

1.2.1.3 EBAS OPERATION.

The GAS 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 are able to comply with the needs (i.e. enough air flow for pressurization function or enough temperature level for cabin heating). 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.

1.2.1.3.1 Bleed switching operation.**1.2.1.3.1.1 Switching on pressure condition.**

The airflow coming from the engine for pressurisation and heating functions is mainly picked up on the P2-5 engine pressure port.

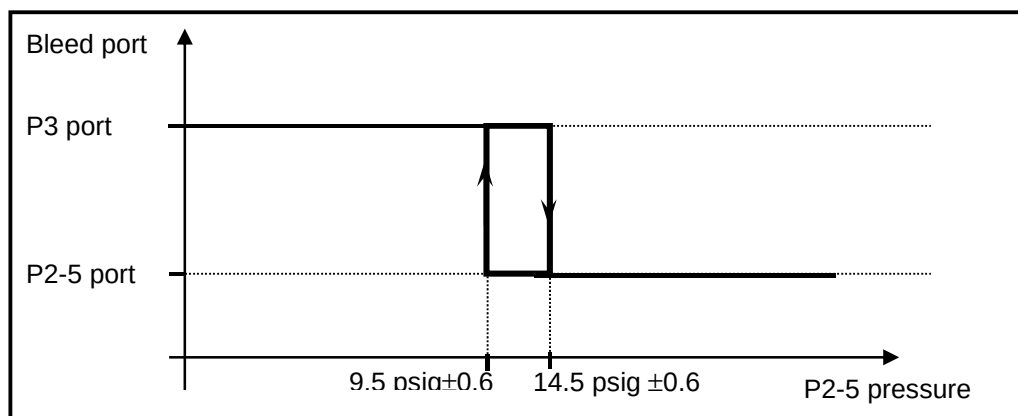
The IPPS measures continuously the pressure at this port and sends the value to the Global Air System Controller (GASC) which manages the ports switching on condition.

When the pressure at P2-5 port, measured by the IPPS, falls below 9.5 psig, the GASC sends an opening order to the SOV. The P3 port is therefore connected to the P2-5/P3 junction. Due to the increase of the pressure, the NRV is consequently closed and the P2-5 port is then isolated. The IPPS being fitted up stream of the NRV, the P2-5 pressure measurement is still valid.

If the P2-5 pressure comes back above 14.5 psig, the GASC sends a closure order to the SOV. The P3 port is therefore isolated and the NRV is re-open.

Figure 3 shows the bleed switching thresholds versus P2-5 port.

Figure 3 : Bleed switching thresholds versus P2-5 pressure



The switching thresholds have been validated on development tests and flight tests.

Global Air System For TBM850
SYSTEM DESCRIPTION AND SPECIFICATION

IDENT. Nr SPT20286-001

ISSUE : 7

DATE : 19/06/2012

1.2.1.3.1.2 Switching on temperature condition.

In some cases (i.e. cold day, high altitude operation, low thermal loads), the P2-5 temperature is not high enough to ensure cabin heating capability, even though the pressure is sufficient to ensure minimum airflow for pressurization.

In these cases, the GASC analyses the heating insufficiency regarding the facts that the measured cabin temperature is not reached (below the temperature demand) even though the BPV position is in full heating position (the MHX is completely by-passed and so the bleed temperature is fully injected in the cabin). This analysis is made using the ITS temperature measurement.

Then, the GASC sends an opening order to the SOV: the bleed is switched on P3 port.

Considering that there is no temperature sensor at the bleed outlet, the switching back to P2-5 port is based on the BPV position. The GASC analyses that the BPV is turning back to cooling position (a certain amount of bleed air is diverted to the MHX in order to decrease the inlet air cabin temperature). When the valve has reached a determined position the GASC closes back the SOV and the system operates again on P2-5 port.

Fig 4 shows bleed thresholds switching versus temperature:

From A to B, the thermal load is such as the temperature bleed allows to maintain the cabin temperature equal to the temperature demand.

From B to C, the thermal load decreases (no more sun, cloud...). The BPV moves towards full by pass to increase the blowing temperature.

From C to D, when the BPV reaches full by pass position, the bleed temperature is too low to ensure cabin heating, so the cabin temperature passes below the cabin demand.

From D to E, the GASC detects that the cabin temperature is below the demand for a certain time, then switches on the SOV: the P3 operation is engaged and the bleed temperature increases. The by-pass valve moves towards by-pass to ensure the cabin temperature control equal to the demand.

From E to F, the systems operate under P3, the bleed temperature is sufficient to heat maintain the cabin temperature equal to the demand with the BPV in partial by pass.

From F to G, the thermal load increases. The BPV moves towards less by pass to decrease the bleed temperature in order to maintain the cabin temperature equal to the demand.

From G to H, the by pass valve reaches a predefined position where it is assumed that the P2-5 temperature is sufficient to ensure maintaining the cabin temperature equal to the demand. The GASC switches off the SOV and the system operates again on P2-5 mode. The BPV reaches a new position corresponding to the new bleed temperature.

Figure 4 : Bleed switching thresholds versus temperature.

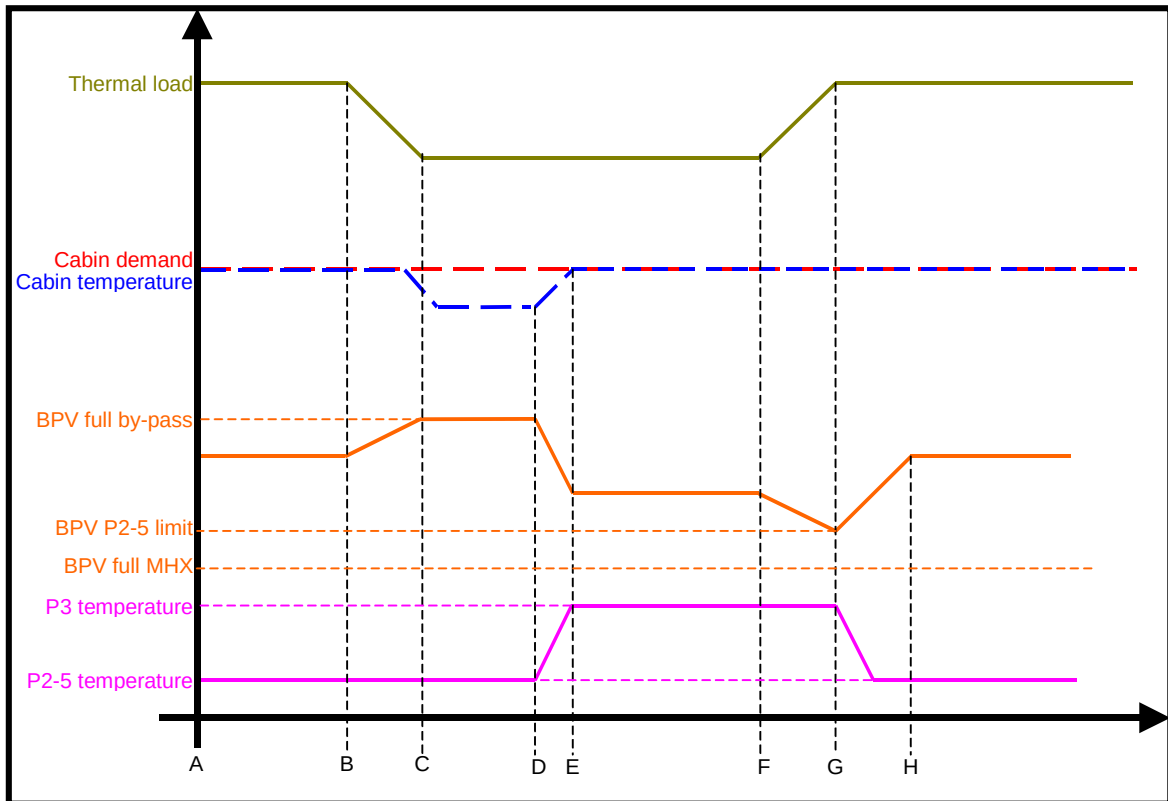


Figure 5 shows the logical diagram for bleed switching versus pressure and temperature conditions.

Figure 5 : Bleed switching logic.

