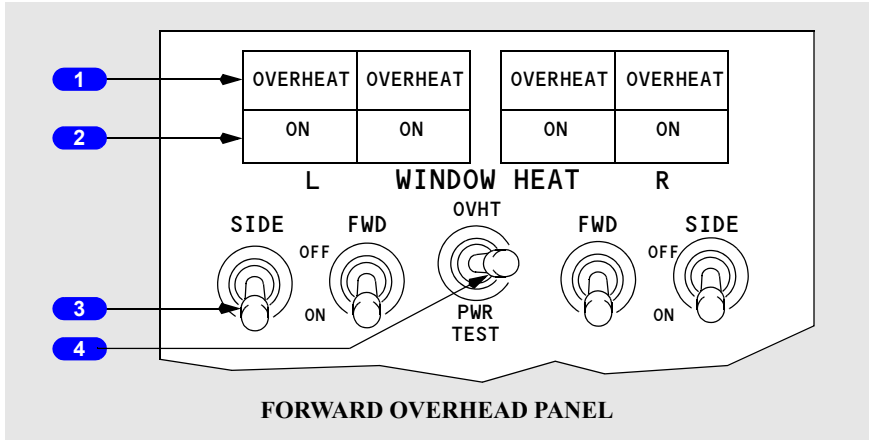


## Window Heat Panel



### 1 Window OVERHEAT Lights

Illuminated (amber) – overheat condition is detected.

**Note:** OVERHEAT light also illuminates if electrical power to window is interrupted.

### 2 Window Heat ON Lights

Illuminated (green) – window heat is being applied to selected window.

Extinguished –

- switch is OFF, or
- an overheat is detected, or
- a system failure has occurred, or
- system is at correct temperature.

### 3 WINDOW HEAT Switches

ON – window heat is applied to selected window.

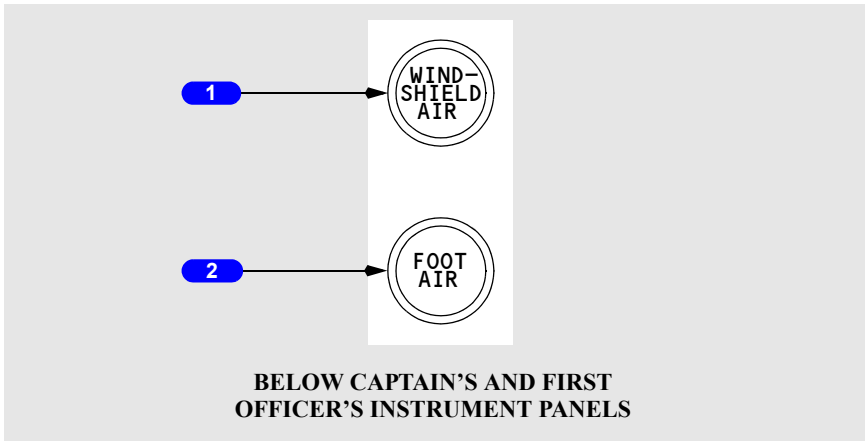
OFF – window heat not in use.

### 4 WINDOW HEAT Test Switch (spring-loaded to neutral)

OVHT – simulates an overheat condition.

RY T"VGUV"ó'r tqxkf gu'c"eqphf gpeg'vgu0P qvg-T ghgt'vq'Uwr r ngo gpvct { "Rtqegf wtgu  
 "....."hqt"Y kpf qy "J gcvVguv'r tqegf wtgu0"

## Windshield/Foot Air Controls



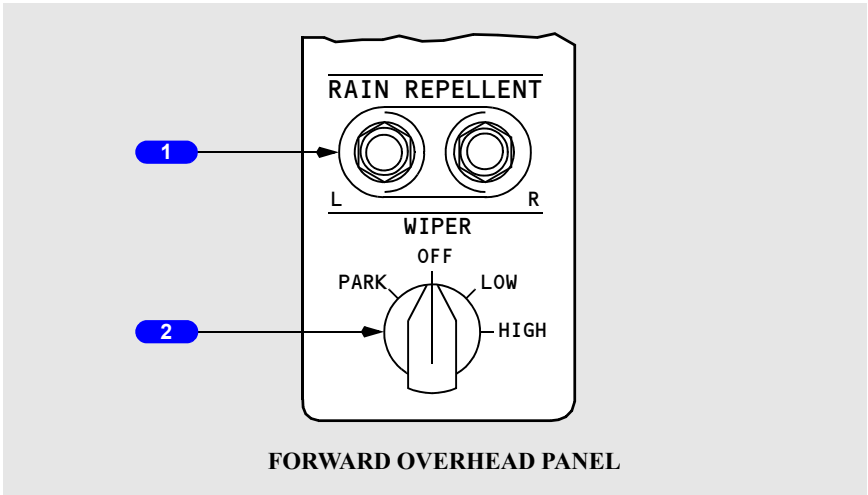
### **1** WINDSHIELD AIR Controls

PULL – supplies conditioned air to No. 1 windows for defogging.

### **2** FOOT AIR Controls

PULL – supplies conditioned air to pilots' leg positions.

## Windshield Wiper Panel



### 1 Rain Repellent Switches

Push – applies measured amount of repellent on related window 1.

### 2 Windshield WIPER Selector

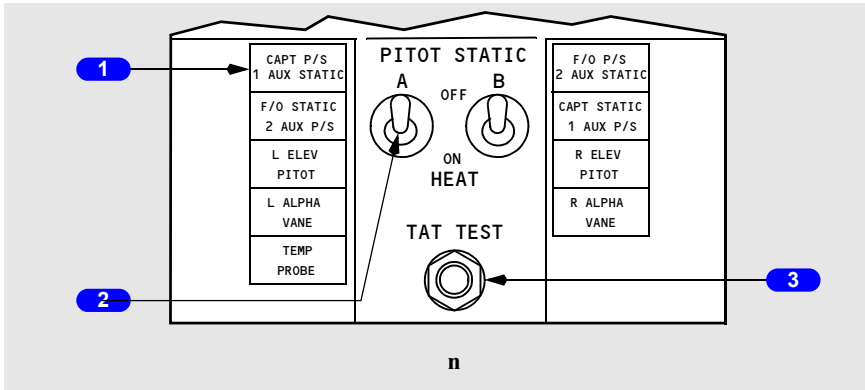
PARK – turns off wiper motors and stows wiper blades.

OFF – turns off wiper motors.

LOW – low speed operation.

HIGH – high speed operation.

## Pitot Static Heat Panel



### 1 Pitot Static Lights

Illuminated (amber) – related probe not heated.

### 2 PITOT STATIC Switches

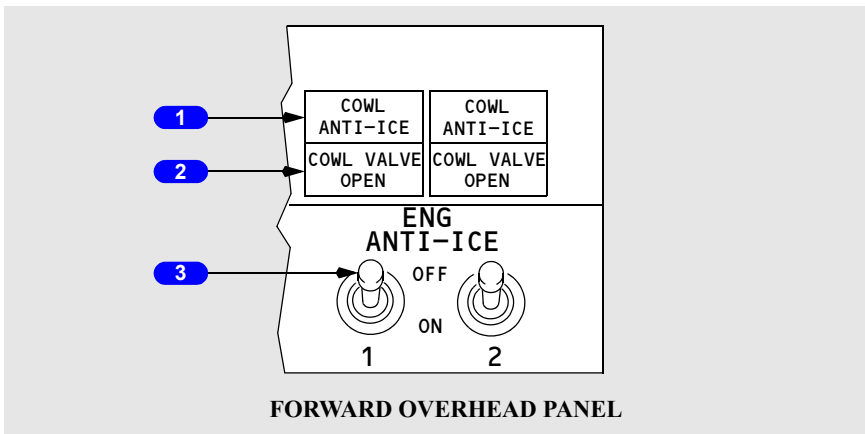
ON – power is supplied to heat related system.

OFF – power off.

### 3 TAT TEST Switch

Push (on ground) – power is applied to temp probe.

## Engine Anti-Ice Panel



### 1 COWL ANTI-ICE Lights

Illuminated (amber) – indicates an overpressure or overtemperature condition in duct downstream of engine cowl anti-ice valve.

### 2 COWL VALVE OPEN Lights

Illuminated (blue) –

- bright – related cowl anti-ice valve is in transit, or, cowl anti-ice valve position disagrees with related ENGINE ANTI-ICE switch position
- dim – related cowl anti-ice valve is open (switch ON).

Extinguished – related cowl anti-ice valve is closed (switch OFF).

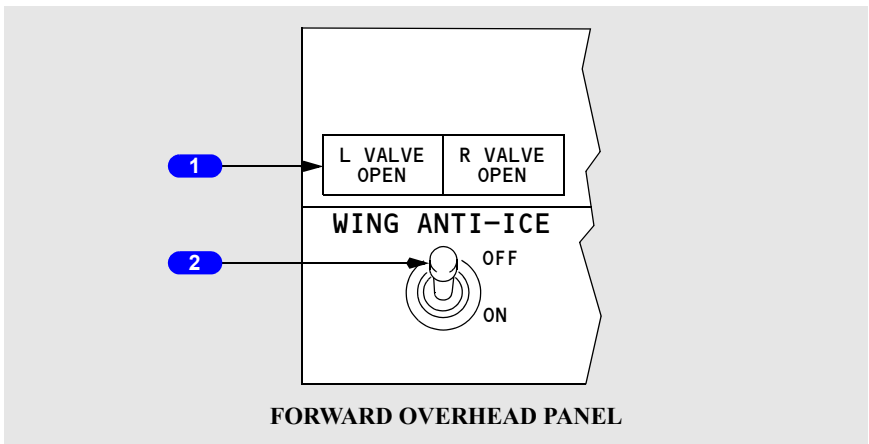
### 3 ENGINE ANTI-ICE Switch

ON – related engine anti-ice valve opens.

OFF – related engine anti-ice valve closes.

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## Wing Anti-Ice Panel



### 1 Wing Anti-Ice VALVE OPEN Lights

Illuminated (blue) –

- bright – related wing anti-ice control valve is in transit, or, related wing anti-ice control valve position disagrees with WING ANTI-ICE switch position
- dim – related wing anti-ice control valve is open (switch ON).

Extinguished – related wing anti-ice control valve is closed (switch OFF).

## **2 WING ANTI-ICE Switch**

OFF – wing anti-ice control valves close.

ON (in flight) – wing anti-ice control valves open.

ON (on the ground) –

- wing anti-ice control valves open if thrust on both engines is below takeoff warning setting and temperature inside both distribution ducts is below thermal switch activation temperature
- control valves close if either engine thrust is above takeoff warning setting or thermal switch is activated in either distribution duct. Switch remains ON
- switch trips OFF at lift-off.

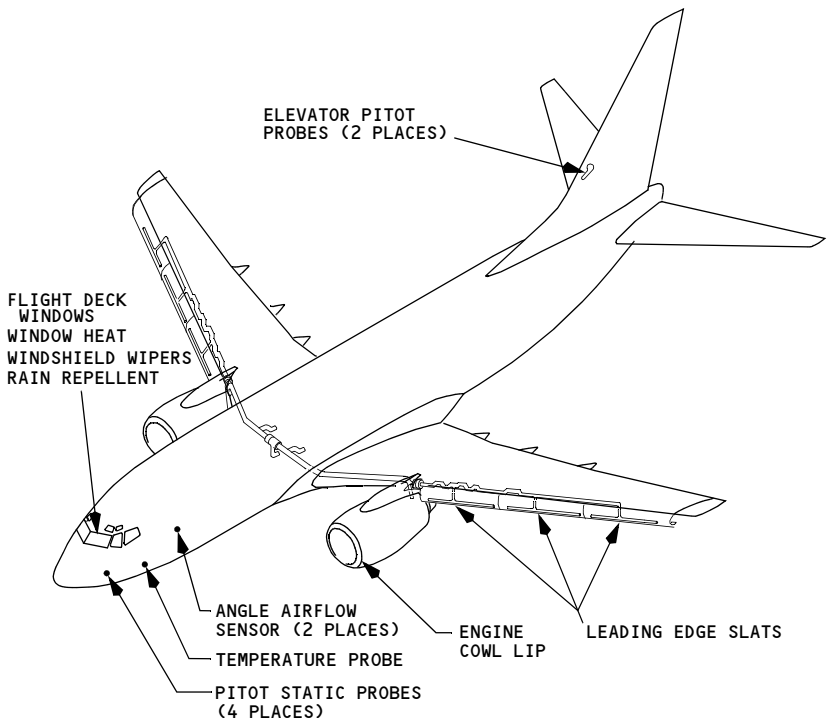
## Introduction 'q' Cp w/ Kg' ( 'T clp

Thermal anti-icing (TAI), electrical anti-icing, and windshield wipers are the systems provided for ice and rain protection.

The anti-ice and rain systems include:

- Flight Deck Window Heat
- Windshield Wipers and Rain Repellent
- Probe and Sensor Heat
- Engine Anti-Ice System
- Wing Anti-Ice System

## Anti-Ice Components Diagram



## **Flight Deck Window Heat**

Flight deck windows 1, 2, 4 and 5 consist of glass panes laminated to each side of a vinyl core. Flight deck window 4 has an additional vinyl layer and acrylic sheet laminated to the inside surface. Flight deck window 3 consists of two acrylic panes separated by an air space.

A conductive coating on the outer glass pane of windows 1 and 2 permits electrical heating to prevent ice build-up and fogging. A conductive coating on the inner glass pane of windows 4 and 5 permits electrical heating to prevent fogging. Window 3 is not electrically heated.

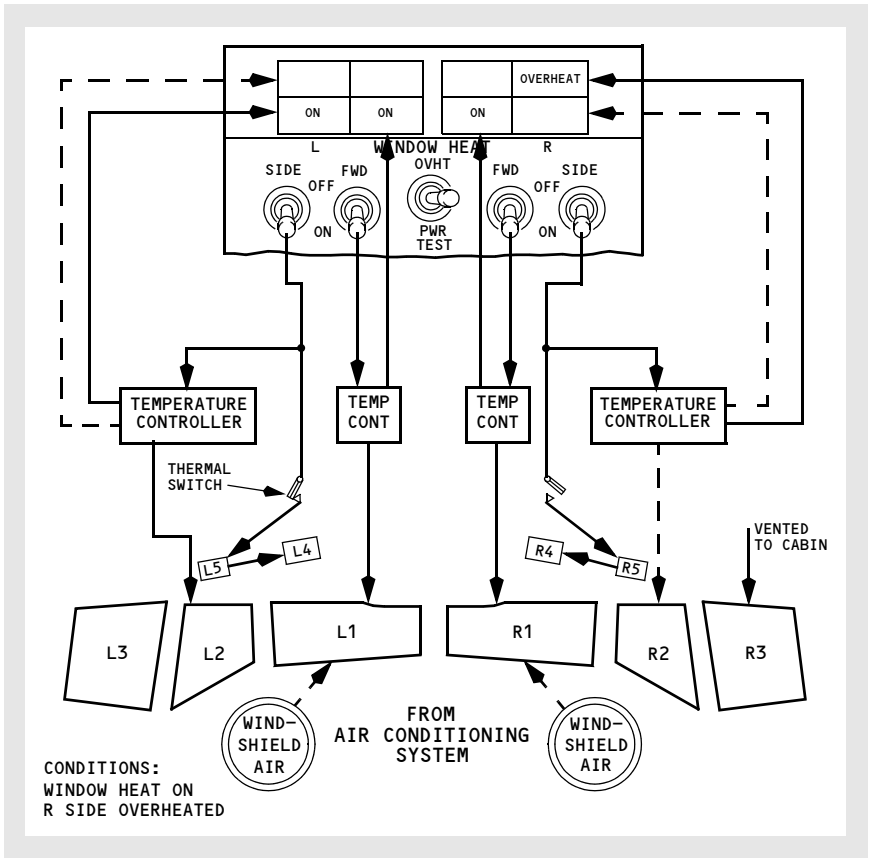
## **Flight Deck Window Heat Operation**

The FWD WINDOW HEAT switches control heat to window 1. The SIDE WINDOW HEAT switches control heat to windows 2, 4 and 5.

Temperature controllers maintain windows 1 and 2 at the correct temperature to ensure maximum strength of the windows in the event of bird impact. Power to windows 1 and 2 is automatically removed if an overheat condition is detected. A thermal switch located on window 5 opens and closes to maintain the correct temperature of windows 4 and 5.



## Flight Deck Window Heat Schematic



## Windshield Wipers and Rain Repellent

The rain removal system for the forward windows consists of windshield wipers and rain repellent. One windshield wiper is located on each No. 1 window. Each wiper is electrically operated by a separate system. Both wiper systems are controlled by a common switch. Each push of a rain repellent switch applies a measured amount of repellent on the related No. 1 windshield.

**CAUTION: Windshield scratching will occur if the windshield wipers are operated on a dry windshield.**

## Probe and Sensor Heat

All pitot-static probes, the total air temperature probe, and angle airflow sensors are electrically heated to prevent the formation of ice. Alternate static ports are not heated.

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## Engine Anti-Ice System

Engine bleed air thermal anti-icing prevents the formation of ice on the engine cowl lip. Engine anti-ice operation is controlled by individual ENG ANTI-ICE switches. The engine anti-ice system may be operated on the ground and in flight.

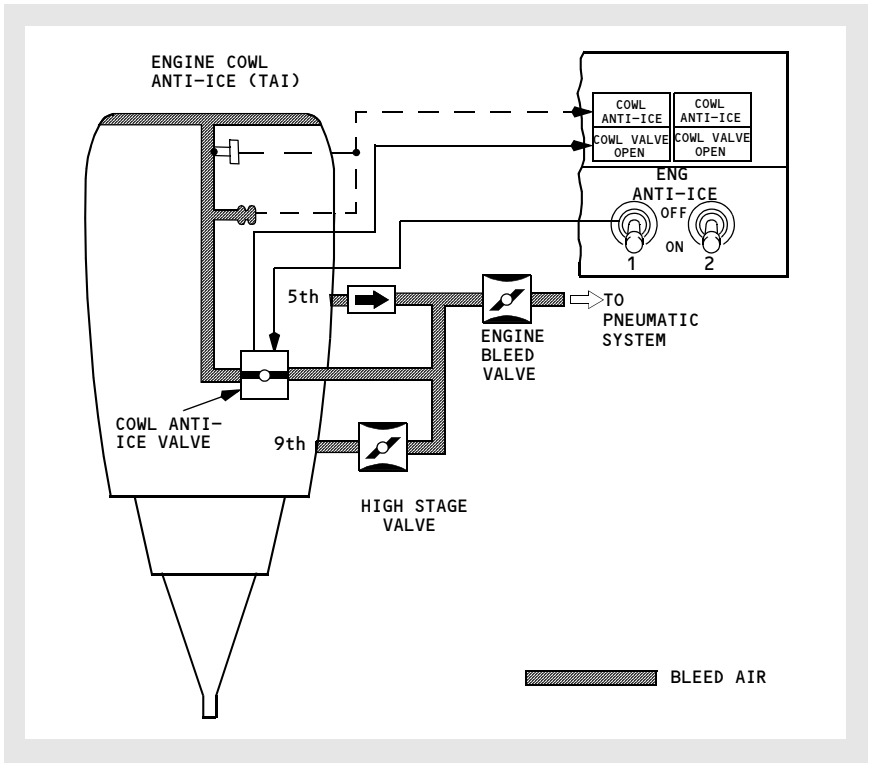
### Engine Anti-Ice System Operation

Each cowl anti-ice valve is electrically controlled and pressure actuated. Positioning the ENG ANTI-ICE switches to ON allows engine bleed air to flow through the cowl anti-ice valve for cowl lip anti-icing.

If the cowl anti-ice valve fails to move to the position indicated by the ENG ANTI-ICE switch, the COWL VALVE OPEN light remains illuminated bright blue.

The amber COWL ANTI-ICE light illuminates due to excessive temperature or pressure in the duct leading from the cowl anti-ice valve to the cowl lip.

## Engine Anti-Ice System Schematic



## Wing Anti-Ice System

The wing anti-ice system provides protection for the leading edge slats by using bleed air. The wing anti-ice system does not include the leading edge flaps.

The wing anti-ice control valves are AC motor-operated. With a valve open, bleed air flows to the leading edge slats through a telescoping duct, and is then exhausted overboard. The wing anti-ice system is effective with the slats in any position.

## Wing Anti-Ice System Operation

On the ground, positioning the WING ANTI-ICE switch ON opens both control valves if thrust on both engines is below the setting for takeoff warning activation and the temperature inside both wing distribution ducts is less than the thermal switch activation temperature.

Both valves close if either engine thrust is above the takeoff warning setting or either temperature sensor senses a duct overtemperature. The valves automatically reopen if thrust on both engines is reduced and both temperature sensors are cool.

With the air/ground sensor in the ground mode and the WING ANTI-ICE switch ON, the switch remains in the ON position regardless of control valve position. The WING ANTI-ICE switch automatically trips OFF at lift-off when the air/ground sensor goes to the air mode.

In flight, both control valves open when the WING ANTI-ICE switch is positioned ON. Duct temperature and thrust setting logic are disabled and have no affect on control valve operation in flight.

Valve position is monitored by the blue VALVE OPEN lights.

## Wing Anti-Ice System Schematic

