1. GENERAL.

1.1. Air conditioning.

Air conditioning is furnished by two packs located under the cabin floor in the wing fairing.

The temperature of the outgoing air is either automatically or manually controlled from the cockpit. The actual temperature regulation is performed by mixing hot air directly from the pneumatic system with air that has been cooled by the main unit of the pack – the air cycle machine. The conditioned air from the left pack is then distributed to the cabin and from the right unit to the cockpit and cabin.

The two distribution systems are connected by a cross manifold for transfer purposes, controlled by a cross valve. The valve may only be open on the ground. Each distribution system recirculates the air to improve air flow.

An external air conditioning system can be connected to the aircraft when parked.

In case of over–temperature, the pneumatic system bleed valve will close and a DUCT OV TEMP light in the AIRCOND panel will come on together with AIRCOND master caution.

1.2. Pressurization.

The cabin is pressurized by the two air conditioning packs. The system is so designed that it is sufficient with one pack for pressurization up to 31 000 ft. However, the engine bleed extraction requirement must be observed above 25 000 ft. (See AOM 17.1.)

The cabin pressure is either automatically controlled by a pressurization controller, or manually controlled by means of a control valve operated from the control panel in the cockpit.

The automatic control system is the one normally used. It receives power lever position, static pressure, cabin pressure, preselected airfield altitude, weight on or off wheels and pressure values from the control panel. These parameters are processed in a control unit which then electrically regulates the electro–pneumatic primary outflow valve to maintain the correct pressure.

The manually controlled system is an all pneumatic system. The pilot operates the pneumatic secondary outflow valve by adjusting the control valve setting while watching the cabin pressure instruments.

With Mod. No. 1994 installed and in auto mode the pressurization control system dumps cabin pressure by opening the primary electro–pneumatic outflow valve when on ground, the pneumatic secondary outflow valve will remain closed. Both outflow valves can be opened by means of an emergency dump switch in the cockpit when on ground. In the air (flight mode) the dump switch only activates the primary electro–pneumatical outflow valve. Both outflow valves incorporate positive and negative pressure relief functions.

Without Mod. No. 1994 installed and in auto mode, the pressurization control system dumps cabin pressure by opening both outflow valves when on ground. The electro–pneumatical outflow valve can also be opened by means of an emergency dump switch in the cockpit. Both outflow valves incorporate positive and negative pressure relief functions.

Cabin pressure is displayed on three indicators in the cockpit. The indicators show differential pressure, cabin altitude and cabin altitude rate–of–change.

A CABIN PRESS master warning on the central warning panel is activated if cabin climbs above 10 000 ft or if the differential pressure exceeds 7.5. psi.

2. MAIN COMPONENTS AND SUBSYSTEMS.

2.1. Air conditioning system. (Fig. 1. and 2.)

Air conditioning pack.

Hot air from the pneumatic system is used for conditioning of the cockpit and cabin. The air conditioning temperature is regulated by two packs.

A dual temperature control valve controls each pack by modulating the amount of air directed to an air cycle machine for temperature decrease (pack valve) and the amount of air bypassing the aircycle machine (bypass valve). The bypass valve and the pack valve are linked together and operate in sequence so that when the bypass valve is moved towards open, the pack valve is moved towards closed and vice versa. This allows a temperature regulation of the air leaving the pack.

The cooling part of the pack consists of an air cycle machine and a dual heat exchanger mounted on the front end of the air cycle machine. The primary section of the heat exchanger decreases the temperature of the bleed air from the pneumatic system before it enters the compressor of the air cycle machine where the pressure and temperature is increased.

The air is then cooled by the secondary heat exchanger section, followed by an expansion over the turbine of the air cycle machine where further temperature decrease occurs.

The cooled air is then mixed with hot, bypassed air and with air from the recirculation fan. Before being distributed, the conditioned air is paced through a condenser where moisture in the air from the secondary heat exchanger is condensed using the conditioned air as a cooling agent. The condensed water is collected, routed to the heat exchanger and sprayed into the cooling airstream to improve the cooling.

Each pack is protected against overtemperature by two overtemperature switches. One switch is located in the compressor outlet duct and closes if the temperature exceeds 225°C (440°F). The other switch is located in the pack outlet duct and closes if the temperature exceeds 82°C (180°F).

If an overtemperature occurs, the respective bleed valve will close and the DUCT OV TEMP light in the AIR COND panel will come on together with AIR COND master caution.

Distribution system. (Fig. 3.)

Conditioned air is ducted from the left and right air conditioning packs. The left pack supplies the cabin while the right pack supplies cockpit and cabin. The required supply to the cockpit is limited to 1/3 of the available flow from the right pack. Therefore, the supplemental flow from the right pack is routed via a connecting duct to the cabin ducting.

A small amount of bleed air is routed from Left and Right Air Conditioning Pack to the Cabin Pressure Air Filter. The air is blown over the filter to prevent a moisture build up in the filter.

With Mod. No. 1991 installed, there is a ducting system from Left and Right air Conditioning Packs supplying a limited amount of dry air into the tail–compartment creating a slight overpressure. By supplying a stream of dry air flow to the tail–compartment a reducing moisture build–up in that area will be achieved.

If a bleed valve is closed or after an engine failure the air supply is automatically shut off by the Tail–compartment Air Shut–off Valve (see also AOM 16.1.).

Two recirculation fans feed air from cockpit and cabin back to the respective pack to improve the airflow. Filters are provided for cleaning of the recirculated air before it enters the recirculation fans.

There is also a recirculation fan fault detection system installed. It consists of a speed sensor which triggers L respectively R RECIRC light in the AIR COND panel should the speed drop below 80% of normal speed, indicating failure of the recirculating fan.

The avionics rack is ventilated by a fan which draws air from the cabin through a filter into the avionics rack and down to the underfloor area and then dumped overboard through the outflow valves. The avionics vent fan operates whenever anyone of the three AVION switches is in ON position.

There is also a vent fan fault detection system installed. It consists of a current detector connected to the avionics vent fan. The detector activates an AVIONICS VENT master caution light should the vent fan stop.

External ground equipment for heating or cooling can be connected to the distribution system. The connector is located inside a service door at the bottom of the fuselage in the rear wing area. The external ground equipment connection door is provided with an on the ground (from outside) extendable ram air intake. The ram air intake shall be extended when dispatching with only one airconditioning pack operating (MEL item). The intake is used as a backup if the operating pack fails. During operation with one Air Conditioning Pack, pressure in the distribution system exceeds the ram air pressure keeping the ground connection check valve closed. Should the remaining ACP fail, ram air pressure opens the check valve furnishing fresh air to the compartments. The ram air pressure is adequate to ventilate the compartments on its own. During cruise a minimum speed of 210 KIAS must be kept to maintain a sufficient ram air pressure.

Temperature control system. (Fig. 1.)

Each pack has its own, independent temperature control system.

The dual temperature control valve can be operated either automatically to provide a compartment temperature of between 18°C and 29°C, or manually if necessary. However, in MAN mode, temperature can be selected within a greater range.

Automatic mode is selected by setting the three position TEMP SELECT switch in the AIR COND panel to AUTO. The dual control valve is then operated by a controller using inputs from temperature sensors both in the duct and in the respective compartment. These temperatures are compared to the temperature selector setting and the control valves adjust accordingly.

In addition, high and low temperature limit circuits keep the duct temperature between 3°C (25°F) and 75°C (167°F) at all times.

The dual temperature control valve is manually operated by holding the TEMP SELECT switch in either HOT or COLD spring–loaded position.

Manual temperature mode shall only be used in case of failure in the automatic control system (with Mod. No. 3121 installed the temperature switches are guarded in AUTO position to prevent unnecessary use of the manual mode).

Since the temperature limit circuits are deactivated in manual mode extreme care shall be taken not to obtain a temperature below freezing in the distribution duct. Therefore always keep the recirculating fan ON for that pack which is operated in manual mode.

The left distribution duct temperature can easily be checked on the temperature indicator in the AIR COND panel.

A temperature below freezing is indicated by snow blowing through the gaspers or frost freezing in the gasper nozzles. This situation can block the system creating an overpressure high enough to damage the distribution ducting.

Typical operating conditions with manual temp control when a temperature below 0°C is created in the distribution ducting.

– Propeller Brake engaged with:

  ° X–VALVE open.

  ° R HP VALVE open (AUTO position).

  ° RECIRC fans OFF.

  ° Dual control valves, TEMP SELECT switches, max COLD.

– Normal engine operation with:

  ° Power levers below approximately 80% Ng (HP VALVES open).

  ° RECIRC fans OFF or ON.

  ° Dual control valves, TEMP SELECT switches, max COLD.

Optional Pilot footwarmer installation (Fig. 3) Mod. No. 1345

As an option the cockpit can be provided with footwarmers. Air is taken from the normal supply to the cockpit, the amount of air can be adjusted by an Air Flow Regulator, one for each pilot. The air temperature is controlled via a heater for each pilot, thereby providing an individual adjustment for optimum comfort.

When the footwarmer is used at least one sides–BLEED system including the RECIRC FAN must be ON.

Optional Cockpit floor heaters installation (Fig. 10) Mod. No. 2293

As an alternate to Mod No 1345, an optional Cockpit Floor Heater installation Mod No 2293 can be provided. Mod No 2293 consists of an electrically powered heater element embedded in the cockpit floor carpets. Extent of heater element: see fig. 10. On the right pilot side a pull loop is fixed to the floor carpet close to the hydraulic hand pump position for easy access.

The heaters are powered from the UTILITY BUS and are individually controlled by an ON–OFF switch on each side panel.

Optional cargo heater installation. Mod. No. 2787 option 21:07.

To improve the temperature in the normally non heated cargo compartment an optional electrical cargo heater can be installed.

The heater consists of an AC driven heater and a DC driven fan for air circulation. The heater unit is controlled from a dedicated CARGO HEATER ON–OFF switch in the cockpit. To operate, the cargo heater requires both AC generator to be on line, and is accordingly automatically disconnected if either AC generator drops off line. Further more the heater unit is disconnected if the cargo fire extinguisher is activated.

With the system in operation the temperature in the cargo compartment will be kept at minimum +2°C at OAT –60°C and +12°C at OAT –40°C. The temperature in the cargo compartment can be continuously monitored by the TEMP indicator on the overhead panel.

2.2. Pressurization system. (Fig. 4.)

The cabin is pressurized by both air conditioning packs. The pressure is regulated by two outflow valves, located in the empennage.

The primary outflow valve is electro–pneumatically controlled by a pressurization controller and is normally used for automatic pressure regulation. The secondary outflow valve is pneumatically controlled from the cockpit control panel and is used as a manual standby system. Both outflow valves are supplied with servo vacuum pressure from the pneumatic system.

The outflow valves also incorporate positive and negative relief functions. For relief valve opening, maximum positive differential pressure is 7.6 psi and maximum negative pressure is 0.5 psi.

In the corporate version an additional altitude limit control function is added on the electro–pneumatic primary outflow valve preventing cabin altitude to exceed 15 000 ft should the pressurization controller fail.

For emergency pressure relief, the electro–pneumatical outflow valve can be opened by an emergency pressure dump switch. With Mod. No. 1994 installed both outflow valves are opened with the pressure dump switch when on ground.

For maintenance purpose the system can be switched to flight mode on ground using the CAB PRESS switch in the overhead TEST 2 panel.

Automatic operation.

When the system is in AUTO and powered, a pressure controller self–test is initiated. This illuminates a FAULT light on the control panel. If no fault is detected, the light will go off in less than 3 seconds.

The automatic function of the pressurization system works in six different modes depending on phase of flight:

- **Ground mode.** The system is in ground mode when the aircraft is on ground with power levers retarded.
  Without Mod. No. 1994 installed:
  After engine start, vacuum pressure is supplied to the outflow valves which will go to fully open position.
  With Mod. No. 1994 installed:
  After engine start, vacuum pressure is supplied to the outflow valves which will make the primary electro–pneumatic valve to go to fully open position while the secondary pneumatic valve remains closed (the valve is closed during all normal operation).
- **Pre–pressurization mode**. When one power lever is moved above the minimum takeoff power position (64° power lever angle), the system transfers to pre–pressurization mode.
  Without Mod. No. 1994 installed:
  The secondary pneumatic outflow valve will close and the primary electro–pneumatical outflow valve is modulated towards its closed position permitting cabin pressurization at a rate of 300 ft/min (at detent position) to 140 ft below actual cabin altitude existing prior to power levers advancement. If both power levers are retarded below the min. takeoff power position the secondary pneumatic outflow valve will go to fully open position and the primary electro–pneumatic valve modulates a cabin uprate of 500 ft/min. After 20 sec. a timer will give a control command driving the valve to fully open position.
  With Mod. No. 1994 installed:
  The primary electro–pneumatical outflow valve is modulated towards its closed position permitting cabin pressurization at a rate of 300 ft/min (at detent position) to 140 ft below actual cabin altitude existing prior to power levers advancement. If both power levers are retarded below the min. takeoff power position the primary electro–pneumatic valve modulates a cabin uprate of 500 ft/min. After 20 sec. a timer will give a control command driving the valve to fully open position.

– **Climb mode.** At Liftoff as sensed by the weight on wheel switches the system transfers to climb mode. The pneumatic outflow valve will remain closed and the electro–pneumatical valve is regulated by the controller. The controller computes the barometric corrected selected LDG ALT and the sensed aircraft altitude. These parameters are compared with the computed auto–schedule to establish a control point for cabin pressure regulation. The rate of change is set to 500 ft/min (at detent position) for uprate and a zero descent rate. If the actual takeoff altitude is less than the selected LDG ALT, the control point is initially set to the LDG ALT. The controller starts to uprate the cabin until it intercepts the auto–schedule when it change control point and follows the auto–schedule.

  If the actual takeoff altitude is greater than the selected LGD ALT, the takeoff altitude will be maintained until the auto–schedule exceeds the takeoff altitude. As the aircraft climb and the auto–schedule exceed the takeoff altitude, the controller switch will effect an uprate and follow the auto–schedule.

  If the system fails to switch to flight mode at liftoff, a backup feature in the pressurization controller will transfer the system to flight mode when aircraft altitude exceeds 15 000 ft. In addition the controller will ensure that the differential pressure never exceeds 7.1 psi. At takeoff with both BLD VALVES switched off both outflow valves will be closed. When switching on the first BLD VALVE the pressurization system goes directly into climb mode.

– **Cruise mode.** When the aircraft reaches its cruising level and the altitude change is less than 200 ft per minute the system transfers to cruise mode. Setting the cruise mode effects two changes in the control logic:

  – the downrate limit is revised from zero to 300 ft/min at detent position.

  – the cabin altitude is clamped at the control point, the cabin altitude will remain unchanged for flight disturbances not exceeding 100 ft climb and 200 ft descend in aircraft altitude. However a change in LDG ALT or barometric setting will cause either an up or down rate of cabin altitude. When the aircraft climbs more than 100 ft or descends more than 200ft below the clamped altitude the clamp will be deleted and a new control point will be established when the altitude change again is less than 100 ft per minute.

– **Descent mode.** When the aircraft descends 200 ft in less then one minute or descends more than 500 ft regardless of time the system transfers to descent mode. The cruise clamp is deleted and a new control point is established which is the higher of either selected LDG ALT or the auto–scheduled altitude. The controller starts to downrate the cabin and maintains the new control point.

– **Landing mode.** When the controller receives signals from the weight on wheel switches at touch down, and aircraft altitude is less than 15000 ft, the system is transferred to landing mode.

  Without Mod. No. 1994 installed, the pneumatic outflow valve will go to fully open position and the electro–pneumatic valve will modulate a cabin uprate of 500 ft/min.

  With Mod. No. 1994 installed, the pneumatic outflow valve will remain closed and the electro–pneumatic valve modulates a cabin uprate of 500 ft/min.

  After 20 sec. a timer will give a control command driving the valve to fully open position, the 20 sec. cabin uprate is to eliminate any error in selected LDG ALT or barometric correction.

Manual operation.

When the AUTO/MAN switch is set to MAN, system pressurization is manually controlled.

A rotary knob on the pressure control panel is used to set the pneumatic outflow valve in desired position. Rotating the knob clockwise will increase and counterclockwise will decrease the cabin altitude. The electro–pneumatic outflow valve will remain closed.

Pressure indication.

The pressure system has the following indications:

– Differential pressure.

– Cabin altitude.

– Cabin altitude rate of change.

A cabin pressure warning will alert the crew if cabin altitude exceeds 10 000 ft or if cabin differential pressure exceeds 7.5 psi. Any one of these situations will activate the CABIN PRESS master warning.

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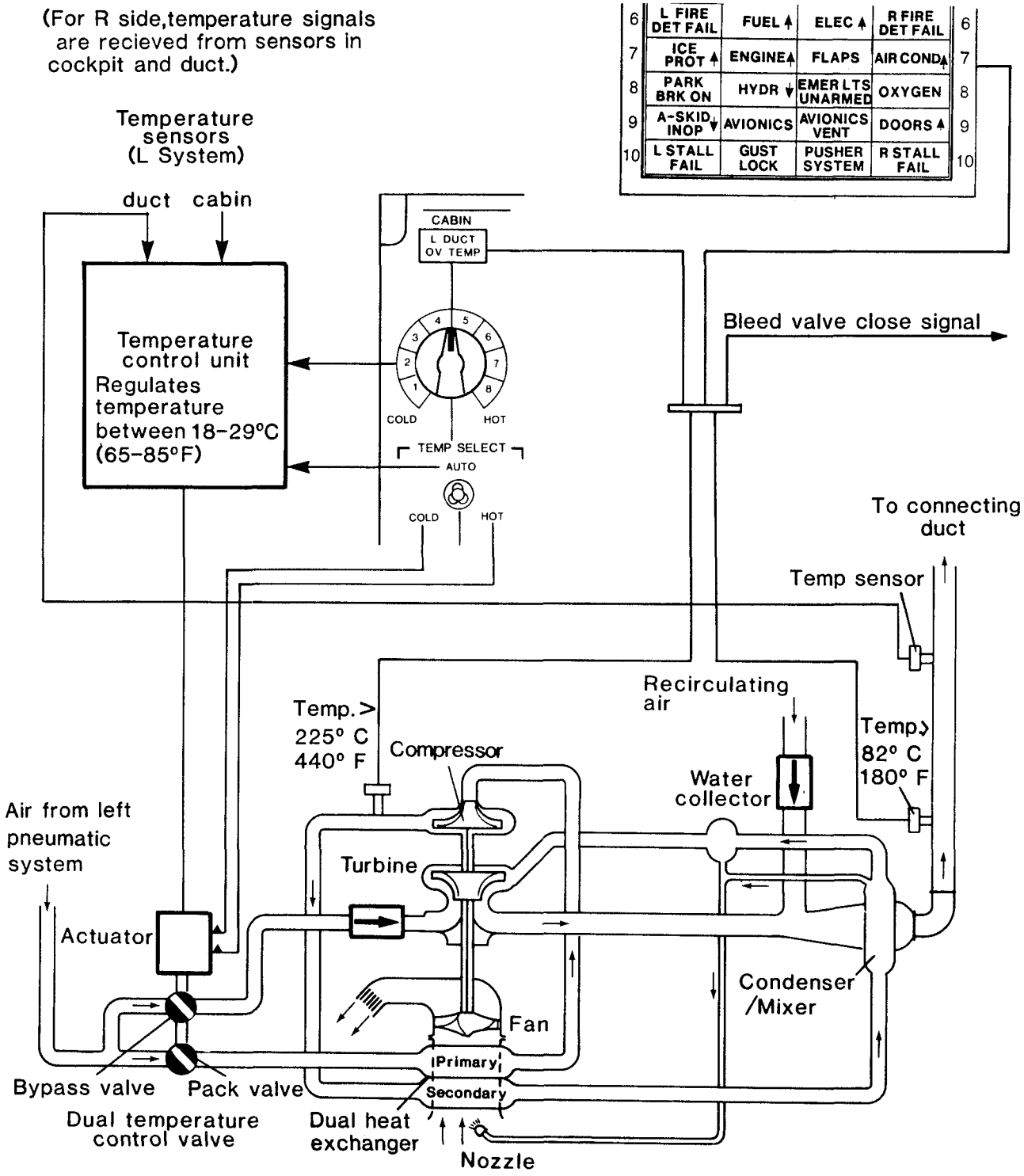

Fig. 1. Air conditioning pack - schematic. (L-side shown)

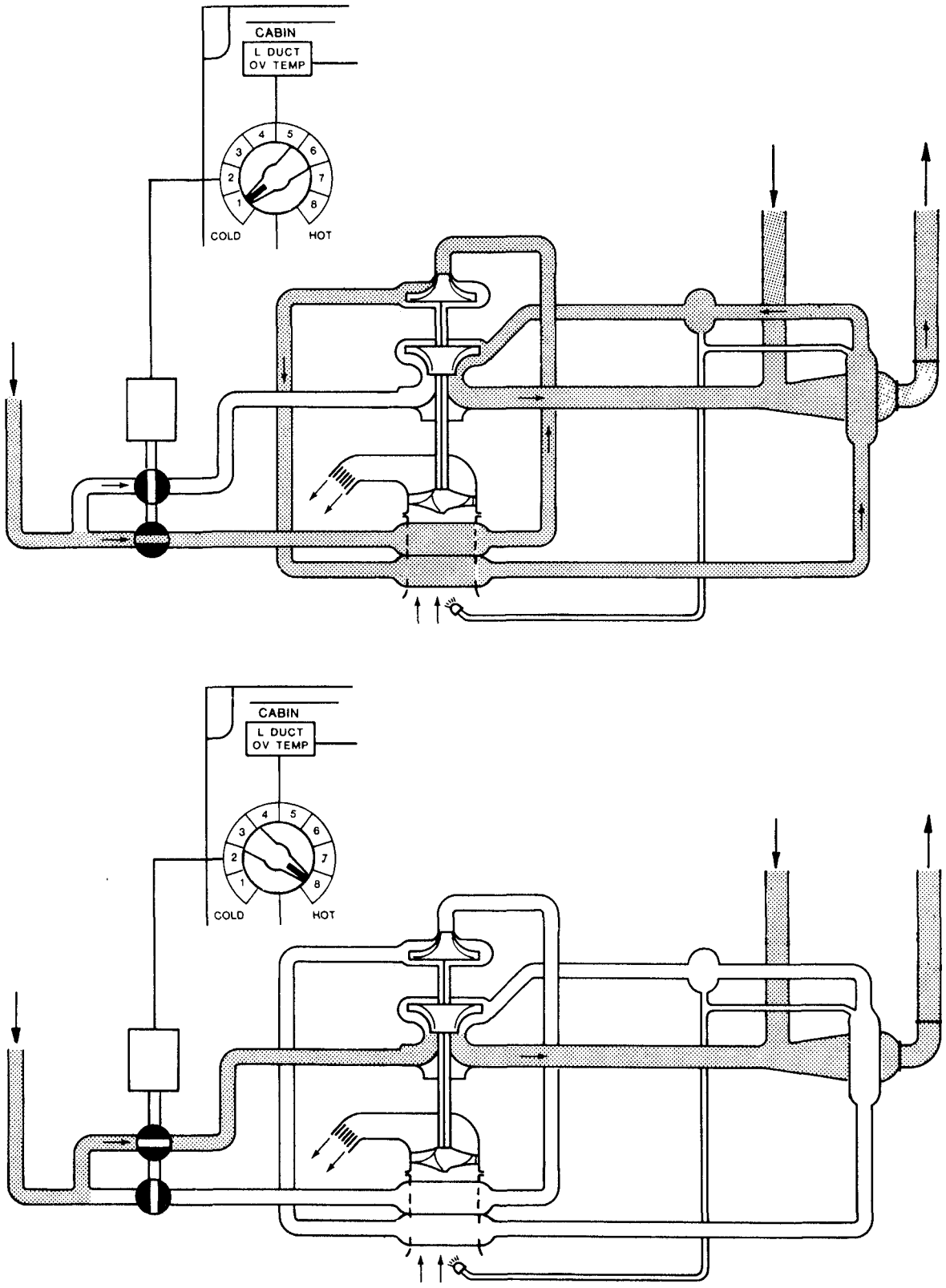

Fig. 2. Flow path through air conditioning pack.

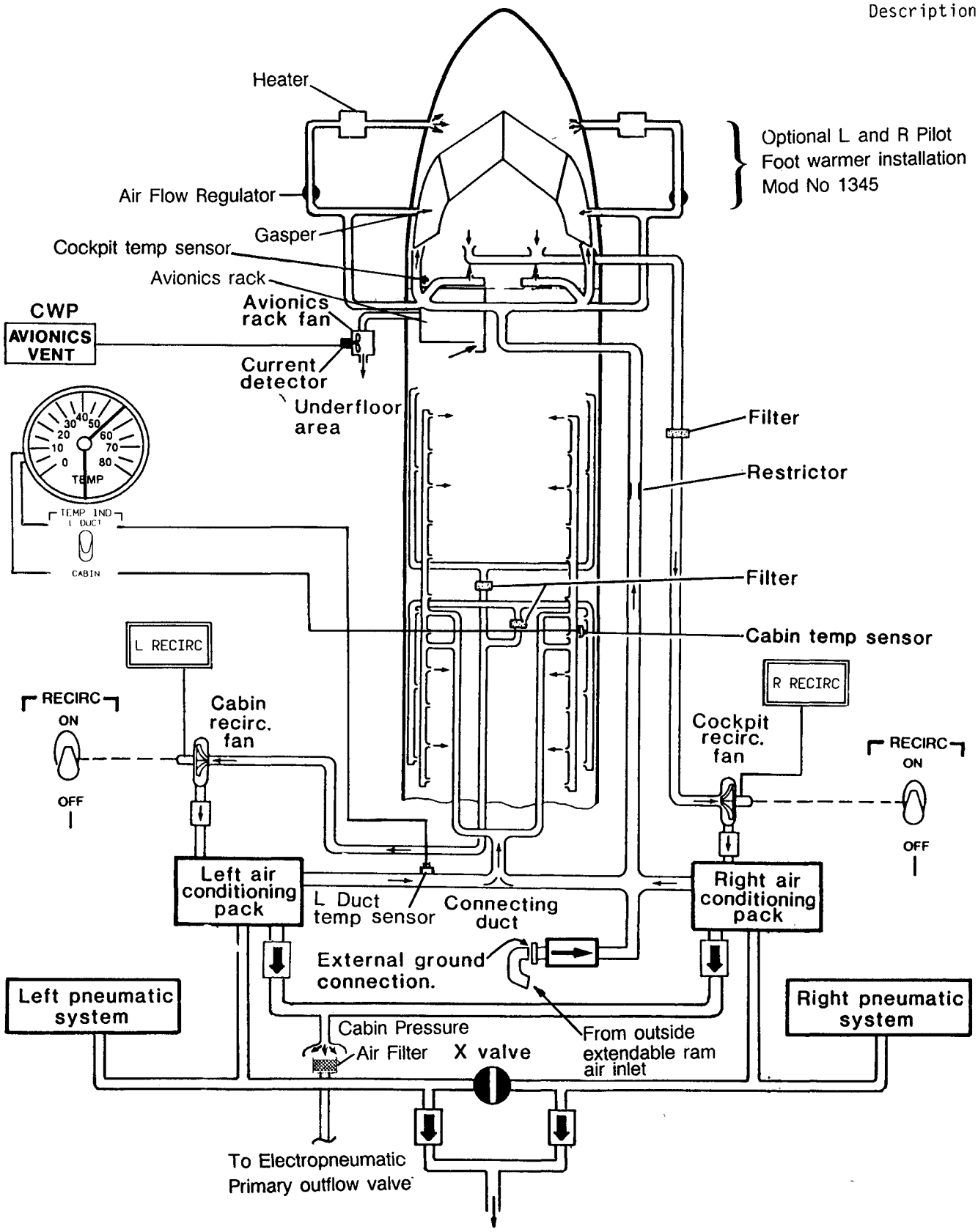

Fig. 3. Air conditioning distribution system - schematic.

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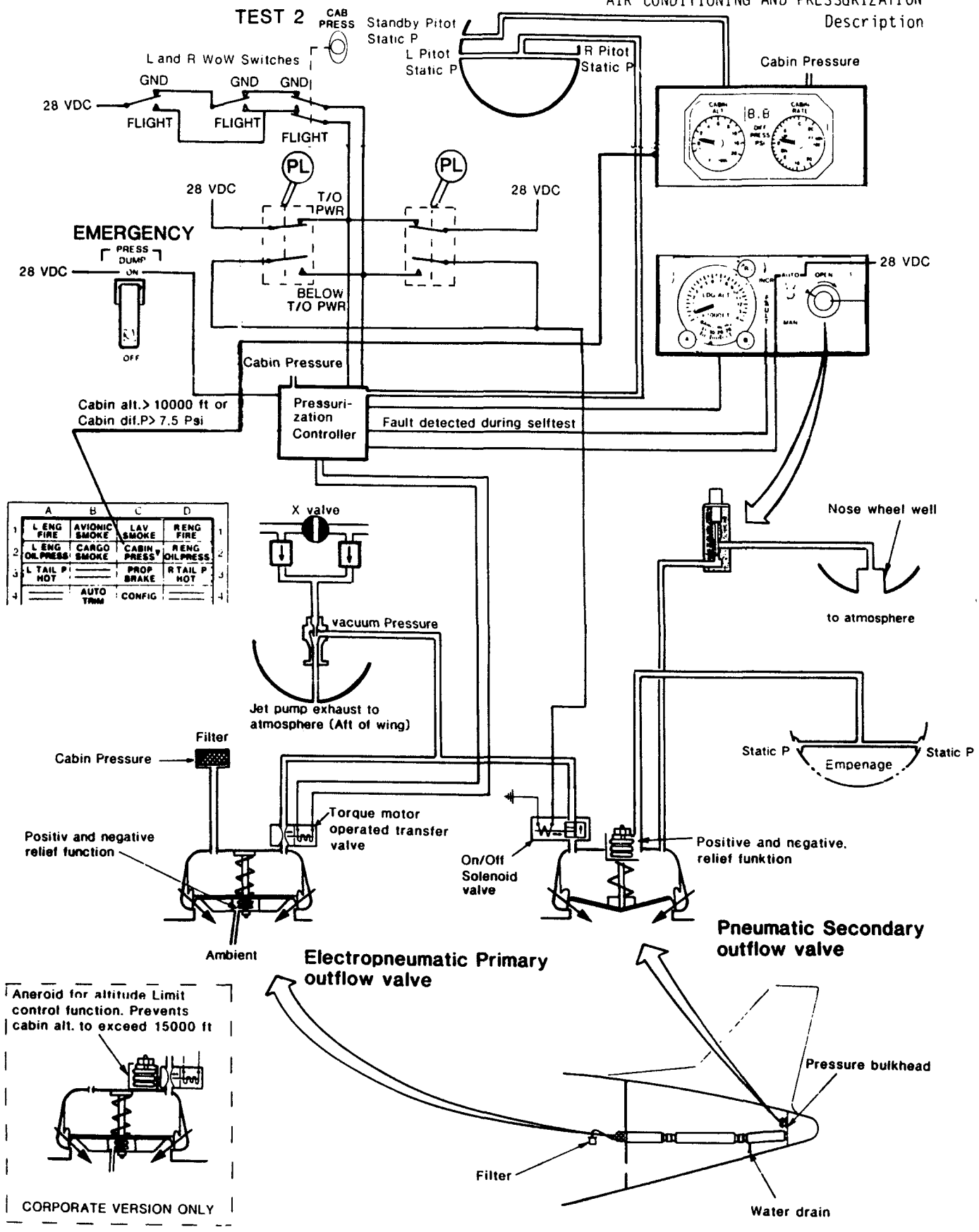

Fig. 4. Cabin pressurization system - schematic.

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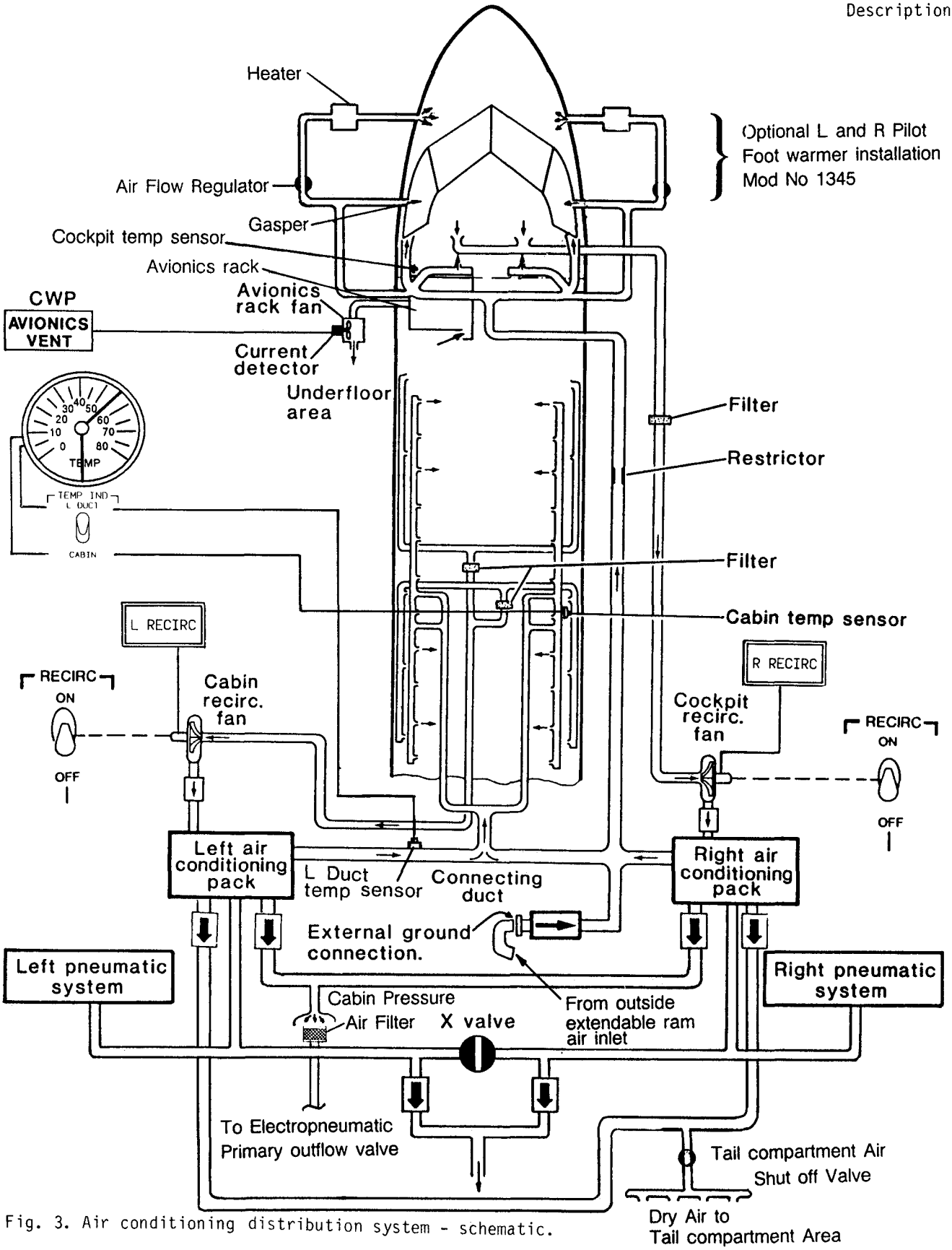

Fig. 3. Air conditioning distribution system - schematic.

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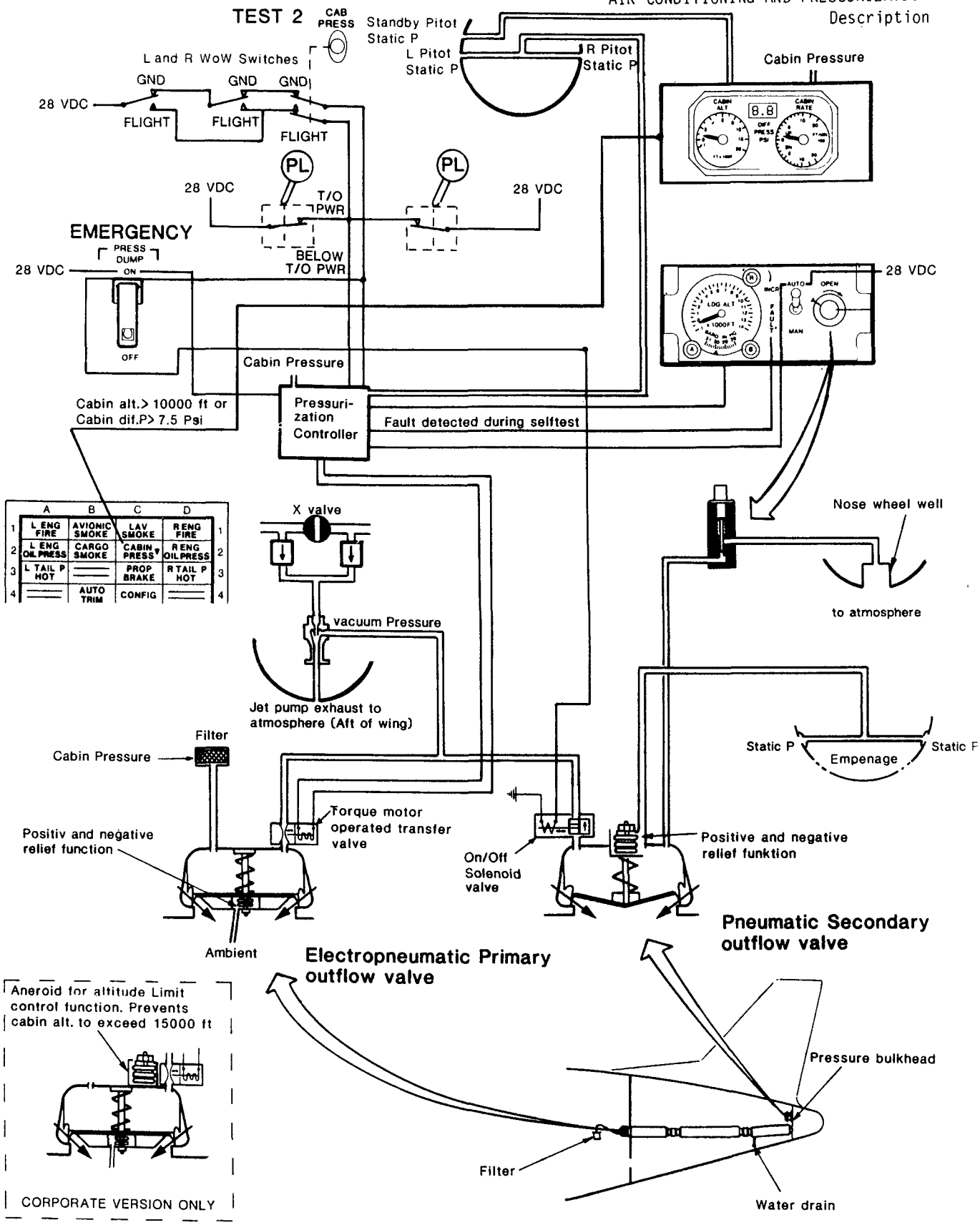

Fig. 4. Cabin pressurization system - schematic.

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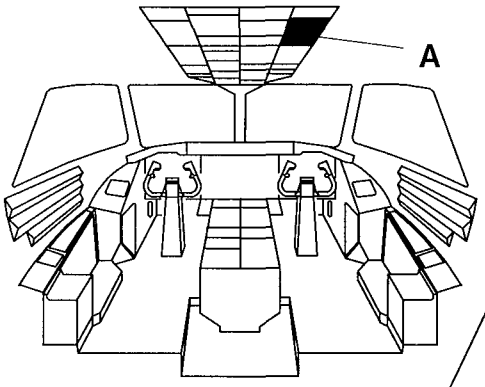
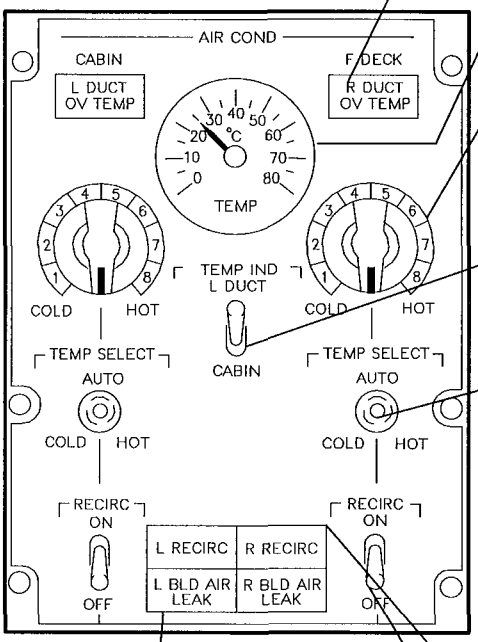
3. CONTROLS AND INDICATORS.



A AIR CONDITIONING PANEL



L/R DUCT OV TEMP light (amber).

Comes on together with associated master caution for a:

– ACP Compressor discharge overtemp.

– Distribution duct overtemp.

Corresponding Bleed Valve will automatically close.

CABIN TEMP indicator.

Displays cabin temperature in °C.

Temperature control knob.

Used to set desired compartment temperature when system is in AUTO. Pos. "1" + 18°C. Pos. "8" = up to 29°C.

TEMP IND switch.

Used to select either cabin or L duct temperature to be displayed on the temp indicator. The switch is springloaded to L DUCT position.

L/R TEMP SELECT switch.

Used to select automatic or manual control of temperature in the respective compartments.

AUTO	Temperature automatically regulated at level selected with temperature selector knob.
HOT/COLD	Springloaded positions where temperature control valve moves in desired direction. (Shall only be used if the automatic temp. regulation fails).
Neutral	No temperature regulation.

L/R BLD AIR LEAK light (amber).

See AOM 1.16 Pneumatics.

L/R RECIRC light (amber).

Comes on should the recirculation fan fail. (Fan speed below 80% of normal speed).

NOTE

AIRCOND master caution will not come on together with this light.

L/R RECIRC switch.

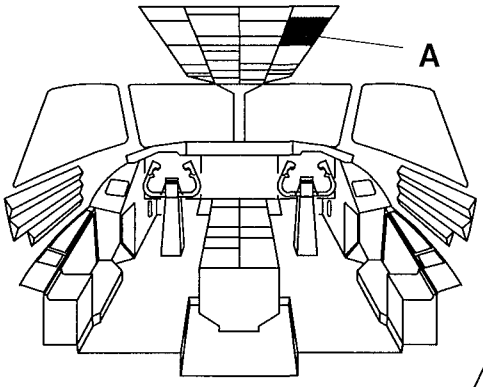
Used to operate the respective systems recirculation fan.

A10723

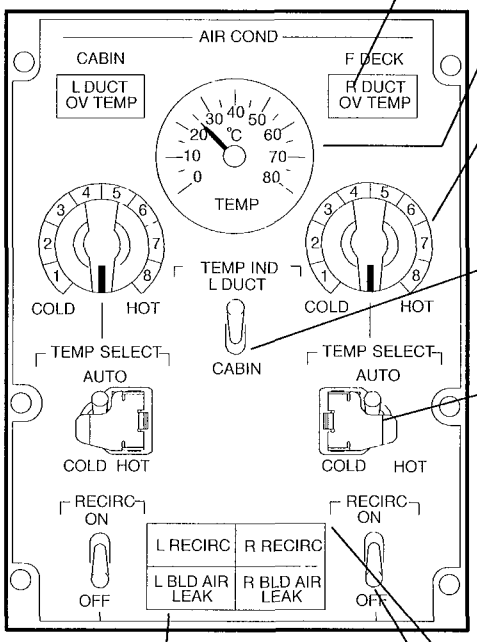
Fig. 5. Air conditioning panel – controls and indicators.

▌ Applicable to aircraft without Mod. No. 3121 installed

4. CONTROLS AND INDICATORS.



A AIR CONDITIONING PANEL



L/R DUCT OV TEMP light (amber).

Comes on together with associated master caution for a:

– ACP Compressor discharge overtemp.

– Distribution duct overtemp.

Corresponding Bleed Valve will automatically close.

CABIN TEMP indicator.

Displays cabin temperature in °C.

Temperature control knob.

Used to set desired compartment temperature when system is in AUTO. Pos. "1" + 18°C. Pos. "8" = up to 29°C.

TEMP IND switch.

Used to select either cabin or L duct temperature to be displayed on the temp indicator. The switch is springloaded to L DUCT position.

L/R TEMP SELECT switch.

Used to select automatic or manual control of temperature in the respective compartments.

AUTO	Temperature automatically regulated at level selected with temperature selector knob.
HOT/COLD	Springloaded positions where temperature control valve moves in desired direction. (Shall only be used if the automatic temp. regulation fails. The temperature switches are guarded in AUTO position to prevent unnecessary use of the manual mode.)
Neutral	No temperature regulation.

L/R BLD AIR LEAK light (amber).

See AOM 1.16 Pneumatics.

L/R RECIRC switch.

Used to operate the respective systems recirculation fan.

L/R RECIRC light (amber).

Comes on should the recirculation fan fail. (Fan speed below 80% of normal speed).

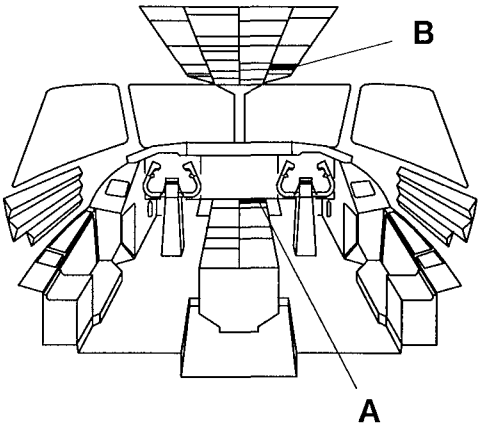
NOTE

AIRCOND master caution will not come on together with this light.

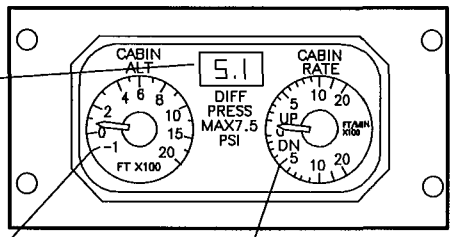
A10723

Fig. 5. Air conditioning panel – controls and indicators.

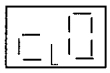
Applicable to aircraft with Mod. No. 3121 installed



A CABIN PRESSURIZATION INDICATION



DIFF PRESS indicator.

Displays cabin differential pressure. Shows 8.8 when LAMP TEST switch on test panel is held in LWR position. A negative diff pressure is indicated by 

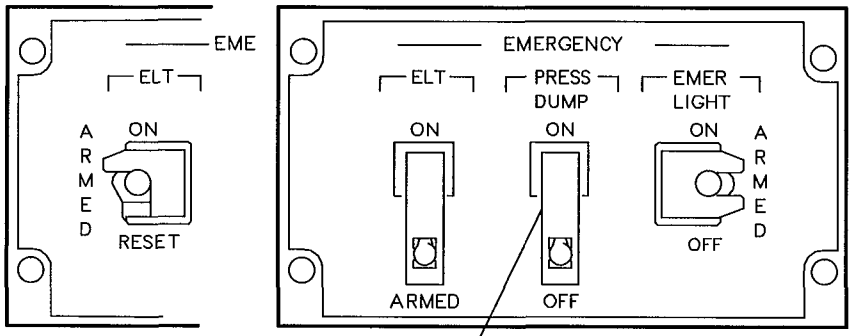
CABIN ALT indicator.

Displays cabin altitude in feet.

CABIN RATE indicator.

Displays cabin vertical speed in ft/min.

B EMERGENCY CONTROL PANEL



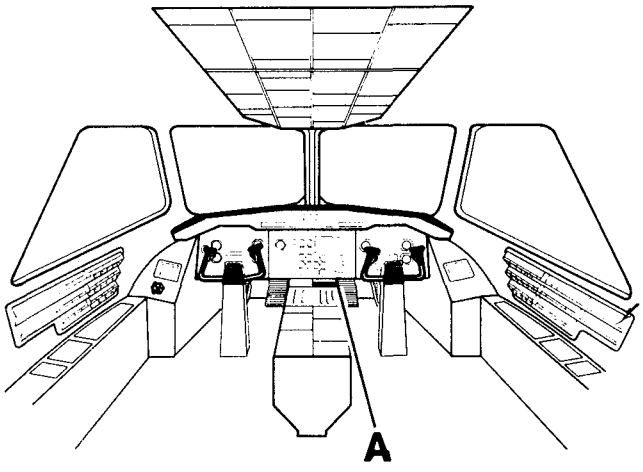
MOD 2204
(A/C 300–UP)

PRESS DUMP switch.

Moves the electropneumatical outflow valve to fully open position.

A10726

Fig. 6 Pressurization system – controls and indicators.



A CABIN PRESSURE CONTROL PANEL

Cabin rate set knob.
Used to set cabin vertical speeds from 50 to 2 500 fpm up, or from 50 to 1 500 fpm down. Detent position corresponds to 500 fpm up or 300 fpm down.

LDG ALT. Baro indicator.
Displays values set by Altitude and Barometric set knobs.

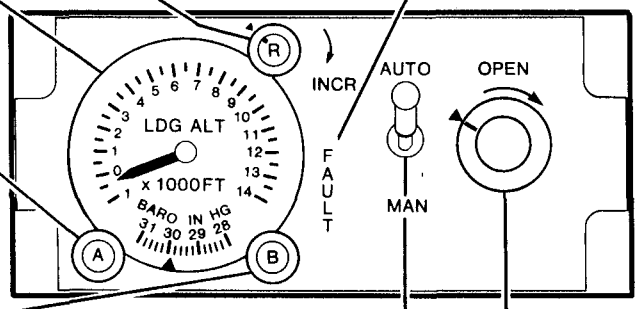
Altitude set knob.
Used to set airfield altitude.

Barometric set knob.
Used to set airfield barometric pressure in inch Hg. As an option the BARO scale is available in millibars

MODE SELECTOR:

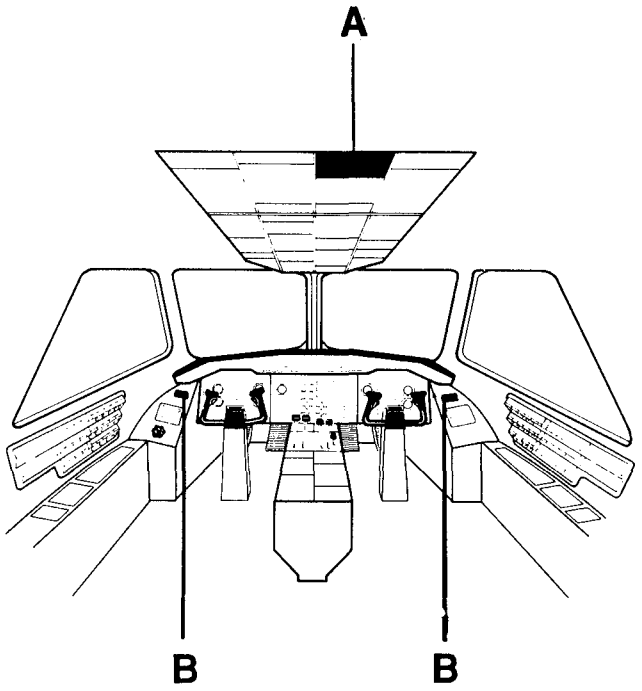
AUTO	Pressure controller operates automatically according to its own cabin pressure schedule.
MAN	Cabin pressure is manually regulated by the manual pressurization knob.

FAULT light (amber).
-Illuminates to advise of a system failure.
-Illuminates for 3 seconds when system self-test is performed. If no fault is detected light goes off.

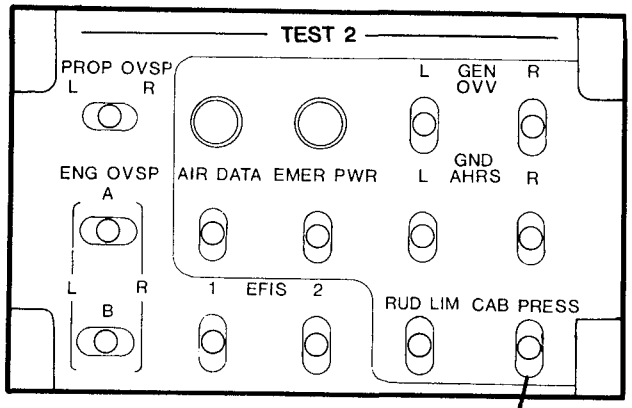


Manual pressurization knob.
Used to operate the pneumatic outflow valve in MAN mode.

Fig. 7. Pressurization system - controls and indicators.



A TEST 2 PANEL



CAB PRESS test switch.
When activated on ground the pressurization system transfers to flight mode.

B PILOT FOOTWARMER PANELS MOD NO 1345

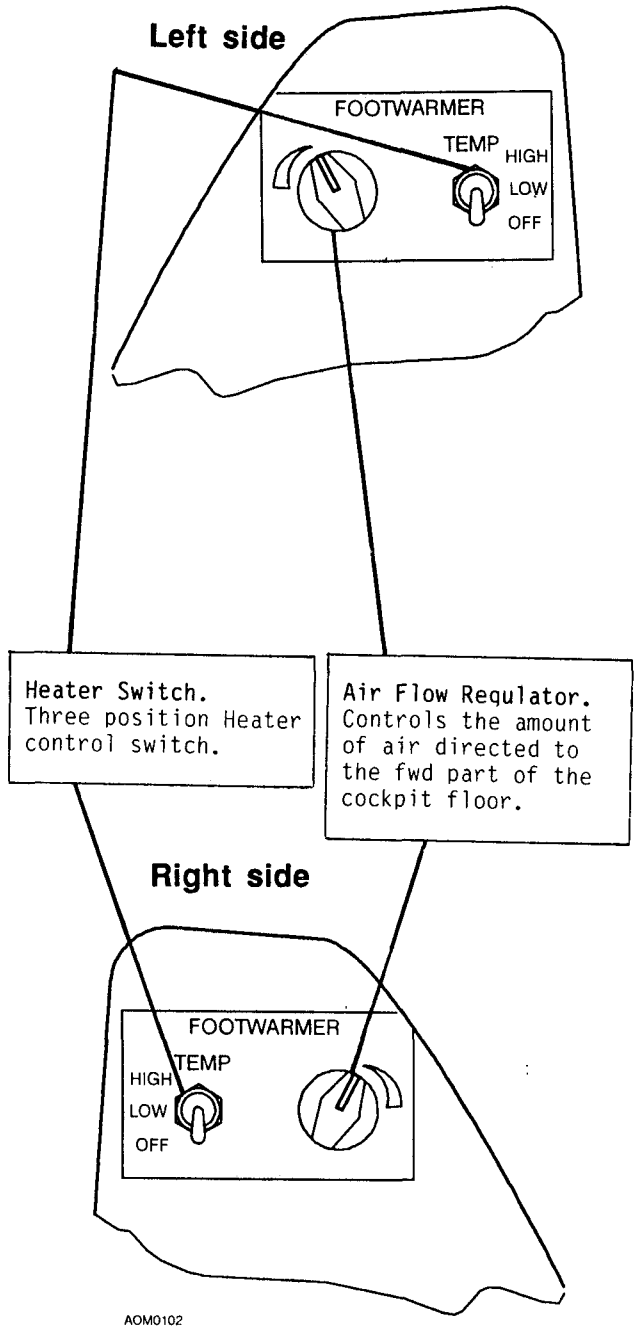
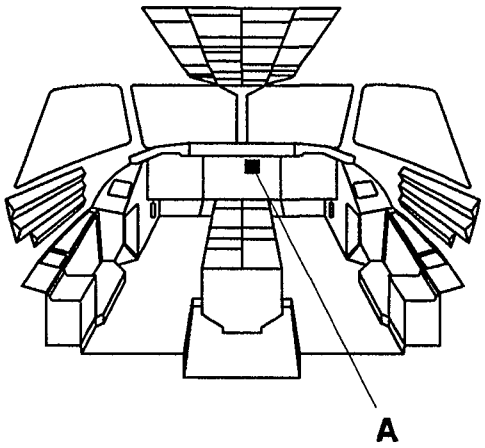


Fig. 8. Air conditioning and pressurization - controls and indicators.



A CENTRAL WARNING PANEL

	A	B	C	D	
1	L ENG FIRE	AVIONIC SMOKE	LAV SMOKE	R ENG FIRE	1
2	L ENG OIL PRESS	CARGO SMOKE	CABIN PRESS	R ENG OIL PRESS	2
3	L TAIL P HOT		PROP BRAKE	R TAILP HOT	3
4		AUTO TRIM	CONFIG		4
5	AUTO COARSEN		PITCH TRIM	RUDDER LIMIT	5
6	L FIRE DET FAIL	FUEL ▲	ELEC ▲	R FIRE DET FAIL	6
7	ICE PROT ▲	ENGINE ▲	FLAPS	AIRCOND ▲	7
8	PARK BRK ON	HYDR ▼	EMER LTS UN ARMED	OXYGEN	8
9	A-SKID INOP ▼	AVIONICS	AVIONICS VET	DOORS ▲	9
10	L STALL FAIL	GUST LOCK	PUSHER SYSTEM	R STALL FAIL	10

CABIN PRESS light (red).

Comes on if cabin altitude climbs above 10 000 ft or if differential pressure exceeds 7.5 psi.

AIRCOND light (amber).

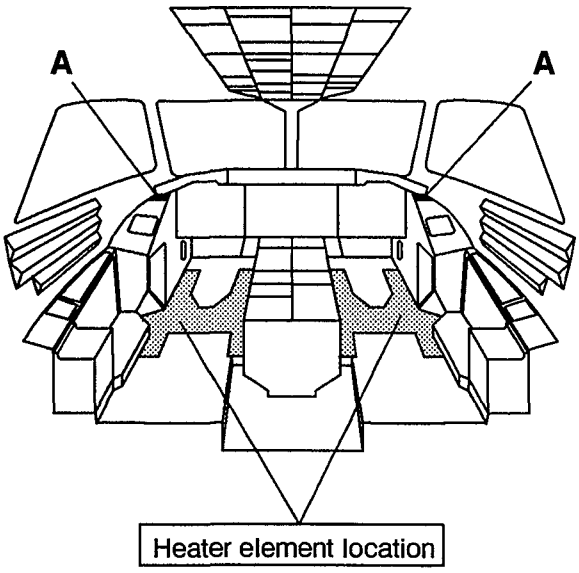
Comes on when any caution light except L/R RECIRC on the air conditioning panel illuminates.

AVIONICS VENT light (amber).

Comes on to indicate a vent fan fault condition in the avionics compartment.

A10778

Fig. 9 Air conditioning and pressurization – controls and indicators



A COCKPIT FLOOR HEATERS MOD NO 2293

Heater switch.
Two position heater element ON–OFF switch.

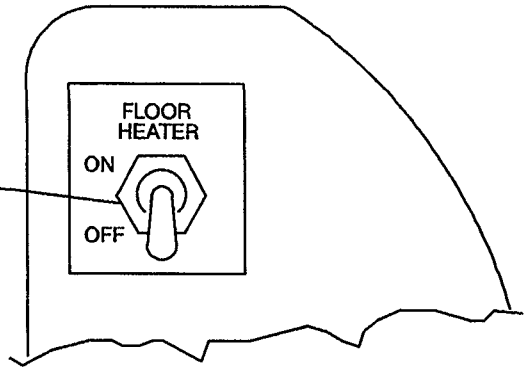


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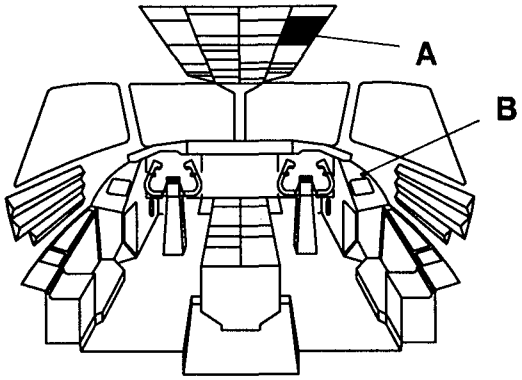
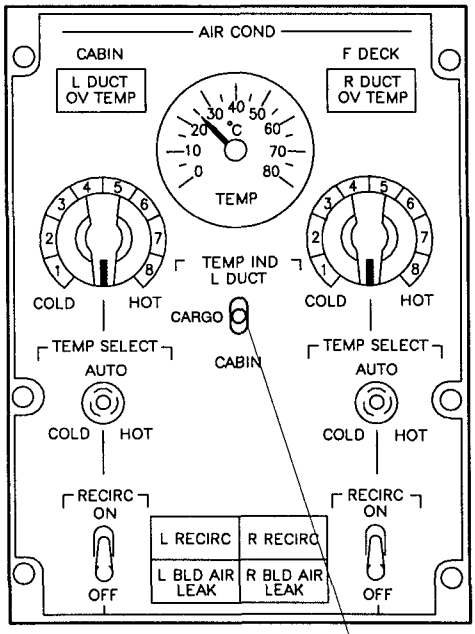
Fig. 10. Air conditioning and pressurization – cockpit floor heaters.

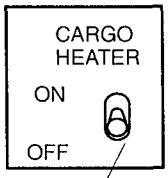


A AIR CONDITIONING PANEL



TEMP IND switch
Used to select either CABIN, CARGO or L DUCT temperature to be displayed on the temp indicator. The switch is spring–loaded to CARGO position.

B



CARGO HEATER ON/OFF switch
Used to control the optional cargo heater.

A15971

Fig. 11. Optional cargo heater controls and indicators.

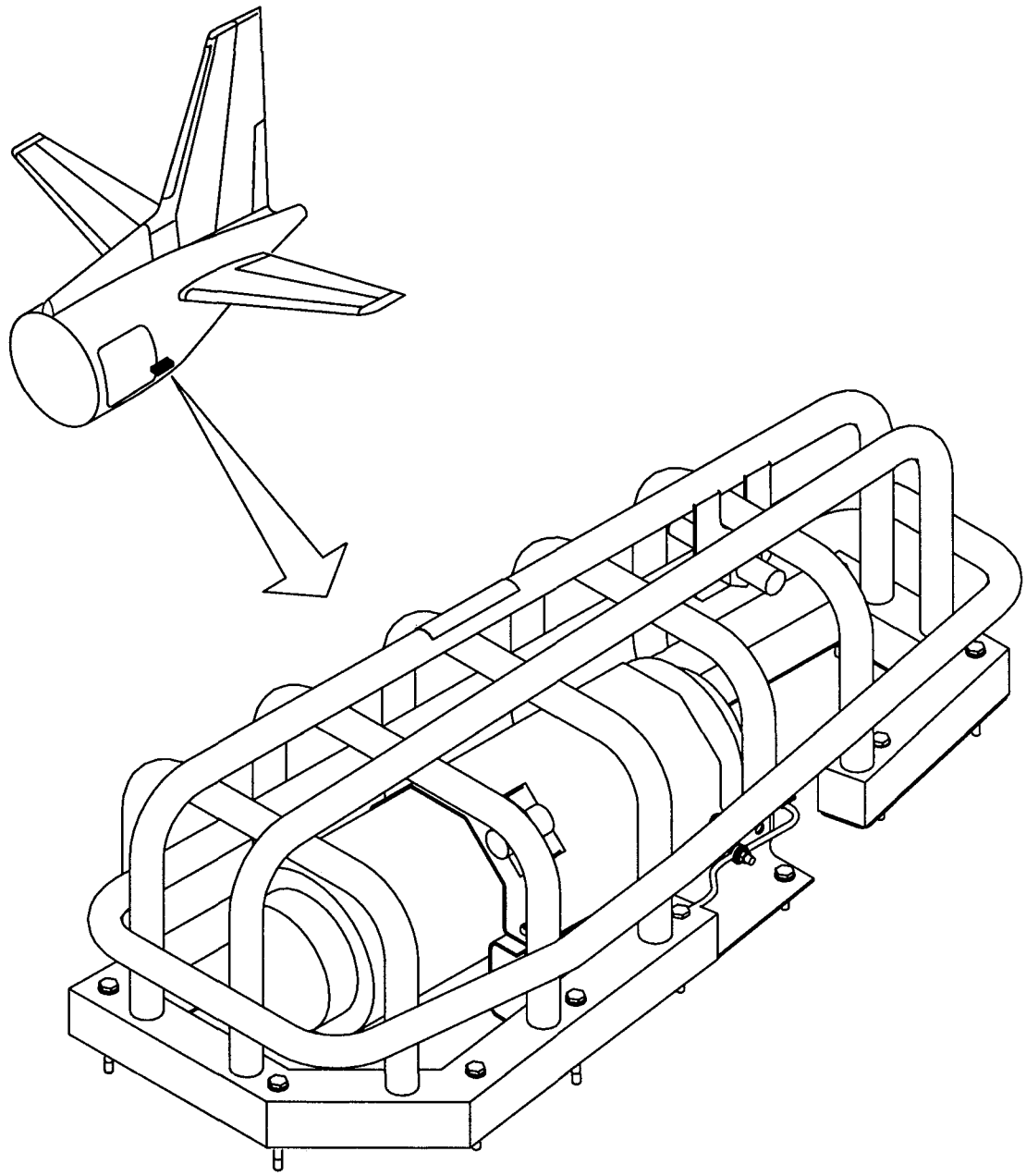


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Fig. 12. Optional cargo heater installation.

4. ELECTRICAL POWER SUPPLY.

Air conditioning.

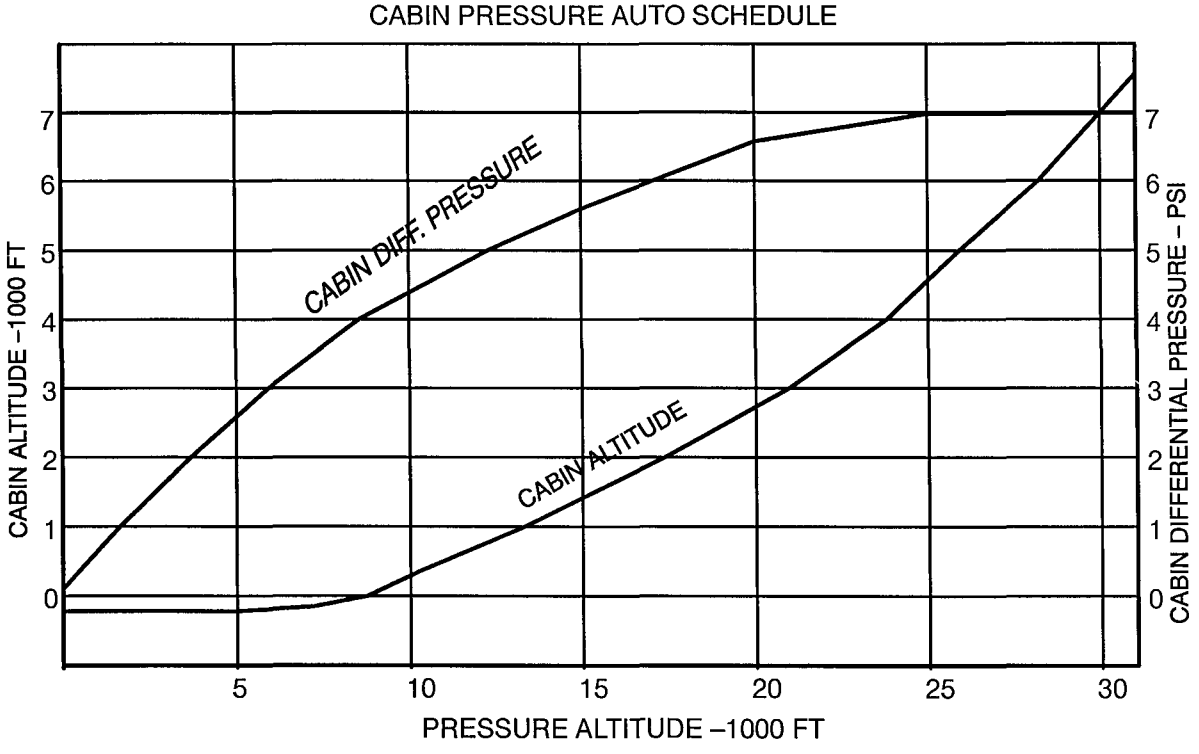
Cockpit temperature control	L MAIN BUS	H–15	F DECK TEMP
Cabin temperature control	R MAIN BUS	P–14	CABIN TEMP
Cockpit recirculation control	R MAIN BUS		No CB in cockpit
Cockpit recirculation	R GEN BUS	P–15	F DECK RECIRC
Cabin recirculation control	L MAIN BUS		No CB in cockpit
Cabin recirculation	L GEN BUS	H–17	CABIN RECIRC
Overheat detection	L MAIN BUS	H–20	RECIRC OVHT
Cabin temperature indication	L ESS BUS	H–14	CABIN TEMP IND
Avionic rack fan control	L MAIN BUS	G–10	VENT AVION FAN CONTROL
Avionic rack fan power	L MAIN BUS	G–11	VENT AVION PWR
Cockpit Floor Heaters (Mod No 2293)	UTILITY BUS		No CB in cockpit
Cargo heater fan (Mod No 2787)	UTILITY BUS	M–15	CARGO HEATER

Pressurization.

Cabin pressurization control	L BAT BUS	G–7	CAB PR CTL & EM DUMP
Indications	R ESS BUS	M–7	CABIN PRESS IND
Ground mode valve opening	R BAT BUS	M–6	CABIN PRESS AUTO DUMP
Emergency dumping	L BAT BUS	G–7	CAB PR CTL & EM DUMP

1. LIMITATIONS.

	Unit	Min	Norm	Max
1. 1. OPERATING LIMITS.				
Cabin differential pressure.				
– In flight	psi	–	7.1	7.6
– Positive safety relief	psi	–	–	7.6
– Landing	psi	–	–	0.2
– Negative diff pressure	psi	–	–	–0.5
– CABIN PRESS warning	psi	–	7.5	–
– Cabin altitude CABIN PRESS warning	ft	–	–	10 000
1. 2. SYSTEM LIMITS.				
Air conditioning.				
– Compartment temperature (AUTO mode)	°C	18	–	29
Pressurization.				
– Cabin vertical speed				
° Up	fpm	50	500 (detent)	2500
° Down	fpm	50	300	1500
– Cabin pressure auto schedule (see below)				



2. NORMAL OPERATION.

2. 0. CARGO COMPARTMENT TEMPERATURE V.S. FLYING TIME, FL AND OAT.

Cargo compartment temperature varies with OAT at the departure airport, cruising level OAT, FL and duration of flight. In general, as can be seen in below graphs there is a slight temperature increase in the cargo compartment

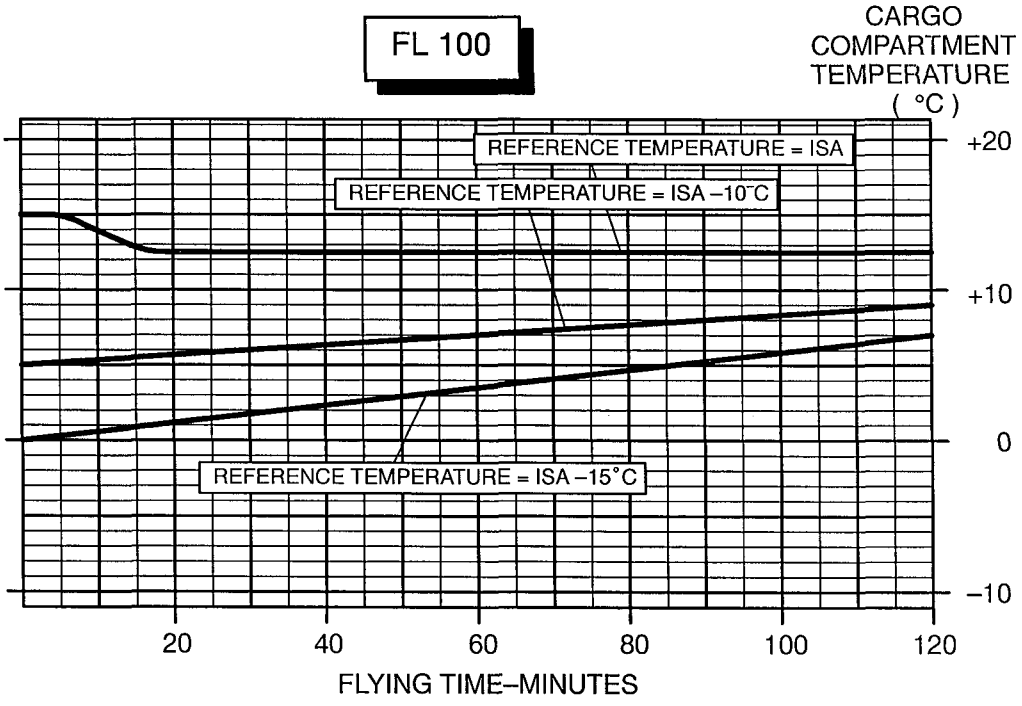
How to use the charts.

1. Establish a REFERENCE TEMPERATURE: when OAT at departure airport and at cruising level deviates from ISA, use the lowest temperature (variation from ISA) as REFERENCE TEMPERATURE.
2. Follow the line for the REFERENCE TEMPERATURE until intersect with the FLYING TIME and find the CARGO COMPARTMENT TEMPERATURE.

Example:
Departure Airport OAT ..... + 15°C (ISA)
Cruising Level ..... FL 200
Cruising Level OAT ..... –30°C (ISA –5°C)
Flying time ..... 1 hr 5 min.

Since ISA –5°C (–30°C) at cruising level is colder than ISA (+15°C) temperature at the departure airport, the ISA –5°C shall be used as REFERENCE TEMPERATURE to establish cargo compartment temperature.

Answer: Lowest cargo compartment temperature will be about +1°C.



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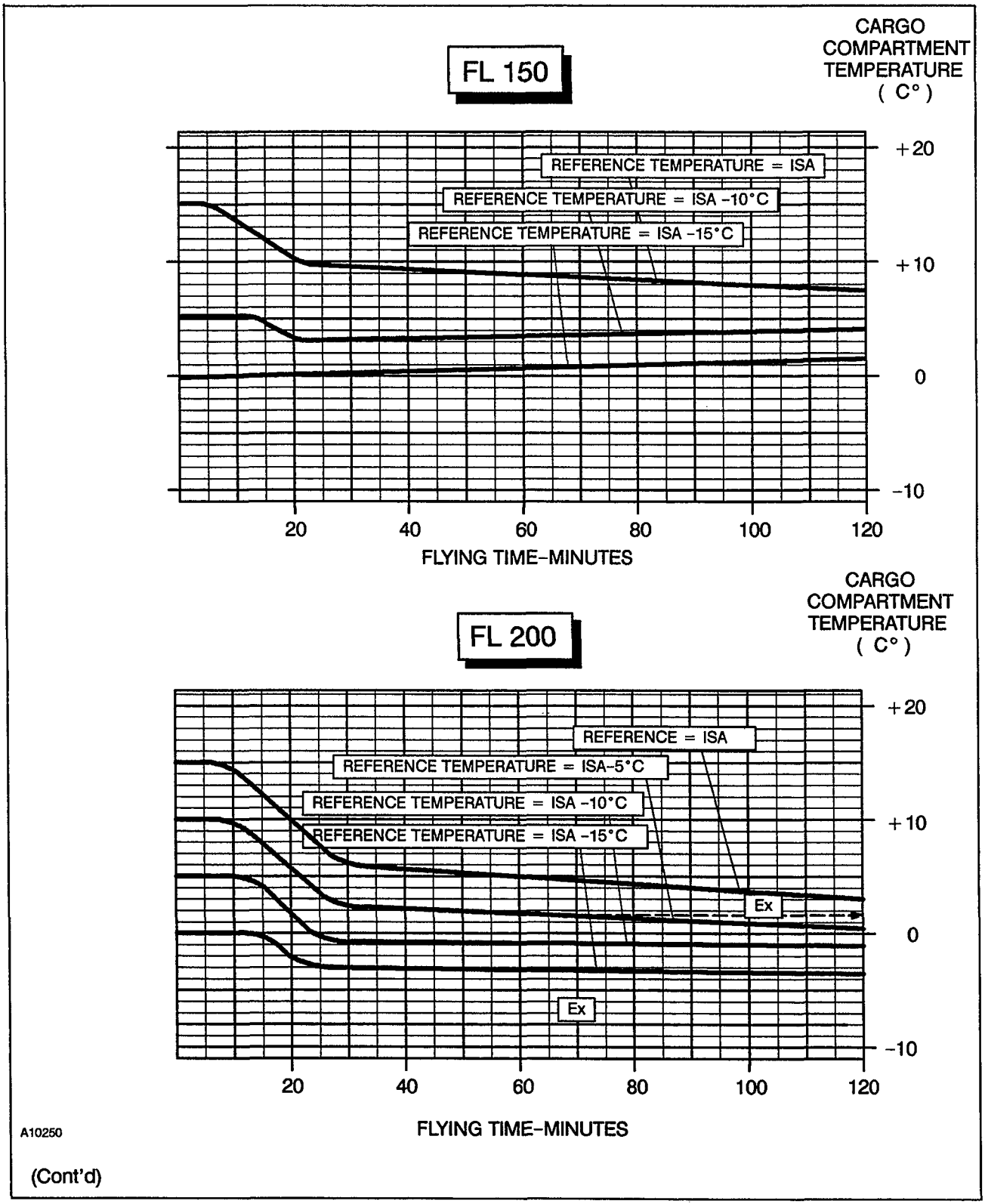
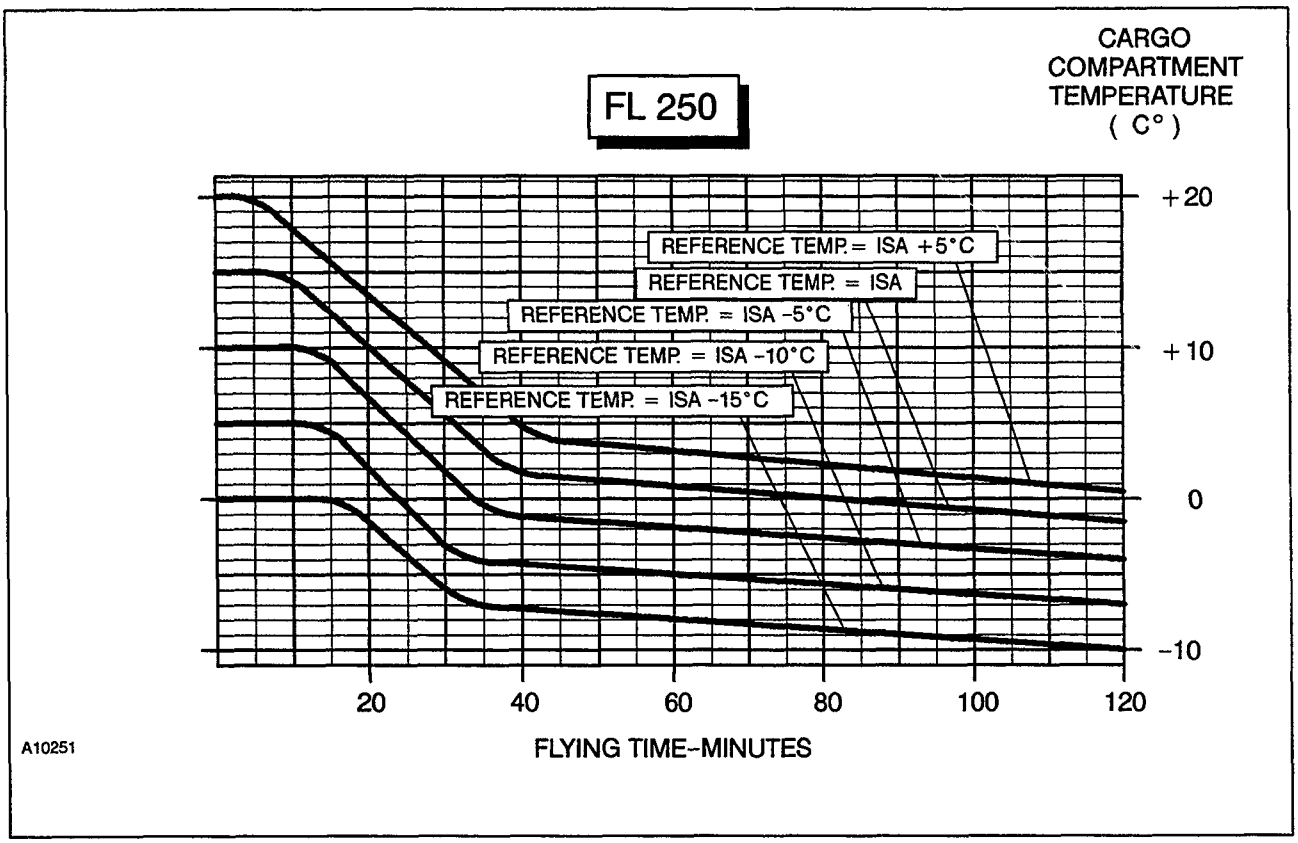
(Cont'd)


FL 150
CARGO COMPARTMENT TEMPERATURE (C°)
REFERENCE TEMPERATURE = ISA
REFERENCE TEMPERATURE = ISA -10°C
REFERENCE TEMPERATURE = ISA -15°C
+20
+10
0
-10
20
40
60
80
100
120
FLYING TIME-MINUTES
FL 200
CARGO COMPARTMENT TEMPERATURE (C°)
REFERENCE = ISA
REFERENCE TEMPERATURE = ISA-5°C
REFERENCE TEMPERATURE = ISA -10°C
REFERENCE TEMPERATURE = ISA -15°C
Ex
Ex
+20
+10
0
-10
20
40
60
80
100
120
FLYING TIME-MINUTES
A10250

(Cont'd)


FL 250
CARGO COMPARTMENT TEMPERATURE (C°)
+20
+10
0
-10
REFERENCE TEMP.= ISA +5°C
REFERENCE TEMP. = ISA
REFERENCE TEMP. = ISA -5°C
REFERENCE TEMP. = ISA -10°C
REFERENCE TEMP. = ISA -15°C
20
40
60
80
100
120
FLYING TIME-MINUTES
A10251

CONDITIONS	NORMAL PROCEDURES
2. 1. AIR CONDITIONING NORMAL OPERATION (AUTO MODE).	This procedure assumes that the pneumatic system is checked and set according to AOM 16.2 PNEUMATICS. NOTE Running a recirculation fan creates heat around the fan itself. If a recirc fan is running (on ground) without the corresponding ACM more than approx. 10 minutes (depending on OAT) a thermo switch will turn off the fan for a considerable time until the temperature has decreased and the thermo switch automatically resets. **Preflight.** 1. TEMP SELECT switches ..... AUTO – Check both TEMP SELECT switches in AUTO. 2. Temperature control knobs ..... SET AS DESIRED **After engine start.** 3. Air conditioning panel ..... CHKD – Check all caution lights to be off. 4. RECIRC fans ..... AS DESIRED **In flight.** 5. Temperature ..... ADJUST AS REQUIRED – Check CABIN TEMP indicator regularly and adjust temperature as required with temperature control knob. **Parking.** 6. RECIRC fans ..... BOTH OFF
2. 2. CABIN COOL DOWN PROCEDURE. (Cont'd)	This procedure describes the most efficient way to pull down the temperature to a comfortable level in a heat soaked parked aircraft. The procedure will also minimize the amount of moisture and condensation experienced in the air distribution ducting during temperature pull–down in hot and humid conditions. The procedure assumes right engine running with propeller brake applied. With HP bleed extracted from the engine, ITT will be high and in some cases limiting. If ITT is limiting, engine temperature will decrease when closing the X–VALVE.

CONDITIONS	NORMAL PROCEDURES
(Cont'd)	**Before embarking passenger.** With propeller brake applied and PL set: 1. Entrance door and cockpit hatches ..... CLOSED 2. TEMP SELECT switches ..... AUTO 3. Temperature control knobs ..... COLD – Set the knobs to max COLD, index 1. 4. R BLD VALVE switch ..... AUTO 5. R HP VALVE switch ..... AUTO 6. L BLD VALVE switch ..... CLOSED 7. X VALVE switch ..... OPEN 8. RECIRC fans ..... ON 9. Reset power and operate the propeller brake in accordance with AOM 17.2. 10. Temperature ..... ADJUST – when the temperature has stabilized adjust the control knobs to maintain a temperature of 5 to 7 °C below actual OAT. At 5 to 7 °C lower temperature gives the optimum comfort feeling. A lower temperature may cause a temperature discomfort when entering the aircraft. **When embarking passenger.** – Keep the cockpit door closed while the entrance door is open to minimize moisture and condensation in cockpit. 11. RECIRC fans ..... OFF **With passengers on–board and entrance door closed.** 12. Temperature control knobs ..... COLD – Set the knobs to max COLD, index 1. 13. RECIRC fans ..... ON 14. Temperature ..... ADJUST 15. Resume normal operation. 16. End of procedure.

CONDITIONS	NORMAL PROCEDURES
2. 3. AIR CONDITIONING MANUAL OPERATION.	One or both air conditioning packs can be operated manually if respective sides AUTO mode fails. CAUTION Extreme care must be taken not to obtain a temperature below freezing in the distribution ducting. 1. RECIRC fan for desired system ..... ON 2. TEMP SELECT switch for desired system ..... HOT – Hold the switch in HOT position for 8 sec., to achieve a reference position. (Dual control valve in hot end position). 3. TEMP SELECT switch for desired system ..... COLD – Hold the switch in COLD position for 3 sec., thereby setting the valve in middle position. (Normal travelling time between valve max COLD and max HOT is 6 sec.) – Allow the system to stabilize for approximately 5 min. 4. Temperature ..... ADJUST AS REQUIRED – Check CABIN TEMP indicator regularly and adjust temperature as required by momentarily setting the TEMP SELECT switch in either HOT or COLD position.
2. 4. PRESSURIZATION CONTROL SYSTEM NORMAL OPERATION. (Cont'd)	**Preflight.** 1. Cabin pressurization control ..... CHKD – Check: ° Mode switch in AUTO; ° Manual pressurization knob at index, i.e. closed; ° Cabin rate set knob at index; ° Altitude set knob at departure airfield elevation; ° Barometric set knob at QNH. 2. PRESS DUMP switch ..... CHECK OFF and GUARDED

CONDITIONS	NORMAL PROCEDURES
(Cont'd)	**After engine start.** 3. Cabin pressurization panel ..... CHKD – Check FAULT light to be off. – Check differential pressure to indicate max 0.3 psi. **Climb.** 4. Cabin pressurization panel ..... CHKD – Check cabin pressure and rate of climb to be normal. **Descent.** 5. Cabin pressurization panel ..... SET – Set barometric knob to actual QNH for landing airfield. – Set altitude knob to airfield elevation. – Check cabin pressure and rate of descent to be normal. **After landing.** 6. Cabin differential pressure ..... CHECK MAX 0.3 PSI
2. 5. PRESSURIZATION SYSTEM MANUAL OPERATION.	In manual operation pressurization is regulated by the pneumatic outflow valve while the normal electropneumatical outflow valve is closed. 1. Mode selector switch ..... MAN – This will disconnect the automatic pressure control system. 2. Manual control knob ..... ADJUST AS REQUIRED – The system will respond slowly therefore wait between adjustments. – Rotating the manual control knob clockwise increases cabin altitude. – Rotating the manual control knob counterclockwise decreases cabin altitude. 3. CABIN ALT/DIFF PRESS indicators ..... MONITOR – Monitor closely to maintain pressurization at required level. Use the Autoschedule, 2.2 page 1, as reference.