

7.9 - AIR CONDITIONING AND PRESSURIZATION

The airplane is equipped with a Global Air System (GAS), which ensures air conditioning and pressurization (Figure 7.9.1).

GAS controls are located on "ECS" panel at the L.H. side of the R.H. side control wheel and above the arm rest of the L.H. passenger's seat (Figure 7.9.2).

The system is monitored through CAS messages appearing on the GDU 1500 MFD.

NOTE

A list of abbreviations used in this chapter is given in Figure 7.9.1.

The GAS is composed of 3 main sub-systems :

- Engine Bleed Air System,
- Dual zones Environmental Control System, including heating and cooling functions,
- Cabin Pressurization Control System.

These 3 sub-systems are managed by a single digital controller (GASC), which receives information coming from :

- the sensors set in the sub-systems,
- the human interfaces set in the airplane.

The GASC elaborates the proper commands to the sub-system actuators and indication or warning elements.

ENGINE BLEED AIR SYSTEM

The Engine Bleed Air System is designed to ensure the following functions :

- to bleed air from the engine,
- to ensure a controlled airflow in the cabin,
- to adjust the temperature of the bleed air at a compatible level, in order to control the cabin temperature in heating and cooling modes.

The "BLEED" switch allows to switch on the Engine Bleed Air System provided that the engine runs. The Ground Fan (GF) runs until takeoff, when "BLEED" switch is set to AUTO, and the **"MAIN GEN"** CAS message is OFF.

The "BLEED" switch is fitted with a blocking device between AUTO and OFF/RST positions preventing the operator from a non expected setting of "BLEED" switch to OFF/RST position.

The **"BLEED TEMP"** CAS message appears in the GDU 1500 MFD "CAS" window (in display normal conditions), when the "BLEED" switch is set to AUTO and when the Bleed Temperature switch (BTSW) or the Overheat Thermal Switch (OTSW) triggers on.

The **"BLEED OFF"** CAS message appears in the GDU 1500 MFD "CAS" window (in display normal conditions), when the engine is running and the Flow Control Shut Off Valve (FCSOV) is closed.

To reactivate the system, set "BLEED" switch to OFF/RST, then to AUTO.

To bleed air from the engine

The Engine Bleed Air System is based on 2 engine bleed ports operation. The normal operation is performed on P2.5 engine port as far as the pressure or temperature available at this port is able to comply with the needs. If one of these conditions is not fulfilled, the system automatically switches to P3 engine bleed port. The switching back to P2.5 supply is automatically performed as far as the conditions on P2.5 are restored to adapted values.

The sensor (IPPS) measures continuously the pressure at the P2.5 pressure port and sends the value to the Global Air System Controller (GASC) which manages the ports switching on condition with the Shut Off Valve (SOV). A Non Return Valve (NRV) secures the P2.5 pressure port when the P3 pressure port is opened.

To ensure a controlled airflow in the cabin

The bleed flow control operation, including bleed AUTO/bleed OFF/RST controls, is ensured by the FCISOV driven by the GASC.

To adjust the temperature of the bleed air

The bleed air outlet temperature control is ensured by the By-Pass Valve (BPV) in association with the Main Heat Exchanger (MHX).

The temperature measurement loop given by the Inlet Temperature Sensor (ITS) and the 2 Ventilated Temperature Sensors (CKVTS, CBVTS) sends the value to the GASC which compares them with the set temperature and manages the BPV position. The BPV derives a part of the bleed air through the MHX to cool it and mix it to the remaining air.

The Engine Air Bleed System is supplied by "BUS 2" bar and protected by the "CAB BLEED" CB60 circuit breaker.

DUAL ZONES ENVIRONMENTAL CONTROL SYSTEM

The Environmental Control System is based on two independent air circuits. The heating circuit uses the controlled temperature bleed air. The cooling circuit is based on a Vapor Cycle System (VCS).

The Environmental Control System is designed to ensure the following functions :

- Cockpit / Cabin Heating function
- Cockpit / Cabin Cooling function.

The Environmental Control System is supplied by "BUS 2" bar and protected by the "AIR COND" CB160 circuit breaker. Four fans are supplied by "BUS 4" bar and protected respectively by following circuit breakers : "COND FAN" CB114, "CABIN FAN" CB113, "COCKPIT FAN" CB112 and "GND FAN" CB111.

The system includes an automatic load shedding feature which :

- shuts off the Ground Fan (GF) and the Condenser Fan "COND FAN" and opens compressor clutch when **"MAIN GEN"** CAS message is ON.
- shuts off all the Vapor Cycle System (VCS) during engine start.

Flight into icing conditions

- 1) All equipment required for IFR flight
- 2) Propeller deicing
- 3) L.H. windshield deicing
- 4) Airframe, stabilizer and elevator horn deicing
- 5) Wing leading edge inspection light (if night flight)
- 6) Stall warning deicing
- 7) Inertial separator
- 8) Garmin annunciation "Airspeed, Airspeed"

ALTITUDE OPERATING LIMITS

Maximum altitude : 31000 ft (9449 m)

Maximum differential pressure : 6.2 psi

Operation in RVSM area

This airplane is approved for operations in Reduced Vertical Separation Minimum (RVSM) airspace when required equipment (refer to Section "List of equipment", § "List of critical RVSM equipment") is maintained in accordance with the airplane Maintenance Manual.

This does not constitute operational approval. Individual airplane and operational approval must be obtained in accordance with applicable operating rules.

Each operator must ensure compliance with required crew training and operating practices and procedures.

Moreover, the following equipment must be installed and operating normally upon entering RVSM airspace :

- Pilot and R.H. station primary altimeters
- Autopilot
- Altitude Alerter
- ATC transponder

NOTE

Any changes to the pitot / static, air data computer, autopilot, altitude alerting and / or transponder systems, or other changes that affect operation of these systems must be evaluated for impact on the RVSM approval.

The standby altimeter is not approved for RVSM operations.

IN-FLIGHT CIRCUIT BREAKER USE LIMITS

A tripped circuit breaker should not be reset in flight unless deemed necessary for continued safe flight and landing. Only one reset should be attempted.