>Display Control Panel</td>
</tr>
<tr>
<td>AEO</td>
<td>All Engines Operating</td>
<td>Decr.</td>
<td>Decrease(s)</td>
</tr>
<tr>
<td>AGL</td>
<td>Above Ground Level</td>
<td>DFDR</td>
<td>Digital Data Flight Recorder</td>
</tr>
<tr>
<td>AHRS</td>
<td>Attitude Heading Reference</td>
<td>EBC</td>
<td>Essential Bus Contactor</td>
</tr>
<tr>
<td>System</td>
<td></td>
<td>EIC</td>
<td>Essential Interconnection Contactor</td>
</tr>
<tr>
<td>AMM</td>
<td>Airplane Maint. Manual</td>
<td>EBV</td>
<td>Engine Bleed Valve</td>
</tr>
<tr>
<td>Amp</td>
<td>Ampere</td>
<td>ECS</td>
<td>Environmental Control System</td>
</tr>
<tr>
<td>AP</td>
<td>Autopilot</td>
<td>EDL</td>
<td>Electrical Distribution Logic</td>
</tr>
<tr>
<td>Approx.</td>
<td>Approximately</td>
<td>EICAS</td>
<td>Engine Indicating And Crew Alerting System</td>
</tr>
<tr>
<td>APU</td>
<td>Auxiliary Power Unit</td>
<td>Elect.</td>
<td>Electric(al)</td>
</tr>
<tr>
<td>Auto</td>
<td>Automatic</td>
<td>ESU</td>
<td>Electronic Sequence Unit</td>
</tr>
<tr>
<td>BACV</td>
<td>Bleed Air Check Valve</td>
<td>F/A or FA</td>
<td>Flight Attendant</td>
</tr>
<tr>
<td>BC</td>
<td>Battery Contactor</td>
<td>FADEC</td>
<td>Full Authority Digital Electronic Control</td>
</tr>
<tr>
<td>BTC</td>
<td>Bus Tie Contactor</td>
<td>FD</td>
<td>Flight Director</td>
</tr>
<tr>
<td>CA</td>
<td>Captain</td>
<td>FI</td>
<td>Flight Idle</td>
</tr>
<tr>
<td>CBV</td>
<td>Cross Bleed Valve</td>
<td>FO</td>
<td>First Officer</td>
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<table>
<thead>
<tr>
<th>Abbrev.</th>
<th>Meaning</th>
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<tr>
<td>Fpm</td>
<td>Feet per minute</td>
<td>Nm</td>
<td>Nautical mile</td>
</tr>
<tr>
<td>FSBY</td>
<td>Forced Standby Mode</td>
<td>O₂</td>
<td>Oxygen</td>
</tr>
<tr>
<td>Ft</td>
<td>Feet</td>
<td>OEI</td>
<td>One engine inoperative</td>
</tr>
<tr>
<td>Fwd</td>
<td>Forward</td>
<td>Pax.</td>
<td>Passenger</td>
</tr>
<tr>
<td>GCU</td>
<td>Generator Control Unit</td>
<td>PCA</td>
<td>Power Control Actuator</td>
</tr>
<tr>
<td>GI</td>
<td>Ground Idle</td>
<td>PCU</td>
<td>Power Control Unit</td>
</tr>
<tr>
<td>GMAP</td>
<td>Ground Map Mode</td>
<td>PFD</td>
<td>Primary Flight Display</td>
</tr>
<tr>
<td>GPC</td>
<td>Ground Power Contactor</td>
<td>PRSV</td>
<td>Pressure Regulating and Shutoff Valve</td>
</tr>
<tr>
<td>GPU</td>
<td>Ground Power Unit</td>
<td>Psi</td>
<td>Pounds per square inch</td>
</tr>
<tr>
<td>Grnd</td>
<td>Ground</td>
<td>PSU</td>
<td>Passenger Service Unit</td>
</tr>
<tr>
<td>GS</td>
<td>Glideslope</td>
<td>PTT</td>
<td>Push-To-Talk</td>
</tr>
<tr>
<td>Hdg</td>
<td>Heading</td>
<td>RCP</td>
<td>Radar Control Panel</td>
</tr>
<tr>
<td>Horiz.</td>
<td>Horizontal</td>
<td>Rcvr</td>
<td>Receiver</td>
</tr>
<tr>
<td>hPa</td>
<td>hectopascals</td>
<td>Rdr</td>
<td>Radar</td>
</tr>
<tr>
<td>HSCU</td>
<td>Horizontal Stabilizer Control Unit</td>
<td>REACT</td>
<td>Rain Echo Attenuation Compensation Logic</td>
</tr>
<tr>
<td>HSV</td>
<td>High Stage Valve</td>
<td>Ref.</td>
<td>Reference(d)</td>
</tr>
<tr>
<td>Hyd.</td>
<td>Hydraulic</td>
<td>RH</td>
<td>Right Hand</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz (cycles per second)</td>
<td>RTA</td>
<td>Receiver/Transmitter/Antenna</td>
</tr>
<tr>
<td>ICU</td>
<td>Interphone Control Unit</td>
<td>Sec.</td>
<td>Second(s)</td>
</tr>
<tr>
<td>Incr.</td>
<td>Increase(s)</td>
<td>SOV</td>
<td>Shut Off Valve</td>
</tr>
<tr>
<td>Kts</td>
<td>Knots</td>
<td>SPS</td>
<td>Stall Protection System</td>
</tr>
<tr>
<td>Lbs</td>
<td>Pounds</td>
<td>SRN</td>
<td>Short Range Navigation</td>
</tr>
<tr>
<td>LH</td>
<td>Left Hand</td>
<td>Sync.</td>
<td>Synchronize(s)</td>
</tr>
<tr>
<td>LRN</td>
<td>Long Range Navigation</td>
<td>Sys.</td>
<td>System</td>
</tr>
<tr>
<td>Mag.</td>
<td>Magnetic</td>
<td>TCS</td>
<td>Touch Control Steering</td>
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<tr>
<td>Max.</td>
<td>Maximum</td>
<td>Tgt</td>
<td>Target</td>
</tr>
<tr>
<td>MFD</td>
<td>Multi-Function Display</td>
<td>TL</td>
<td>Thrust Lever</td>
</tr>
<tr>
<td>Mic.</td>
<td>Microphone</td>
<td>TLA</td>
<td>Thrust Lever Angle</td>
</tr>
<tr>
<td>Min.</td>
<td>Minimum or Minute</td>
<td>V</td>
<td>Volt</td>
</tr>
<tr>
<td>Msg.</td>
<td>Message</td>
<td>WX</td>
<td>Weather radar mode</td>
</tr>
<tr>
<td>MSL</td>
<td>Mean Sea Level</td>
<td>Xmtr</td>
<td>Transmitter</td>
</tr>
<tr>
<td>Nav</td>
<td>Navigation</td>
<td>YD</td>
<td>Yaw damper</td>
</tr>
<tr>
<td>NiCad</td>
<td>Nickel-Cadmium</td>
<td></td>
<td></td>
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EMBRAER 145 RIGHT MAIN INSTRUMENT & GLARESHIELD PANELS

Rain Echo Attenuation Compensation Technique (REACT)
- Pushed enables REACT
- Avail in all mode except GMAP
- Always selected when in TEST mode.
- Calibrated Gain

Range Select Buttons
- In WX, REACT, & GMAP modes 5 to 300 nm available.
- In FP mode 5 to 1000 nm available
- TEST mode, auto set 100 nm

Radar Control Panel (RCP)

Cycles between 120° or 60° azimuth sweep for on-side AND cross-side displays.

Primary Flight Display (PFD) [Avionic Switched DC Bus]

- Switch altimeter ref. between Inches and HPa.
- Standard altimeter setting button
- Switch on fwd side of yoke disengages nose wheel steering
- Remote Start/Stop/Reset for chronograph
- Touch Control Steering (TCS)
  - While pressed allows manual maneuvering without disengaging the AP
  - When released syncs to new pitch attitude & vertical mode & maintains it.
  - Lateral control returned to previously selected mode.
  - Pressing & releasing after GS capture in APR mode with AP engaged releasing AP will return to ILS center beam.

ADC – selects cross-side ADC. ADC 1(2) on PFD.
AHRS – selects cross-side AHRS. ATT 1(2) & MAG 1(2) on PFD.
SG – selects cross-side symbol generator (IC-600). ADC 1(2), ATT 1(2), MAG 1(2), & SG 1(2) on PFD.

- Pressing cycles antenna stabilization. When off STAB on PFD and OFF on RCP.
- Used to invoke stabilization Trim mode
- On ground, after warm-up, pressing 4x within 3 sec. inhibits FSBY
- Selects Target Alert Mode. Mode monitors for red (level 3) or greater beyond selected range & +/- 7.5° of A/C hdg. TGT label if target detected.
- Min. target depth of 5 nm
- TGT label with no target
- Calibrated Gain
- Radar operational if FP mode selected.

- Pushed – Calibrated Gain
- Pulled – Manual gain active & VAR label displayed on PFD

- Antenna Tilt +/- 15°
- Range indicators between +5° & -5° are expanded
- Antenna beam width 7.9°

Quick Disconnect Button
- Disconnects AP; AUTOPILOT voice msg self stabilizes Trim mode
- When off
- When on displays on PFD
- Used to invoke stabilization Trim mode
- On ground, after warm-up, pressing 4x within 3 sec. inhibits FSBY
- Selects Target Alert Mode. Mode monitors for red (level 3) or greater beyond selected range & +/- 7.5° of A/C hdg. TGT label if target detected.
- Min. target depth of 5 nm
- TGT label with no target
- Calibrated Gain
- Radar operational if FP mode selected.

- Radar in Forced Standby Mode (FSBY) when A/C on grnd and Radar Mode knob not set to OFF; FSBY label displayed. FSBY inhibits the xtrn and antenna scan; can override through the STAB button.
- REACT – Automatic rcrv calibration to compensate for attenuation losses. RCT label displayed. A blue field indicates ranges where further compensation not possible. Active in all modes except GMAP. Tgts within blue field cannot be calibrated & should be considered dangerous.
- OFF – On-side controller slaved to cross-side controller. SLV displayed on RCP.
- SBY – Standby mode. STBY label displayed. WAIT label displayed during 40-100 sec. warm-up.
- WX – Weather detection mode. CA & FO RTA settings alternate on each sweep, CA's on left sweep & FO's on right. To get 100% duty factor one Radar Control Panel must be set OFF. WX label if rdr selected for display on MFD; otherwise TX label
- GMAP – Ground map mode. GMAP label displayed.
- TEST – Test pattern displayed with a TEST label.

PFD comparison monitors

- HDG
  - Δ > 6° for a/c roll < 6°
  - Δ > 12° for a/c roll > 6°
- ROL
  - Δ > 5°
- PIT
  - Δ > 5°
- ATT
  - if both ROL and PIT set
- ALT
  - Δ 200 ft or more
- IAS
  - Δ > 5 kts
- LOC
  - Δ > 1/2 dot (below 1200 ft.)
  - Δ > 2/3 dot (below 1200 ft.)
- GS
  - if both LOC and GS set
- ILS

- Pressed, tests regulator & a
- May 2008

Digital Audio Panel (DAP)

- PAX – reroutes audio signal from crew mic to pax cabin when any PTT is pressed.
- EMER – directly connects mic & headphones to com/nav radios. CA to Com/Nav 1, FO to Com/Nav 2.
- Closed – Disables PSU O2 latches. Also resets O2 ON indicator & cabin signs after system activation on AUTO or MANUAL.
- AUTO – PSU O2 latches energized & cabin signs on when cabin altitude > 14,000 ft.

Vertical CDI Scaling per dot
- For CN: GS = 0.35°
- For FMS: ENR = 750' TERM = 0.35° APPR = 0.35° VNAV = 250'
- For CN: LOG = 1.25°
- For FMS: ENR = 2.5 nm TERM = 1.0° (0.5 nm) APPR = 0.15 nm

Horizontal CDI Scaling per dot

- N – O2/Ar mixture based on cabin altitude; pure O2 above 33,000 ft.
- 100% - Pure O2 at all altitudes. Must be selected with EMERGENCY position for protective breathing
EMBRAER 145 CENTER PEDESTAL

**Inhibition Logic**
- **Takeoff**
  - Active > V1 - 15
  - Deactive. RA > 400 ft, or < 60 kts, or > 1 min.
- **Landing**
  - Valid < 200 ft
  - Deactive. WOW > 3 sec., or > 1 min.

**Mechanical gust lock** secures only the elevator
- Electromechanical gust lock does the same thing but uses a solenoid and locking pins installed in the horizontal stabilizer. Powered by DC Bus 2 & incorporates an amber indication light on the glareshield.

**Disconnects CA’s elevator control from FO’s**
- CA’s side has all AP servos & stick pusher
- Cannot be reset in flight

**Disconnects CA’s aileron control from FO’s**
- FO’s side has roll trim actuator & artificial feel unit
- Cannot be reset in flight

**Checks takeoff configuration warning by simulating TLs advanced**
- If ok, “TAKEOFF OK” voice message
- If fail, “TAKEOFF ___” voice message & NO TAKEOFF CONFIG EICAS msg

**FLAPS**
- **SPOILERS**
- **TRIM**
- **BRAKES**

**Thrust Reversers** have 3 locking systems. The Primary & Secondary are electrically controlled & hydraulically actuated. The third lock is completely electric. Loss of electric power latches locks closed.

**Cmds outboard spoiler panels to open when:**
- TLA of both engines < 50º
- Flaps < 13º
- No intermediate positions
- Electrically controlled thru DC Bus 1 & 2
- Hydraulically actuated

**Pulling actuates emergency brakes (no anti-skid)**
- Pull & rotate to set parking brake
- Always have toe brakes applied when setting or releasing to prevent hydraulic fluid transfer
- All 4 brakes supplied by Hyd Sys 2 proportional to handle displacement with no protections

**Pedal braking**
- Hyd Sys 1 supplies outbd brakes
- Hyd Sys 2 supplies inbd brakes
- Anti-skid protection > 10 knots wheel speed
- Locked wheel protection through anti-skid system > 30 knots wheel speed
- Touchdown protection allows braking 3 seconds after touchdown, or when wheel speed > 50 knots.

**Cuts out SPS channel 1 or 2 in case of failure**
- Stripped bar in button when pressed

**Joystick controls MFD designator**
- With control column held full back, momentary push actuates SPS test (stick shaker, clacker, & stick pusher)
- TEST button illuminated after an unsuccessful test or if system has not been tested.
- TEST button inhibited in flight till 30 sec. after landing, above 70 KIAS, or with gear not downlocked.
- Ice compensation of SPS inhibited for 5 min. after takeoff.
- Ice compensation reset if:
  - airborne & flaps set to 45º, SPS ICE SPEED msg remains, or
  - on ground after pressing TEST button. SPS ICE SPEED msg cleared.

**Pusher inhibited**
- On grnd (except for test)
  - Below 0.5 G
  - While Quick Disconnect button pressed
  - ≥200 ft if RA failed
  - Any Cutout button pressed
  - ≥200 knots
  - At least 1 channel inop

**CON thrust** if one of the following:
- ≥300 ft AFL & gear not locked down, or
- ≥1700 ft AFL
- Limited to OEI only

**CLB or CRZ thrust** if one of the following:
- ≥500 ft AFL, gear not locked down, AEO, or
- ≥1700 ft AFL and AEO

**TO thrust**
- T/O-1 for the EMB 145
- T/O RSV for the EMB 135/140

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**EMBRAER 145 AFT CENTER PEDESTAL**

- **Control Display Unit (CDU) of Universal UNS-1K Flight Management System (FMS)**

- **ARINC Communications And Reporting System (ACARS) Printer**

- **Pitch control wheel**
  - Inhibited if any Vertical Mode selected in FD

- **Manually controls roll attitude when AP engaged**

- **Landing Gear Freefall Compartment**
  - On floor between co-pilot's seat and control pedestal
  - Electrical Override Switch
    - NORMAL – Extension/retraction controlled by LGEU
    - DOORS – Bypasses LGEU to open nose landing gear doors
    - GEAR DOORS – Bypasses LGEU extending landing gear while keeping nose landing gear doors open.

- **Free-Fall Lever**
  - Initial movement operates the free fall selector valve relieving hydraulic pressure and connecting the lines to the return. Further movement mechanically unlocks the landing gear uplocks allowing the gear to free-fall to the down and locked position.

- **Roll trim**
  - Actuates roll trim by repositioning neutral position of aileron command
  - Must be in DN position in AUTO mode
  - In MAN Mode:
    - Controls pneumatic outflow valve by metering vacuum pressure to that valve
    - On (pressed)
    - Dumps cabin up to 14,500 ft +/-500 ft
    - ON inscription when pressed
    - Inhibited in MAN mode

- **Pitch trim**
  - Actuates pitch trim through the HSCU backup channel
  - Actuates roll trim by repositioning neutral position of aileron command
  - Must be in DN position in AUTO mode
  - In MAN Mode:
    - Controls pneumatic outflow valve by metering vacuum pressure to that valve
    - On (pressed)
    - Dumps cabin up to 14,500 ft +/-500 ft
    - ON inscription when pressed
    - Inhibited in MAN mode

- **Landing Gear Freefall Compartment**
  - On floor between co-pilot's seat and control pedestal

- **Electrical Override Switch**
  - NORMAL – Extension/retraction controlled by LGEU
  - DOORS – Bypasses LGEU to open nose landing gear doors
  - GEAR DOORS – Bypasses LGEU extending landing gear while keeping nose landing gear doors open.

- **Free-Fall Lever**
  - Initial movement operates the free fall selector valve relieving hydraulic pressure and connecting the lines to the return. Further movement mechanically unlocks the landing gear uplocks allowing the gear to free-fall to the down and locked position.
- **ELEC EMERG.** – Loss of all generators in flight. The batteries supply the Central & Essential Buses, sharing the load & not being charged. The Inverter, Shed and DC Buses not energized.

- **ELEC EMERG. ABNORMAL** – The EDL configured for an electrical emergency when not required. The generator supplied DC Buses are isolated from the battery supplied Central & Essential Buses & the batteries are not being charged.

- **ELEC ESS XFER FAIL** – The EDL failed to configure for an electrical emergency when required. DC Bus 1 and/or DC Bus 2 are not isolated from the batteries & the batteries are not being charged.

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**Erases data only on the ground with parking brake set. Only the manufacturer can recover the “erased” data.**

- **Connects (pressed) or disconnects (released) the GPU to/from the electrical system.**
- **GPU AVAIL**. inscription illuminates when operating GPU is physically connected to aircraft; does not indicate good power.
- **Inscription goes out when button pressed & GPU connected to electrical network. Priority over all batts & gens.**
- **Striped bar in button when pressed.**
- **Verify 26.0 - 29.0 V before selecting.**

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**On (pressed), overrides auto transfer to electrical emergency configuration & ensures batteries powering only Essential Buses regardless of EDL. Isolates batteries from DC Buses. (EBC 1 & 2, and EIC closed, BC1 and BTC 2 open).**

- **Auto (released), power contactors operate automatically according to EDL. (EBC 1 & 2, and EIC open, BC1 and BTC 2 closed).**
- **Striped bar in button when pressed.**

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**OVDR – BTCs kept closed regardless of EDL provided no overcurrent detected by one of 5 GCUs.**

- **AUTO – BTCs controlled by EDL.**
- **OFF – Opens BTCs regardless of EDL.**

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**Connects (pressed) or disconnects (released) the Backup Battery to/from the electrical system.**

- **24 vDC, 5A lead acid battery, in fwd avionics cmpt. in front of FO.**
- **Backup Battery charged when button pressed with BAT 1 in AUTO.**
- **BATT OFF BUS msg when button released.**
- **Supplies Backup Hot Bus, providing stabilized power for the GCU’s protective function in case of a short-circuit or near zero system voltage.**

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**ON – Emergency lights ON using the 4 dedicated batteries; 15 min. duration; batteries not charging. - EMER LT NOT ARMED**

**OFF – Emergency lights turned off if EMER LTS button on F/A Panel in NORM; batteries not being charged. - EMER LT NOT ARMED.** (Switch that turns on the lights is the only switch that can turn them off)

**ARM – Emergency lights off & batteries being charged, lights illuminate automatically in Elec. Emerg.**
• Illuminates red upon fire detection
• Pulling will send close cmd to:
  - Hyd. Pump SOV
  - Bleed Air SOV
  - Engine Intake Lip Anti-ice SOV
  - Fuel SOV (on Hot Bus).

Remember H.A.L.F.
• Rotate CCW fires bottle A & CW fires bottle B
• Fire bell can be canceled but visual warning cannot as long as fire signal exists.

• Selects which electric fuel pump will be operating continuously for that engine
• Remaining pumps of associated side are kept in auto standby
• If fuel pressure < 6.5 psi remaining two pumps come on line & will cycle with inoperative pump causing “clicking” in relay box.

• Fuel tank temperature taken from left tank only & displayed on MFD, FUEL page.
  - **FUEL TANK LO TEMP** msg. indicates fuel temp. inside left tank is < -40°C
  - **E1 (2) FUEL LO TEMP** msg. indicates engine fuel temp. (leaving FCOC) is < 5°C.
• Pressure refueling to full leaves 7.9 U.S. gallons below fuel tank capacity; must fuel over wing to get that last 7.9 U.S. gallons.
• To de-fuel left tank set XFEED to LOW 2 and Tank 1 - ON with de-fuel SOV open

• Allows interphone com between FA and pilots.
• Generates cabin chime
• On FA’s Call Panels:
  - PILOT
  - Striped bar when button when pressed

Same as CABIN button except on F/A’s Call Panels:
• EMER
• PILOT

• Turns on or off the associated lights
  - DFDR begins recording when RED BCN switch in ON or A/C is airborne

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**FUEL 1 (2) LOW LEVEL**
• Fuel remaining ranges from 463 to 584 lbs.

**FUEL IMBALANCE**
• Comes on at 800 lbs difference
• Goes off at 100 lbs difference

**LOW 1** – opens cross-feed valve & shuts off left selected electric fuel pump
**OFF** – closes cross-feed valve & returns electric fuel pump to normal operation
**LOW 2** – opens cross-feed valve & shuts off right selected electric fuel pump
• To cross-feed select tank with lower fuel
• Switch powered by Ess DC Bus 2

**ON** – Energizes selected pump
**OFF** – De-energizes selected pump

**Interphone Control Unit (ICU)**
• Generates a cabin chime to call FA
• Allows interphone com between pilots and FA in case of normal mode failure
• Illuminated CABIN and CAB EMER buttons on ICU, and PILOT and EMER PILOT annunciators on Attendant’s Call Panel
• Striped bar in button when pressed

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EMBRAER 145 OVERHEAD CHANNEL C

OFF – De-energizes FADEC, closes APU Fuel Feed SOV in wing stub (APU FUEL SOV CLSD EICAS msg) & closes APU Main Fuel Solenoid Valve (at APU)
Removes APU indications & alarms when RPM < 10%, cnds APU shutdown.
ON – Energizes FADEC (Ess DC Bus 2 or HOT Bus 1), opens APU Fuel Feed SOV, enables APU indications & alarms on EICAS. FADEC performs self-test.
START – Initiates start cycle

Abnormal APU Shutdown:
In Flight: Overspeed, underspeed, loss of speed data, failure to start, accelerate, or light, external short, or FADEC failure or loss of signal.
On Ground: Fire (APU FIRE aural warning of 10 sec. or more), EGT over-temperature, Loss of EGT, high oil temperature, low oil pressure, oil pressure switch short.

RESET – Resets FADEC & clears faults
ALTN – Alternates FADEC in control
• Inoperative if held > 3 sec.

Enabled on grnd only with TLA < 50º
1st press – enables T/O Mode setting
2nd press – REF TO TEMP
3rd press – REF A-ICE
4th press – stores values. Data accepted if REF TO TEMP within +/-10ºC & both engines running

STOP – Cmds FADEC to shut engine down provided TLA is IDLE
RUN – Allows normal engine operations
START – Initiates engine start cycle, and automatically switches FADEC from the FADEC that had the last successful engine start. If held > 3 sec. knob becomes inoperative. In this case select STOP and reset the FADEC to reset knob

In the case of APU fire detection, the APU will NOT auto shutdown in flight but will auto shutdown if A/C on the ground.

Closes APU Fuel Feed SOV in wing stub (APU FUEL SOV CLSD EICAS msg) & closes APU Main Fuel Solenoid Valve (at APU)
Discharges APU fire bottle
• Causes APU Normal Shutdown, and
• Does NOT illuminate
• <30 sec delay, per EPC, before pressing

PRESS

Turns off wing landing lights

Sets T/LA to OFF and enables T/O Mode setting

FADEC

RUN

Sends stop request to FADEC, and
• Closes APU Fuel Feed SOV in wing stub (APU FUEL SOV CLSD EICAS msg) & closes APU Main Fuel Solenoid Valve (at APU)
• Striped bar in button when pressed

Auto

Inoperative if held > 3 sec.

Reset the FADEC to reset knob

Reset FADEC to inoperative. In this case select STOP and reset the FADEC to reset knob

Casual and Excessive Speeding

• Class C baggage compartment
• Two cargo extinguisher bottles located in rear Electrical Compartment
• Two smoke detectors – Maintenance must reset
• Sight glass in lavatory

• Button illuminated if smoke detected in baggage compartment
• When pressed
  ➢ Discharges both bottles; the high rate & metered discharge bottles
  ➢ Deactivates baggage compartment fans (if not previously deactivated by smoke detection)
  ➢ 50 minutes of protection

• Sends stop request to FADEC, and
• Closes APU Fuel Feed SOV in wing stub (APU FUEL SOV CLSD EICAS msg) & closes APU Main Fuel Solenoid Valve (at APU)

APU Normal Shutdown
• Sends stop request to FADEC and closes the APU Main Fuel Solenoid Valve (at the APU).

APU start cycle:
3% (0% airborne): ignition energized & Main Fuel Solenoid Valve opens
50%: Starter de-energized
70%: ignition excitser de-energized
95%+7sec: Max Fuel Solenoid Valve energized, pneumatic & electrical power available
If no EGT rise then 1 auto restart (swing start): starter de-energized at 20% & re-energized at 5%.

OFF – De-energizes ignition system
AUTO – Active FADECs control ignition system automatically
➢ One channel for grnd start (14% N1)
➢ Both channels for airstart (10% N1)
➢ Auto-relight (above 53% N1)
ON – Cmds FADECs to continuously activate both ignition channels; A & B.
➢ First fit of day
➢ Cold eng. starts SAT or oil ≤ 5ºC
➢ External air or Crossbleed start
➢ Contam.runway TO AND ≤ 10ºC.
➢ Moderate or > turb. or heavy precip.

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  ➢ 50 minutes of protection

• Sends stop request to FADEC, and
• Closes APU Fuel Feed SOV in wing stub (APU FUEL SOV CLSD EICAS msg) & closes APU Main Fuel Solenoid Valve (at APU)
• Striped bar in button when pressed

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• Sends stop request to FADEC and closes the APU Main Fuel Solenoid Valve (at the APU).

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3% (0% airborne): ignition energized & Main Fuel Solenoid Valve opens
50%: Starter de-energized
70%: ignition excitser de-energized
95%+7sec: Max Fuel Solenoid Valve energized, pneumatic & electrical power available
If no EGT rise then 1 auto restart (swing start): starter de-energized at 20% & re-energized at 5%.

Callsign: First OFF-1

[APU Start Cycle]
**EMBAER 145 OVERHEAD CHANNEL D**

- **Illuminates red upon fire detection**
- **Pulling will send close cmd to:**
  - Hyd. Pump SOV
  - Bleed Air SOV
  - Engine Intake Lip Anti-ice SOV
  - Fuel SOV.

Remember **H.A.L.F.**
- Rotate CCW fires bottle A & CW fires bottle B
- Fire bell can be canceled but visual warning cannot as long as fire signal exists.

- **Automatic Rudder Shutoff Through Speed Switch**
  - Rudder limiter for high speed
  - Rudder Sys 1 auto shutoff > 135 kts to reduce rudder authority at high speed
  - If Sys 2 fails Sys 1 comes back on line automatically with EICAS message
  - **RUDDER OVERBOOST** if neither Sys shuts off > 135 kts

- **Rudder Hardover Protection (for low speed)**
  - Both Sys 1 & 2 auto shutoff
  - Force on any pedal > 130 lbs, and
  - Rudder deflected > 5° to opposite side, and
  - Both engines running (\(N_2 > 56.4\%\))

  - Inhibited at higher speeds due to speed switch logic that reduces rudder authority. Rudder deflection will not achieve 5°
  - Inhibited with OEI operation

- **Priority Valve**
  - Only on Hyd Sys 1
  - Priority valve closes during ldg gear operation with only electric hyd. pump supplying system, to isolate ldg. gear giving priority to the flight controls.

- **Accumulator**
  - Closes (pressed) or opens (released) engine-driven Hyd. Pump SOV
  - Hyd. Pump continues to run if engine running
  - Striped bar in button when released

- **24 hr parking brake or 6 full emerg. brake applications**

- **OFF** – Electric Hyd. Pump off
- **ON** – Electric Hyd. Pump on. Provides 2900 ± 100 psi @ 1 gal/min
- **AUTO** – Electric Hyd. Pump in standby ready to come on line if engine driven pump outlet pressure < 1600 psi or \(N_2 < 56.4\%\)

  - **HYD SYS 1 (2) FAIL** msg if hyd. pressure < 1300 psi

- **Control cockpit dome lights at a fixed intensity**
- **Control logo lights on underside of horizontal stabilizer**
- **Turns signs on or off with a chime**
- **Both signs are automatically activated when pax O2 dispensing units open**

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An accumulator is basically a "hydraulic battery" storing hydraulic energy & providing surge protection.
**ENG** – Intake A/I valve open with engine running. On ground, with wheel speed > 25 kts an ICE CONDITION will open WING and TAIL A/I valves.

**AUTO** – Allows automatic operation of bleed air anti-ice system. On ground, no A/I valves open. But at wheel speeds > 25 kts an ICE CONDITION will open all A/I valves (ENG, WING, & TAIL).

**ALL** – Turns on entire bleed air anti-ice system in flight regardless of ice detection. On ground, intake A/I valve open & when wheel speed > 25 kts the WING and TAIL A/I valves open, regardless of ice condition.

**CLOSED** – Closes CBV

**OPEN** – Opens CBV (CROSS BLD OPEN)

**AUTO** – Automatic operation of CBV

- Electrically controlled, pneumatically actuated
- EBV (PRSOV) open (pressed) only when bleed air demanded or closed (released).

- LEAK inscription indicates duct leakage.
- Engine intake lip A/I taken upstream of HSV
- HSV (14th stage) open during low thrust, crossbleed starts, and A/I operations
- 9th stage air joins 14th stage, both with BACVs, then thru precooler upstream of EBV
- EBV closed by Fire Handle or automatically with intense hot air leak (BLD VLV CLOSED)
- Used for engine start, ECS, pressurization, & ice protection

**OPEN** (pressed or released) or selects auto mode (pressed of wing and/or horizontal stabilizer A/I valves). L pneumatic supplies horizontal.

- OPEN inscription means valves open with system cmd’d open or at least one valve open with system not cmd’d open.

- Striped bar in button when released

**ON** (pressed) or off (released)

- Striped bar in button when released
- Defog mode if no ice detected – maintains windshield at 26°C. If ice cond. anti-ice mode holds windshield at 43°C
- 3 sensors, 1 temp control, 1 overheat protection, 1 spare
- Should be off when OAT > 10°C on ground

- On (pressed) or off (released)
- Striped bar in button when released

- On ground the ram air valves are always open, regardless of ice condition.
- But at wheel speeds > 25 kts the WING and TAIL A/I valves open, regardless of ice condition.

- On ground, with wheel speed < 227°C PRSV operates in high mode, other times in low mode

- PACK 1 closes with A/I on below 24,600 ft provided PACK 2 operating
- Max thrust (takeoffs & go-arounds) with EBVs open, Pack Valves automatically close by FADEC when:
  - OEI up to 9700’ MSL & TAT >19°C at S.L. decreasing to -5°C at 9700’ MSL
  - AEO up to 1700’ AGL & TAT >19°C decreasing to -5°C at 9700’ MSL
- Must reset Pack Valves after auto shutdown
- If both Pack Valves closed in flight the ram air valves open & recirculation fans auto shutdown.
- On the ground the ram air valves are always closed, regardless of Pack Valve position.

- Opens (pressed) or closes (released) the Pack Pressure Regulating and SOV (PRSOV)
- Striped bar in button when released
- On ground with main door open & pack < 227°C PRSV operates in high mode, other times in low mode
- PACK 1 closes with A/I on below 24,600 ft provided PACK 2 operating
- Max thrust (takeoffs & go-arounds) with EBVs open, Pack Valves automatically close by FADEC when:
  - OEI up to 9700’ MSL & TAT >19°C at S.L. decreasing to -5°C at 9700’ MSL
  - AEO up to 1700’ AGL & TAT >19°C decreasing to -5°C at 9700’ MSL
- Must reset Pack Valves after auto shutdown
- If both Pack Valves closed in flight the ram air valves open & recirculation fans auto shutdown.
- On the ground the ram air valves are always closed, regardless of Pack Valve position.

**BLEED TEMP** on ECS page of MFD is taken downstream of precooler.

**LOW** – 80 strokes/min
**Hi** – 140 strokes/min

**TIMER** – Intermittent operation, 2 strokes at high speed with 8 sec. delay

Dry windshield protection parks blades until knob cycled to OFF to reset.

Maximum speed for operation - 160 KIAS
DAU 1: Forward aircraft & engine 1 parameters.
Ch A: Ess DC Bus 1 & Backup Ess Bus (default)
Ch B: DC Bus 1
DAU 2: Aft aircraft & engine 2 parameters.
Ch A: Ess DC Bus 2 & Backup Ess Bus (default)
Ch B: DC Bus 2

Radio Management Unit (RMU)

• Pressing allows Data Acquisition Unit (DAU) Channel B to supply both IC-600
• Striped bar in button when pressed

Activates internal self-test of component selected with yellow cursor box.
COM transceiver – Hold button 2 sec.
DME, ATC, and ADF – Hold for 5 to 7 sec.
NAV (VOR/ILS) – Hold for 20 sec.

First press: Splits the NAV window into two windows. Top window displays active VOR frequency. The lower window, with the DME Label, displays the active DME frequency in VHF format. An H (DME Hold) is displayed in the DME window and on the PFD to show DME not paired with active VOR/ILS freq. The DME may then be tuned directly by pressing the LSK beside the DME window.

Second press: Displays the TACAN channel format and will allow tuning to the DME portion of any TACAN station.

Third press: Reverts NAV window to normal DME operation.

NORM – RMU tuning available
EMERG – tuning through RMU inhibited

Tuning Backup Control Head (TBCH)
Allows alternative means of tuning Com 2 and Nav 2