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1.03.00 CONTENTS

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The aircraft uses external air to supply :

- The air conditioning and the ventilation systems
- The pressurization system
- The de-icing system

Air inlets location :

- Engines air intakes
- Main landing gear fairings
- Low pressure ground unit through a connector

The air intended for air conditioning and pressurization is pressurized by engines compressors and delivered through the bleed valves.

It is conditioned by the packs, distributed to the pressurized zones then discharged overboard through two outflow valves. A part of this air is recirculated.

Electric and electronic equipments and the forward cargo compartment are ventilated by cabin ambient air which is then recirculated or discharged outside the aircraft.

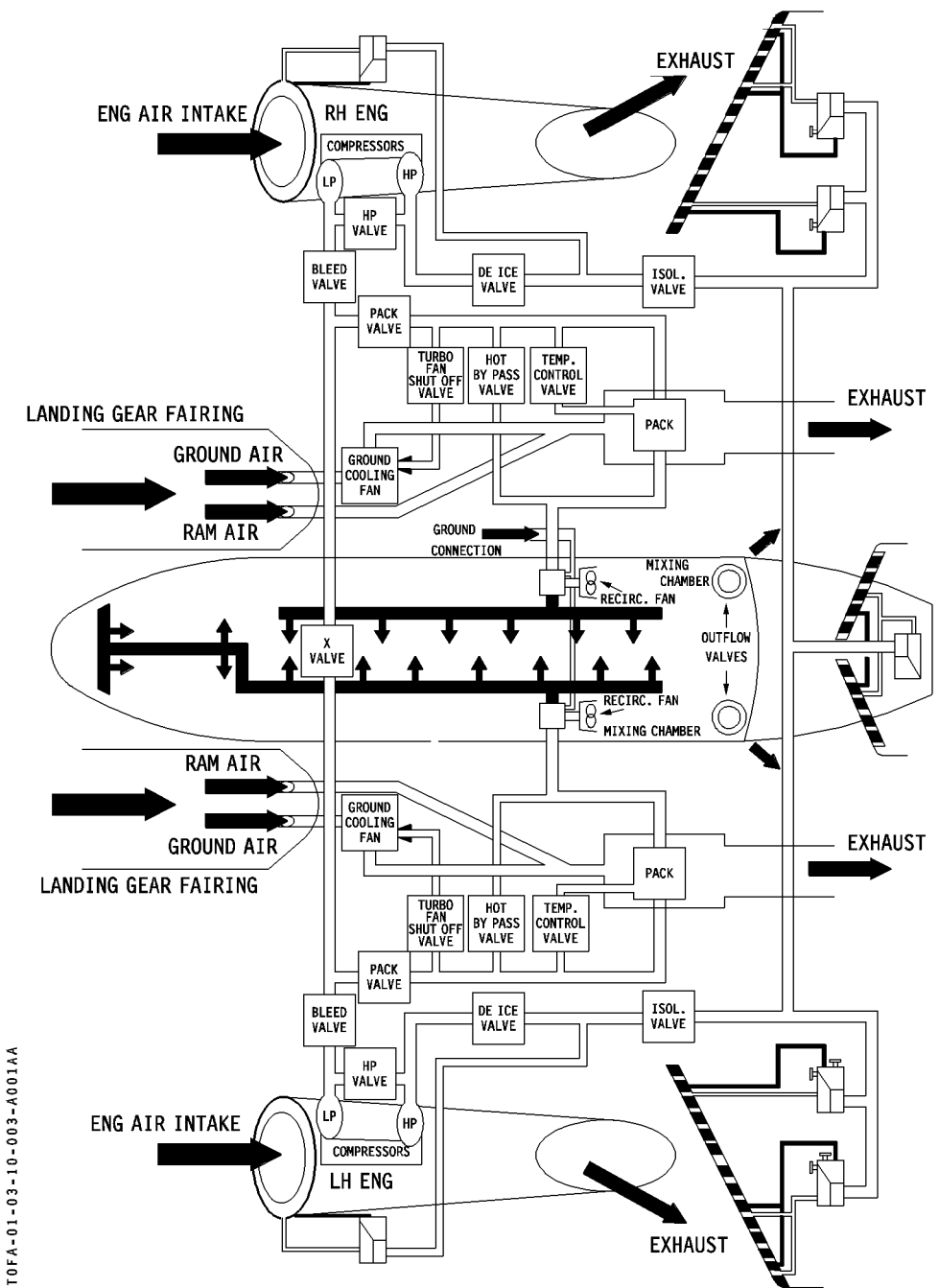
The de-icing system is described in the chapter 1.13.

The MFC provides the system monitoring and failures information to crew members.

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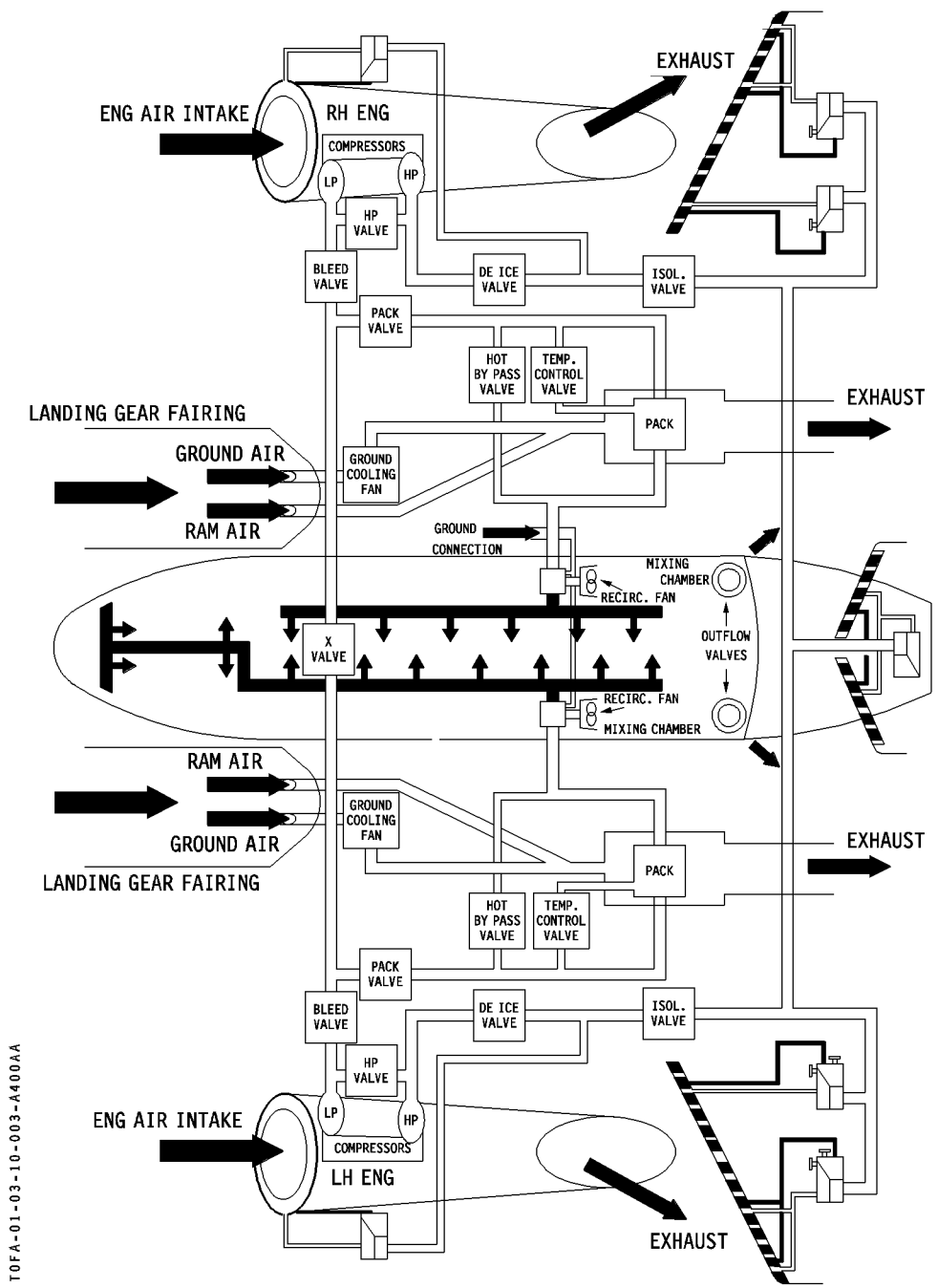
SCHEMATIC



TOFA-01-03-10-003-A001AA

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SCHEMATIC



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20.1 DESCRIPTION

(See schematic p 7/8)

Compressed air is bled from the engine compressors at the LP or HP stages. The pneumatic system consists of all the systems designed to supply air to the various aircraft systems, zones or engines, with associated control, monitoring and indicating components. It supplies under pressure air for air conditioning, pressurization and ice protection system.

A protection against overheat due to possible leakage around the hot air ducts is provided.

AIR BLEED

- Air conditioning and pressurization

The system is designed to :

- select the compressor stage from which air is bled, depending on the pressure and/or temperature existing at these stages.
- regulate air pressure in order to avoid excessive pressures

Air is generally bled from the low compressor stage (LP). At low engine speed when pressure from LP stage is insufficient, air source is automatically switched to the high compressor stage HP. (This may occur on ground and during descent at F.I.). Transfer of air is achieved by means of a pneumatically operated and electrically controlled butterfly valve, (HP valve) which remains closed in absence of electrical supply :

- when the HP valve is closed, air is directly bled from the LP stage through LP bleed air check valves.
- when the HP valve is open, the HP air pressure is admitted into the LP pneumatic ducting and closes the check valves ; air is therefore bled from HP stage only, without any recirculation into the engine.

- Wing and engine de-icing.

Air is bled from the HP compressor stage. Transfer of air is achieved through a pressure regulating valve which is electrically controlled.

ISOLATION

Downstream of the junction of the LP and HP ducting, air is admitted into the duct by a pneumatically operated, electrically controlled butterfly bleed valve which acts as a shut off valve. It includes a single solenoid which locks the valve closed when deenergized. The bleed valve automatically closes in the following cases :

- Bleed duct OVHT
- Bleed duct LEAK
- Actuation of associated ENG FIRE handle
- R - Engine failure at TO (UP TRIM signal)
- PROPELLER BRAKE selected ON (for left bleed valve only).

In the absence of air pressure, the valve is spring-loaded closed regardless of electrical power supply.

Note : During a starting sequence, the bleed valves opening is inhibited.

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CROSSFEED

The crossfeed valve installed on the crossfeed duct is designed to connect LH and RH air bleed systems.

- R – On the ground, it is always open except when both engines are running and
- R propeller brake is disengaged.
- R – In flight, the crossfeed valve is normally closed. This is a spring loaded closed,
- R solenoid controlled, pneumatic shut off valve. The valve is closed with solenoid
- R deenergized.

LEAK DETECTION SYSTEM

A continuous monitoring system is installed in order to detect overheat due to duct leakage and to protect the structure and components in the vicinity of hot air ducts :

- Wing leading edge and wing to fuselage fairing,
- Upper and lower fuselage floor,
- Air conditioning pack area.

In order to ensure rapid leak sensing, a Kevlar envelope is installed around the major part of the high temperature ducts to collect and direct leaking air to the sensing elements.

The sensing system includes two single loop detection assemblies, one for the RH and one for the LH air duct systems.

The sensing elements comprise a control lead (nickel wire) embedded in an insulating material and are integrated in an inconel tube connected to aircraft ground.

Each sensing element is permanently subjected to the temperature of the compartment it protects. For any temperature higher than a preset value : 124°C (255°F) applied to a part of the sensing element, the resistance of the eutectic mixture rapidly decreases and the central lead is grounded. This results in an alert signal processed in a control unit which triggers illumination of LEAK lt. After one second time delay, the associated pack valve, HP valve and BLEED valve (and GRD X FEED valve if the left loop is affected) are automatically latched closed.

Note : *In case of LEAK, the crew must consider the associated bleed system as inoperative for the rest of the flight.*

OVERHEAT CONTROL SYSTEM

This system includes switches (thermal resistances) which are installed on the engines, near the HP compressors exit.

These switches, which are duplicated for safety, ensure that the bleed valve and the bleed air shut-off valve are closed whenever any abnormal over temperature conditions occur. They operate at 274°C (525°F) and are controlled by the MFC.

Note : *In case of OVHT, the associated bleed system may be recovered after a cooling time.*

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20.1 DESCRIPTION

(See schematic p 7/8)

Compressed air is bled from the engine compressors at the LP or HP stages. The pneumatic system consists of all the systems designed to supply air to the various aircraft systems, zones or engines, with associated control, monitoring and indicating components. It supplies under pressure air for air conditioning, pressurization and ice protection system.

A protection against overheat due to possible leakage around the hot air ducts is provided.

AIR BLEED

- Air conditioning and pressurization

The system is designed to :

- select the compressor stage from which air is bled, depending on the pressure and/or temperature existing at these stages.
- regulate air pressure in order to avoid excessive pressures

Air is generally bled from the low compressor stage (LP). At low engine speed when pressure from LP stage is insufficient, air source is automatically switched to the high compressor stage HP. (This may occur on ground and during descent at F.I.). Transfer of air is achieved by means of a pneumatically operated and electrically controlled butterfly valve, (HP valve) which remains closed in absence of electrical supply :

- when the HP valve is closed, air is directly bled from the LP stage through LP bleed air check valves.
- when the HP valve is open, the HP air pressure is admitted into the LP pneumatic ducting and closes the check valves ; air is therefore bled from HP stage only, without any recirculation into the engine.

- Wing and engine de-icing.

Air is bled from the HP compressor stage. Transfer of air is achieved through a pressure regulating valve which is electrically controlled.

ISOLATION

Downstream of the junction of the LP and HP ducting, air is admitted into the duct by a pneumatically operated, electrically controlled butterfly bleed valve which acts as a shut off valve. It includes a single solenoid which locks the valve closed when deenergized. The bleed valve automatically closes in the following cases :

- Bleed duct OVHT
- Bleed duct LEAK
- Actuation of associated ENG FIRE handle
- R - Engine failure at TO (UP TRIM signal)
- PROPELLER BRAKE selected ON (for left bleed valve only).

In the absence of air pressure, the valve is spring-loaded closed regardless of electrical power supply.

Note : During a starting sequence, the bleed valves opening is inhibited.

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CROSSFEED

The crossfeed valve installed on the crossfeed duct is designed to connect LH and RH air bleed systems.

- On the ground, it is always open except when both engines are running and propeller brake is disengaged.
- In flight, the crossfeed valve is normally closed. This is a spring loaded closed, solenoid controlled, pneumatic shut off valve. The valve is closed with solenoid deenergized.

LEAK DETECTION SYSTEM

A continuous monitoring system is installed in order to detect overheat due to duct leakage and to protect the structure and components in the vicinity of hot air ducts :

- Wing leading edge and wing to fuselage fairing,
- Upper and lower fuselage floor,
- Air conditioning pack area.

In order to ensure rapid leak sensing, a Kevlar envelope is installed around the major part of the high temperature ducts to collect and direct leaking air to the sensing elements.

The sensing system includes two single loop detection assemblies, one for the RH and one for the LH air duct systems.

The sensing elements comprise a control lead (nickel wire) embedded in an insulating material and are integrated in an inconel tube connected to aircraft ground.

Each sensing element is permanently subjected to the temperature of the compartment it protects. For any temperature higher than a preset value : 153°C (307°F) applied to a part of the sensing element, the resistance of the eutectic mixture rapidly decreases and the central lead is grounded. This results in an alert signal processed in a control unit which triggers illumination of LEAK lt. After one second time delay, the associated pack valve, HP valve and BLEED valve (and GRD X FEED valve if the left loop is affected) are automatically latched closed.

Note : *In case of LEAK, the crew must consider the associated bleed system as inoperative for the rest of the flight.*

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This system includes switches (thermal resistances) which are installed on the engines, near the HP compressors exit.

These switches, which are duplicated for safety, ensure that the bleed valve and the bleed air shut-off valve are closed whenever any abnormal over temperature conditions occur. They operate at 274°C (525°F) and are controlled by the MFC.

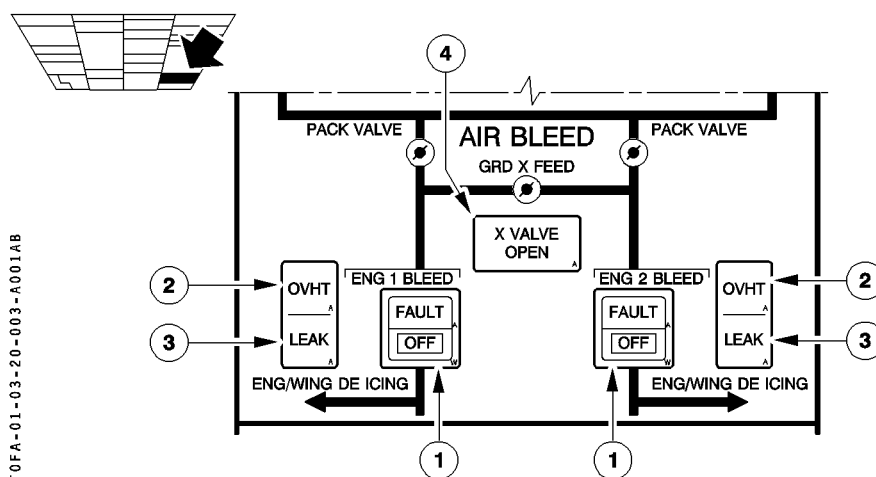
Note : *In case of OVHT, the associated bleed system may be recovered after a cooling time.*

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20.2 CONTROLS

AIR BLEED PANEL



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① ENG BLEED pbs

Controls the associated HP valve and BLEED valve.

ON (pb pressed in) associated HP and bleed valves solenoids are energized. The valves will open if pressure is available.

OFF (pb released) associated HP and bleed valves are closed. OFF light illuminates white.

FAULT The light illuminates amber and the CCAS is activated when the bleed valve position disagrees with the selected position, this especially occurs in case of leak or overheat.

② OVHT light

The light illuminates amber and the CCAS is activated when either of the respective bleed duct dual overheat sw operates ($T > 274^{\circ}\text{C}/525^{\circ}\text{F}$).

③ LEAK light

The light comes on amber and the CCAS is activated when respective bleed leak detection system signals an alert ($T \text{ loop} > 124^{\circ}\text{C}/255^{\circ}\text{F}$).

④ X VALVE OPEN light

The light illuminates amber when the GRD X FEED valve is open.

 ATR F.C.O.M.	AIR PNEUMATIC SYSTEM	1.03.20		
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20.3 ELECTRICAL SUPPLY/MFC LOGIC/SYSTEM MONITORING

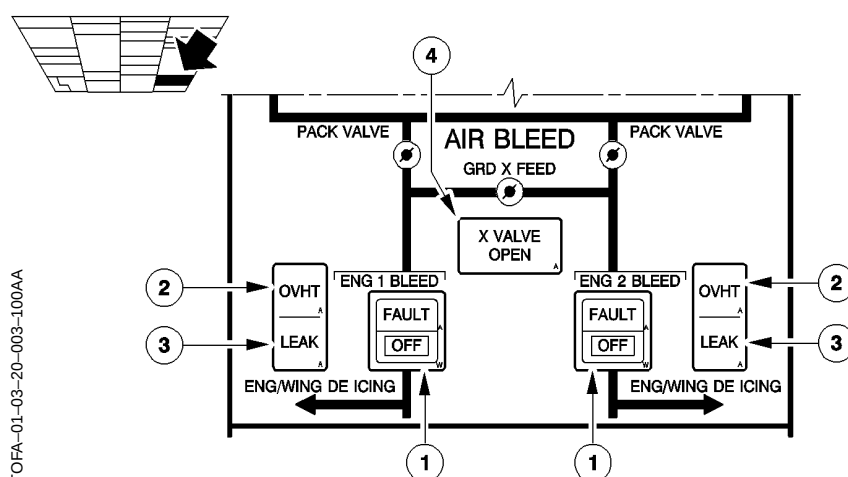
EQUIPMENT	DC BUS SUPPLY (C/B)	AC BUS SUPPLY (C/B)
ENG 1 HP valve	DC BUS 1 (on lateral panel HP NORM)	– Nil –
Bleed valve	DC ESS BUS (on lateral panel BLEED)	– Nil –
Fault and OVHT alert light	DC ESS BUS (on lateral panel CAUTION)	– Nil –
ENG 2 HP valve	DC BUS 2 (on lateral panel HP NORM)	– Nil –
Bleed valve	DC ESS BUS (on lateral panel BLEED)	– Nil –
FAULT and OVHT alert light	DC ESS BUS (on lateral panel CAUTION)	– Nil –
CROSSFEED Crossfeed valve and associated OPEN light	DC BUS 1 (on lateral panel X FEED)	– Nil –
LEAK Bleed leak detection system	– Nil –	115 VAC BUS 1 (on lateral panel BLEED LEAK DET)
LEAK lights	DC BUS 1 (on lateral panel CAUTION)	– Nil –

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			P 3	100	
	PNEUMATIC SYSTEM				NOV 99

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20.2 CONTROLS

AIR BLEED PANEL



① ENG BLEED pbs

Controls the associated HP valve and BLEED valve.

ON (pb pressed in) associated HP and bleed valves solenoids are energized. The valves will open if pressure is available.

OFF (pb released) associated HP and bleed valves are closed. OFF light illuminates white.

FAULT The light illuminates amber and the CCAS is activated when the bleed valve position disagrees with the selected position, this especially occurs in case of leak or overheat.

② OVHT light

The light illuminates amber and the CCAS is activated when either of the respective bleed duct dual overheat sw operates ($T > 274^{\circ}\text{C}/525^{\circ}\text{F}$).

③ LEAK light

The light comes on amber and the CCAS is activated when respective bleed leak detection system signals an alert ($T \text{ loop} > 153^{\circ}\text{C}/307^{\circ}\text{F}$).

④ X VALVE OPEN light

The light illuminates amber when the GRD X FEED valve is open.

 ATR F.C.O.M.	AIR PNEUMATIC SYSTEM	1.03.20		
		P 4	001	
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AA

20.3 ELECTRICAL SUPPLY/MFC LOGIC/SYSTEM MONITORING

EQUIPMENT	DC BUS SUPPLY (C/B)	AC BUS SUPPLY (C/B)
ENG 1 HP valve	DC BUS 1 (on lateral panel HP NORM)	– Nil –
Bleed valve	DC ESS BUS (on lateral panel BLEED)	– Nil –
Fault and OVHT alert light	DC ESS BUS (on lateral panel CAUTION)	– Nil –
ENG 2 HP valve	DC BUS 2 (on lateral panel HP NORM)	– Nil –
Bleed valve	DC ESS BUS (on lateral panel BLEED)	– Nil –
FAULT and OVHT alert light	DC ESS BUS (on lateral panel CAUTION)	– Nil –
CROSSFEED Crossfeed valve and associated OPEN light	DC BUS 1 (on lateral panel X FEED)	– Nil –
LEAK Bleed leak detection system	– Nil –	115 VAC BUS 1 (on lateral panel BLEED LEAK DET)
LEAK lights	DC BUS 1 (on lateral panel CAUTION)	– Nil –

 ATR F.C.O.M.	AIR PNEUMATIC SYSTEM	1.03.20		
		P 5	001	
				DEC 95

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MFC LOGIC

See chapter 1.01

SYSTEM MONITORING

The following conditions are monitored by visual and aural alerts :

- Bleed valve position in disagree with command.
 - See BLEED VALVE FAULT procedure in chapter 2.05.08
- Overheat in bleed duct (T duct > 274°C/525°F).
 - See BLEED OVHT procedure in chapter 2.05.08
- Bleed air leak (Loop > 124°C/255°F).
 - See BLEED LEAK procedure in chapter 2.05.08

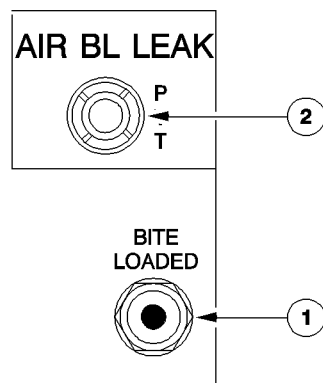
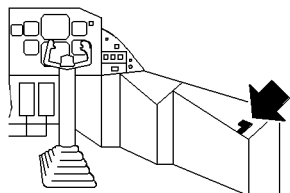
 ATR F.C.O.M.	AIR PNEUMATIC SYSTEM	1.03.20		
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				DEC 95

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20.4 LATERAL MAINTENANCE PANEL

On the RH maintenance panel, a magnetic indicator and a leak test button are provided, for air bleed system maintenance purposes only.

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① BITE LOADED magnetic indicator

Indicates that a failure – “LH or RH HP valve position disagrees with the closed selected position” – has been recorded by the maintenance system.

② Push to test button

Is used to check the functioning of both ambient overheat detection circuits along the bleed air ducts. When depressed, both “LEAK” lights illuminate on the overhead panel.

	AIR PNEUMATIC SYSTEM	1.03.20		
		P 5	100	
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MFC LOGIC

See chapter 1.01

SYSTEM MONITORING

The following conditions are monitored by visual and aural alerts :

- Bleed valve position in disagree with command.
 - See BLEED VALVE FAULT procedure in chapter 2.05.08
- Overheat in bleed duct (T duct > 274°C/525°F).
 - See BLEED OVHT procedure in chapter 2.05.08
- Bleed air leak (Loop > 153°C/307°F).
 - See BLEED LEAK procedure in chapter 2.05.08

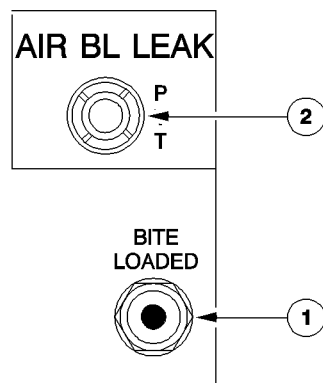
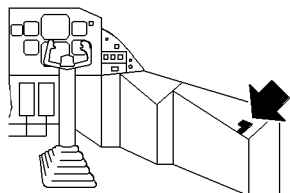
 ATR F.C.O.M.	AIR PNEUMATIC SYSTEM	1.03.20		
		P 6	001	
				DEC 95

AA

20.4 LATERAL MAINTENANCE PANEL

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T0FA-01-03-20-006-A001AA



① BITE LOADED magnetic indicator

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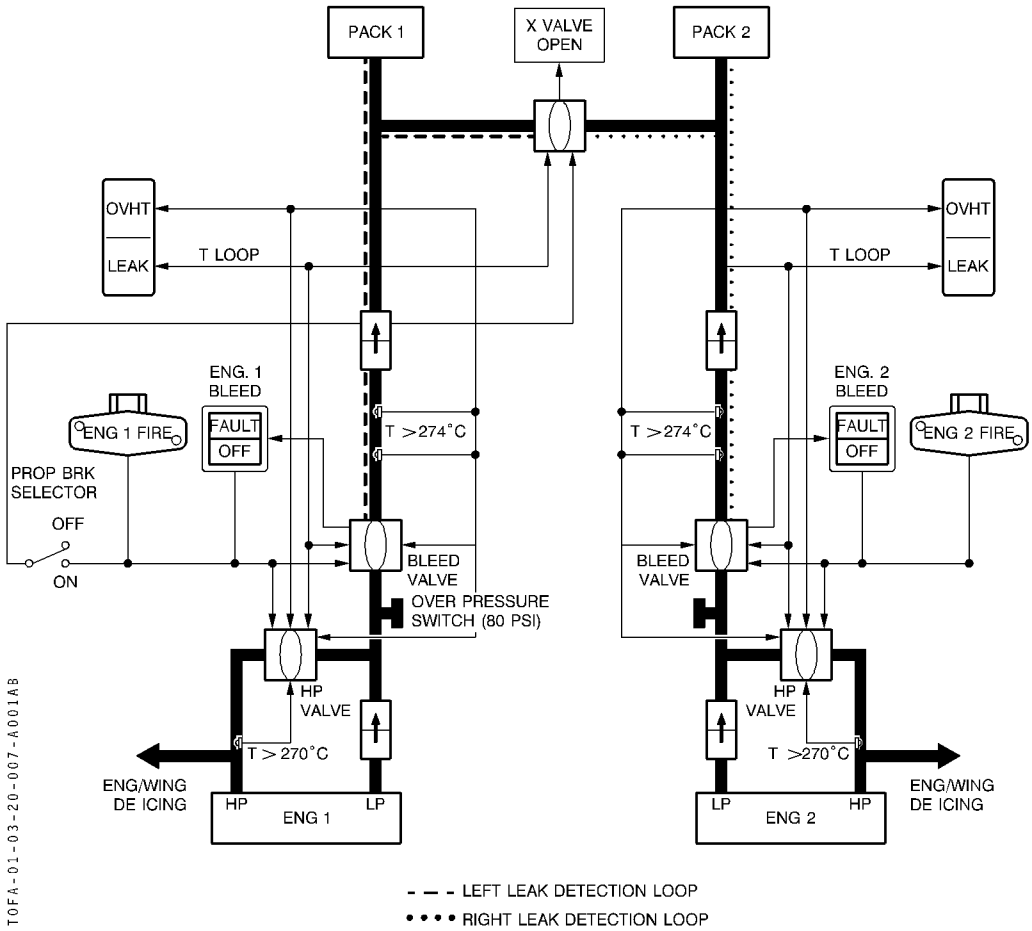
② Push to test button

Is used to check the functioning of both ambient overheat detection circuits along the bleed air ducts. When depressed, both “LEAK” lights illuminate on the overhead panel.

	AIR PNEUMATIC SYSTEM	1.03.20		
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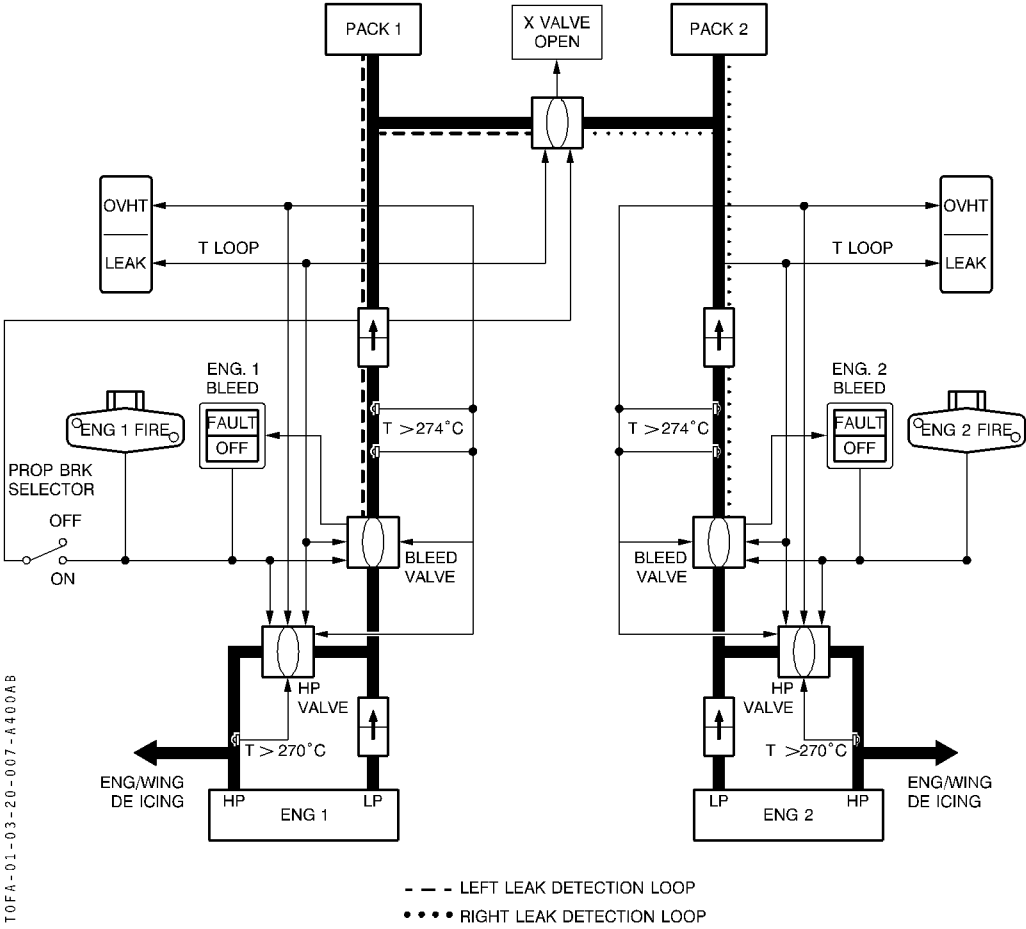
20.5 SCHEMATIC



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20.5 SCHEMATIC



 ATR F.C.O.M.	AIR		1.03.30		
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	AIR CONDITIONING				MAR 96

AA

30.1 DESCRIPTION

(See schematics p. 13/14 and p. 15/16)

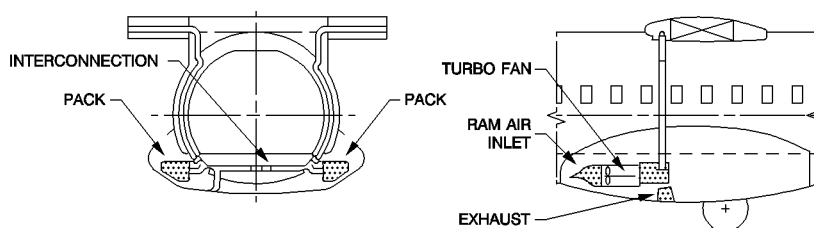
AIR PRODUCTION

R The air conditioning system is supplied by air processed through two packs which regulate air flow and temperature as required (see page 13/14). The two packs are installed in the main landing gear fairings and operate automatically and independently.

R The left pack supplies the cabin and the cockpit air conditioned ; the right pack supplies only the cabin air conditioned.

R *Note : If one pack is inoperative, the other one supplies both compartments through the mixing chamber, (see page 15/16)*

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Hot air from the engines is admitted through pack valves and conditioned (cooled, dried, compressed) into the packs.

The pack valve is pneumatically operated and electrically controlled. This butterfly valve has two functions :

- Pack shut off.
- Pressure control and hence flow control. Normal or high flow are available. The selection of the high flow mode increases the pack entrance pressure resulting in conditioning performance improvement.

Without air pressure and regardless of electrical command, the pack valve is spring-load closed. It will also close without electrical supply.

Note : Pack valves will be automatically closed in case of leak detection.

Cooling of air is performed by air-air heat exchangers. External air is blown to the heat exchanger :

- by two ground turbo fans through turbo shut off valves when :
 - IAS $\leq$ 150 kt and landing gear is retracted for less than 10 min.
- by ram air when IAS > 150 kt.

Note : In case of ENG OIL LO PRESS, the turbo fan starts on the opposite side and is running as long as IAS $\leq$ 150 kt and regardless of landing gear position.

· IAS $\leq$ 150 kt and landing is extended.

Note : Incorrect position of a turbo fan shut off valve leads to closure of associated pack valve.

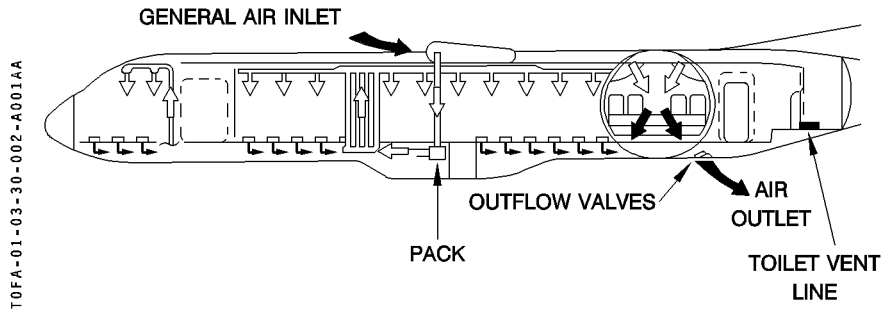
	AIR AIR CONDITIONING	1.03.30		
		P 2	001	
				DEC 95

AA

AIR VENTILATION

- R Conditioned air is blown into the cabin by outlet ramps located under the hot racks. It is then evacuated through guides along the cabin side walls at floor level. A part of it is recirculated by the fans, the other part being evacuated overboard through the outflow valves installed in the rear under floor.

The toilet is ventilated by differential pressure through a vent line.



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	AIR		1.03.30		
			P 1	001	
	AIR CONDITIONING				MAR 96

AA

30.1 DESCRIPTION

(See schematics p. 13/14 and p. 15/16)

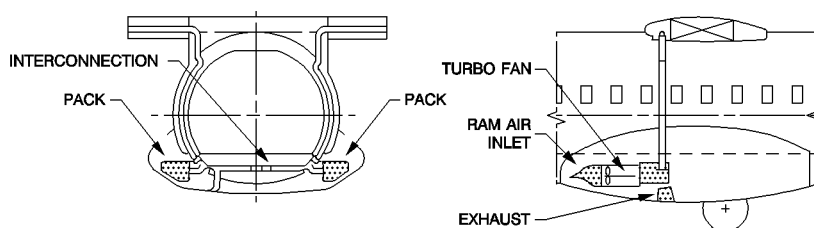
AIR PRODUCTION

R The air conditioning system is supplied by air processed through two packs which regulate air flow and temperature as required (see page 13/14). The two packs are installed in the main landing gear fairings and operate automatically and independently.

R The left pack supplies the cabin and the cockpit air conditioned ; the right pack supplies only the cabin air conditioned.

R *Note : If one pack is inoperative, the other one supplies both compartments through the mixing chamber, (see page 15/16)*

T0FA-01-03-30-001-A001AA



Hot air from the engines is admitted through pack valves and conditioned (cooled, dried, compressed) into the packs.

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- Pressure control and hence flow control. Normal or high flow are available. The selection of the high flow mode increases the pack entrance pressure resulting in conditioning performance improvement.

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- by two ground turbo fans through turbo shut off valves when :
 - IAS $\leq$ 150 kt and landing gear is retracted for less than 10 min.
- by ram air when IAS > 150 kt.

Note : In case of ENG OIL LO PRESS, the turbo fan starts on the opposite side and is running as long as IAS $\leq$ 150 kt and regardless of landing gear position.

· IAS $\leq$ 150 kt and landing is extended.

Note : Incorrect position of a turbo fan shut off valve leads to closure of associated pack valve.

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	AIR CONDITIONING		P 2	090
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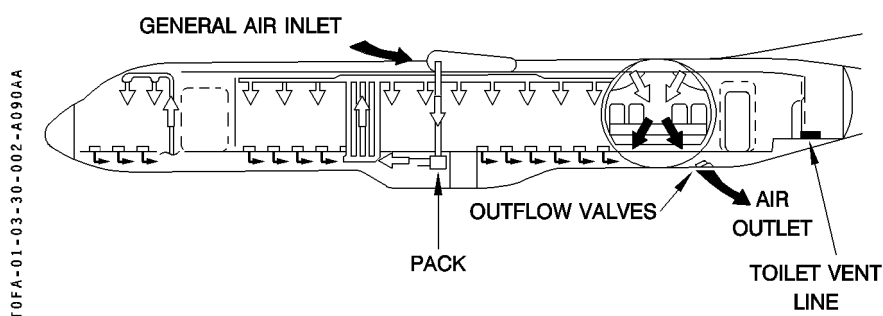
AA

AIR VENTILATION

Conditioned air is blown into the cabin by outlet ramps located under the hot racks through two electrical isolating valves (CAB VENT).

It is then evacuated through guides along the cabin side walls at floor level. A part of it is recirculated by the fans, the other part being evacuated overboard through the outflow valves installed in the rear under floor.

The toilet is ventilated by differential pressure through a vent line.



 ATR F.C.O.M.	AIR		1.03.30		
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	AIR CONDITIONING				MAR 96

AA

30.1 DESCRIPTION

(See schematics p. 13/14 and p. 15/16)

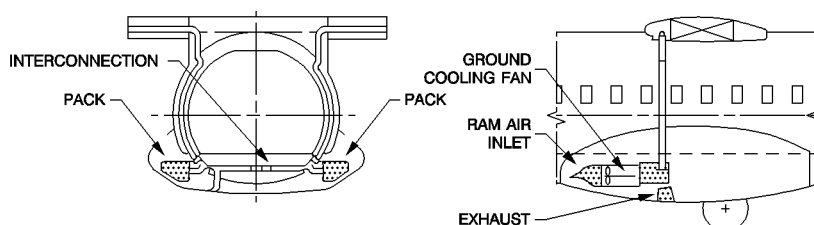
AIR PRODUCTION

R The air conditioning system is supplied by air processed through two packs which regulate air flow and temperature as required (see page 13/14). The two packs are installed in the main landing gear fairings and operate automatically and independently.

R The left pack supplies the cabin and the cockpit air conditioned ; the right pack supplies only the cabin air conditioned.

R *Note : If one pack is inoperative, the other one supplies both compartments through the mixing chamber, (see page 15/16)*

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- Pack shut off.
- Pressure control and hence flow control. Normal or high flow are available. The selection of the high flow mode increases the pack entrance pressure resulting in conditioning performance improvement.

Without air pressure and regardless of electrical command, the pack valve is spring-load closed. It will also close without electrical supply.

Note : Pack valves will be automatically closed in case of leak detection.

Cooling of air is performed :

- on ground provided relative pack valve is not close or in flight when speed is lower than 130 kt by air sucked by ground cooling fans.
- in flight when speed is higher than 130 kt by ram air.

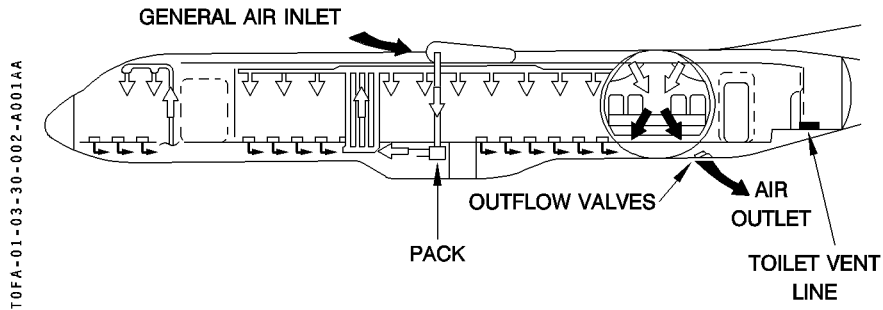
 ATR F.C.O.M.	AIR		1.03.30		
	AIR CONDITIONING		P 2	001	
					DEC 95

AA

AIR VENTILATION

- R Conditioned air is blown into the cabin by outlet ramps located under the hot racks. It is then evacuated through guides along the cabin side walls at floor level. A part of it is recirculated by the fans, the other part being evacuated overboard through the outflow valves installed in the rear under floor.

The toilet is ventilated by differential pressure through a vent line.



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 ATR F.C.O.M.	AIR		1.03.30		
			P 1	400	
	AIR CONDITIONING				MAR 96

AA

30.1 DESCRIPTION

(See schematics p. 13/14 and p. 15/16)

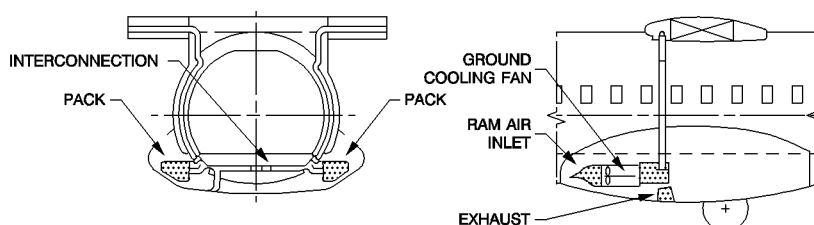
AIR PRODUCTION

R The air conditioning system is supplied by air processed through two packs which regulate air flow and temperature as required (see page 13/14). The two packs are installed in the main landing gear fairings and operate automatically and independently.

R The left pack supplies the cabin and the cockpit air conditioned ; the right pack supplies only the cabin air conditioned.

R *Note : If one pack is inoperative, the other one supplies both compartments through the mixing chamber, (see page 15/16)*

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Hot air from the engines is admitted through pack valves and conditioned (cooled, dried, compressed) into the packs.

The pack valve is pneumatically operated and electrically controlled. This butterfly valve has two functions :

- Pack shut off.
- Pressure control and hence flow control. Normal or high flow are available. The selection of the high flow mode increases the pack entrance pressure resulting in conditioning performance improvement.

Without air pressure and regardless of electrical command, the pack valve is spring-load closed. It will also close without electrical supply.

Note : Pack valves will be automatically closed in case of leak detection.

Cooling of air is performed :

- on ground provided relative pack valve is not close or in flight when speed is lower than 130 kt by air sucked by ground cooling fans.
- in flight when speed is higher than 130 kt by ram air.

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				NOV 99

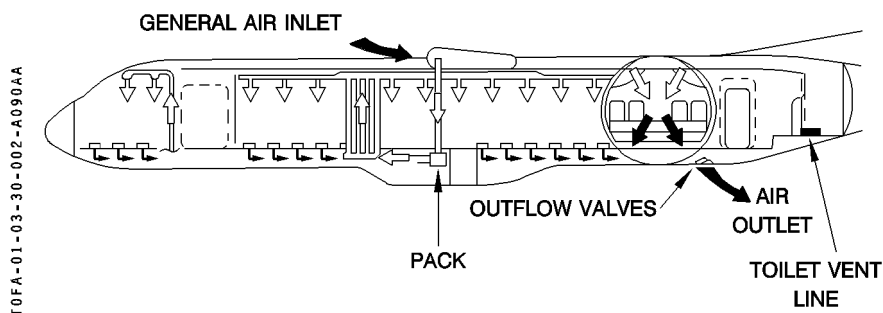
AA

AIR VENTILATION

Conditioned air is blown into the cabin by outlet ramps located under the hot racks through two electrical isolating valves (CAB VENT).

It is then evacuated through guides along the cabin side walls at floor level. A part of it is recirculated by the fans, the other part being evacuated overboard through the outflow valves installed in the rear under floor.

The toilet is ventilated by differential pressure through a vent line.



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Flight deck, forward cargo compartment, electric and electronic equipments are ventilated by flow of ambient air which is :

- Recirculated (underfloor) to the pressurized compartment, or
- Ducted overboard.

The selection is operated by the overboard (OVBD) valve which controls the underfloor (U/F) valve :

- OVBD full closed → U/F open
- OVBD partially or full open → U/F closed

In normal operation OVBD valve is in AUTO mode.

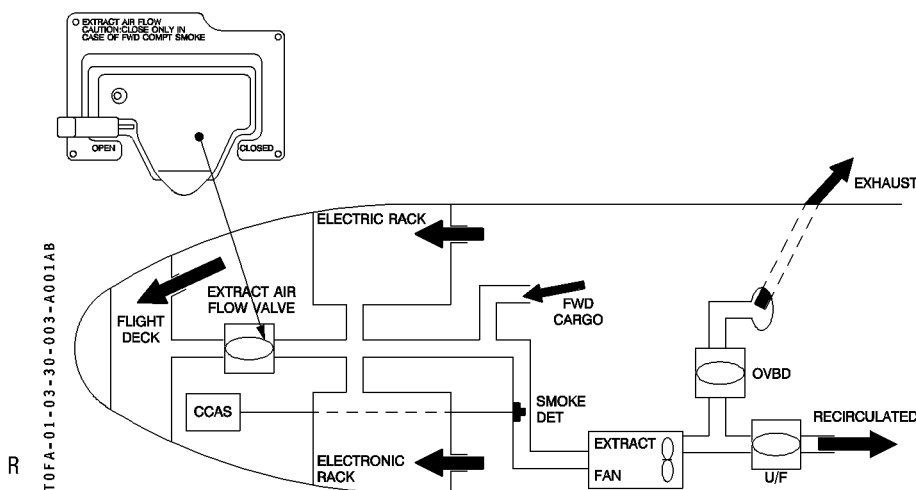
In case of AUTO mode failure, the crew may use full open or full closed position.

Full closed position may also be used on ground to accelerate cabin heating.

Air is extracted by a fan which may operate at different speeds depending on flight deck temperature : rotation speed is minimum below 20°C (68°F), maximum above 52°C (126°F) and varies linearly between these values.

Only when OVBD valve AUTO MODE is selected, EXHAUST mode pb may be used to control OVBD valve in a partially open position. This action is required in case of fan failure to provide cooling air flow by allowing cabin differential pressure.

In case of smoke in forward cargo compartment, flight deck air extraction duct can be closed with a lever located on right side maintenance panel in order to avoid contaminated air suction to the flight deck.



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TEMPERATURE CONTROL

The system is designed to regulate and limit the temperature of the air discharged from the packs which is supplied to the different zones :

- FLT COMPT by the left pack
- CABIN by the right pack and excess air from the left pack.

To establish the required temperature, the amount of added hot air, mixed with cool air is varied through the pack temperature control valves.

In automatic mode, each pack discharge temperature is controlled by an electronic temperature controller which computes temperature control valve position taking into account :

- Duct temperature
- Zone temperature demand selector
- Associated compartment temperature
- Aircraft skin temperature

In manual mode, each pack temperature control valve is controlled directly by the zone temperature demand selector and limited by the pneumatic temperature sensor.

OVERHEAT PROTECTION

When duct temperature downstream of the mixing chamber increases over $T = 88^{\circ}\text{C}$ (191°F), the limiter closes the temperature control valve progressively by a pneumatic action in order to reduce hot air flow.

An OVHT caution is provided to the pilot when $T_{\text{duct}} > 92^{\circ}\text{C}$ (200°F) (but the pack valve does not close).

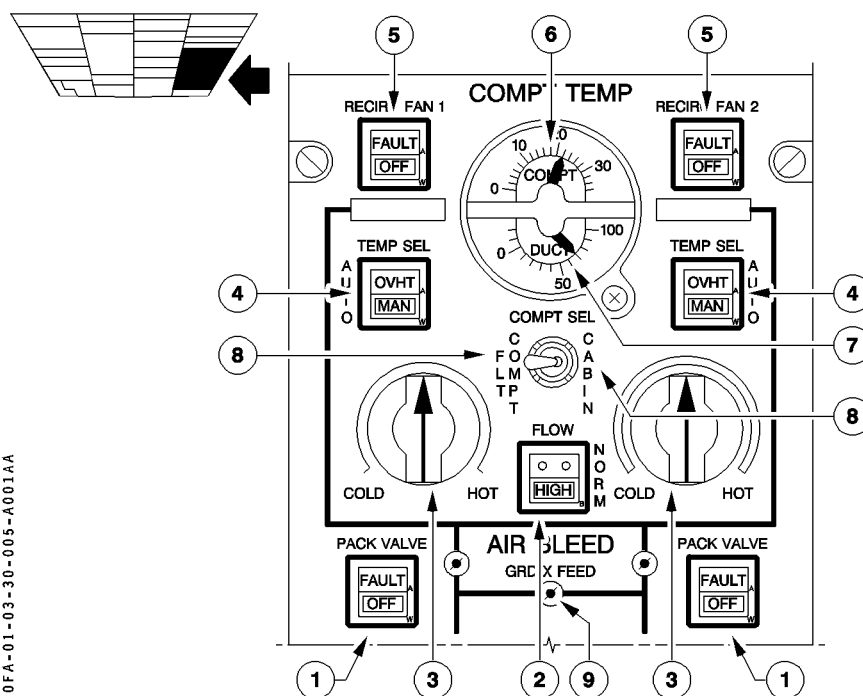
In case of overheat downstream of the pack compressor ($T > 204^{\circ}\text{C}$ (399°F)) the pack valve closes automatically.

 ATR F.C.O.M.	AIR AIR CONDITIONING	1.03.30		
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30.2 CONTROLS

COMPT TEMP PANEL



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① PACK VALVE pb

ON (pb pressed in) associated PACK VALVE is open if electrical supply and air pressure are available.

Note : A 6 seconds delay has been provided on right pack valve for passengers comfort purpose.

OFF (pb released) associated PACK VALVE is closed. The OFF light illuminates white.

FAULT Illuminates amber and the CCAS is activated when the PACK VALVE position disagrees with the selected position or in case of overheat downstream of the pack compressor ($T > 204^{\circ}\text{C}/399^{\circ}\text{F}$). In the later case, the valve is latched closed automatically.

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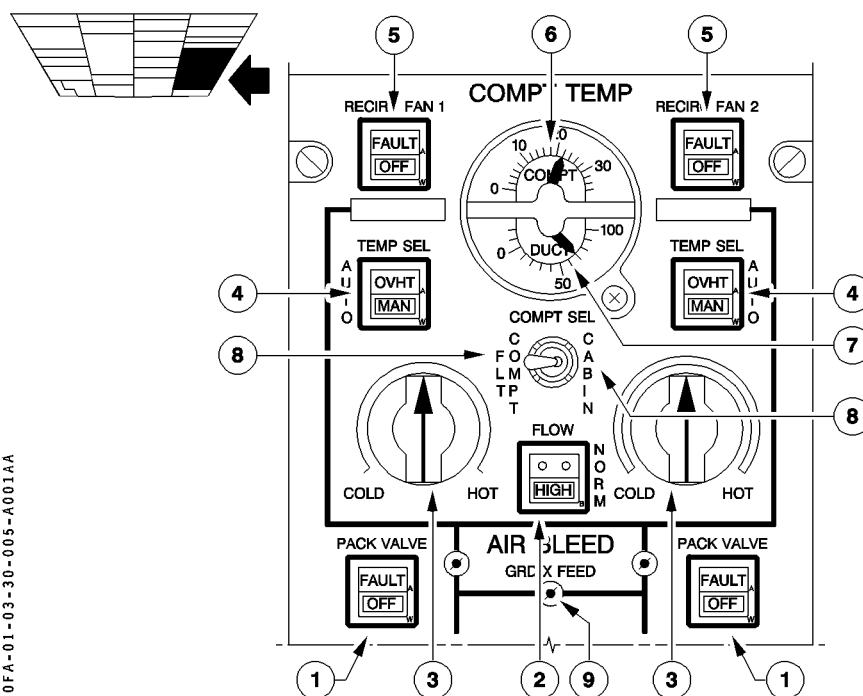
- ② FLOW pb
R NORM (pb released) Both pack valves are controlled automatically to give 22 PSI regulated pressure
HIGH (pb pressed in) Both pack valves are controlled to give 30 PSI regulated pressure which increases the flow accordingly. The HIGH light illuminates blue.
- ③ COMPT TEMP selectors
For the related compartment the temperature is either automatically controlled by the electronic controller taking into account the selector position or manually selected by direct operation of the temperature control valve through the selector.
- ④ TEMP SEL pb
Selects the temperature control mode of operation.
AUTO : (pb pressed in) Automatic mode is selected. The electronic temperature controller controls the valve position.
MAN : (pb released) Manual mode is selected. The COMPT TEMP selector directly controls the position of the valve.
The pneumatic temperature limiter will limit the max duct temperature below $T = 88^{\circ}\text{C}$ (191°F). The MAN light illuminates white.
OVHT : Illuminates amber and the CCAS is activated when an over temperature is detected in the duct ($T > 92^{\circ}\text{C}/200^{\circ}\text{F}$). It is not inhibited in MAN mode.
- ⑤ RECIRC FAN pb
Selects operation of the respective recirculation fan
ON : (pb pressed in) Fan runs. Recirculation of a part of the cabin air to supplement the fresh air supply is provided.
Fan rotation speed linearly varies from 1500 RPM to 2200 RPM depending on temperature control valve position. If temperature measured at cabin floor level is lower than 13°C (64°F), high speed is automatically selected.
R OFF : (pb released) Fan stops. All the air is supplied by the packs without recirculation. The OFF light illuminates white.
FAULT : Illuminates amber and the CCAS is activated in case of either low fan RPM (< 900 RPM) or fan electrical motor overheat conditions.
- ⑥ COMPT ind.
Air temperature in the selected compartment is indicated in $^{\circ}\text{C}$.
- ⑦ DUCT ind.
For the selected compartment, the temperature of the conditioned air before leaving the duct is indicated in $^{\circ}\text{C}$.
Duct temperature is automatically limited to max 88°C in AUTO mode or MAN mode.
- ⑧ COMPT selector
Selects the zone – FLT COMPT or CABIN – for which temperature (COMPT and DUCT) reading is desired.
- ⑨ GND X FEED
See chapter 1.03.20

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30.2 CONTROLS

COMPT TEMP PANEL



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① PACK VALVE pb

ON (pb pressed in) associated PACK VALVE is open if electrical supply and air pressure are available.

Note : A 6 seconds delay has been provided on right pack valve for passengers comfort purpose.

OFF (pb released) associated PACK VALVE is closed. The OFF light illuminates white.

FAULT Illuminates amber and the CCAS is activated when the PACK VALVE position disagrees with the selected position or in case of overheat downstream of the pack compressor ($T > 204^{\circ}\text{C}/399^{\circ}\text{F}$). In the later case, the valve is latched closed automatically.

	AIR	1.03.30		
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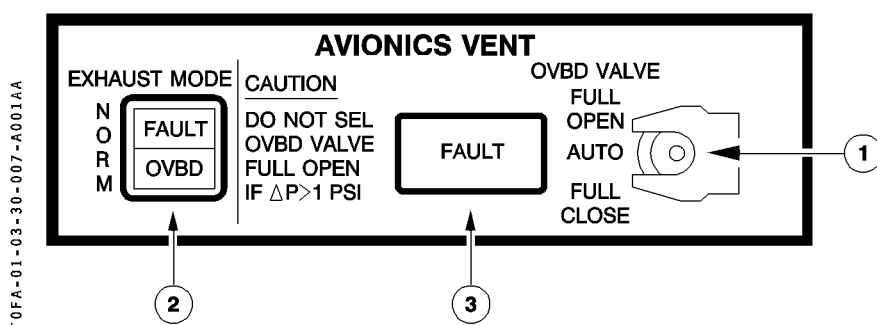
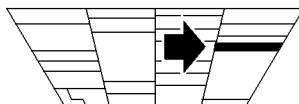
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- ② FLOW pb
R NORM (pb released) Both pack valves are controlled automatically to give 17 PSI regulated pressure
HIGH (pb pressed in) Both pack valves are controlled to give 30 PSI regulated pressure which increases the flow accordingly. The HIGH light illuminates blue.
- ③ COMPT TEMP selectors
For the related compartment the temperature is either automatically controlled by the electronic controller taking into account the selector position or manually selected by direct operation of the temperature control valve through the selector.
- ④ TEMP SEL pb
Selects the temperature control mode of operation.
AUTO : (pb pressed in) Automatic mode is selected. The electronic temperature controller controls the valve position.
MAN : (pb released) Manual mode is selected. The COMPT TEMP selector directly controls the position of the valve.
The pneumatic temperature limiter will limit the max duct temperature below $T = 88^{\circ}\text{C}$ (191°F). The MAN light illuminates white.
OVHT : Illuminates amber and the CCAS is activated when an over temperature is detected in the duct ($T > 92^{\circ}\text{C}/200^{\circ}\text{F}$). It is not inhibited in MAN mode.
- ⑤ RECIRC FAN pb
Selects operation of the respective recirculation fan
ON : (pb pressed in) Fan runs. Recirculation of a part of the cabin air to supplement the fresh air supply is provided.
Fan rotation speed linearly varies from 1500 RPM to 2200 RPM depending on temperature control valve position. If temperature measured at cabin floor level is lower than 13°C (64°F), high speed is automatically selected.
OFF : (pb released) Fan stops. All the air is supplied by the packs without recirculation. The OFF light illuminates white.
FAULT : Illuminates amber and the CCAS is activated in case of either low fan RPM (< 900 RPM) or fan electrical motor overheat conditions.
- ⑥ COMPT ind.
Air temperature in the selected compartment is indicated in $^{\circ}\text{C}$.
- ⑦ DUCT ind.
For the selected compartment, the temperature of the conditioned air before leaving the duct is indicated in $^{\circ}\text{C}$.
Duct temperature is automatically limited to max 88°C in AUTO mode or MAN mode.
- ⑧ COMPT selector
Selects the zone – FLT COMPT or CABIN – for which temperature (COMPT and DUCT) reading is desired.
- ⑨ GND X FEED
See chapter 1.03.20

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				DEC 95

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AVIONICS VENT PANEL



① OVBD VALVE CTL switch

The selector is operated to manually full open or full close the OVBD valve if required. In normal configuration, the selector must be guarded in AUTO position in order to allow proper selection of the EXHAUST mode.

FULL OPEN The OVBD valve is fully open.

CAUTION : DO NOT SELECT OVBD VALVE FULL OPEN IF DIFFERENTIAL PRESSURE EXCEEDS 1.PSI.

AUTO The OVBD valve position is function of :
. The EXHAUST mode PB selection
. The aircraft condition (flight or ground)

FULL CLOSE The OVBD valve is fully closed.

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② EXHAUST MODE PB

Controls the OVBD valve as long as OVBD valve CTL sw is in AUTO position.

NORM (pb pressed in) :

- On ground, engine 1 not running (OIL LOW PRESS)
 - extract fan runs continuously
 - OVBD valve is full open
 - U/F valve is closed
- in flight (or on ground, with engine 1 running)
 - extract fan runs continuously
 - OVBD valve is full closed
 - U/F valve is open

OVBD (pb released) :

- extract fan is OFF
- OVBD valve is partially open (in flight only)
- U/F valve is closed
- OVBD light illuminates white

FAULT Illuminates amber and the CCAS is activated in case of fan failure or overheat.

Note 1 : Aircraft on ground and external power available :
if exhaust mode is set on OVBD position, a ground mechanic call is generated and intermediate position is inhibited.

Note 2 : When start sequence is initiated, extract fan stops for 120s to avoid pressure shocks. Exhaust mode fault illuminates, however the ground mechanic call is not generated.

Note 3 : Reset EXHAUST Mode pb, refer to 2.03.07 (COMPT SMK).

③ FAULT LIGHT

Illuminates amber and the CCAS is activated when there is an OVBD VALVE position disagreement :

- When on ground, engine 1 not running (OIL LOW PRESS), OVBD valve is not fully open (except with CTL sw on FULL CLOSE).
- When, in flight or, on ground engine 1 running, OVBD valve is fully open (except with CTL sw ON FULL OPEN).

The LIGHT goes off when the OVBD VALVE reaches the selected position.

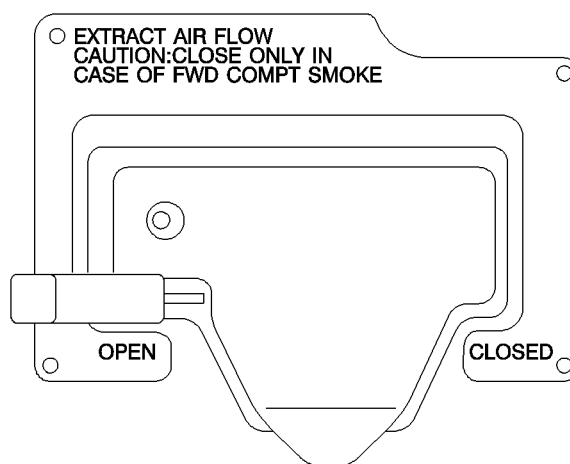
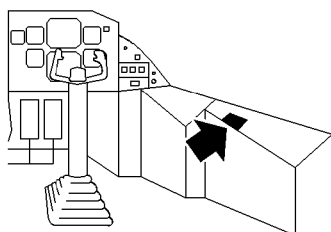
 ATR F.C.O.M.	AIR AIR CONDITIONING	1.03.30		
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FLIGHT DECK VENTILATION ISOLATION

EXTRACT AIR FLOW

CAUTION : Close only in case of FWD COMPT smoke.



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Enables, in case of smoke in the forward cargo compartment, to isolate the flight deck ventilation preventing smoke to enter the flight compartment.

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30.3 ELECTRICAL SUPPLY/MFC LOGIC/SYSTEM MONITORING

ELECTRICAL SUPPLY

EQUIPMENT	DC BUS SUPPLY (C/B)
<i>LH SIDE</i>	
Pack valve	DC ESS BUS (on lateral panel PACK VALVE)
Recirculation fan	DC UTIL BUS 1 (on lateral panel PWR SUPPLY CTL)
Pack and recirculation fan alert	DC ESS BUS (on lateral panel PACK and RECIRC FAN CAUTION)
FLT COMPT automatic temperature control	DC ESS BUS (on lateral panel AUTO)
FLT COMPT Manual temperature control	DC ESS BUS (on lateral panel MAN)
<i>RH SIDE</i>	
Pack valve	DC ESS BUS (on lateral panel PACK VALVE)
Recirculation fan	DC UTIL BUS 2 (on lateral panel PWR SUPPLY CTL)
Pack and recirculation fan alert	DC ESS BUS (on lateral panel PACK and RECIRC FAN CAUTION)
Automatic temperature control	DC ESS BUS (on lateral panel AUTO)
Manual temperature control	DC ESS BUS (on lateral panel MAN)
Compartment and duct temperature ind.	DC BUS 1 (on lateral panel COMPT and DUCT TEMP IND)
TURBO FAN SHUT OFF VALVE 1 CTL	DC BUS 1 (On lateral panel)
TURBO FAN SHUT OFF VALVE 2 CTL	DC BUS 2 (On lateral panel)

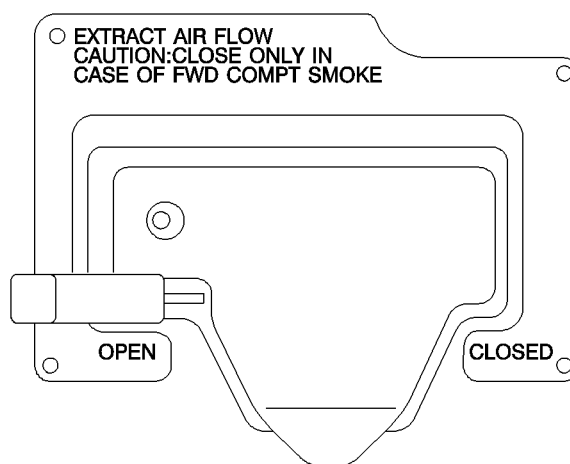
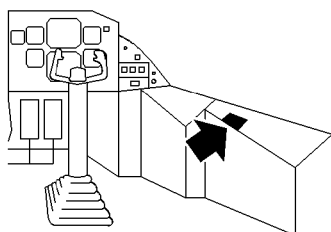
 ATR F.C.O.M.	AIR AIR CONDITIONING	1.03.30		
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FLIGHT DECK VENTILATION ISOLATION

EXTRACT AIR FLOW

CAUTION : Close only in case of FWD COMPT smoke.



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Enables, in case of smoke in the forward cargo compartment, to isolate the flight deck ventilation preventing smoke to enter the flight compartment.

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				NOV 99

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30.3 ELECTRICAL SUPPLY/MFC LOGIC/SYSTEM MONITORING

ELECTRICAL SUPPLY

EQUIPMENT	DC BUS SUPPLY (C/B)
<i>LH SIDE</i>	
Pack valve	DC ESS BUS (on lateral panel PACK VALVE)
Recirculation fan	DC UTIL BUS 1 (on lateral panel PWR SUPPLY CTL)
Pack and recirculation fan alert	DC ESS BUS (on lateral panel PACK and RECIRC FAN CAUTION)
FLT COMPT automatic temperature control	DC ESS BUS (on lateral panel AUTO)
FLT COMPT Manual temperature control	DC ESS BUS (on lateral panel MAN)
<i>RH SIDE</i>	
Pack valve	DC ESS BUS (on lateral panel PACK VALVE)
Recirculation fan	DC UTIL BUS 2 (on lateral panel PWR SUPPLY CTL)
Pack and recirculation fan alert	DC ESS BUS (on lateral panel PACK and RECIRC FAN CAUTION)
Automatic temperature control	DC ESS BUS (on lateral panel AUTO)
Manual temperature control	DC ESS BUS (on lateral panel MAN)
Compartment and duct temperature ind.	DC BUS 1 (on lateral panel COMPT and DUCT TEMP IND)
TURBO FAN SHUT OFF VALVE 1 CTL	DC BUS 1 (On lateral panel)
TURBO FAN SHUT OFF VALVE 2 CTL	DC BUS 2 (On lateral panel)
Isolating valves (CAB VENT)	DC ESS BUS (on lateral panel)

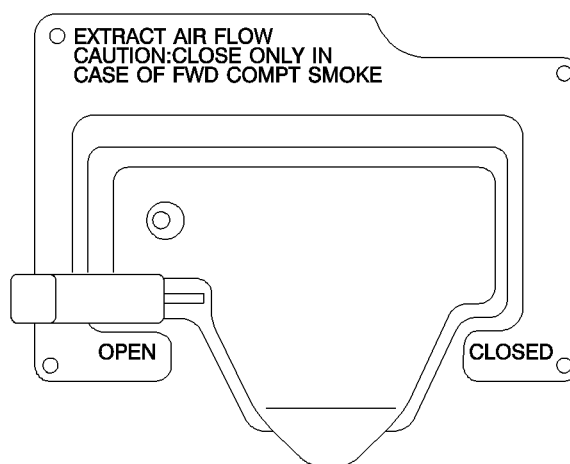
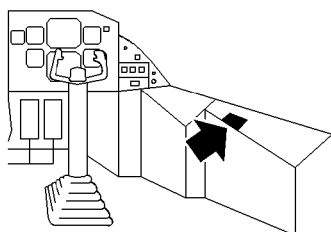
 ATR F.C.O.M.	AIR AIR CONDITIONING	1.03.30		
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				DEC 95

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FLIGHT DECK VENTILATION ISOLATION

EXTRACT AIR FLOW

CAUTION : Close only in case of FWD COMPT smoke.



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Enables, in case of smoke in the forward cargo compartment, to isolate the flight deck ventilation preventing smoke to enter the flight compartment.

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	AIR CONDITIONING			DEC 95

AA

30.3 ELECTRICAL SUPPLY/MFC LOGIC/SYSTEM MONITORING

ELECTRICAL SUPPLY

EQUIPMENT	DC BUS SUPPLY (C/B)
<i>LH SIDE</i>	
Ground cooling fan	DC BUS 1 (on lateral panel GND COOLING FAN CTL)
Pack valve	DC ESS BUS (on lateral panel PACK VALVE)
Recirculation fan	DC UTIL BUS 1 (on lateral panel PWR SUPPLY CTL)
Pack and recirculation fan alert	DC ESS BUS (on lateral panel PACK and RECIRC FAN CAUTION)
FLT COMPT automatic temperature control	DC ESS BUS (on lateral panel AUTO)
FLT COMPT Manual temperature control	DC ESS BUS (on lateral panel MAN)
<i>RH SIDE</i>	
Ground cooling fan	DC BUS 2 (on lateral panel GND COOLING FAN CTL)
Pack valve	DC ESS BUS (on lateral panel PACK VALVE)
Recirculation fan	DC UTIL BUS 2 (on lateral panel PWR SUPPLY CTL)
Pack and recirculation fan alert	DC ESS BUS (on lateral panel PACK and RECIRC FAN CAUTION)
Automatic temperature control	DC ESS BUS (on lateral panel AUTO)
Manual temperature control	DC ESS BUS (on lateral panel MAN)
Compartment and duct temperature ind.	DC BUS 1 (on lateral panel COMPT and DUCT TEMP IND)

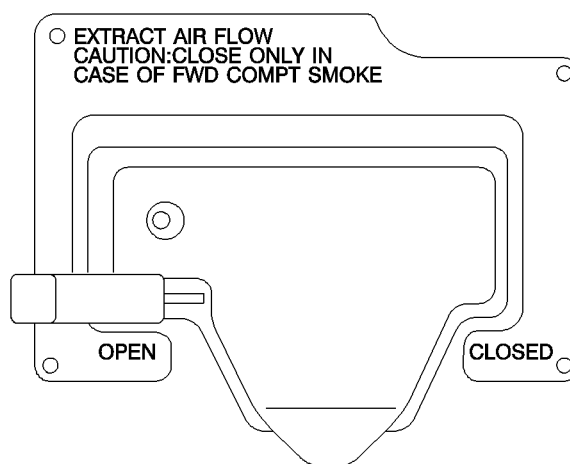
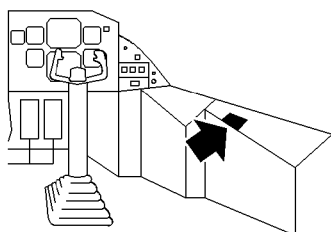
 ATR F.C.O.M.	AIR AIR CONDITIONING	1.03.30		
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				DEC 95

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FLIGHT DECK VENTILATION ISOLATION

EXTRACT AIR FLOW

CAUTION : Close only in case of FWD COMPT smoke.



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Enables, in case of smoke in the forward cargo compartment, to isolate the flight deck ventilation preventing smoke to enter the flight compartment.

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				NOV 99

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30.3 ELECTRICAL SUPPLY/MFC LOGIC/SYSTEM MONITORING

ELECTRICAL SUPPLY

EQUIPMENT	DC BUS SUPPLY (C/B)
<i>LH SIDE</i>	
Ground cooling fan	DC BUS 1 (on lateral panel GND COOLING FAN CTL)
Pack valve	DC ESS BUS (on lateral panel PACK VALVE)
Recirculation fan	DC UTIL BUS 1 (on lateral panel PWR SUPPLY CTL)
Pack and recirculation fan alert	DC ESS BUS (on lateral panel PACK and RECIRC FAN CAUTION)
FLT COMPT automatic temperature control	DC ESS BUS (on lateral panel AUTO)
FLT COMPT Manual temperature control	DC ESS BUS (on lateral panel MAN)
<i>RH SIDE</i>	
Ground cooling fan	DC BUS 2 (on lateral panel GND COOLING FAN CTL)
Pack valve	DC ESS BUS (on lateral panel PACK VALVE)
Recirculation fan	DC UTIL BUS 2 (on lateral panel PWR SUPPLY CTL)
Pack and recirculation fan alert	DC ESS BUS (on lateral panel PACK and RECIRC FAN CAUTION)
Automatic temperature control	DC ESS BUS (on lateral panel AUTO)
Manual temperature control	DC ESS BUS (on lateral panel MAN)
Compartment and duct temperature ind.	DC BUS 1 (on lateral panel COMPT and DUCT TEMP IND)
Isolating valves (CAB VENT)	DC ESS BUS (on lateral panel)

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EQUIPEMENT	DC BUS SUPPLY (C/B)
OVBD valve, U/F valve	DC EMER BUS (on lateral panel VALVES)
Extract fan control relay	DC ESS BUS (on lateral panel CTL)
EXTRACT FAN Contactor	DC BUS 2 (on lateral panel EXTRACT FAN)
EXTRACT FAN Contactor	DC BUS 1 (on lateral panel EXTRACT FAN)

MFC LOGIC

See chapter 1.01

SYSTEM MONITORING

The following conditions are monitored by visual and aural alerts :

- Pack valve position in disagree with command or overheat downstream of the compressor (T > 204°C/393°F).
 - See PACK VALVE FAULT procedure in chapter 2.05.08.
- Overheat in bleed duct (T duct > 274°C/525°F).
 - See BLEED OVHT procedure in chapter 2.05.08.
- R – Recirculation fan low RPM or internal overheat.
 - See RECIRC FAN FAULT procedure in chapter 2.05.08.
- R – Underspeed or overheat of extract fan (T > 90°C/194°F).
 - See AVIONICS VENT EXHAUST MODE FAULT procedure in chapter 2.05.08.
- OVBD VALVE position in disagree with aircraft condition.
 - See OVBD VALVE FAULT procedure in chapter 2.05.08.

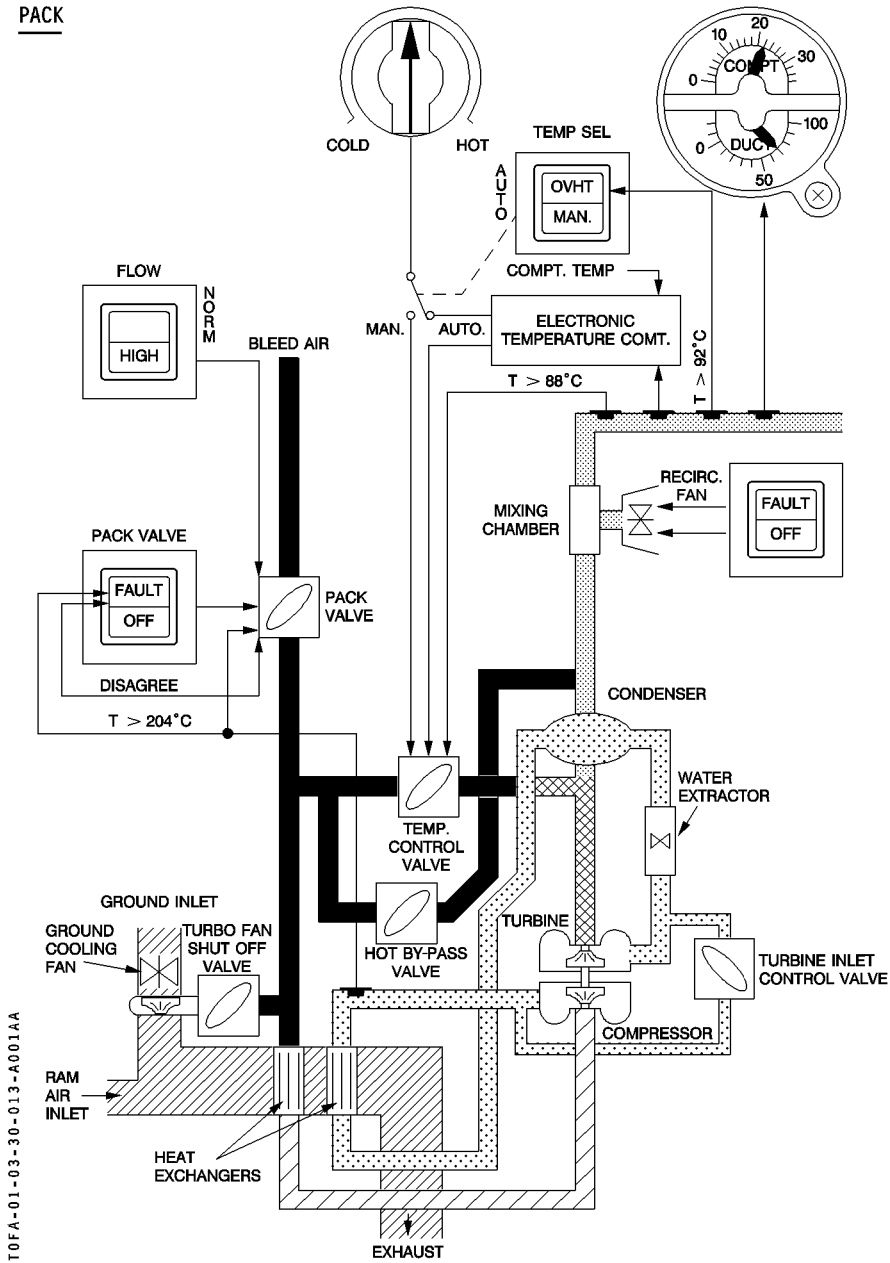
Note : In case of overheat downstream of the compressor, alert is maintained on magnetic indicator (RH maintenance panel) even if fault disappears (See chapter 1.03.20).

	AIR AIR CONDITIONING	1.03.30		
		P 13/14	001	
				DEC 95

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30.4 SCHEMATICS

PACK

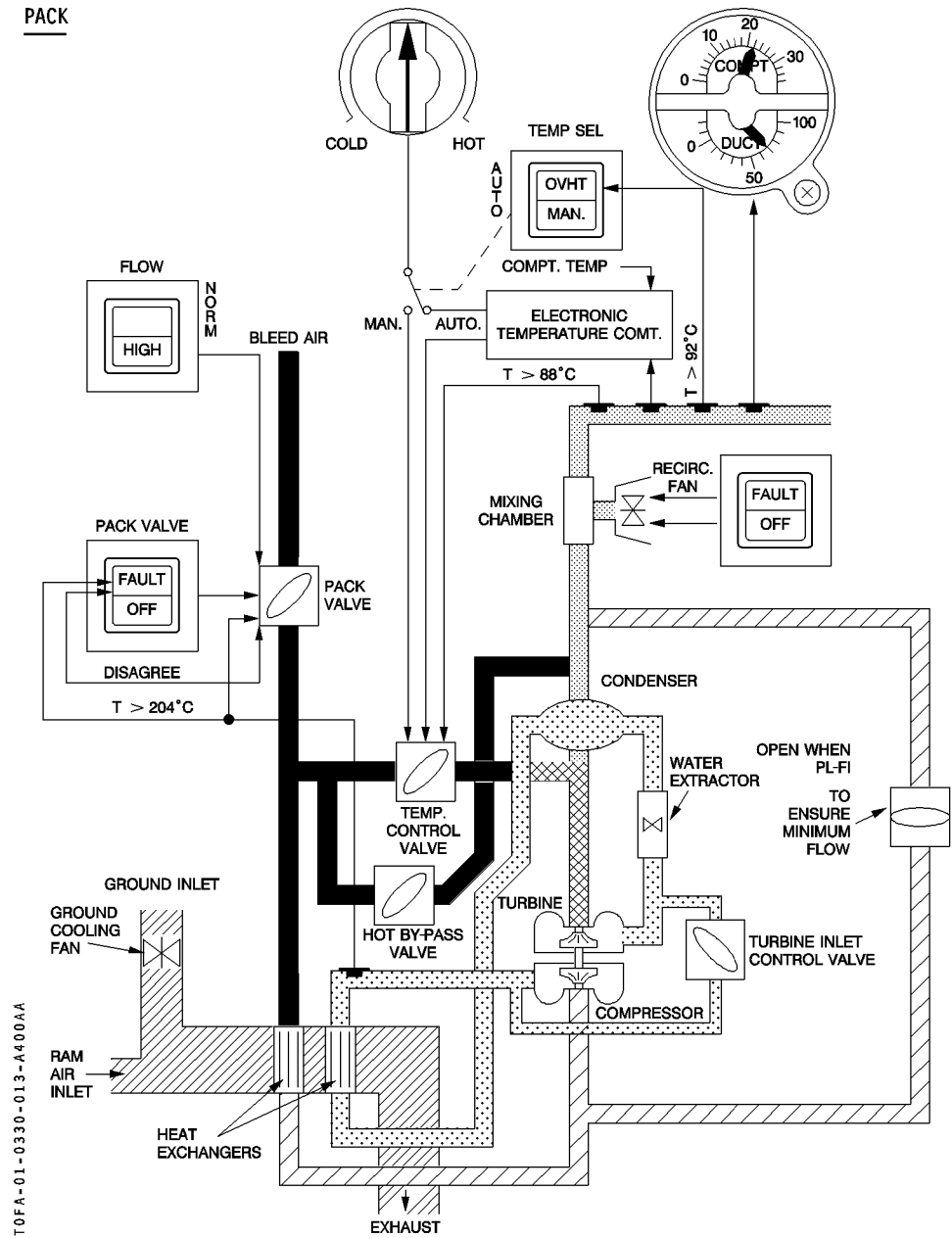


	AIR AIR CONDITIONING	1.03.30		
		P 13/14	400	
				DEC 95

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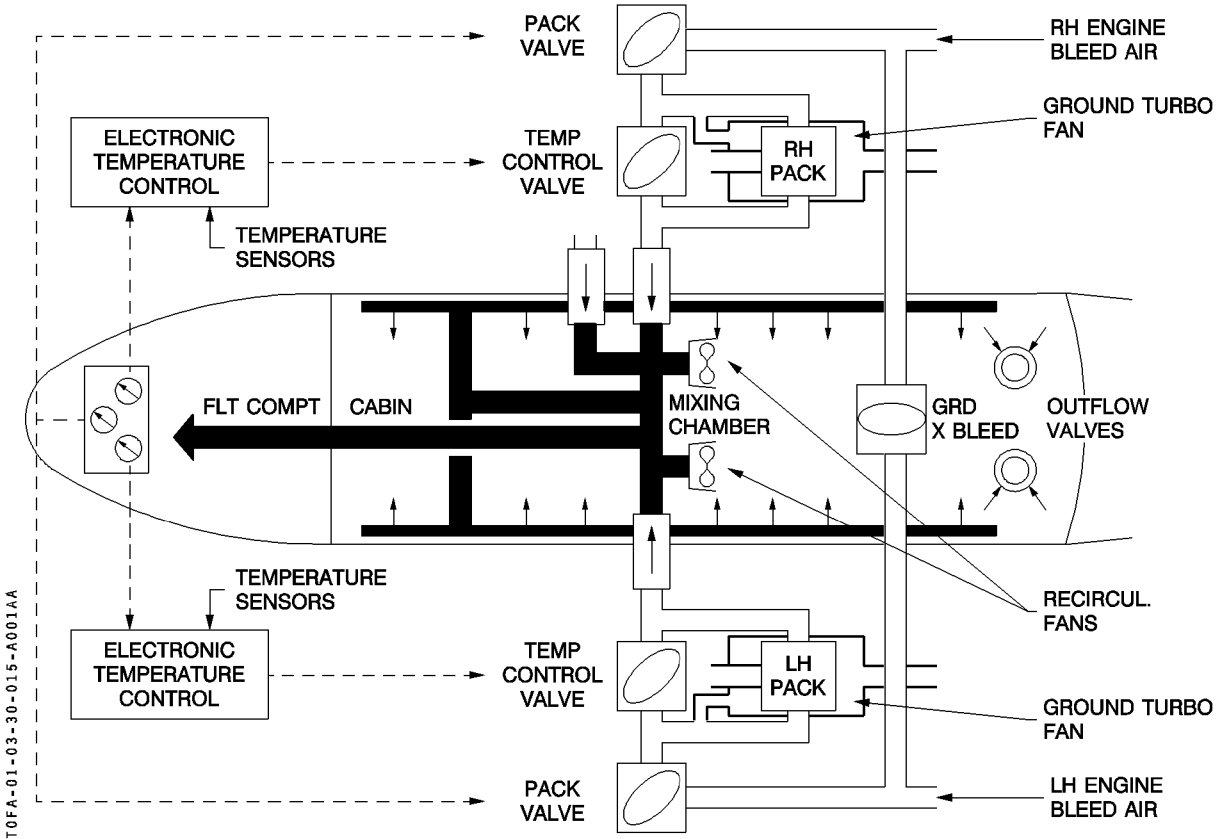
30.4 SCHEMATICS

PACK



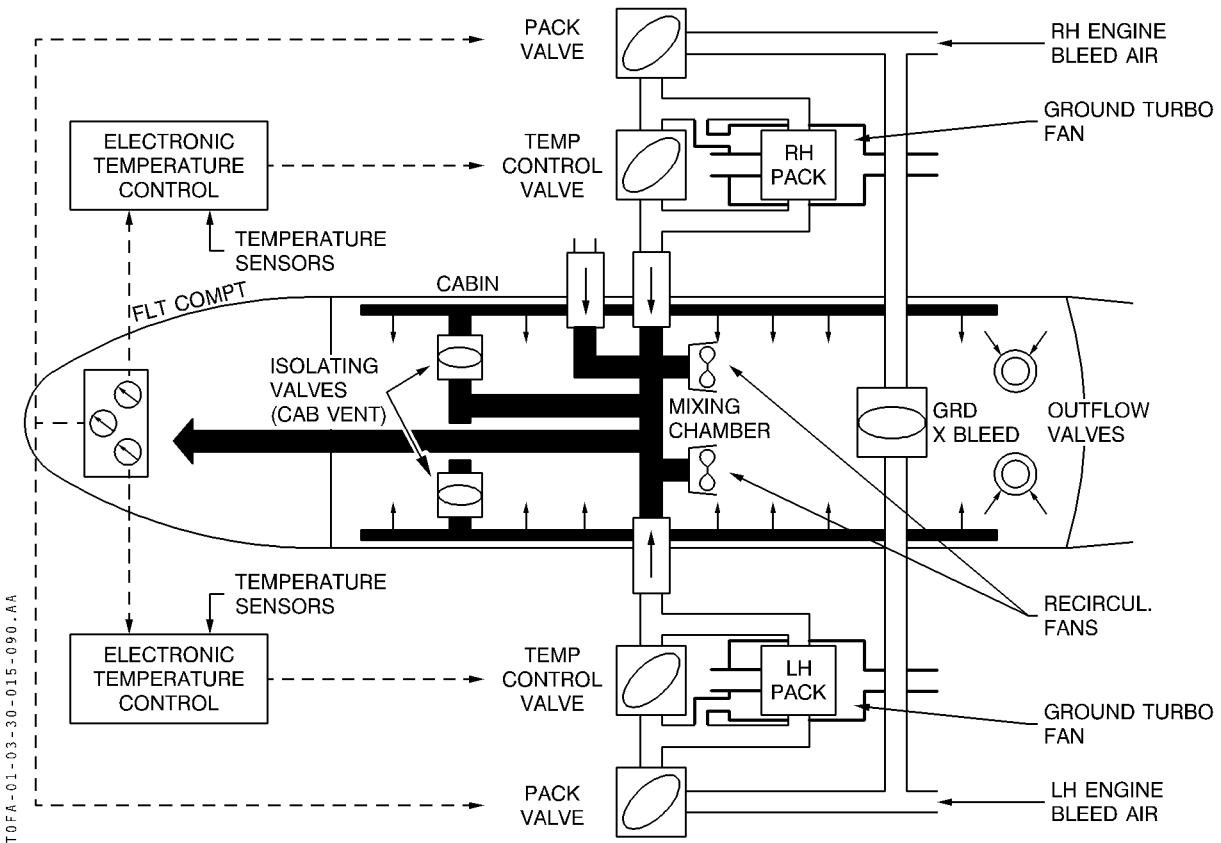
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			P 15/16	001	
	AIR CONDITIONING				DEC 95

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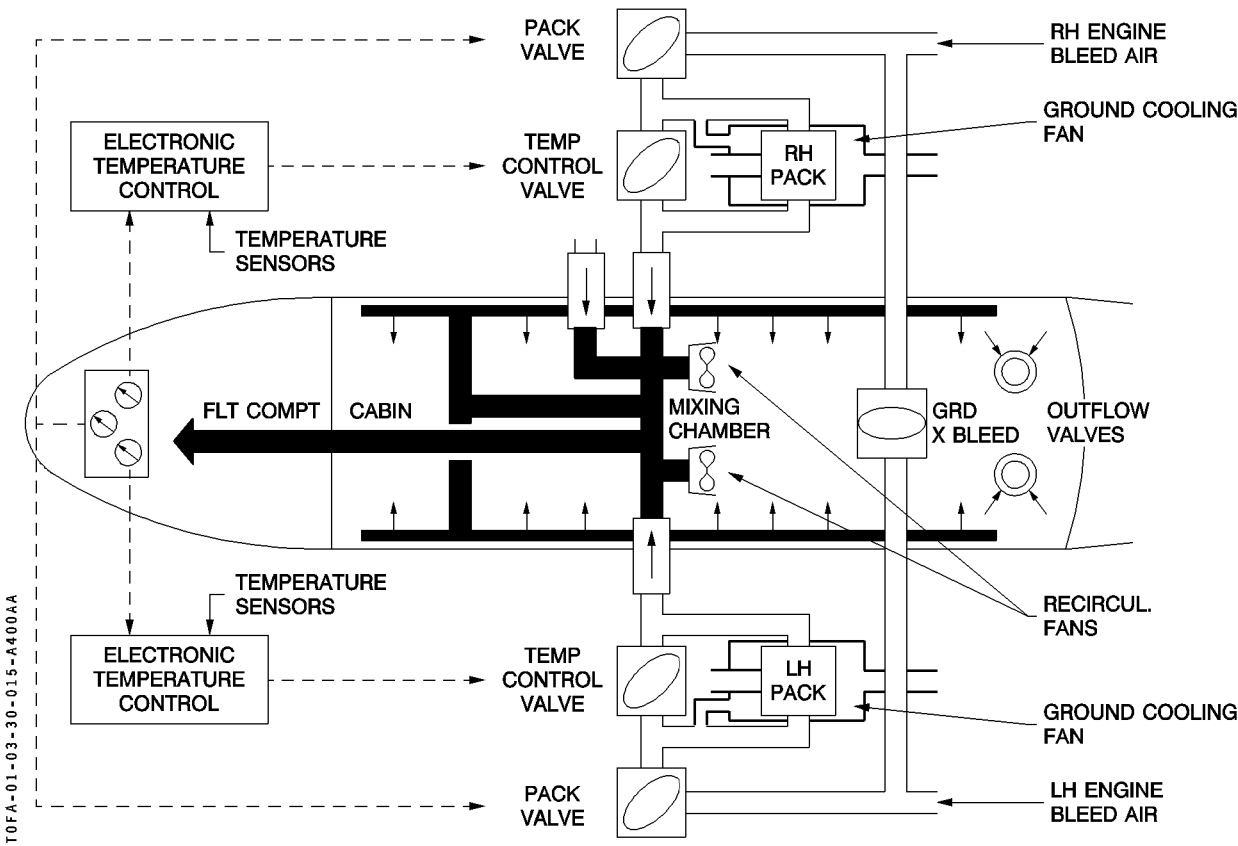
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			P 15/16	090
	AIR CONDITIONING			NOV 99

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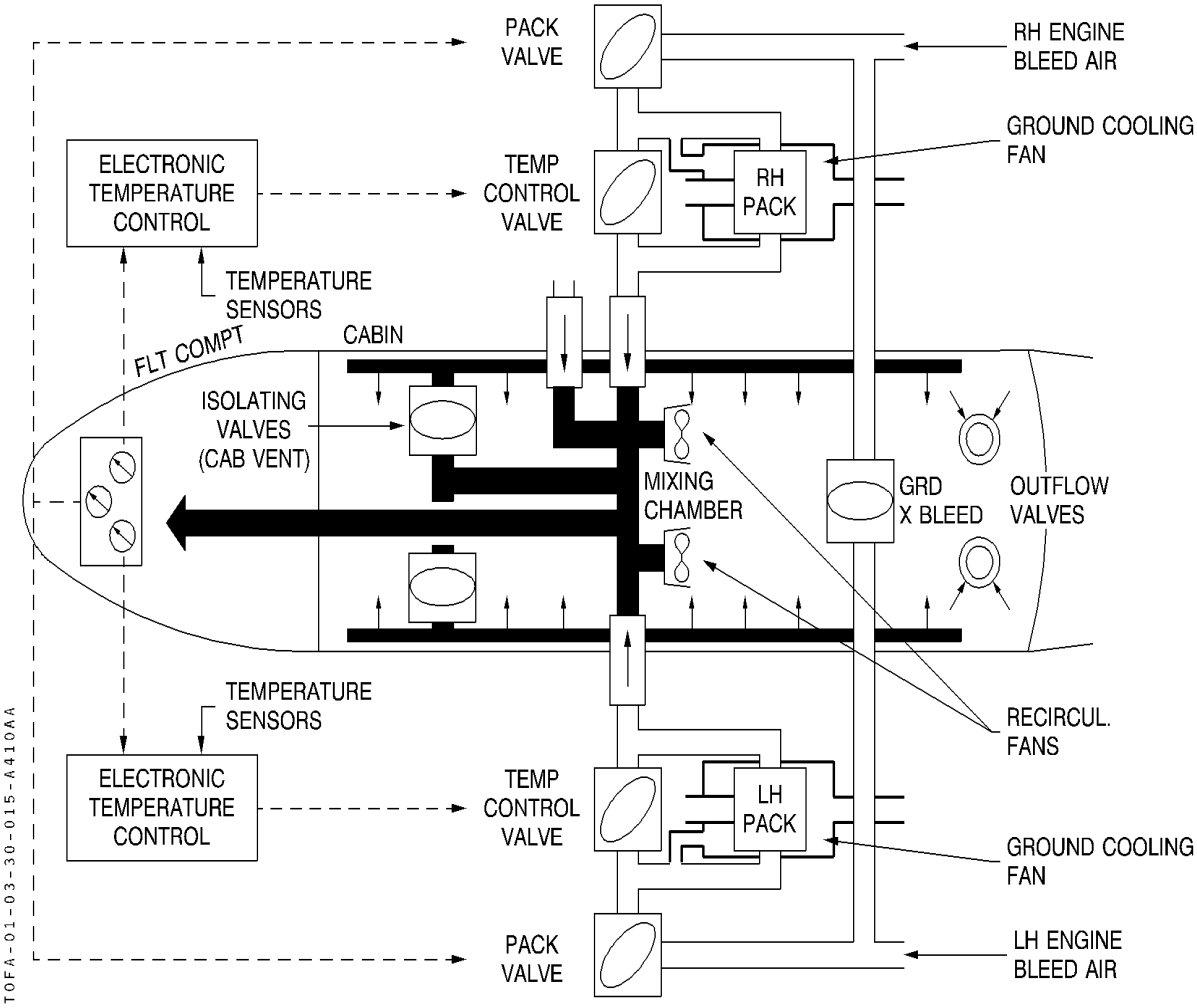
	AIR		1.03.30		
			P 15/16	400	
	AIR CONDITIONING				DEC 95

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	AIR		1.03.30	
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40.1 DESCRIPTION (See schematic p. 11/12)

Cabin pressure and rate of change control is obtained through :

- A fully automatic digital electronic controller, or
- A manual pneumatic controller

which control the outflow of conditioned air to a level compatible with passenger and crew members comfort.

Two outflow valves are installed :

- An electropneumatic.
- A pneumatic.

In Auto Mode, the pneumatic valve is slaved to the electropneumatic one. Their opening will be the same.

Each outflow valve includes devices for the required safety function in case of controller failure :

- The positive differential pressure is limited to 6.35 PSI by a manometric capsule.
- The negative differential pressure is limited to – 0.5 PSI by a non return valve.

Note : The manual controller knob must be selected to NORM position in order not to disturb the automatic regulation.

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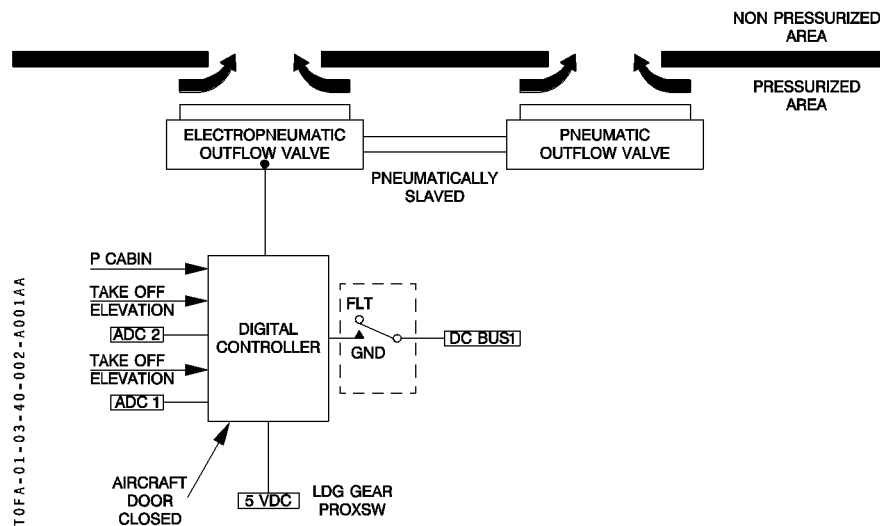
AUTO MODE

The digital controller generates a signal for positioning outflow valves during all phases of flight. The parameters received by the controller for signal computation are :

- Landing elevation from landing elevation selector
- Take off elevation memorized by the controller
- Cabin pressure
- Aircraft static pressure generated by ADC 1 with CAPT altimeter baro setting or, in case of ADC 1 failure, aircraft static pressure generated by ADC 2 with a 1013.2 HPa reference (29.92 in Hg).

The controller computes a theoretical cabin altitude and, then sends a signal to the electropneumatic outflow valve torque motor in order to adjust the actual cabin altitude by opening or closing the two outflow valves.

The loss of electrical signal causes closing of the valve.



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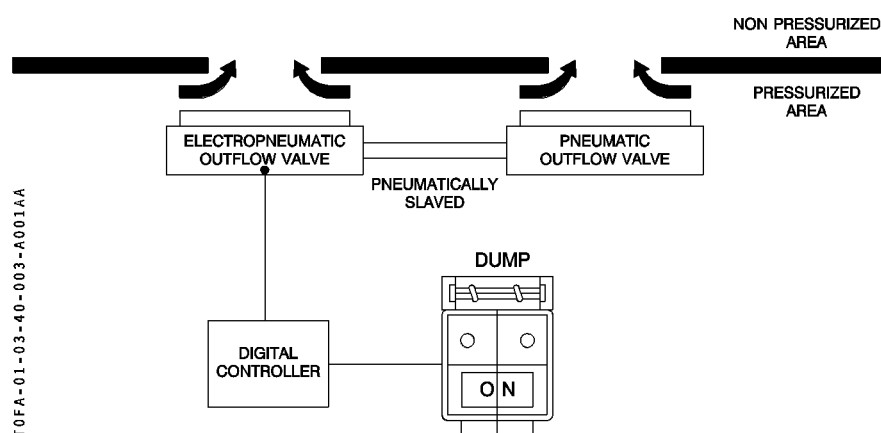
AA

DUMP FUNCTION

A DUMP function is available to send a fully open electrical signal to the electropneumatic outflow valve.

DUMP function is available as long as pressurization system is in AUTO mode.

CAUTION : The DUMP PB is mechanically protected. No other safety device protects DUMP function from inadvertent use.

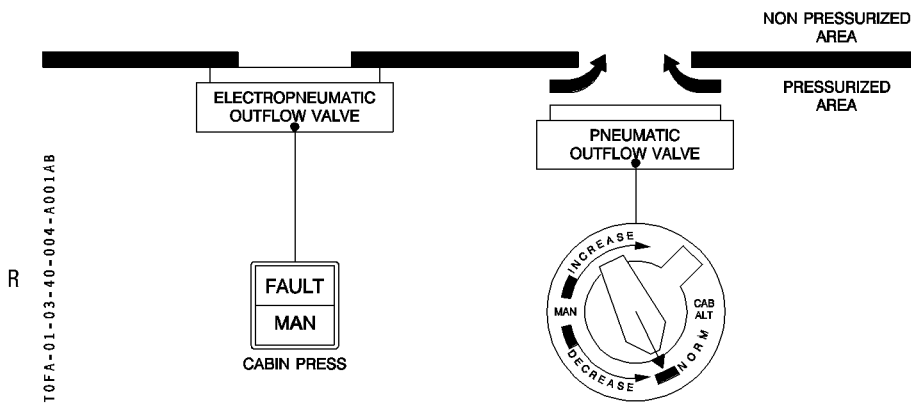


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MANUAL MODE

The electropneumatic outflow valve is maintained closed and the pneumatic outflow valve controls the cabin outlet air flow. Its control servo pressure is function of the manual controller demand. The control knob is used to select any cabin rate of change from – 1500 ft/mn to + 2500 ft/mn.



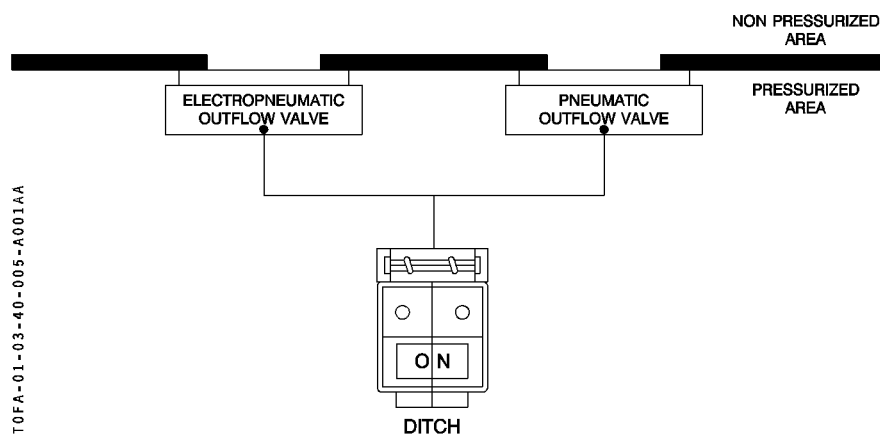
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		P 5	001	
				DEC 95

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DITCHING MODE

Two electrical motors (one for each outflow valves) maintain both outflow valves in closed position.

Ditching mode is available in both automatic and manual modes.



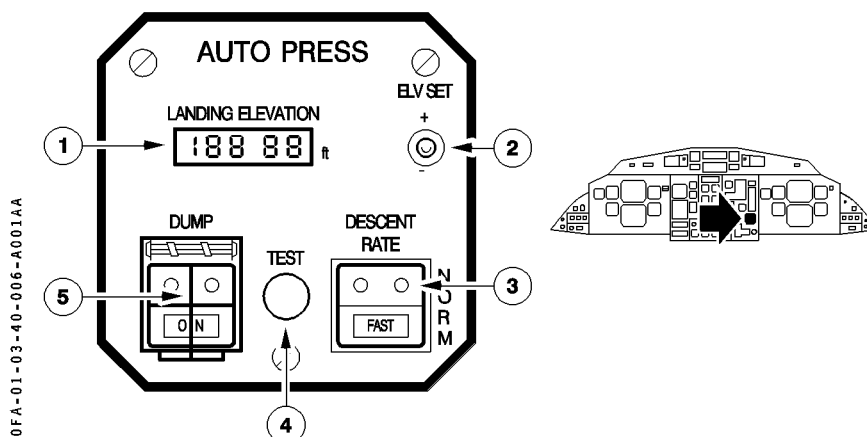
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	PRESSURIZATION				DEC 95

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40.2 CONTROLS

AUTO PRESS PANEL



① LANDING ELEVATION ind.

Displays in ft the landing elevation setting. The two last digits always display 0. All digits will extinguish in case of automatic system failure.

② ELV SET trigger switch

Allows selection of the elevation of the planned destination airport in 100 ft increments with two running speeds (depending on impuls duration). The landing altitude ranges between – 1500 ft and 9900 ft.

③ DESCENT RATE pb

Is operated to allow a fast cabin descent.

NORM (pb released) The max cabin vertical speed in descent is – 400 ft/mn.

FAST (pb pressed in) The max cabin vertical speed in descent is – 500 ft/mn. The FAST LIGHT illuminates blue.

④ TEST pb

When depressed, the system is electrically tested. If the system is ready to use, the LANDING ELEVATION ind. displays alternately 18800 and – 8800. Fault light illuminates amber on MAN pb.

In flight, this test is inhibited.

⑤ DUMP guarded pb

This guarded pb allows selection of the dump function when in AUTO mode.

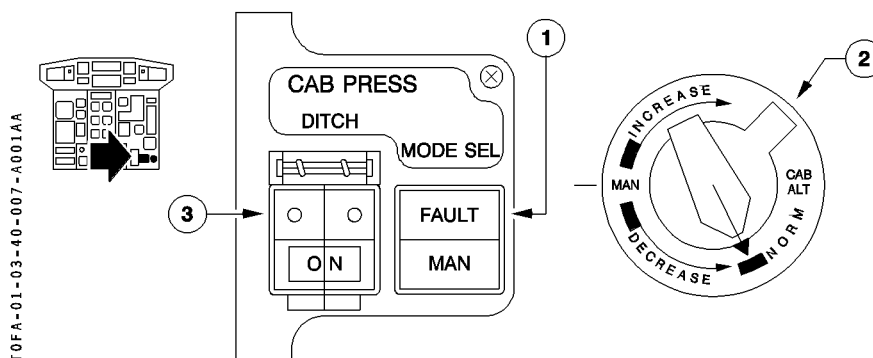
NORMAL (pb released) The digital controller operates normally.

ON (pb pressed in) The digital controller is out of circuit and an electrical opening signal is sent to the electropneumatic outflow valve. Both outflow valves will fully open. The ON light illuminates white.

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MAN PRESS CONTROLS



① MODE pb

Selects the pressure control mode :

AUTO (pb pressed in) The digital controller is in operation.

MAN (pb released) The digital controller is out of operation, digits extinguish and the manual controller regulates the pressure. The MAN light illuminates white.

FAULT The light illuminates amber to indicate a digital controller failure, associated with a CCAS alert.

② MAN RATE knob

In manual mode, the control knob is used to select any cabin rate of change from - 1 500 ft/mn to + 2 500 ft/mn.

NORM This position must be used when in AUTO mode.

③ DITCH guarded pb

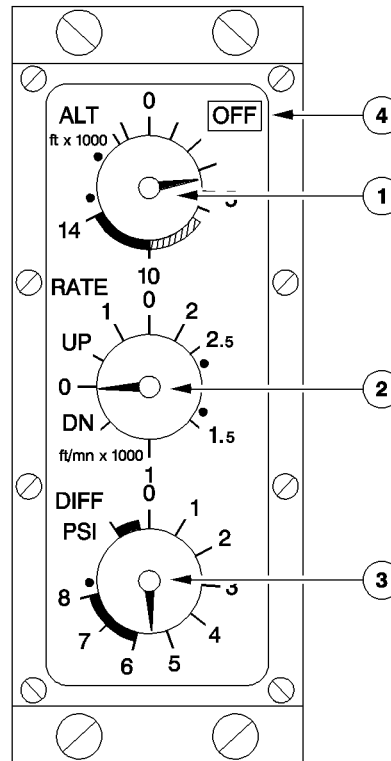
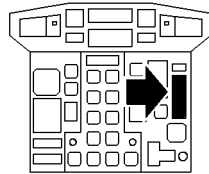
Selects the ditch mode.

ON : (pb pressed in) both outflow valves are forced to closed position regardless of the pressure control mode. The ON light illuminates white.

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CABIN PRESS IND



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① **ALT indication**

Indicates the cabin pressure in thousands of feet altitude based on 1013.2 HPa (29.92 in Hg).

② **RATE indication**

Indicates the cabin altitude rate of change in ft/mn X 1 000.

③ **DIFF indication**

Indicates the differential pressure between cabin and aircraft static pressure from - 1 to + 8 PSI.

④ **A red flag appears on the right top of the ind. to indicate the loss of power supply.**

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40.3 ELECTRICAL SUPPLY/MFC LOGIC/SYSTEM MONITORING

ELECTRICAL SUPPLY

R R R R R R R R	EQUIPMENT	DC BUS SUPPLY (C/B)
	Digital controller	DC BUS 1 (on lateral panel AUTO PRESS)
	Cabin pressure ind.	DC EMER BUS (on lateral panel CAB PRESS IND and WARN)
	Pneumatic OUTFLOW Valves	DC EMER BUS (on lateral DITCH)

MFC LOGIC

See chapter 1.01

SYSTEM MONITORING

The following conditions are monitored by visual and aural alerts :

- Cabin altitude above 10 000 ft.
 - See EXCESS CAB ALT procedure in chapter 2.05.08.
- Differential pressure exceeds 6.35 PSI.
 - See EXCESS CAB Δ P procedure in chapter 2.05.08.
- Digital controller failure.
 - See AUTO PRESS FAULT procedure in chapter 2.05.08.
- Both outflow valves selected in DITCH position.
 - VISUAL alerts are :
 - MC light flashing amber
 - AIR amber light on CAP
 - ON white light on DITCH pb
 - AURAL alert is the single chime.

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40.4 SCHEMATIC

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