# Table of Contents

Page Intentionally Left Blank

# List of Figures

**Graphic Title** **Figure**

Page Intentionally Left Blank

## Introduction

The air conditioning system provides temperature-regulated conditioned air to the cockpit and passenger cabin using two air conditioning units (ACUs), commonly referred to as “packs”.

An electric cockpit heating system and an avionics cooling system are also provided.

Aircraft pressurization is accomplished by regulating the overboard discharge of the conditioned air through two outflow valves. The automatic pressurization system maintains cabin pressure to provide passenger comfort throughout all phases of flight within the limitations of the aircraft structure.

During unpressurized flight, ram air may be used to ventilate the cockpit and cabin.

# Air Conditioning System

## Description

The air conditioning system converts 10th-stage bleed air from the engines, APU, or an external source into temperature-regulated pressurized air for distribution to the cockpit and cabin.

The air conditioning system consists of two packs, a temperature control system, distribution ducting, and a ram air system for pack cooling and supplementary ventilation.

A single pack can provide sufficient air to cool and pressurize the aircraft.

## Components and Operation

### Packs

The packs are located in the aft equipment bay and are referred to as the left pack and right pack. The L (R) PACK switch/lights on the AIR CONDITIONING panel are used to operate the respective air conditioning pack.

The prime function of the packs is to produce cold air. Hot 10th-stage bleed air is cooled by heat exchangers and an air cycle machine (cold air unit) in each pack, and exits through a water separator as cold air. The packs also produce temperature-regulated conditioned air by mixing the cold air output of the pack with precooled 10th-stage bleed air.

The right pack normally operates from right engine bleed air and supplies the passenger cabin. The left pack normally operates from left engine bleed air and supplies the flight compartment and the passenger cabin.

In the event of a single-pack failure, the remaining pack can supply sufficient conditioned air to both compartments. The packs are monitored for overtemperature and overpressure conditions and have automatic protection for both cases.

The left pack is powered by the DC Essential Bus, and the right pack is powered by DC Bus 2. In the event of a double-generator failure when airborne, leading to deployment of the air-driven generator, the left pack remains operational, enabling continued flight at high altitude.

#### *Pressure Regulation*

When the L (R) PACK switch/light is pressed in, the corresponding pressure-regulating shutoff valve (ACU valve) allows bleed air from the 10th-stage manifold to enter the pack. The ACU valves operate in two different modes, low mode or high mode, according to the following conditions:

- Low Mode: bleed air supplied by the engines, both packs operating
- High Mode: airborne during single-pack operations or, on the ground with the APU supplying the bleed air

When in low mode, the ACU valves regulate pressure to 24 psi. In high mode, the ACU valves deliver 39.5 psi.

**NOTE**

If a pack failure occurs due to causes other than overpressure or overtemperature, then the failed pack switch/light must be de-selected in order for the remaining pack to operate in high mode.

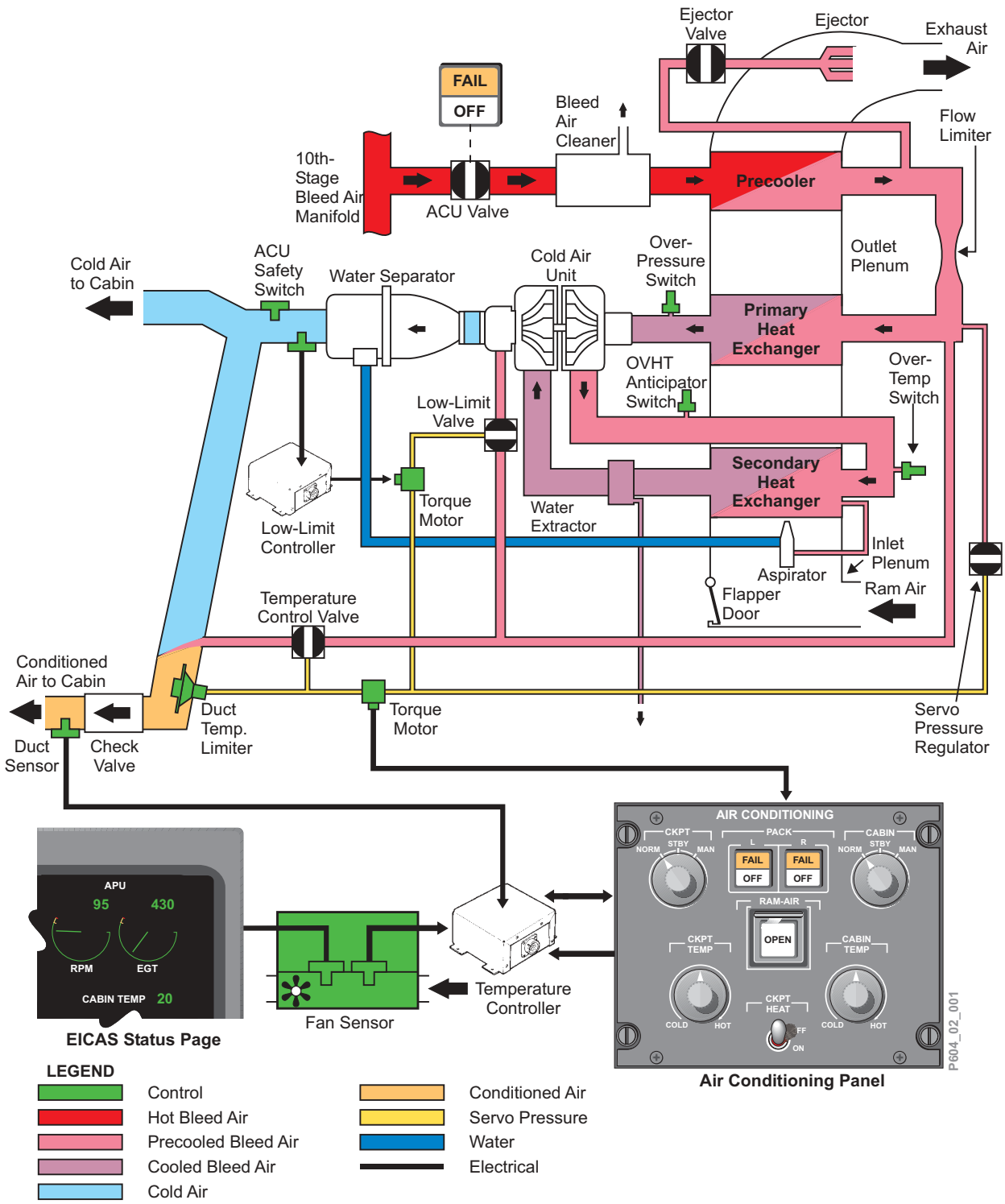
### *Pack Temperature and Pressure Protection*

Heat exchangers and an air cycle machine (cold air unit) are used to cool the bleed air as it flows through the pack. The temperature of the hot bleed air entering the pack is first reduced by the precooler heat exchanger and the primary heat exchanger. The pressurized air then enters the air cycle machine compressor, the secondary heat exchanger, and finally the air cycle machine turbine to complete the cooling process.

Pack discharge air temperature is controlled by the low-limit valve, which maintains the air cycle machine output just above freezing. The air then passes through the water separator, where water vapor is removed from the cold air prior to entering the cabin or cockpit distribution ducting.

Pack overtemperature monitoring is accomplished using a temperature sensor located in the ducting between the compressor of the air cycle machine and the secondary heat exchanger. Compressor outlet temperatures above the trip setting cause the pack to shut down automatically (by closing the pressure-regulating ACU valve), illuminating the FAIL annunciation in the affected L (R) PACK switch/light and displaying the L (R) PACK HI TEMP caution EICAS message. Once the pack has cooled, it can be re-selected.

Pack overpressure monitoring is accomplished by an overpressure switch in the output of the primary heat exchanger. An overpressure condition will cause the affected pack to shut down (by closing the pressure-regulating ACU valve). During an overpressure condition, the 10th-stage isolation valve and the applicable 10th-stage shutoff valve will also close automatically. A pack overpressure condition will illuminate the FAIL annunciation in the affected L (R) PACK switch/light and display the L (R) PACK HI PRESS caution EICAS message.




## Air Conditioning Pack - Schematic

*Figure 2-1*

## Temperature Control

Each pack has an identical but independently operated temperature control system. The left pack is controlled by the cockpit temperature control system and the right pack is controlled by the cabin temperature control system. Each controller subsystem is comprised of the following components:

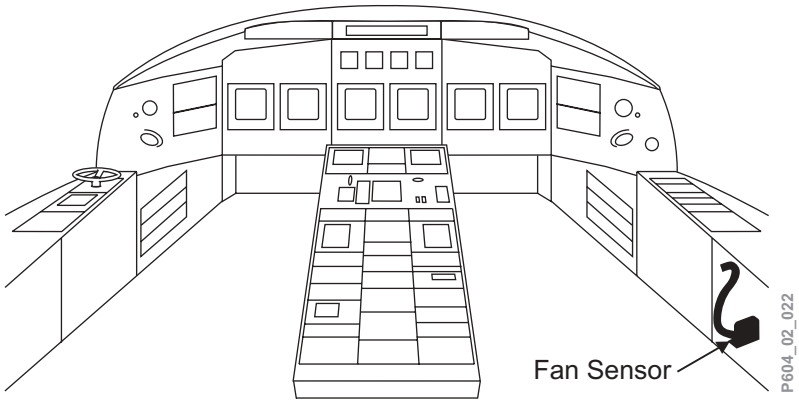
- fan sensor
- duct temperature sensor
- mode selector
- temperature selector
- temperature controller
- temperature control valve

### *Cabin and Cockpit Fan Sensors*

Each fan sensor consists of a vane axial fan and a circuit board which contains a control sensor and an indicator sensor. The fan draws air over the sensors. The sensed temperature is converted to an electrical signal and passed to the temperature controller. The temperature signal from the cabin fan sensor is used for the CABIN TEMP display on the EICAS status page.

**NOTE**

It is important to keep the area around the fan sensors free from objects and contaminants to ensure proper operation.




**Flight Compartment Fan Sensor**
***Figure 2-2***

### *Duct Temperature Sensors*

Each duct temperature sensor consists of two thermistor elements, exposed to duct airflow, within a probe-type housing. The sensor is connected to the temperature controller and provides one of the inputs for automatic temperature control.

### *Temperature Controller*

The temperature controllers monitor the cockpit or cabin temperature using the respective fan sensor, duct temperature sensor and the position of the temperature selector on the AIR CONDITIONING panel. The temperature controllers automatically modulate the temperature control valve to maintain the selected temperature when in NORM or STBY modes.

### *Mode Selectors*

The mode selector knobs to control temperature in the cockpit (CKPT) and passenger cabin (CABIN) are located on the AIR CONDITIONING panel and can be selected to NORM, STBY, or MAN modes.

### *NORM Mode*

In normal mode, the temperature controller provides automatic temperature control in the selected compartment, using inputs from the fan sensor, the duct sensor, and the temperature selector.

When there is more than a 3°F difference between the actual and selected temperature, the temperature control valve is commanded to full hot or full cold. When the actual and selected temperature is within 3°F, the duct temperature is controlled by modulating the temperature control valve to maintain the selected temperature. The NORM mode temperature control range is from 15°C to 32°C (60°F to 90°F).

### *STBY Mode*

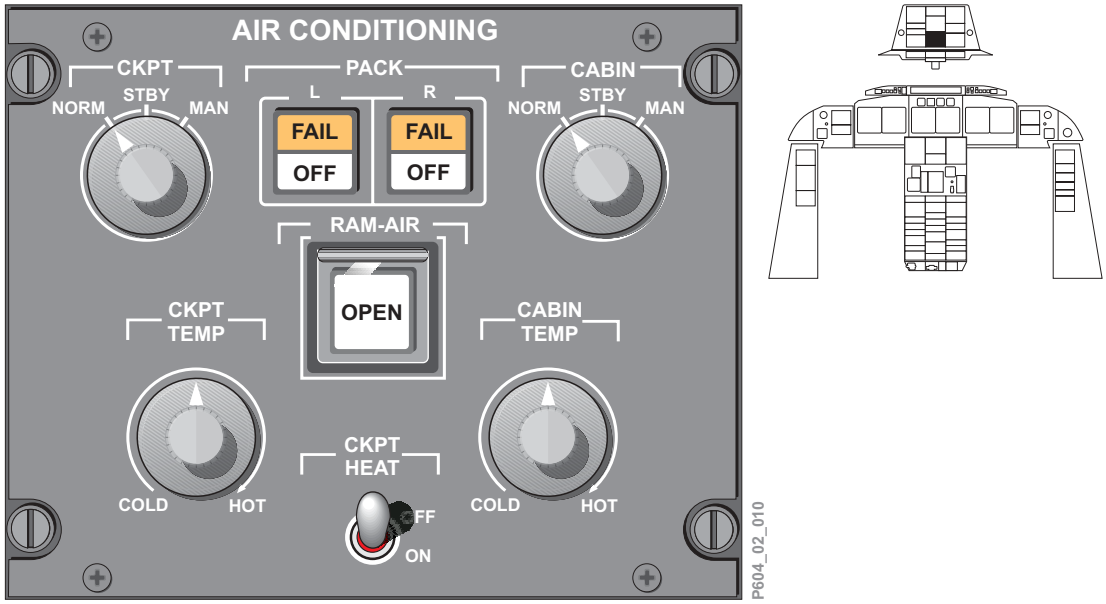
In standby mode, the temperature controller provides automatic temperature control in the selected compartment. The fan sensor is inhibited and the temperature controller uses inputs from the temperature selector and the duct sensor. The STBY mode temperature control range is is from 2°C to 85°C (35°F to 180°F).

### *MAN Mode*

When manual mode is selected, the flight crew directly commands the temperature control valve by adjusting the respective temperature selector on the AIR CONDITIONING panel.

### *Temperature Knobs*

The temperature selector knobs to control temperature in the CKPT and CABIN are located on the AIR CONDITIONING Panel. They are rotated to vary the desired cabin or flight compartment temperature within the selected mode limits.




**Air Conditioning Panel**
***Figure 2-3***

## Ram Air Scoop

Ram air, taken from the air scoop in the base of the vertical fin, is used as the cooling medium for the heat exchangers. Ram air passes across the precooler and the dual heat exchangers, extracting heat from the bleed air used by the air-conditioning packs. The ram air is discharged through exhaust louvers on the upper left and right sides of the aft fuselage.

During ground operations, when airflow through the ram air scoop is inadequate for cooling of the heat exchangers, an ejector valve opens automatically and draws ambient air from the aft equipment bay for use in the heat extraction process. The ejector valve may also be automatically commanded open in flight if insufficient pack cooling is detected.

### Ram Air Valve

If both packs are inoperative (unpressurized flight), the ram air valve can be opened to allow air from the ram air scoop to enter the mixing manifold and ventilate the cockpit and the passenger cabin. The ram air valve is controlled by the RAM-AIR switch/light located on the AIR CONDITIONING panel. The white OPEN legend will illuminate when the valve is opened.

**NOTE**

An airspeed of 250 KIAS is recommended during cruise to provide sufficient airflow to passengers within the cabin.

### Air Conditioning Distribution

#### *Cold Air*

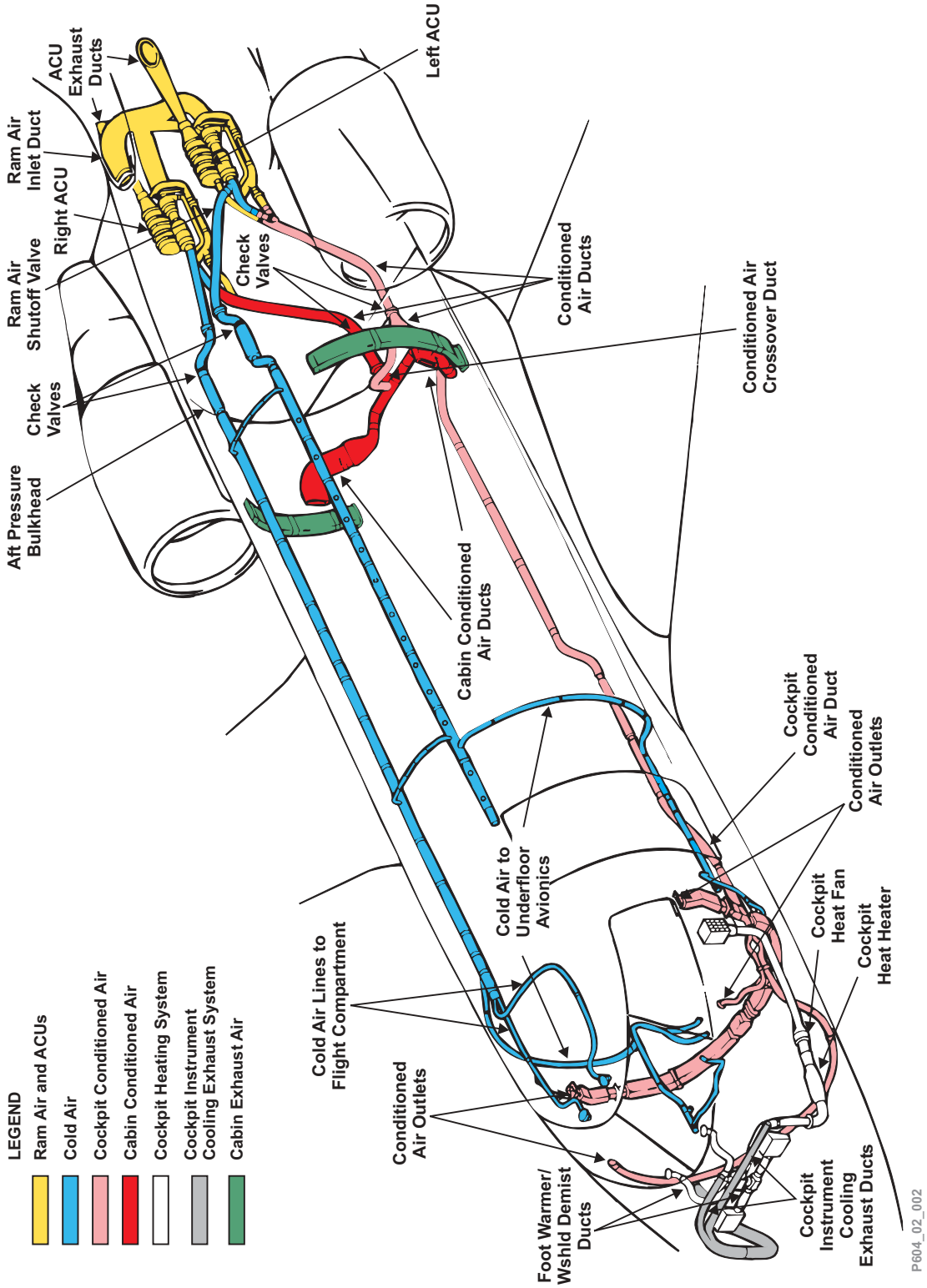
Cold air from the right pack is ducted via a check valve on the aft pressure bulkhead, through flexible insulated ducts, to each passenger position along the right cabin and to the cockpit. Cold air is also drawn from these ducts and routed below the cabin floor to cool the avionics equipment. The cold airflow in the cockpit is divided to supply the pilot's and copilot's adjustable cold air vents on the overhead panel.

Cold air from the left pack is similarly ducted to the left cabin cold air outlets and to the avionics bay. Crossover ducts allow a cold air supply to both sides of the cabin, the cockpit area, and for avionics cooling, from one pack if necessary.

#### *Conditioned Air*

The cabin requires a greater volume of conditioned air than the cockpit. To achieve this, 100% of the right pack's conditioned air, and 40% of the left pack's conditioned air, is ducted to the cabin. The remaining 60% of the left pack's output is ducted to the cockpit.

A balancing valve is located in each branch of the cabin conditioned air duct. The balancing valves are used to balance the airflow between left and right sides of the cabin and between cabin and cockpit. Conditioned air is vented into the cabin area by ducting located below the windows on either side of the fuselage. In the cockpit, the conditioned air is supplied to both sides through outlets located on both side consoles and adjustable gasper vents located on both side panels.




**Air Conditioning Distribution**

*Figure 2-4*

# Cockpit Heat

## Description and Operation

The cockpit heat (CKPT HEAT) switch on the AIR CONDITIONING panel controls a fan, an electric heating element, and a duct temperature sensor mounted on the exhaust duct of the heater. The fan, mounted under the left-hand side of the cockpit floor, forces air through the heating element. The temperature sensor monitors the duct temperature and controls power to the heating element to maintain outlet temperature at 38°C to 49°C (100°F to 120°F). The heated airflow can be distributed to either the foot warmer manifold or the windshield demist manifold, or at half flow rate to both, by use of the DEMIST knob on the right side panel.

### *Fan Speed Protection*

If the fan fails to attain 60% or more of its rated speed within 2 seconds of activation, the fan and heater will shut down. During operation, if the fan speed drops below 60% for more than 2 seconds, the fan and heater will shut down, and a white CKPT HEAT FAN FAIL status message will be displayed on the EICAS.

### *Overtemperature Protection*

If the temperature in the heater element reaches approximately 65°C (150°F), the thermal safety switch will deactivate the heater. The fan will continue to operate to dissipate heat and, as the element cools, the system will reset automatically.

## Avionics Cooling System

### Description and Operation

The underfloor avionics bay is cooled by a combination of cockpit exhaust air and a portion of the cold air output from each pack. Electronic displays and instruments in the flight compartment instrument panel, control panels, and display units in the center pedestal, and some of the electronic units in the underfloor avionics bay (e.g., IRUs, DCUs) are cooled with recirculated air from their integral fans. In addition, an automatic cooling system, with its own fan, draws hot air from behind the flight compartment instrument panel and exhausts it under the copilot's seat area. All fans activate automatically when AC power is applied to the airplane.

If the cockpit instrument exhaust fan drops to less than 60% of its rated speed when cooling is demanded, an EXHAUST FAN FAIL status EICAS message will be displayed. This message extinguishes when fan speed recovers or when cooling is no longer demanded.

The DISPLAY COOL FAIL status EICAS message will be displayed when any individual EFIS or EICAS display fan has failed. Continued operation of an EFIS or EICAS display with a failed fan may result in a display overtemperature. This is indicated by the raster image (e.g., PFD sky/ground color) being removed from the display and a red DISPLAY TEMP annunciation appearing on the affected display.

# Pressurization System

## Description

Cabin pressurization is achieved by controlling the leakage rate, or outflow, of cabin air of the aircraft through two outflow valves. The outflow valves are located on the aft pressure bulkhead and are normally controlled by the Cabin Pressure Controller (CPC).

During normal operation, the pressurization system automatically maintains cabin pressure through all phases of flight. The flight crew only needs to set the landing field elevation and baro-correction input. Controls are provided on the CABIN PRESSURIZATION panel, and indications are on the EICAS status page and standby cabin altimeter.

## Components and Operation

### Outflow Valves

Dual, redundant, electropneumatic, poppet-type outflow valves, identified as primary and secondary, are installed on the aft pressure bulkhead. The outflow valves are spring-loaded closed and modulate open when vacuum pressure is applied to an internal diaphragm. A jet pump fed by 10th-stage bleed air uses venturi action to provide a source of vacuum to operate the primary and secondary outflow valves for both automatic (electropneumatic) and manual (pneumatic) operation.

Both primary and secondary outflow valves are slaved through a pneumatic line. The outflow valves respond to electrical control signals in the automatic mode, or pneumatic inputs via the manual regulators on the CABIN PRESSURIZATION panel in manual mode.

#### *Automatic Mode*

In automatic mode, the outflow valves are electropneumatically controlled and operated to set and maintain the aircraft pressurization schedule. The CPC provides electrical commands which regulate the amount of vacuum applied in order to modulate the opening of the primary outflow valve. The secondary valve is slaved to the primary outflow valve.

#### *Manual Mode*

In manual mode, control of pressurization is scheduled by manually varying the amount the vacuum sends to the secondary outflow flow valve. The primary valve is slaved to the secondary outflow valve.

### *Differential Pressure Schedule*

The outflow valves operate to maintain a differential pressure from 0 to 8.8 psid according to a predetermined schedule. Should a differential pressure of 9.1 ± 0.1 psid be sensed, the outflow valves will automatically open to relieve excess pressure. Whenever the cabin differential pressure exceeds 9.0 psid, the DIFF PRESS warning EICAS message will be displayed and the “CABIN PRESSURE” aural warning will sound.

Should pressure of the fuselage reduce to -0.5 psid, the outflow valves will automatically open to equalize the pressure.

### *Cabin Altitude Limiter*

Each outflow valve includes an altitude limiter to prevent the cabin altitude from exceeding a preset limit.

### *On aircraft 5301-5366 and aircraft pre SB 604-21-004*

If cabin altitude reaches approximately 13,000 feet ± 500 feet, the altitude limiter closes the outflow valves to maintain the cabin altitude at 13,000 ± 500 feet, provided sufficient air is entering the cabin to maintain this level.

### *On aircraft 5367 and subsequent and aircraft post SB 604-21-004*

The cabin altitude limiter preset limit is set to 14,500 feet ± 500 feet.

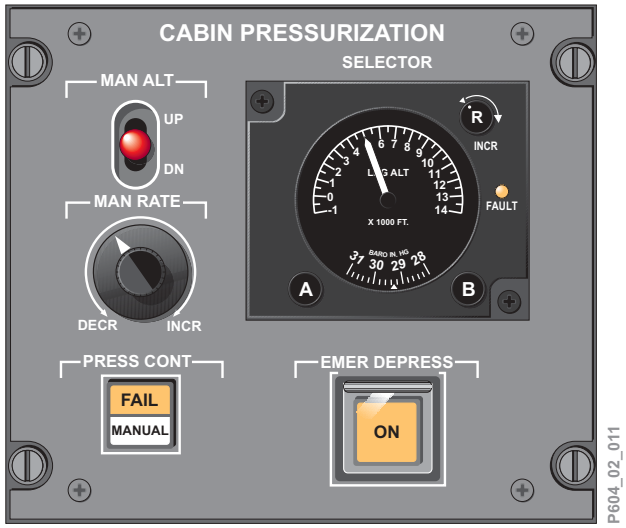
## Cabin Pressurization Panel

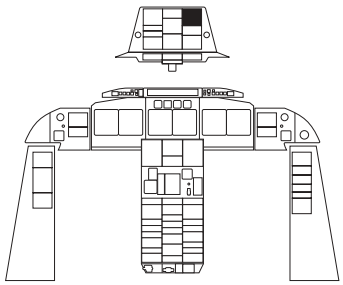
The automatic and manual pressurization controls are located on the overhead CABIN PRESSURIZATION panel. Pilot input to the cabin pressure controller for automatic mode operation is made through the cabin pressure selector which includes:

- landing field elevation (A knob)
- landing field barometric pressure (B knob)
- cabin altitude rate-of-change (R knob)

A yellow FAULT light illuminates to indicate automatic pressurization system failure.

The PRESS CONT switch/light allows selection of manual or automatic control of the pressurization system. Cabin pressurization in manual mode is accomplished by the MAN ALT and MAN RATE controls.



**Cabin Pressurization Panel**

***Figure 2-5***

## Cabin Pressure Acquisition Module

The cabin pressure acquisition module (CPAM) provides the data concentrator units (DCUs) with pressurization data for display on the EICAS.

EICAS indications include:

- Cabin Altitude (C ALT)
- Cabin Rate of Climb or Descent (RATE)
- Differential Pressure (Δ P)

The CPAM also provides the DCUs with data to generate the following EICAS messages:

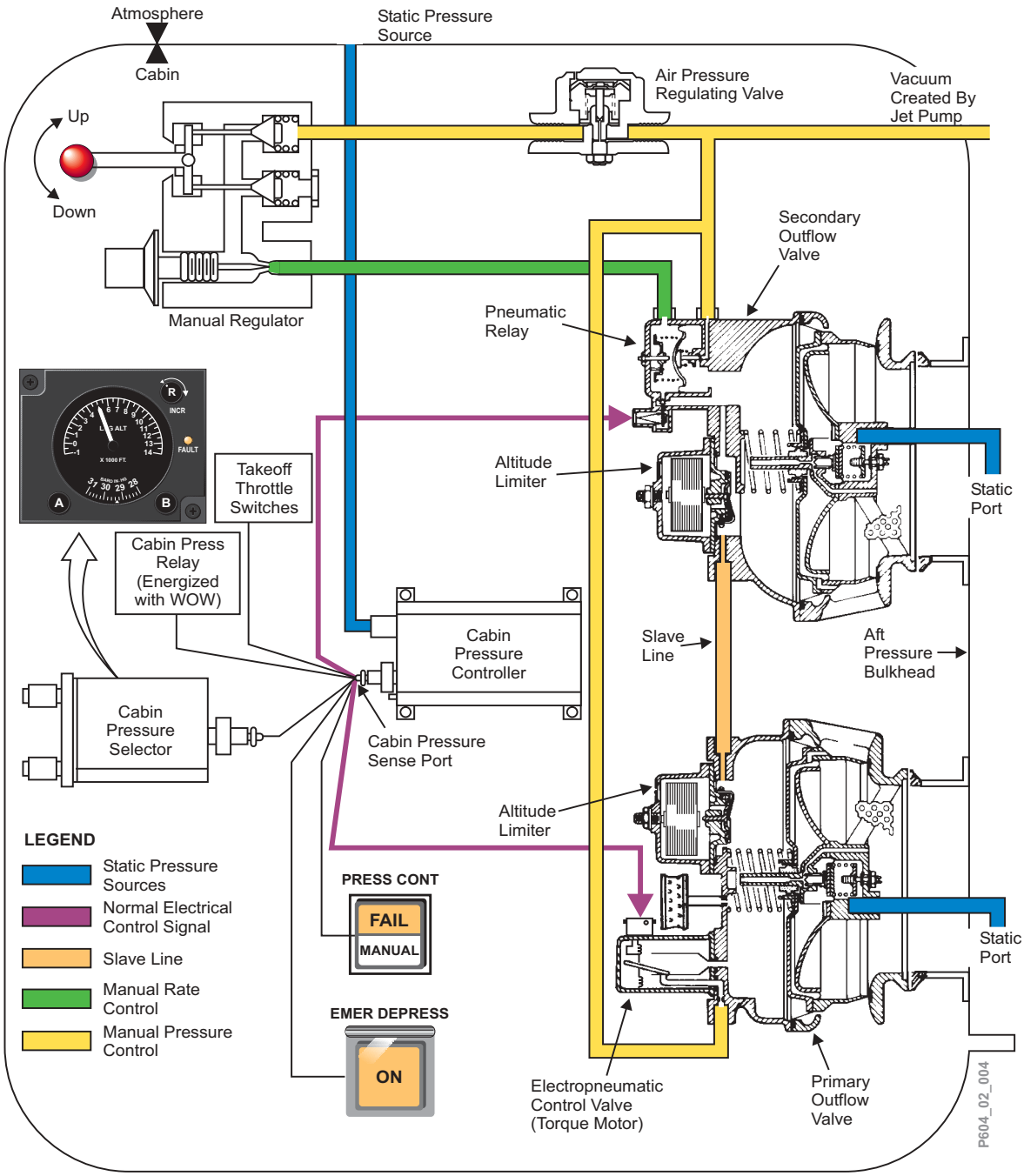
- CABIN ALT caution message
- CABIN ALT warning message

If PASS SlGNS switches are selected to AUTO, the CPAM will cause the NO SMKG and SEAT BLTS signs to illuminate when the airplane's cabin altitude exceeds 10,000 feet.

If the CPAM fails, the CPAM FAIL caution EICAS message will be displayed and all of the above functions will be lost. The standby cabin altitude indicator located on the center instrument panel can then be used to monitor the cabin altitude.

**NOTE**

Failure of the CPAM does not affect the operation of the Cabin Pressure Controller.




## Cabin Pressurization Schematic

*Figure 2-6*

## Cabin Pressure Controller (CPC)

The cabin pressure controller (CPC) controls all phases of pressurization in the automatic mode. The CPC receives and processes inputs from the S3 static port (ambient pressure), cabin pressure acquisition module (CPAM), cabin pressurization selector, thrust levers, and weight-on-wheels relays to automatically control pressurization.

During automatic mode operation, the flight crew tasks are normally limited to selection of a landing field elevation prior to takeoff, and making certain that the proper barometric correction is made before landing.

If the CPC fails, both outflow valves will go to an isobaric hold mode to maintain the existing cabin altitude. When a CPC failure occurs, the AUTO PRESS caution EICAS message appears, the amber FAULT light located on the cabin pressure selector and the FAIL annunciator on the PRESS CONT switch/light illuminate.

The CPC automatic pressurization modes are:

- ground mode
- prepressure mode
- takeoff abort mode
- flight mode
- flight abort mode
- landing mode
- touch-and-go mode
- high-altitude airfield mode (On aircraft 5367 and subsequent and aircraft post SB 604-21-004)

### *Ground Mode*

The ground mode drives both outflow valves fully open to provide maximum ventilation on the ground.

### *Prepressure Mode*

The prepressurization mode is activated when thrust levers are advanced to takeoff when the aircraft is on the ground. Prepressurizing the aircraft allows the outflow valves to achieve a controlling position prior to takeoff. This eliminates any noticeable pressure bumps. The cabin is pressurized between -150 to -200 feet below airfield elevation at the selected rate limit (approximately 300 feet per minute at the PIP mark).

### *Takeoff Abort Mode*

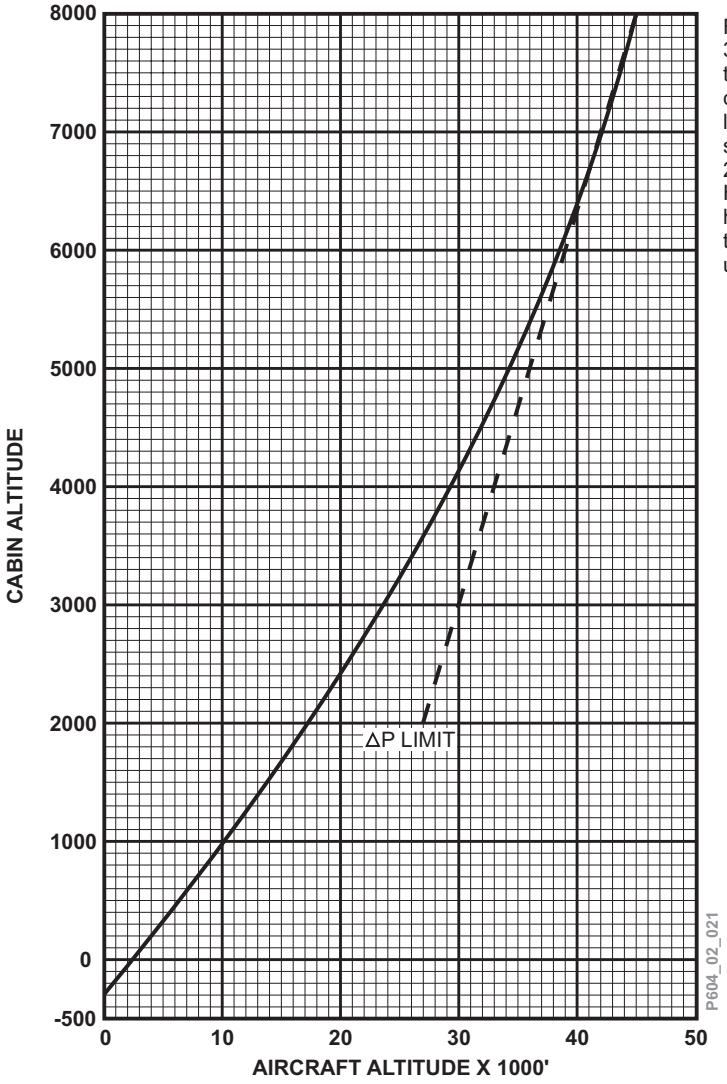
The takeoff abort mode is entered when the thrust levers are retarded during a rejected takeoff. The cabin altitude climbs back to field elevation at 500 feet per minute for 20

seconds, then the outflow valves are driven fully open. Ground mode is then re-established.

### *Flight Mode*

Flight mode is entered when the CPC receives a weight-off-wheels signal from the PSEU. A fixed schedule of cabin altitude versus aircraft altitude is used to establish cabin pressurization. The CPC selects whichever is higher, selected landing field elevation or fixed schedule, as the control value, then either maintains or drives cabin altitude toward this control value.

With the auto RATE knob selected at the PIP mark (▼), the cabin rate will climb at a rate of 500 feet per minute up, or descend at a rate of 300 feet per minute down.




For example, at an aircraft altitude of 35,000 feet, the cabin altitude as per the autoschedule is 5,200 feet. The controller will also monitor the selected landing altitude. If the landing altitude selected is less than 5,200 feet (say 2,000 feet) the controller will ignore it. However, if cabin altitude is selected higher than 5,200 feet (say 6,000 feet) the controller will drive cabin altitude up to the higher altitude (6,000 feet).

**Cabin Pressurization Schedule**

***Figure 2-7***

### *Flight Abort Mode*

#### *On aircraft 5301-5366 and aircraft pre SB 604-21-004*

The CPC will maintain the cabin altitude at the takeoff field elevation, when that field elevation is higher than the fixed cabin pressure schedule, until 60 seconds after the airplane is at cruise altitude.

#### *On aircraft 5367 and subsequent and aircraft post SB 604-21-004*

The flight abort mode is set by the CPC when:

- less than 10 minutes have elapsed since takeoff, and
- aircraft has climbed less than 6000 feet, and
- descent is detected by the CPC (aircraft descends by more than 1000 feet from its maximum altitude)

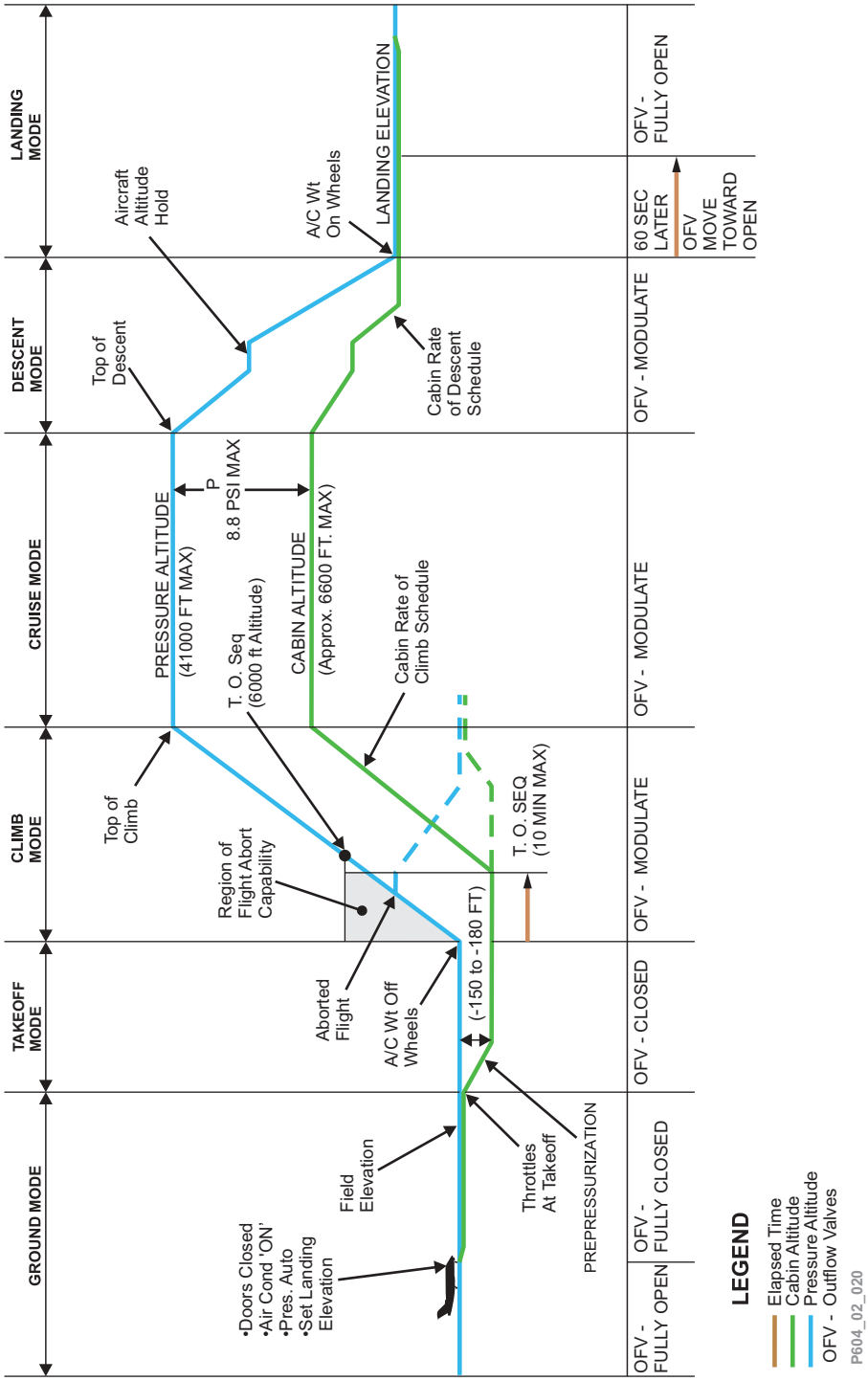
When the CPC sets the flight abort mode, it automatically drives the cabin altitude to takeoff field elevation, at the selected up/down rate.

### *Landing Mode*

The landing mode is entered when the CPC receives a weight-on-wheels signal from the PSEU and the thrust levers are at idle. The cabin altitude is driven up at the selected rate for 60 seconds, and then the CPC reverts to ground mode (outflow valves are driven fully open).

### *Touch-and-Go Mode*

On airplane touchdown, the system will assume landing mode. As the thrust levers are advanced, the system will schedule prepressure mode.




**Typical Flight Pressurization Profile**
**(Aircraft 5367 and Subsequent Aircraft Post SB 604-21-004)**
*Figure 2-8*

### *High-Altitude Airfield Mode*

#### *On aircraft 5367 and subsequent and aircraft post SB 604-21-004*

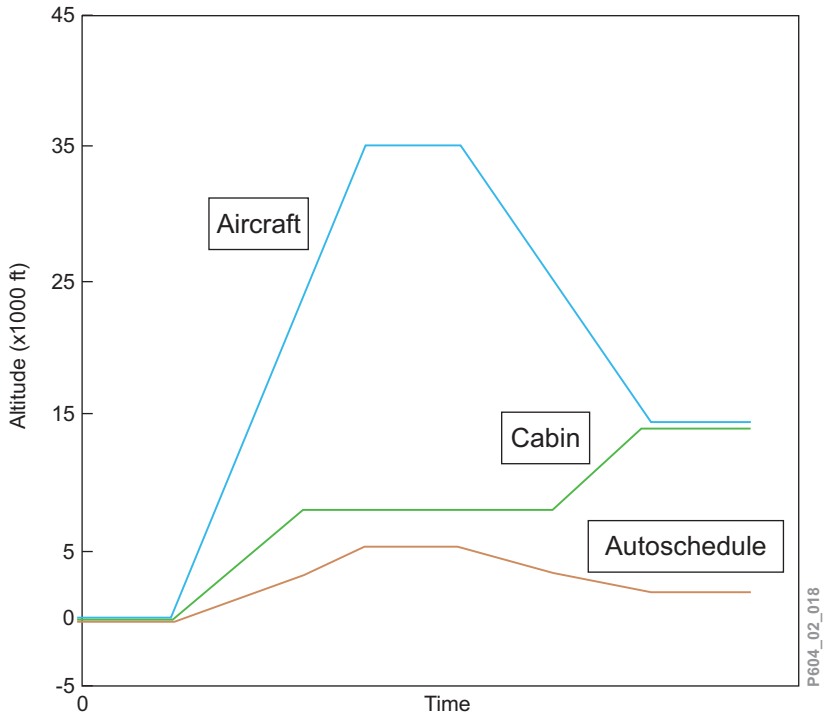
The CPC includes a high-altitude airfield mode to support aircraft operation up to a maximum airport pressure altitude of 14,000 feet MSL.

During takeoff and landing at airport pressure altitudes above 8000 feet, the CPC reduces the time at which cabin altitude exceeds 8000 feet as explained below:

#### *Operation to a High-Altitude Airfield (Above 8000 feet)*

When a landing field elevation above 8000 feet is selected, the CPC will schedule cabin altitude versus aircraft altitude as follows:

- Climb Phase: After takeoff, the CPC uses 8000 feet as the control point. With the auto RATE knob selected at the PIP mark, the cabin rate will climb at a rate of 500 feet per minute up until it reaches 8000 feet
- Cruise Phase: The CPC maintains the cabin altitude at 8000 feet
- Landing Phase: When the aircraft is in descent and aircraft altitude is less than 25,000 feet MSL, the CPC will climb the cabin altitude to the selected landing field elevation at an increased rate (700 feet per minute at the PIP mark). This altitude is maintained for the remainder of the flight




**Takeoff at Sea Level to Land at 14,000 feet**

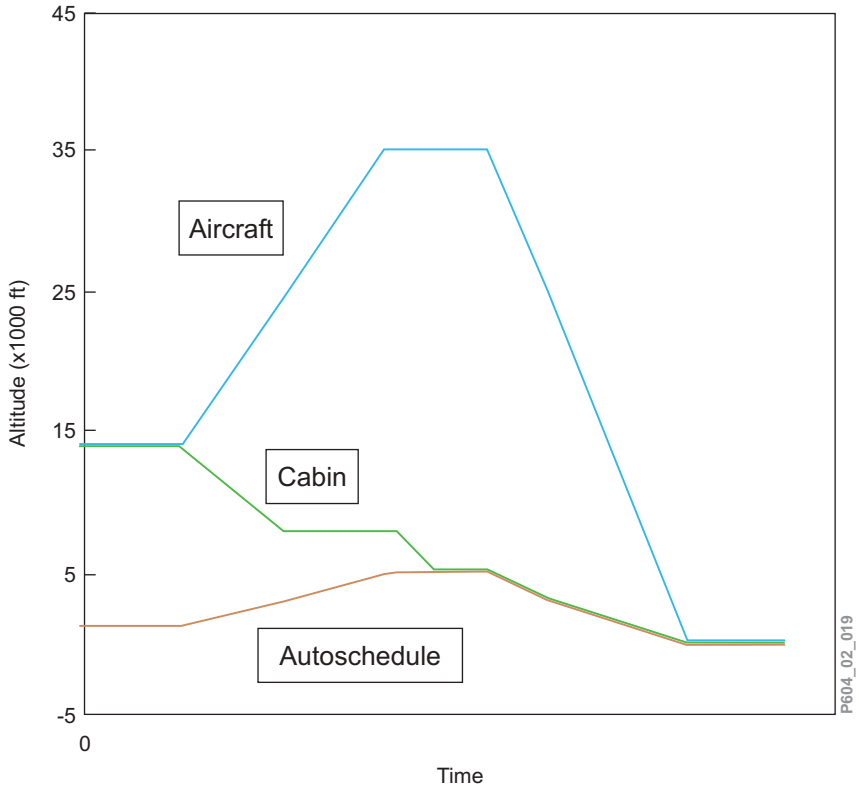
***Figure 2-9***

### *Operation from a High-Altitude Airport (Above 8000 feet)*

When departing from an airport above 8000 feet, the CPC will schedule cabin altitude versus aircraft altitude as follows:

Climb Phase: After takeoff, the CPC immediately sets the cabin altitude control point to 8000 feet and descends the cabin altitude at an increased rate (600 feet per minute with the auto RATE knob selected at the PIP mark) until it reaches 8000 feet.

Cruise Phase: The cabin altitude remains at 8000 feet until the aircraft is established in cruise. The CPC then controls the cabin altitude toward the autoschedule control point at the selected rate.




**Takeoff at 14,000 feet to Land at Sea Level**

***Figure 2-10***

### *Operation From and To a High-Altitude Airport (Above 8000 feet)*

For operation from and to airfields above 8000 feet, the cabin altitude profile can be obtained by combining Figure 2-9 and Figure 2-10.

### Manual Pressurization Mode

When MANUAL is selected on the CABIN PRESSURIZATION control panel, the outflow valves are manually controlled. The MAN ALT lever and the MAN RATE knob on the CABIN PRESSURIZATION control panel are used to position the outflow valves. An UP selection on the MAN ALT lever will cause an increase in cabin altitude at the rate selected on the MAN RATE knob. A DN selection of the MAN ALT lever will cause the cabin altitude to decrease at the rate set by the MAN RATE knob. When the MAN ALT lever is released, it is spring-loaded to the neutral position and the cabin altitude will be maintained regardless of changes to the aircraft altitude.

When manual pressurization is selected, pressurization data is reproduced on the EICAS primary page.

### Emergency Depressurization

Electrical signals from the EMER DEPRESS switch command both outflow valves to open in order to rapidly depressurize the aircraft.

#### *On aircraft 5301-5366 and aircraft pre SB 604-21-004*

If the airplane is above 13,000 feet, the altitude limiters operate to prevent cabin attitude from exceeding 13,000 ± 500 feet (if conditioned air is still available).

If the airplane altitude is below 13,000 feet, the airplane will depressurize.

#### *On aircraft 5367 and subsequent and aircraft post SB 604-21-004*

The altitude limiters operate to prevent cabin altitude from exceeding 14,500 ± 500 feet (if conditioned air is still available).

### Pressure Differential Diaphragms

Pressure differential diaphragms are incorporated into the cabin floor structure to prevent floor buckling in the event of rapid decompression. The diaphragms open to equalize floor pressure when the difference in pressure between the overfloor and underfloor areas exceeds 3 psid.

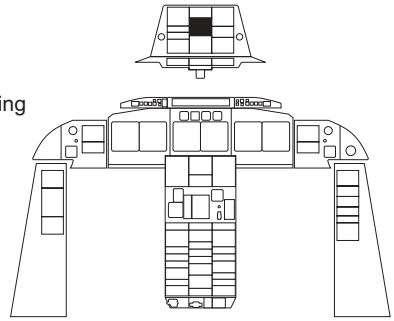
## Controls and Indicators

The air conditioning panel is located on the overhead panel and has separate cockpit and cabin controls that can be operated in normal, standby and manual modes.

Warning, caution, advisory, and status messages are presented on the Engine Indication and Crew Alerting System (EICAS). Cabin temperature and pressurization information is also presented through EICAS.

The pressurization control panel is located on the overhead panel and has automatic and manual methods for controlling the airplane's cabin pressure.

## Air Conditioning System

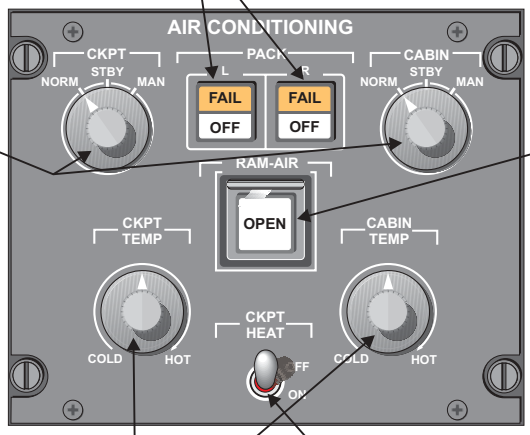


**L (R) PACK Switch/Light (alternate-action)**
**Press** - Opens associated pack pressure regulating shutoff valve
**OFF Light**
Illuminated - Indicates associated pack pressure regulating shutoff valve is closed
**FAIL Light**
Illuminated - Indicates associated pack failure (overtemperature, overpressure, pack pressure regulating shutoff valve failed open)

**CKPT and CABIN Temperature Mode Selector**
**NORM**
- Provides automatic control of temperature in selected compartment using fan and duct sensor inputs
- Selectable temperature range is from 15ºC to 32ºC (60ºF to 90ºF)

**STBY**
- Provides automatic control of temperature in selected compartment using duct sensor inputs only
- Selectable temperature range is from 2ºC to 85ºC (35ºF to 180ºF)

**MAN**
- Provides manual control of temperature in selected compartment
- Selectable temperature range is from 2ºC to 93ºC (35ºF to 200ºF)




**RAM-AIR Switch/Light (guarded, alternate-action)**
**Press** - Opens ram air shutoff valve
**OPEN Light**
Illuminated - Indicates ram air shutoff valve is open

**CKPT and CABIN Temperature Selector**
**Rotate** -
- Selects desired temperature in selected compartment
- Temperature range is dependent on selected mode

**CKPT HEAT Switch**
**OFF** - Turns off cockpit heat system off
**ON** - Turns on cockpit heater and fan

### Air Conditioning Panel
*Figure 2-11*

## Pressurization System

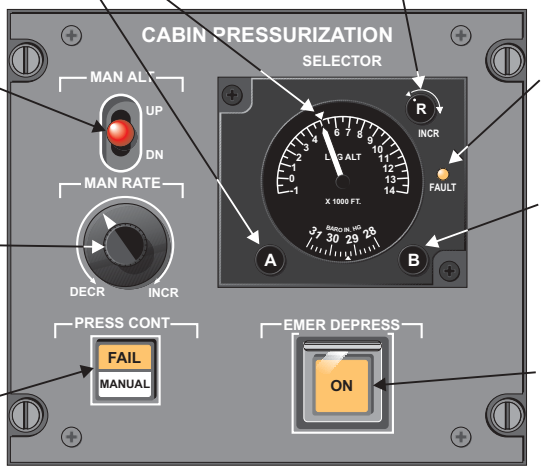
**Airport Elevation Selector and Pointer**
**Rotate -**
- Adjusts landing airport elevation
- *On aircraft 5301-5366 and aircraft pre SB 604-21-004*
  Range is from -1,000 to 10,000 ft
- *On aircraft 5367 and subsequent and aircraft post SB 604-21-004*
  Range is from -1,000 to 14,000 ft

**Rate Selector**
**Rotate -**
- Adjusts the cabin rate of climb and descent commanded by the Cabin Pressure Controller (CPC)
- Selectable from 0-2500 FPM UP and 0-1500 FPM DOWN
- PIP position (▲) corresponds to 500 FPM UP and 300 FPM DOWN

**MAN ALT Selector (spring-loaded to the center position)**
**UP** - Commands cabin climb when in manual mode
**DOWN** - Commands cabin descent when in manual mode

**MAN RATE Selector**
**Rotate** - Adjusts cabin climb and descent rate when in manual mode

**PRESS CONT Switch/Light (alternate-action)**
**Press** - Selects manual pressurization mode
**MANUAL Light**
**Illuminated** - Indicates manual pressurization mode is selected
**FAIL Light**
**Illuminated** - Indicates Cabin Pressure Controller (CPC) failure

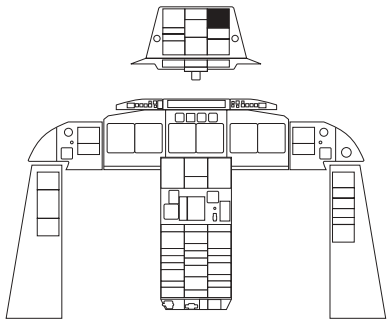



**FAULT Light**
**Illuminated** - Indicates Cabin Pressure Controller (CPC) failure

**Barometric Selector and Pointer**
**Rotate** - Adjusts landing airport barometric pressure in inches Hg

**EMER DEPRESS Switch/Light (guarded, alternate-action)**
**Press** - Commands both outflow valves to full open
**ON Light**
**Illuminated** - Indicates EMER DEPRESS switch/light has been selected

Note: Cabin altitude will increase up to the cabin altitude limiter set point.




**CABIN PRESSURIZATION SELECTOR (On aircraft 5301-5366 and not incorporating SB 604-21-004)**

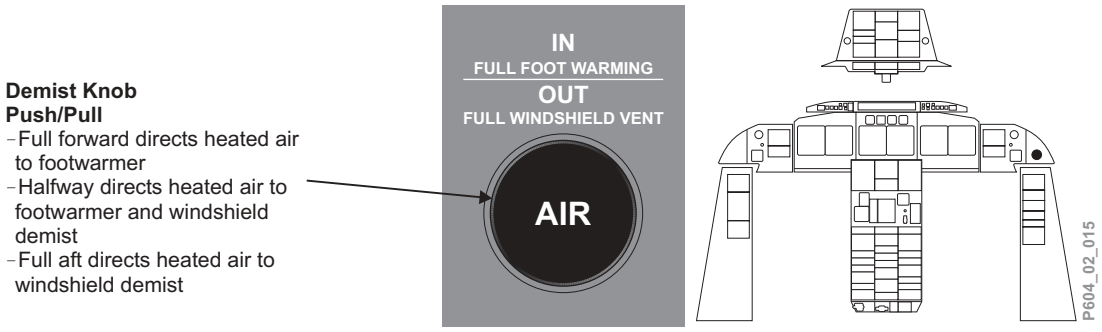
## Cabin Pressurization Panel

*Figure 2-12*

## Pressurization System


### Standby Cabin Altitude Indicator

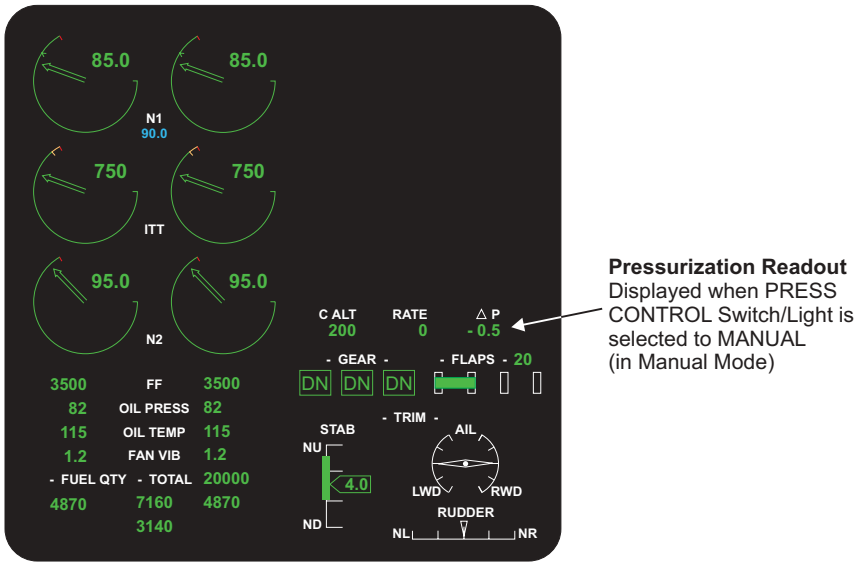
*Figure 2-13*



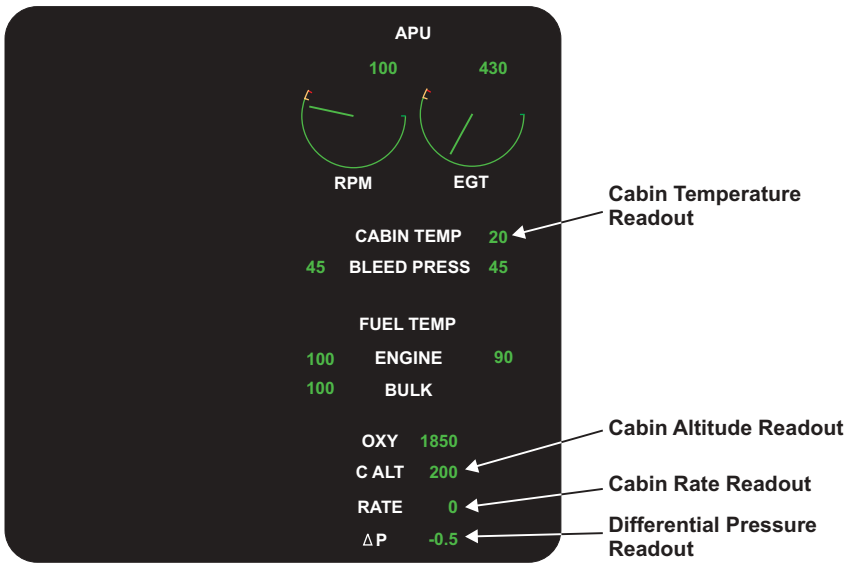

### Copilot's Side Panel - Demist Knob

*Figure 2-14*

## EICAS Primary Page and Status Page




EICAS PRIMARY PAGE




EICAS STATUS PAGE

### Air Conditioning and Pressurization Indications

*Figure 2-15*

## EICAS Primary Page and Status Page

| Description | Symbol | Condition |
|---|---|---|
| Cabin Altitude Readout | 3100 | Cabin pressure altitude is less than 8000 ft MSL |
| | 8700 | On aircraft 5301-5366 and aircraft pre SB 604-21-004:<br>Cabin pressure altitude is greater than 8500 ft MSL and less than 10,000 ft MSL<br>On aircraft 5367 and subsequent and aircraft post SB 604-21-004:<br>Cabin pressure altitude is greater than 8500 ft MSL and less than 10,000 ft MSL, during low-altitude airfield operations |
| | 10500 | On aircraft 5301-5366 and aircraft pre SB 604-21-004:<br>Cabin pressure altitude is greater than 10,000 ft MSL<br>On aircraft 5367 and subsequent and aircraft post SB 604-21-004:<br>Cabin pressure altitude is greater than 10,000 ft MSL during low-altitude airfield operations, or<br>Cabin pressure altitude is greater than 14,500 ft MSL during high-altitude airfield operations |
| | ---- | Invalid data |
| Cabin Rate Readout | 500 | Indicates rate of change in feet per minute (increments in 100 fpm) and direction via arrow symbol |
| | ---- | Invalid data |
| Differential Pressure Readout | 4.2 | Cabin to ambient differential pressure is less than 9.0 psid |
| | 9.1 | Cabin to ambient differential pressure is greater than 9.0 psid |
| | -- | Invalid data |
| Cabin Temperature Readout | 20 | Indicates current cabin temperature (°C) |
| | -- | Invalid data |

P604_02_017

### Air Conditioning and Pressurization Indications

*Figure 2-16*

## EICAS Messages

| MESSAGE | MEANING | AURAL WARNING (IF ANY) |
|---|---|---|
| CABIN ALT | *On aircraft 5301-5366 and aircraft pre SB 604-21-004:*<br>Cabin pressure altitude is greater than 10,000 feet MSL.<br><br>*On aircraft 5367 and subsequent and aircraft post SB 604-21-004:*<br>Cabin pressure altitude is greater than 10,000 feet MSL during low-altitude airfield operations, or<br>Cabin pressure altitude is greater than 14,500 feet MSL during high-altitude airfield operations. | "CABIN PRESSURE" |
| DIFF PRESS | Cabin pressure differential is greater than 9.0 psid. | "CABIN PRESSURE" |
| AUTO PRESS | Automatic cabin pressurization controller has failed. | |
| CABIN ALT | *On aircraft 5301-5366 and aircraft pre SB 604-21-004*:<br>Cabin pressure altitude is greater than 8500 feet MSL and less than 10,000 feet MSL.<br><br>*On aircraft 5367 and subsequent and aircraft post SB 604-21-004*:<br>Cabin pressure altitude is greater than 8500 feet MSL and less than 10,000 feet MSL, during low-altitude airfield operations. | |
| CPAM FAIL | Cabin pressure acquisition module has failed. | |
| EMER DEPRESS | Emergency depressurization switch/light has been activated. | |
| LANDING ALT HI | The aircraft has landed at an airfield above 8000 feet with battery bus powered, parking brake set and both engines running. (Inhibited on A/C 5367 and subsequent and post SB 604-21-004). | |
| L PACK HI PRESS<br>R PACK HI PRESS | Respective ACU pressure exceeded limits and shut down. | |
| L PACK HI TEMP<br>R PACK HI TEMP | Respective ACU temperature exceeded limits and shut down. | |
| L PACK NOT OFF<br>R PACK NOT OFF | Respective ACU is pressurized after being switched off. | |
| CKPT HEAT FAN FAIL | The cockpit heat fan is inoperative. | |
| DISPLAY COOL FAIL | Any EFIS or EICAS display fan failed. | |
| EXHAUST FAN FAIL | Cockpit instruments cooling exhaust fan is inoperative. | |

**EICAS Messages**
***Table 2-1***

Page Intentionally Left Blank