

Part I

Chapter 10—Airframe and Engine Air Intakes Anti-icing Systems

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Description, Controls and Indicators

1 General description

(a) A hot air anti-icing system augmented by electrically heated mats, is provided for the engine intakes, the alternator CSDU oil-cooler air intake, Blue Steel vapour cooling pack air intake, ECM heat exchanger intake, and for the leading edges of the mainplane, tailplane, fin and elevators. The hot air supply is from the same source as the cabin pressurising and temperature supply. The engine air intakes electric heating mats are thermostatically controlled by sensing units to ensure that the temperature of the area which they cover does not exceed approximately 80°C.

(b) Engine anti-icing (as opposed to engine air intake anti-icing) is covered in Part I, Chap. 6, paras. 5 and 18.

2 Controls and indicators—hot air system

NOTE: The electrical supply to the ice detectors and heater mats is inoperative until the airspeed is above 105 knots, since the 28 volts supply from feeder 21P7 is controlled by the undercarriage pitot switch.

(a) In order that the hot air system may function the ENGINE BLEED ISOLATION VALVES OPEN-CLOSE switches should all be set to OPEN. The system is then controlled by the following switches and indicators under the second pilot's control:

(i) An icing conditions indicator which shows black when not in icing conditions or ICE if such conditions are encountered. Below the indicator is a notice: SWITCH OFF ANTI-ICING IF INDICATOR REMAINS BLACK FOR OVER TWO MINUTES.

(ii) Three OFF-ON ANTI-ICING CONTROL switches for the PORT and STBD. wings and TAIL, together with three OVERHEAT WARNING lights and three RESET-OFF switches. Also fitted are four WING AIR EXIT SHUTTERS magnetic indicators.

(b) When the switches are set ON, conditioned hot air is fed to the thermal anti-icing system. In order to make the hot air supplies from the starboard engines available at the tailplane for anti-icing purposes, the navigator's bomb-bay heating switch must be selected to TAIL ANTI-ICING, BOMB-BAY HEATING. The ON selection of the PORT and STBD. switches also opens the wing air exit shutters and the indicators show OPEN. Conversely an OFF selection automatically closes the shutters.

(c) If an overheat warning is given by any one of the three lights a hot-air valve is moved to the fully closed position and a cold-air valve is fully opened. All air exit shutters remain open. Also, in the case of a TAIL overheat warning, the port isolation cock, in the supply lines to the tail, closes.

(d) To reset any part of the system following an overheat warning, hold up the appropriate RESET switch. This action closes the cold-air valve and the system is brought back into use again.

3 Controls and indicators—electrical system

(a) Two electrical anti-icing bus-bars are provided, the PORT supplied by No. 2, 200 volt bus-bar and the STBD. supplied by the No. 3. These supplies are controlled by an AUXILIARY HEATERS, ON/OFF switch. This switch is only effective at airspeeds above 105 knots, as the 28 volt supply to feeders 33P7 and 34P7 is controlled by a pitot-pressure switch.

(b) Post-Mod. 3275, two green press-to-test lights are fitted on the co-pilot's side panel AD to provide visual indication of the operation of the port and starboard air intake heater mats.

(c) Post-Mods 4131, 4132 the heaters ON/OFF switch also controls the supplies to the port and starboard drop tanks ram air intakes heater mats.

Normal Management of the Systems

4 General

(a) The effect of continuous operation in icing conditions has yet to be established and thus operation in icing conditions is to be avoided where possible and limited to a minimum when unavoidable. It is possible that with the current mod. state, large pieces of ice may form on and be shed from the air intake anti-surge vanes after 5-10 minutes in icing conditions with the possibility of damage to the engines.

(b) Heating of the air intake leading edge in the region of the inner engines is negligible at engine speeds below 80% RPM.

(c) If rapid throttle movements are made, slight engine surging may occur when the systems are in use.

5 Control of the hot air system

(a) To switch on the system the following procedure should be used:

Appropriate circuit breakers on panel AV	Closed
Engine isolation cocks	OPEN
Anti-icing control switches	ON. Exit shutter indicators OPEN

(b) The systems should be switched on in any of the following circumstances:

- 1 For take-off in conditions where the air temperature is below +8°C and visibility is reduced to less than 1,000 yards in fog or mist.
- 2 If the icing indicator shows ICE.
- 3 If icing conditions are forecast.
- 4 If visual inspection shows ice formation on the windscreen and build-up of ice on the wing leading edges.

The system should be switched off above 40,000 feet.

(c) If an OVERHEAT WARNING is given, the affected section is automatically switched off. To bring the section back into use, hold up the RESET switch when the indication should be cancelled. If three overheats occur successively, the system must be switched off. There is a possibility of overheat indication during climb at high RPM before the system has stabilised.

6 Control of the electric heater mats

The heater mats may be switched on before take-off, the airspeed switch keeping them inoperative until a speed of 105 knots is attained.

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