Heating and Ventilation
**HEATING AND VENTILATION SYSTEM**

**General**

Ambient air, drawn in by a fan through a vent in the cowling above the cockpit is mixed with hot air (P2), tapped from the engines, and distributed by pipelines to the cockpit and cabin. Fresh air for the passengers is admitted by a scoop on each side of the aircraft, just aft of the pilot's doors, and passes through the trim panels to the individual louvres above each passenger's head.

A vent just forward of the front windscreen can be operated by a handle in the cockpit to allow fresh air into the cockpit if desired.

Each pilot's door is fitted with a sliding window.

A 3-phase AC fan can be switched on to supply ambient air through the heater distribution pipelines if required.

Fixed vents in the upper rear side walls of the cabin extract the air and ensure the flow through the aircraft.

**Controls and Indications**

Three controls are fitted on the overhead panel as shown in Figure 1.

1. A rotary temperature control knob, which automatically switches on the fan when moved from its COLD/OFF position.

2. A sliding distribution lever which can be set in 3 positions. Aft (OFF), Centre (COCKPIT & CABIN) and Forward (COCKPIT ONLY). This lever controls a flap valve in the distribution pipelines by a teleflex control.

3. A ventilation switch on the left-hand side of the overhead panel to allow the fan to be ON when the temperature controller is at COLD/OFF.

The control for the cockpit ventilation flap is fitted to a cross member just above the instrument panel.

![Figure 1 – Heater Control Component Locations](image-url)
Figure 3 – Heat Distribution & Airframe Components
**Limitations**

Because the heater draws compressor air from the engines, it must be switched ‘OFF’ for take-off and landing.

**Distribution**

The hot air from the engines compressors passes through a non-return check-valve to the regulation valve on the transmission decking. A pressure-reducing valve fitted to the regulation valve produces a control pressure to operate the system. When the regulation valve is opened the hot air passes forward to the mixing chamber where it is ejected into the ambient air drawn in by the fan.

A thermostat downstream of the mixing chamber cuts off the hot air if the temperature reaches 90°C.

The distribution pipelines direct the air to the four outlets in the bottom of the cabin, the pilots individual overhead louvres, the Autopilot hydraulic unit in the broom cupboard, the windscreen de-misting diffusers and the lower screen de-misting diffusers. The supply to the cabin can be cut off by means of the sliding control in the cockpit when not required.

**Electrical Power Supplies**

The fan is powered by 3-phase 200V 400 Hz AC current from Primary AC bus bar (CB HEATING VENTIL). The control DC supply for the fan contactor is from Secondary DC bus 2PP5 (CB HEATING VENT).

**System Operation**

Refer to Figure 3. With the temperature control valve in its COLD/OFF position the micro switch (39H) is open and the needle valve is off its seat allowing the control pressure (reduced P2 air pressure) to flow away via the vent to atmosphere. There is therefore no control pressure acting under the diaphragm (3) and the regulation valve is closed preventing P2 air from passing through to the ejector and into the mixing chamber.

Should the fan switch (43H) now be made the contactor relay (40H) will be energised and the AC contactor made thus motoring the fan and blowing fresh air through the distribution pipelines.

When the temperature control valve is turned towards the HOT position the cam on the valve makes the micro-switch (39H) and the fan starts running. Rotating the control closes the needle valve, reducing the leak of control P2 pressure. The pressure under the diaphragm (3) increases lifting the regulation valve off its seat and allowing hot air to pass through to the mixing chamber. Thus, the more the rotary control is turned, the more control pressure is increased and the more hot air is allowed through. The temperature of the hot air passing through the distribution pipelines depends entirely upon the setting of the rotary valve.

To prevent overheating of the system a thermostat is fitted just downstream of the mixing chamber. Should the temperature exceed 90°C the thermostat valve opens and the control pressure leaks away thus closing the regulation valve under action of the return spring (2).

If the rotary control is not in the COLD/OFF position when starting the engines fuel fumes will enter the heating ducts and pass into the cabin. To overcome this problem, when the start button is pressed, relay (48H) is energised and continues to be energised for 45 seconds after starter cut-out, giving an earth for the supply through the windings of the solenoid valve (47H). The solenoid valve is energised, opening the needle valve and the control pressure is vented to atmosphere. The regulation valve therefore, remains closed and no P2 air gets through to the distribution lines during this period.

The Distribution Controller in the cockpit operates the Distribution Flap, which closes off the supply completely when the control is in its aft position. In the intermediate position the air is distributed to cockpit and cabin and in the forward position only the cockpit is supplied.
Figure 3 – Heater Operation

Key to Figure
1. Regulation Valve Body
2. Return Spring

Section 11 Heating & Ventilation Systems
Figure 4 – Heater Components