

# **DASSAULT FALCON 900EX EASY SYSTEMS SUMMARY**



## **Air Conditioning & Pressurization**

**The material contained on this site is to be used for training purposes only.**

**Do not use it for flight!**

**Please note that this document is not affiliated in any way with any aircraft manufacturer.**

### AIR CONDITIONING & PRESSURIZATION INTRODUCTION

In order to maintain a comfortable area inside the cabin, the F900EX EASY is equipped with an air conditioning and pressurization system.

The air conditioning system regulates the flow and temperature of air into the cabin and cockpit areas for conditioning purpose.

The pressurization system regulates the cabin pressure, by the air flow discharged outside of the cabin, it depends on:

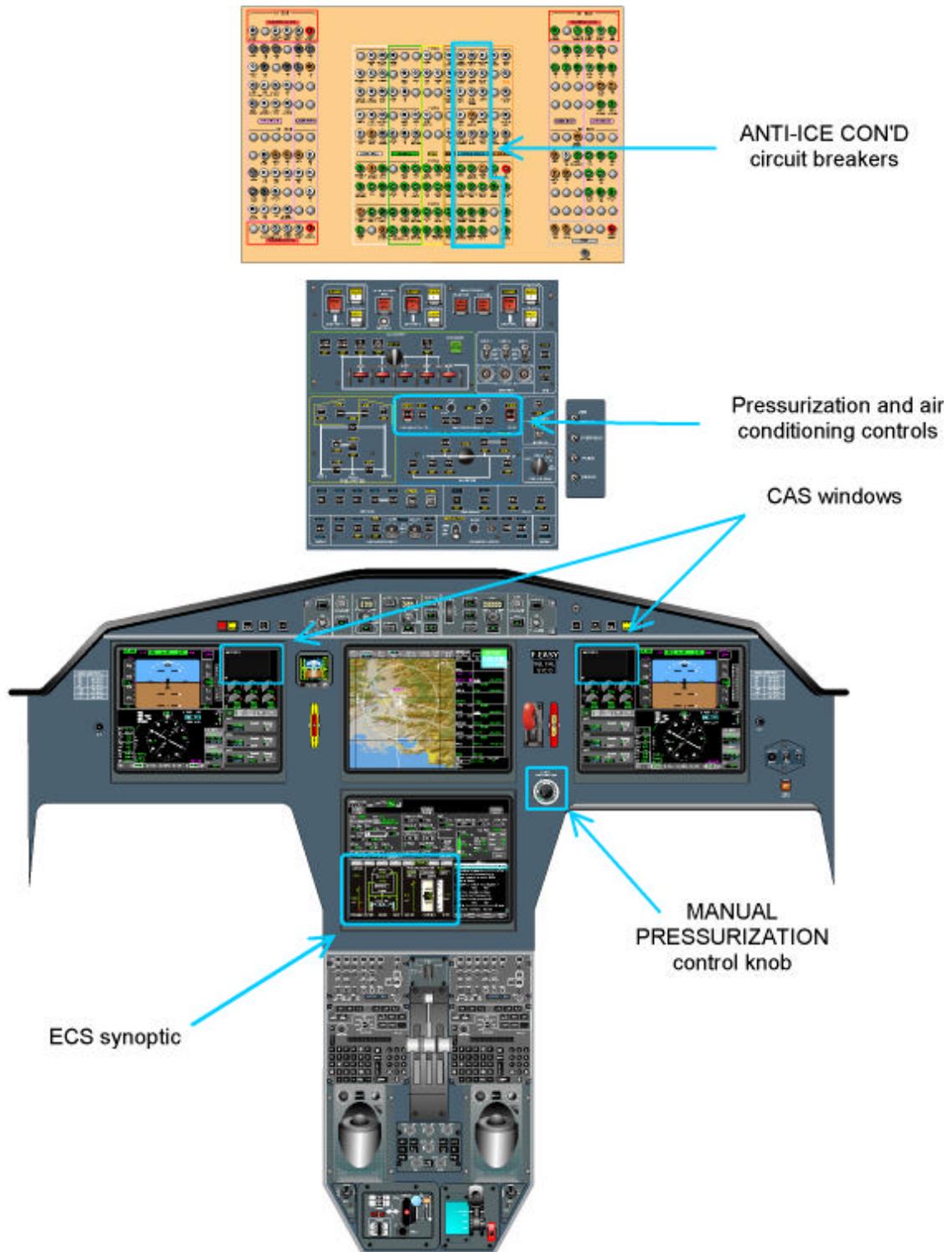
- airplane altitude,
- airplane vertical speed,
- the maximum differential pressure supported by the system.

Both systems have an automatic mode and a manual mode, allowing the pilot to control directly the valves.

They use hot air supplied by the engines and/or the APU.

In case of failure (overpressure, negative pressure, maximum altitude), protections ensure that limitations are observed.

# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]



## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

### SOURCES

The air conditioning system uses air supplied by:

- engine No 1,
- engine No 2,
- engine No 3,
- APU.

➤ *For more information, refer to CODDE 1 / Chapter 02 / ATA 36.*

The conditioned air is a mixture of:

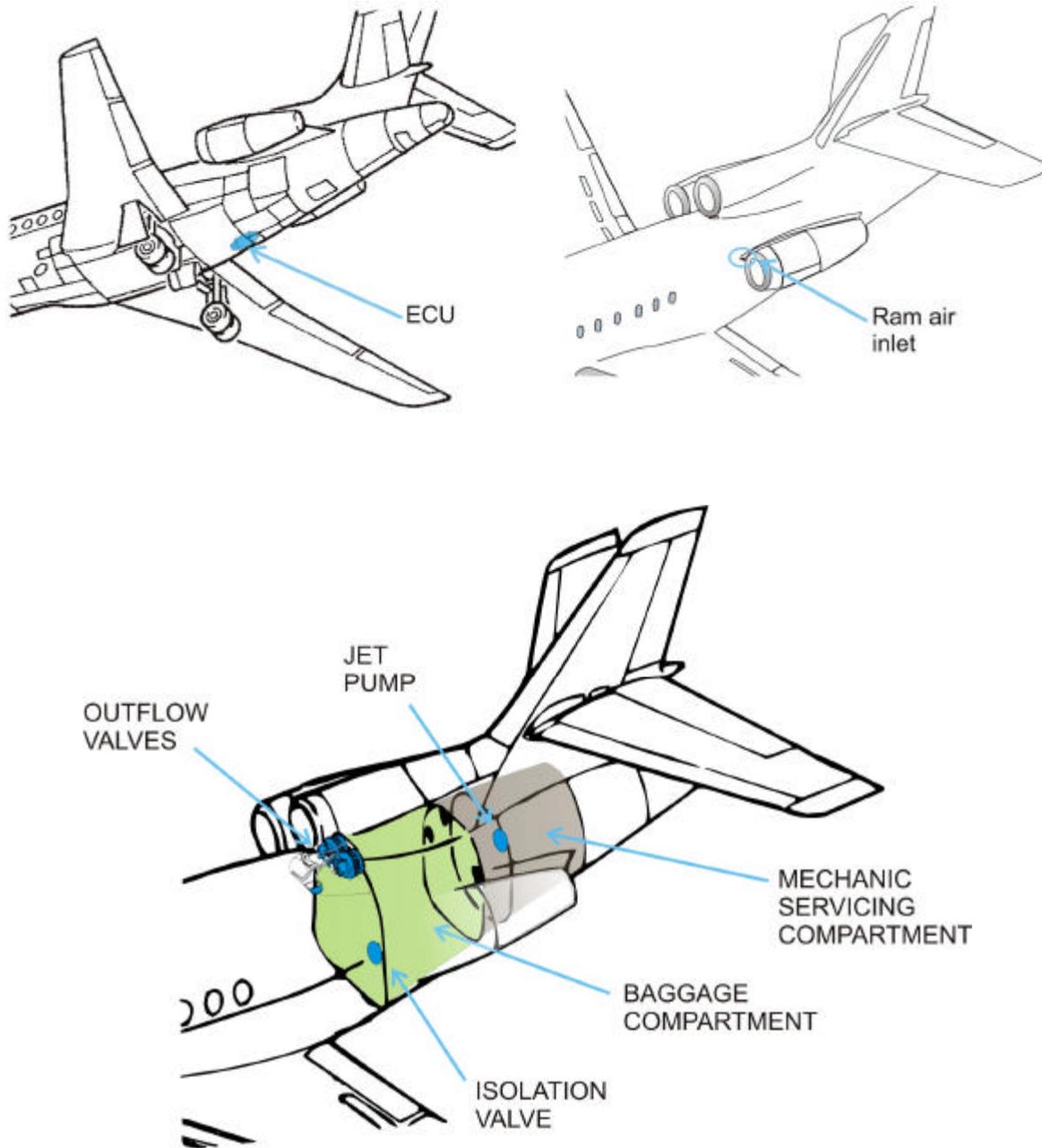
- hot bleed air directly supplied by engines HP and LP ports, or the APU,
- cold air (hot bleed air cooled through the Environmental Control Unit (ECU)),
- recycled cabin air.

The air conditioning heat exchanger is ventilated:

- in-flight, with external air supplied through a ram air inlet located on the No 1 engine pylon leading edge,
- on ground or in-flight at low speed, with additional air supplied through an air inlet located on the lower part of the fuselage.

AIR CONDITIONING	PRESSURIZATION
Engine No 1, 2 and 3 and/or APU bleed air	Conditioned air
Recycled cabin air	
Ram air (for heat exchanger ventilation)	

**EQUIPMENT LOCATION**



### DESCRIPTION

#### INTRODUCTION

The air conditioning system provides the pressurized areas with air at mild temperature. It consists of:

- Environmental Control Unit (ECU),
- distribution system.

The system is supplied with hot air coming from the common duct of the bleed air system.

The hot air enters the conditioning system via a cockpit conditioning electric valve or a cabin conditioning electric valve through a flow limiter and an ozone catalyzer.

Positions of the two valves are controlled by the CABIN and CKPT pushbuttons located on the BLEED AIR overhead panel (for more information, refer to ATA 36).

Downstream from the conditioning valves, a variable amount of hot air is directed to the Environmental Control Unit (ECU) cooling system, through cockpit and cabin temperature control dual electric valves. These valves are controlled in automatic or manual mode from the AIR CONDITIONING overhead panel.

Cold air generated by the ECU is mixed with hot bleed air inside the cockpit and cabin ducts to obtain the desired air temperature. Cold air from the ECU is also provided to the gaspers and used for cockpit avionics cooling.

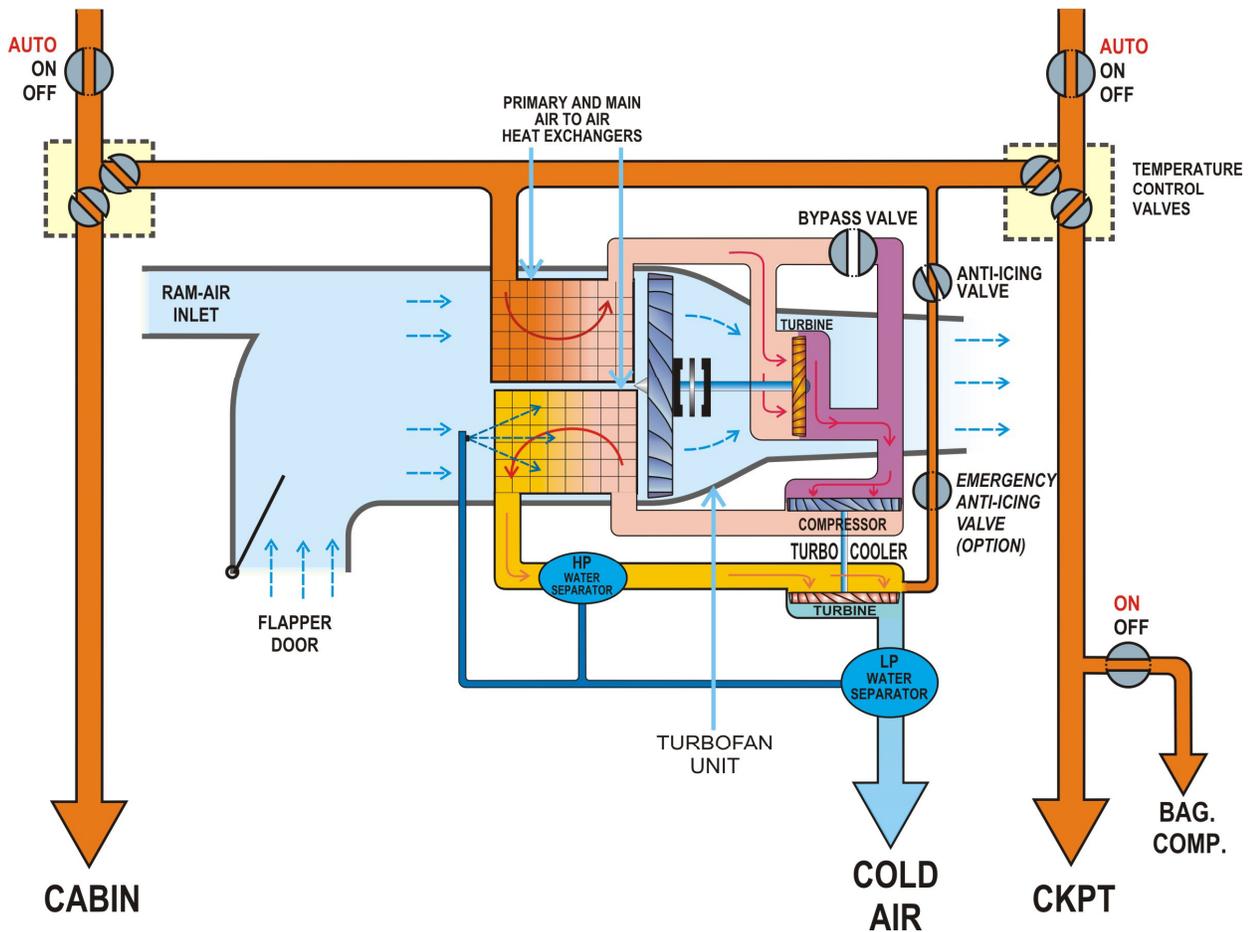
# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

## ENVIRONMENTAL CONTROL UNIT (ECU)

The purpose of the environmental control unit is to generate the cold air required by the cockpit and passenger cabin air conditioning systems, and the cold air system.

The ECU is mainly composed of:

- a dual heat exchanger,
- a turbofan,
- a by-pass electric valve,
- a turbocooler,
- two water separators (High Pressure and Low Pressure),
- a turbine anti-icing electric valve,
- an overheat detection system.



# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

## Dual Heat exchanger

The hot bleed air is pre-cooled inside the primary part of the exchanger. The air flow is then routed to the turbo-cooler compressor or through the turbofan depending on the by-pass electric valve position. At the turbo-cooler compressor outlet, the air is cooled inside the main heat exchanger prior to entering the turbine section of the turbo-cooler.

## Turbofan

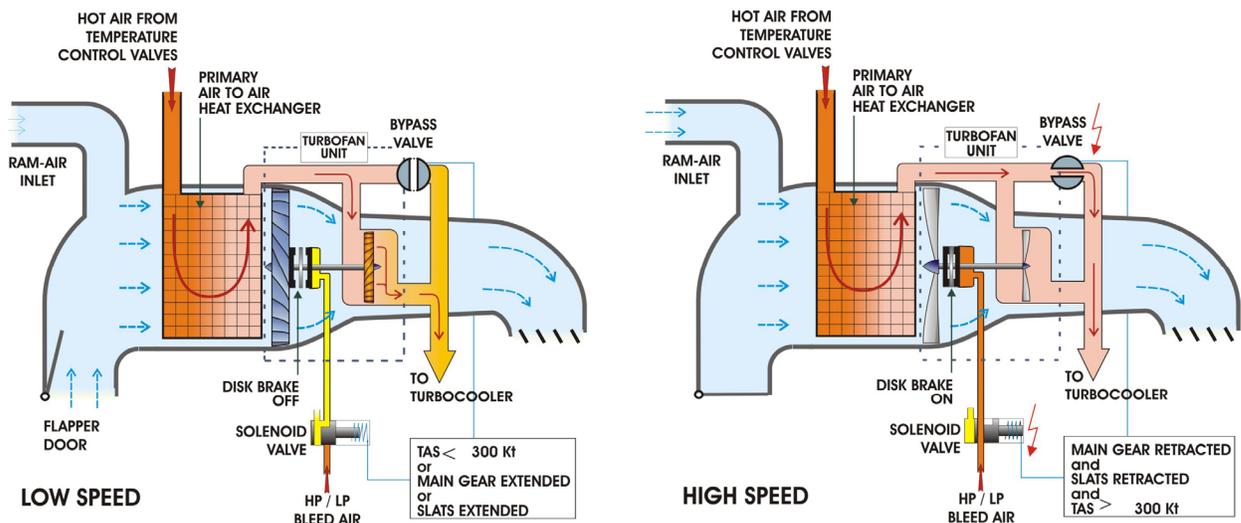
The purpose of the turbofan is to accelerate the cooling outside airflow through the exchangers when airplane True Air Speed is lower than 300 kt.

It consists of a fan and turbine mounted on opposite ends of a common shaft.

When airplane speed becomes high enough, the turbine/fan assembly is prevented from rotating by a braking system composed of a disk brake controlled via an electric valve.

The electric and the by-pass electric valves are automatically controlled according to:

- airplane speed,
- slats position,
- landing gear position.



## Turbo-cooler

The turbo-cooler is a single stage compressor and turbine. The turbo-cooler operates in conjunction with the heat exchangers and the water separator to produce cooled and dry air for the conditioning system.

## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

### Water-separators

The water separator separates and collects the water droplets formed in the condenser. The water is then routed to the atomizer. Two atomizers discharge it, as a fine mist, into the cooling airflow of the main heat exchanger and contribute to the cooling process.

### Anti-icing system

An anti-icing system is used to prevent ice in the turbo-cooler turbine thanks to hot air picked off at the primary heat exchanger inlet and introduced into the turbo-cooler turbine casing. Hot air admission is controlled through an automatic valve to maintain the inlet temperature turbine above + 3°C (37°F).

### Optional emergency anti-icing valve

For airplane fitted with the optional M2521 modification, when the standard turbine anti-icing valve is detected jammed open, the optional electric turbine anti-icing valve can be closed by activating the CLOSE soft key in the ECS synoptic (soft key available only when the option is installed).

### Overheat detection system

The overheat detection system consists of a sensor located in the turbo-cooler compressor outlet duct.

The **ECU OVHT** CAS message is displayed when the bypass electric valve is not closed and:

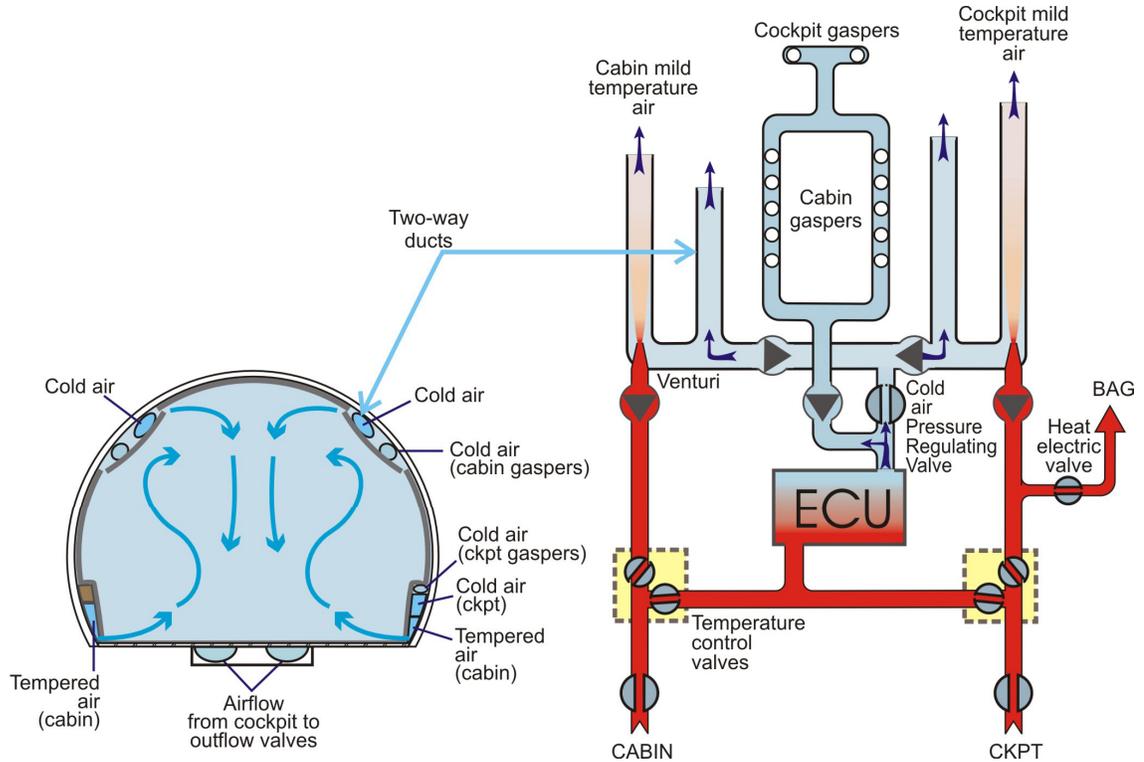
- the duct temperature reaches or exceeds 230°C (446°F), or
- the nose gear is down and turbofan brake operating.

# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

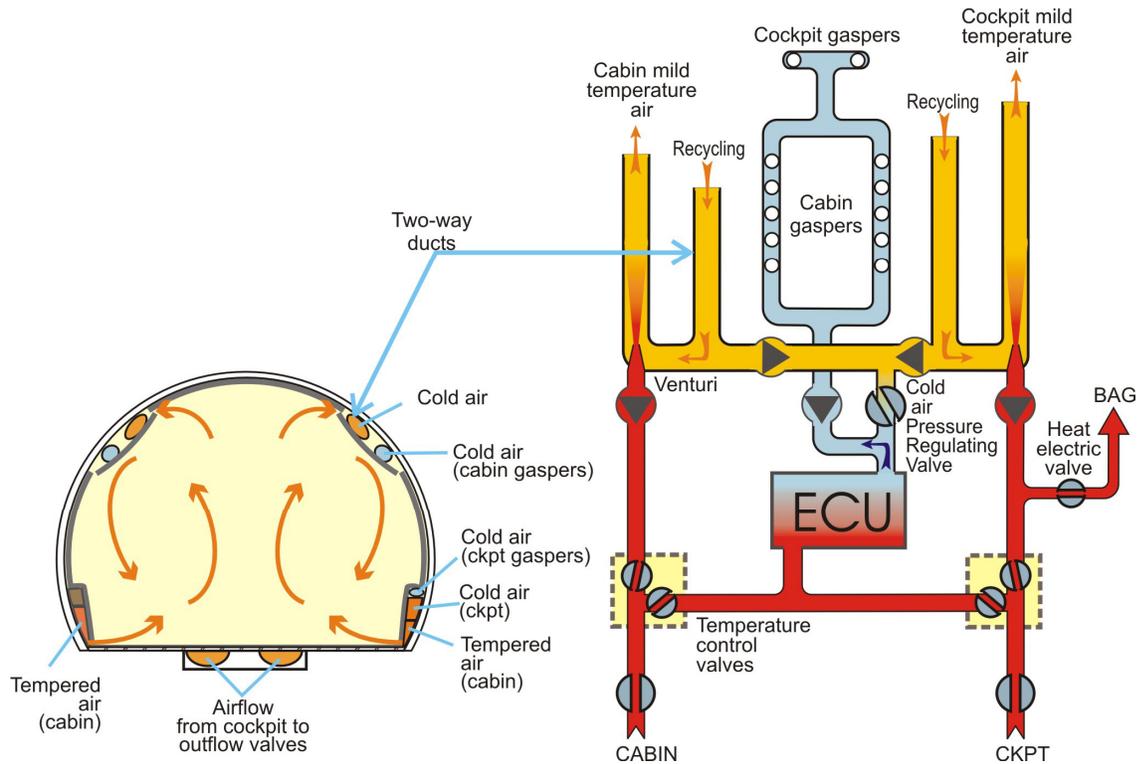
## DISTRIBUTION

The distribution system is divided into:

- the cockpit conditioned air system,
- the cabin conditioned air system (for passengers, equipment and hold).



## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]



**AIR CONDITIONING HOT SYSTEM SCHEMATIC**

### Temperature control valves

The temperature control valves of the cabin and cockpit systems are identical but differ in operation.

Each assembly consists of two butterfly valves, mechanically linked and operated in an opposing direction by a single motor. The motor receives inputs from either the automatic or manual temperature control system of the associated controller.

Even if the cabin temperature control valve is in full hot position, the cold butterfly valve is not fully closed, allowing a volume of air to pass through the ECU.

Each temperature control valve is supplied through the associated air conditioning valve.

The air mass through each valve is directed into two ducts:

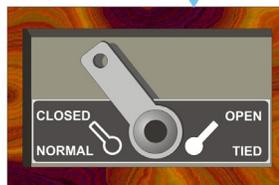
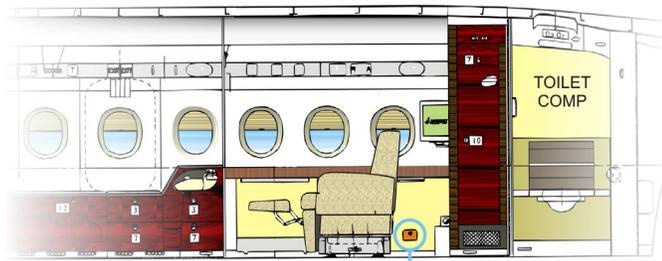
- one duct supplies hot air flow to the associated jet pumps in the cabin and cockpit distribution system,
- the other duct supplies an air mass to a common duct, which directs it through the cold air unit.

# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

## Cabin ducts

The cabin air conditioning ducts are routed within the lower side of the left and right hand cabin side consoles.

Passenger and crew conditioned air ducts may be manually interconnected to allow either the cabin or the cockpit distribution system to supply both ducting systems. The manual interconnection valve is located on the lower right-hand side of the cabin area.



### CONDITIONING CONTROL LEVER (APPLICABLE TO AIRPLANE < 141)



### CONDITIONING CONTROL LEVER (APPLICABLE TO AIRPLANE ≥ 141)

## **Falcon 900EX EASY [Air Conditioning & Pressurization Summary]**

### **Cockpit ducts**

The cockpit conditioning ducts are routed along the right side of the fuselage and supply conditioned air to the entrance area, the cockpit, the windshields and the foot warmers. Each pilot selects the direction of the air supply (to the windshield for defogging or to the foot warmer) with a control lever on the instrument console.

### **Two-way ducts**

The two-way ducts (one for the cockpit and one for the cabin) are routed along the top of the cabin. They have two functions:

- distribute cold air to the upper part of the cabin / cockpit when the air conditioning requires a temperature drop,
- recycle air from the cabin / cockpit and mix it with conditioned air when conditioning requires a temperature rise.

### **Gaspers ducts**

The duct system providing cold air to the gaspers is a three-branch system:

- one branch supplies the crew air gaspers, the air cooling tube for the MDU / PDU and for airplane fitted with M3374, the glareshield. An additional control lever located on the left side console enables to control cold air flow to the glareshield (M3374),
- the other two branches supply the gaspers of the left and right side of the cabin.

Cold air is directly supplied from the turbo-cooler through the low pressure water separator.

Air supplied to the gaspers and for MDU / PDU cooling is maintained at a constant pressure through a pressure regulating valve.

### **MDU / PDU cooling**

Cooling of the components of the instrument panel is achieved by airflow coming from the crew gasper system.

### **Floor heating**

Air is distributed between the floor panels and the fuel tanks by a manifold supplied with cabin conditioning air. In addition to that air, cockpit air is evacuated underneath the floor panels to help floor heating.

### **Baggage compartment conditioning**

The baggage compartment is conditioned by extracted air, from the cockpit hot air line, through the heat electric valve. It is pressurized at the same differential pressure as the cabin area through the isolation valve. This valve allows the baggage compartment to be isolated from the pressurization system.

## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

When the baggage compartment isolation is commanded and the isolation valve is closed, the amber **BAG ISOL** CAS message is displayed.

### Nose cone ventilation

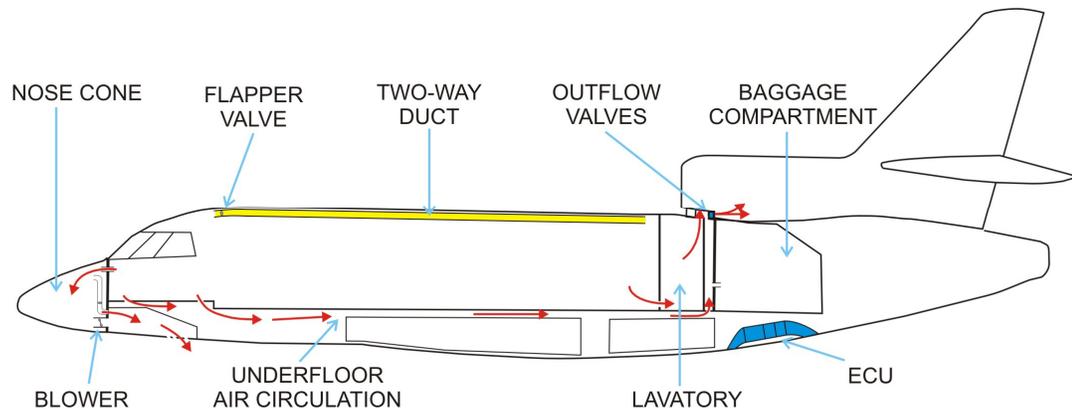
An electric blower ventilates the nose cone during ground operations and in-flight at low altitude (differential pressure < 0.7 psi). In flight, ventilation is also provided by the cabin conditioned air through a calibrated orifice. The air is evacuated through the nose gear well.

The **NOSE CONE OVHT** CAS message appears if the nose cone ambient temperature exceeds 70°C (158°F).

### Air evacuation

Cabin air is evacuated via the lavatory through the outflow valves.

Cockpit air is evacuated from the rear of the pilot and copilot consoles, circulates underneath the cabin floor and is directed to the outflow valves.



**AIR EVACUATION CIRCUITS**

### Sensors

Temperature sensors located in the cabin and cockpit ducts provide air temperature inputs to the corresponding controller.

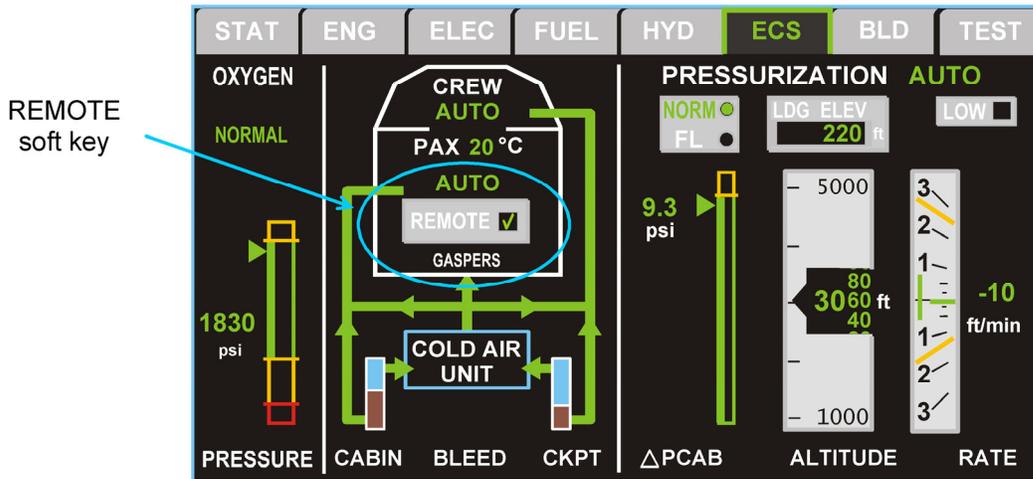
Temperature switches are activated when air duct temperature is over 95°C (203°F). The amber **COND OVHT XX** CAS message is then displayed and the lines on the ECS synoptic corresponding to the overheated duct are displayed in amber.

**CONTROL AND INDICATION**

**CONTROL**



**AIR CONDITIONING OVERHEAD PANEL**



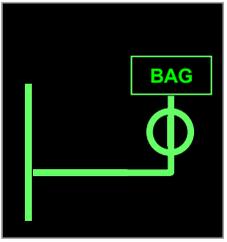
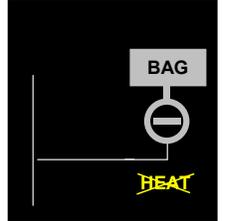
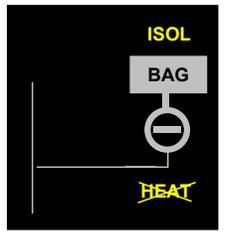
**ECS SYNOPTIC**

**NOTE**

The REMOTE soft key is active only when the option is installed

In automatic mode, by selecting the REMOTE soft key, the cabin temperature can be controlled directly from a rotactor located in the cabin (VIP seat).

Synthetic table

CONTROL	FUNCTION	TO ACTIVATE	SYNOPTIC
		TO DEACTIVATE	
	<p>Automatic mode: the PAX / CREW rotator is used to select cabin / cockpit temperature</p> <p>Manual mode: the PAX / CREW rotator must be at full counter clockwise position. MAN is displayed on the left side and the COLD / HOT pushbuttons are used to control the cabin/cockpit temperature</p>	<p>Auto mode</p>  <p>Manual mode</p> 	<p>PAX Auto</p>  <p>CREW Auto</p>  <p>PAX Manual</p>  <p>CREW Manual</p> 
 <p>status light pushbutton</p>	<p>BAG pushbutton is located in the BLEED AIR overhead panel:</p> <ul style="list-style-type: none"> <li>- pressed once, closes the baggage compartment heat valve</li> <li>- pressed twice, closes the isolation valve between baggage compartment and cabin</li> </ul> <p>The synoptic is displayed in the BLD synoptic page. For more information, refer to CODDE 1 / Chapter 02 / ATA 36</p>	<p>Normal</p>  <p>Heat valve closed</p>  <p>Baggage comp<sup>t</sup> isolated</p> 	 <p>BLD synoptic</p>  <p>BLD synoptic</p>  <p>BLD synoptic</p>

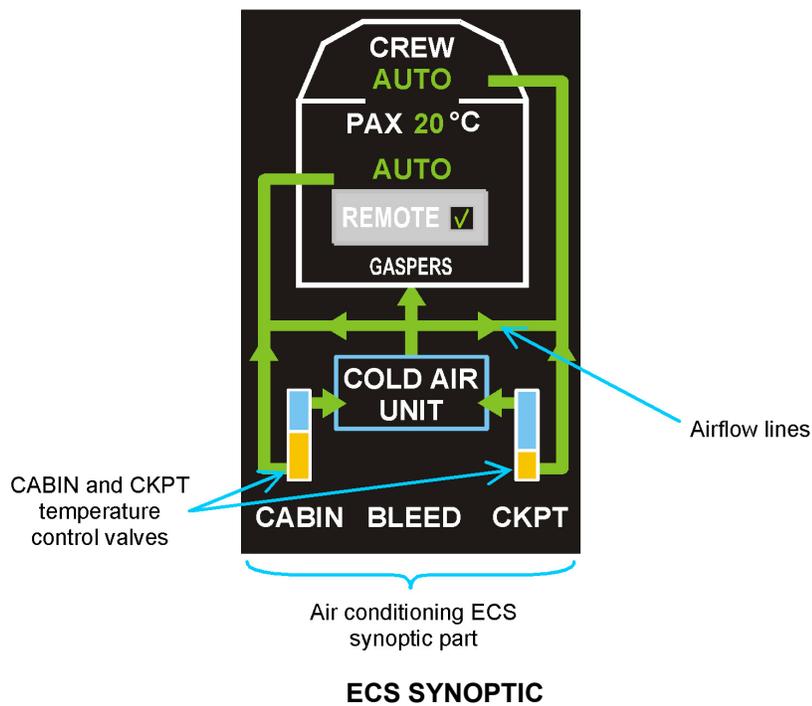
# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

## INDICATION

Air conditioning indications and system status are displayed on the ECS synoptic.

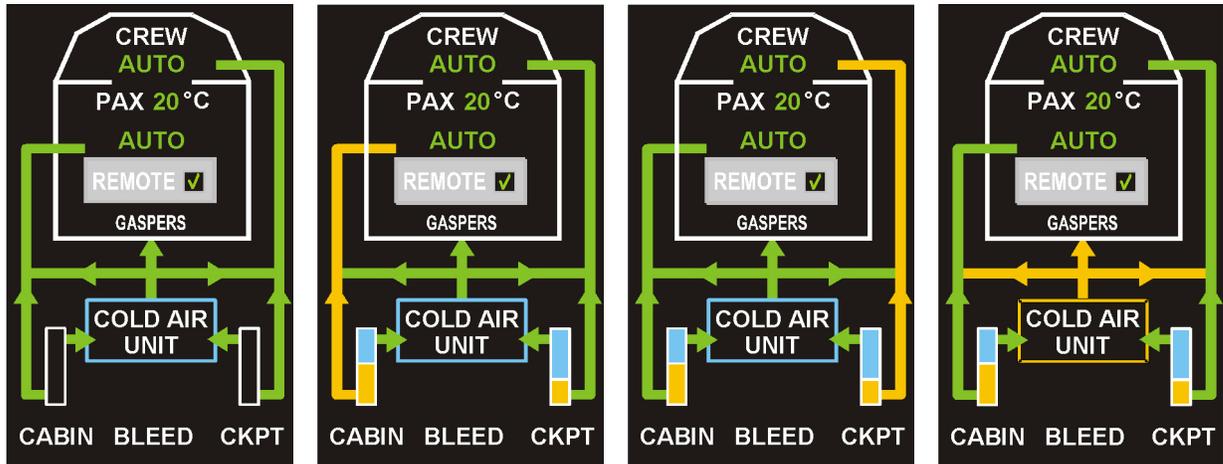
Command indications include cabin temperature remote mode selection. The system status items include operating status, cockpit and cabin temperature regulation valve positions and cabin temperature.

The cockpit and cabin temperature control valve positions are indicated by two vertical bar graphs located at the bottom of the air conditioning schematic of the ECS synoptic. The bar graphs and associated color present the temperature control valve actual positions. A full brown bar graph indicates a full hot valve position and a full blue indicates a full cold position.



# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

## Cold air unit and air flow lines indication



Cabin and Cockpit temperature control valve when temperatures are invalid

**COND OVHT PAX**  
CAS message

**COND OVHT CREW**  
CAS message

T cabin duct air > 95°C  
T cockpit duct air > 95°C  
T compressor ECU outlet air > 230°C or nose gear down and turbofan by-pass valve not closed

**ECU OVHT**  
CAS message

### NOTE

The remote control is authorized by selecting the REMOTE soft key on the ECS synoptic. The remote control is authorized in conditioning AUTO mode only. Upon the manual mode selection, the REMOTE control is automatically de-selected and the REMOTE selection is impossible.

## Cabin temperature indication

Cabin temperature indication is presented on the right of the PAX label. The indication is based on the air cabin temperature measurement. The temperature spacing is 1°. The readout ranges from 0 to 40°C. When the signal is invalid, two amber dashes are displayed in place of temperature indication.



## CREW and PAX indications during emergency pressurization

The activation of the EMERG pressurization pushbutton simultaneously:

- closes the CABIN conditioning valve,
- drives the CKPT temperature control valve into full hot position,

Airflow admission to the ECU is shut off. Conditioning is therefore only achieved by mixing ambient cabin air with hot bleed air. Temperature control at high altitude may not present a problem. But, at lower altitude, cabin and cockpit ambient temperature will naturally increase. In this case, temperature may be manually controlled by using the COLD CREW pushbutton that commands hot bleed airflow reduction but consequently affects cabin pressurization.

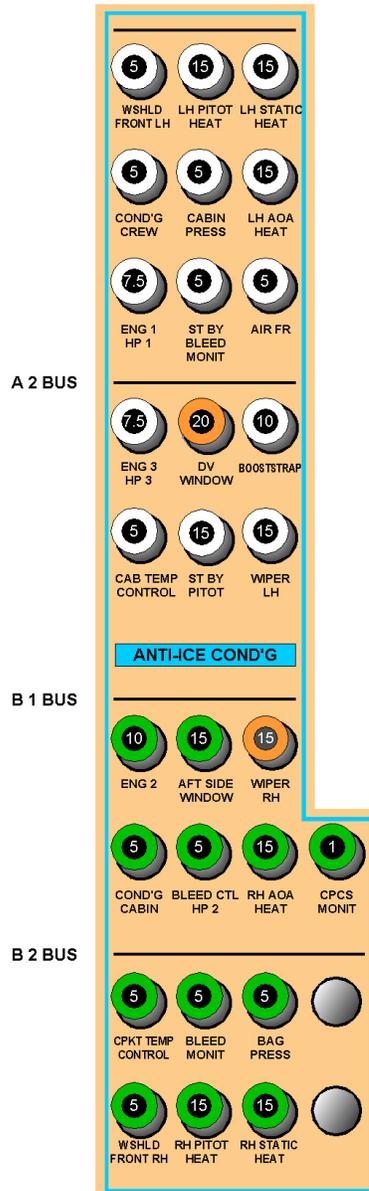


## SYSTEM PROTECTION

### INTRODUCTION

Electrical circuit protection is provided by conventional trip-free circuit breakers located above the overhead panel.

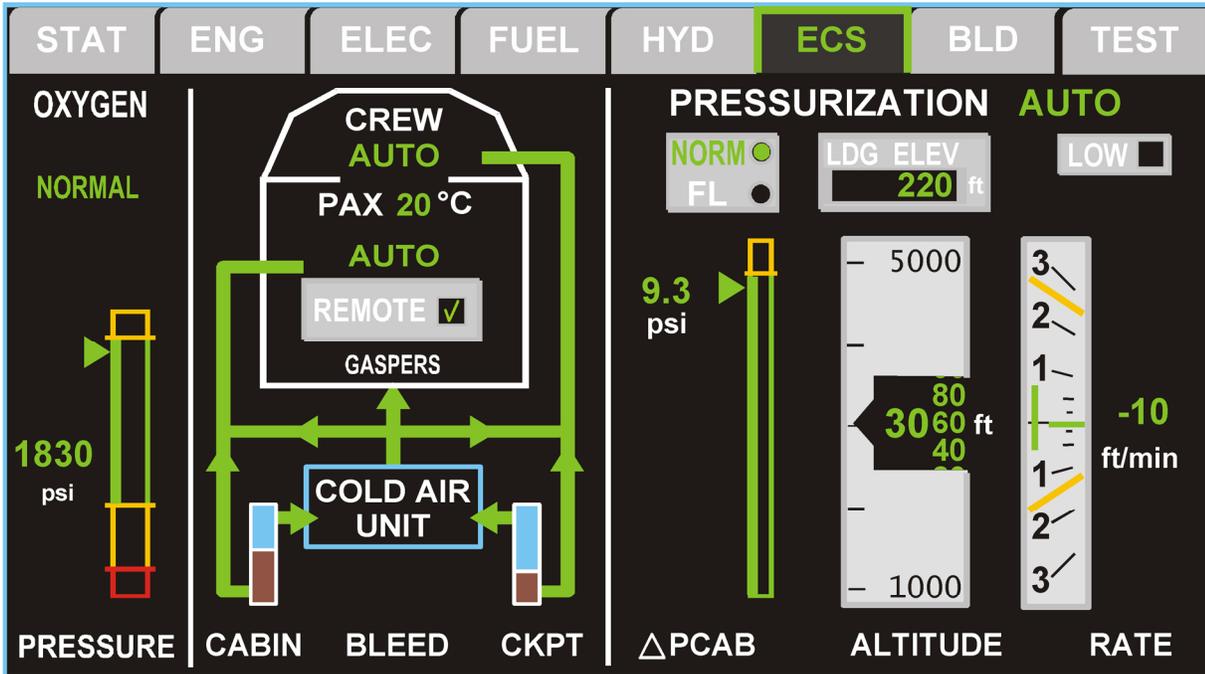
### CIRCUIT BREAKERS



**AIR CONDITIONING CIRCUIT BREAKERS**

**NORMAL OPERATION**

In the following, typical situation has been selected to help the crew to understand the symbols provided in the various panels and displays.



ECS SYNOPSIS

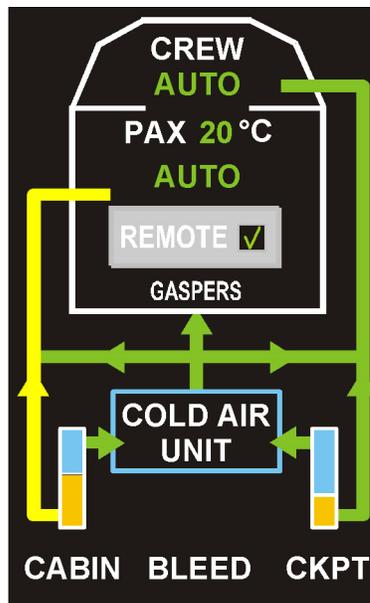
**ABNORMAL OPERATION**

**INTRODUCTION**

In the following, abnormal operations have been selected to help the crew to understand the symbols provided in the various panels and displays.

**AIR CONDITIONING WITH CABIN OVERHEAT**

Abnormal status



ECS SYNOPSIS

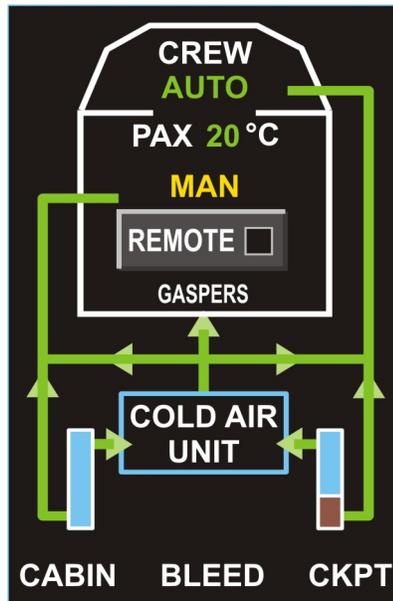
CONTEXT	RESULT
Cabin conditioning system overheat	<p><b>COND OVHT PAX</b> CAS message</p> <p>+   light on</p> <p>CABIN air flow line in amber</p>

# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

After procedure complete



AIR CONDITIONING OVERHEAD PANEL

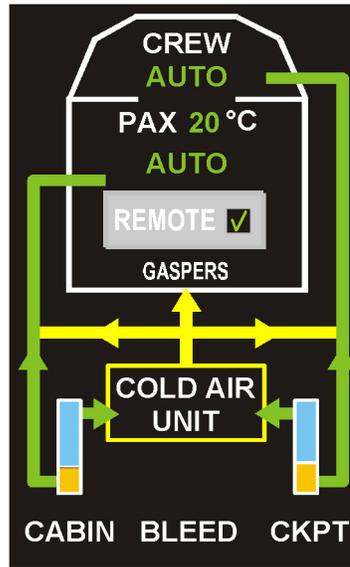


ECS SYNOPTIC

ACTION	RESULT
PAX rotactor fully counter clockwise	CABIN air conditioning in manual mode MAN status light in amber REMOTE status de-selected
COLD PAX pushbutton pressed and maintained	CABIN temperature valve position 100 % blue CABIN air flow line in green

**AIR CONDITIONING WITH ECU OVERHEAT**

Abnormal status



ECS SYNOPSIS

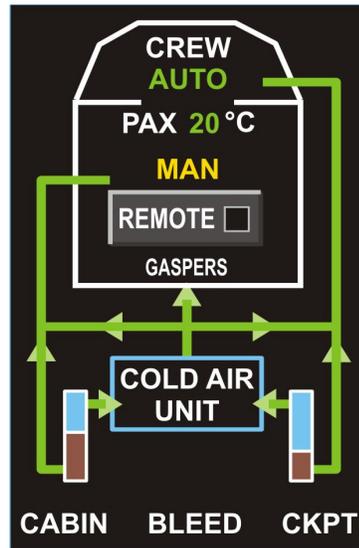
CONTEXT	RESULT
ECU (COLD AIR UNIT) overheat	<p><b>ECU OVHT</b> CAS message</p> <p>+   light on</p> <p>COLD AIR UNIT air flow lines in amber</p>

# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

After procedure complete



AIR CONDITIONING OVERHEAD PANEL



ECS SYNOPSIS

ACTION	RESULT
PAX rotactor fully counter clockwise	CABIN air conditioning in manual mode MAN status light in amber  REMOTE status de-selected
COLD or HOT PAX pushbutton pressed and maintained	<ul style="list-style-type: none"> <li>- CABIN temperature valve position select above 40% brown position to reduce the air flow in the ECU</li> <li>- COLD AIR UNIT air flow lines in green. If not, refer to CODDE 2 / ABNORMAL PROCEDURES / ATA 21</li> </ul>

## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

CAS MESSAGES	
CAS MESSAGE	DEFINITION
COND OVHT CREW	Cockpit conditioning system overheat
COND OVHT PAX	Cabin conditioning system overheat
ECU OVHT	ECU overheat
NOSE CONE OVHT	Nose cone overheat

## DESCRIPTION

### GENERAL

The purpose of pressurization is to maintain a certain level of pressure inside the fuselage that is comfortable for the passengers and crew, taking into account structural limits of the airframe, whatever the flying conditions.

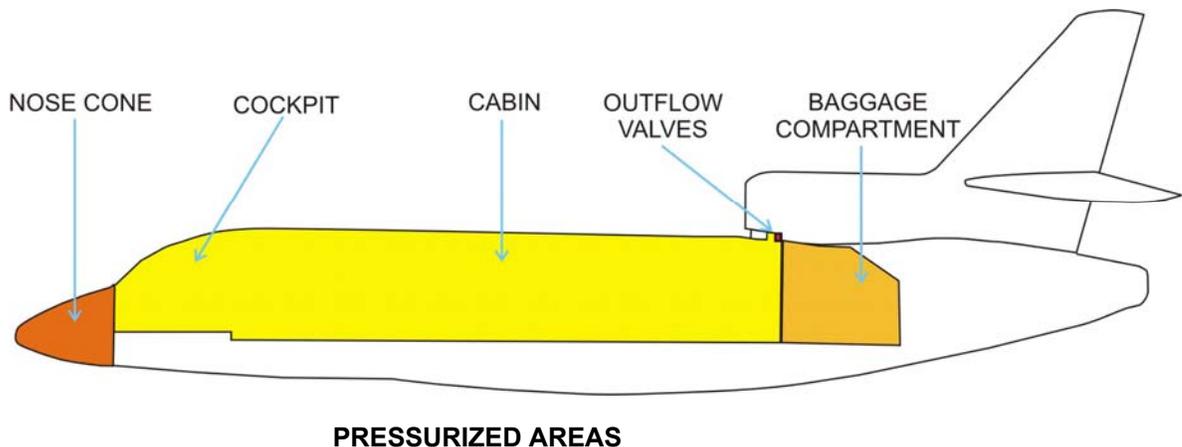
The air conditioning system provides the pressurized areas with air at mild temperature.

The pressurization system can operate in three modes:

- automatic mode (AUTO),
- manual mode (MAN),
- rapid depressurization mode (DUMP).

The airplane comprises three pressurized areas:

- the cockpit, passenger cabin and toilets, from frame 0 to frame 25, supplied with air by the air conditioning system,
- the baggage compartment, from frame 25 to frame 30, which can be accessed in flight through a door usually closed, and pressurized with the passenger cabin air through an interconnection device,
- the nose cone, supplied with cabin conditioning air and slightly pressurized in flight by an automatic control system.



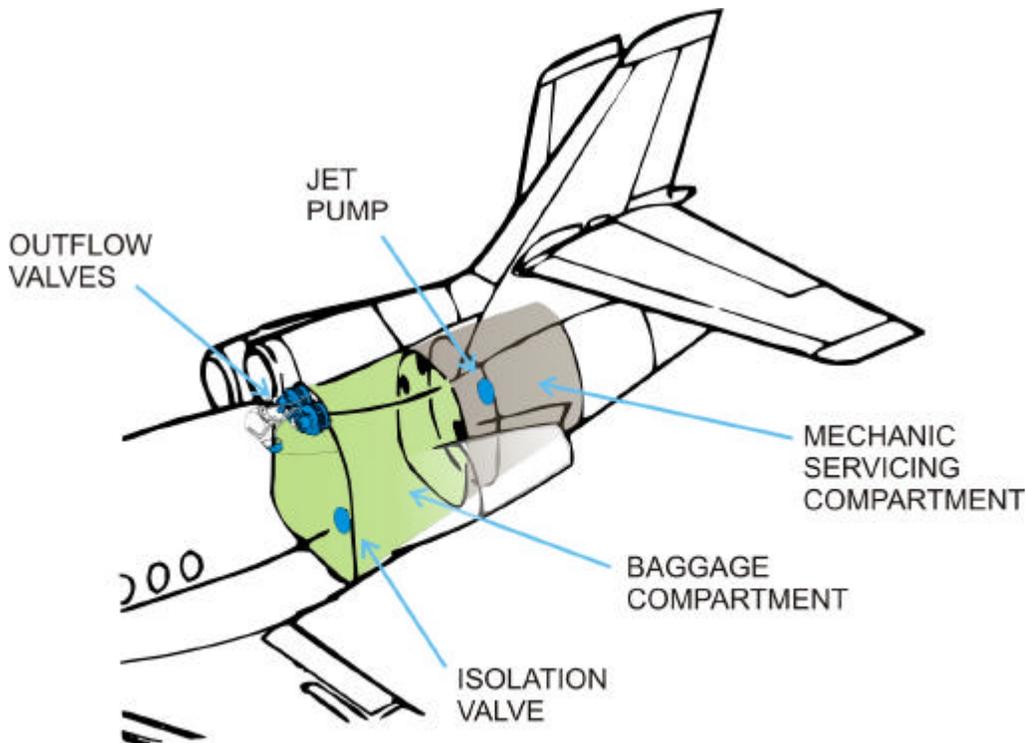
## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

Pressurization is achieved by regulating cabin conditioning airflow through two outflow valves located in the fuselage rear bulkhead:

- one electro-pneumatic main valve,
- one pneumatic emergency valve.

In automatic mode, the Cabin Pressurization Controller (CPC) electrically controls the electro-pneumatic main outflow valve and the emergency outflow valve is pneumatically slaved to the main outflow valve.

In manual mode, the second outflow valve is pneumatically controlled by the manual cabin altitude rate setting knob, the electro-pneumatic valve is closed. Pneumatic operation is used as a backup mode in case the electrically controlled outflow valve fails.



### MAIN PRESSURIZATION COMPONENTS LOCATION

The pressurization system is connected to the avionics system to:

- allow the crew to select the different AUTO modes (NORM or FL),
- activate the LOW mode of climb/descent rate,
- enter the landing field elevation,
- take into account the barometric setting,
- provide the CPC with airplane altitude and vertical speed,
- display the cabin pressurization parameters and CAS messages to the crew.

### **PRESSURIZATION SYSTEM COMPONENTS**

#### **Cabin Pressure Controller (CPC)**

The digital cabin pressure controller manages cabin pressurization in the automatic mode.

The CPC is composed of:

- a digital Printed Circuit Board (PCB) with a pressure and temperature sensor to achieve automatic pressure control,
- an analog PCB with a pressure sensor which provides a second indication of cabin pressure and cabin pressure rate of change. This output is the only available source in manual mode.

The CPC is located in the left side electrical cabinet behind the pilot seat and is controlled by the pressurization controls located on the overhead panel.

The CPC is electrically energized only in the automatic mode of operation.

#### **Electro-pneumatic main outflow valve**

The electro-pneumatic main outflow valve is mounted on the rear pressure bulkhead of the pressurized area. The outflow valve controls cabin pressurization by actuating atmospheric chambers. A flexible diaphragm connected to the poppet valve separates each chamber. A spring in the control chamber determines a fail-safe closed position for the poppet.

The pressure in the control chamber is determined by a torque motor quadrant in response to output signals received from the CPC. The quadrant alternately opens two nozzles, one admits cabin pressure into the control chamber (moving the poppet toward the closed position) and the other nozzle connects the control chamber to the jet pump pressure line (reducing pressure inside the control chamber and inducing the poppet towards the open position).

The function of the main outflow valve is, in response to signals from the CPC, to regulate the airflow exiting the cabin, so as to:

- maintain the programmed cabin altitude,
- limit the rate of climb and descent.

The electro-pneumatic main outflow valve control chamber includes:

- a cabin altitude limitation capsule,
- an overpressure limitation protection,
- the negative pressure relief valve to prevent negative differential pressure.

The cabin altitude limitation capsule, which is fitted with an aneroid capsule, detects the absolute pressure in the cabin. When the set pressure is reached (cabin altitude  $14,500 \pm 500$  ft), a valve linked to this capsule interconnects the control chamber to the cabin pressure, which tends to close the outflow valve and pressurize the cabin again.

The overpressure limitation capsule receives the external static pressure and the cabin pressure. When the difference between the two pressures reaches the calibration value of 9.6 psi, the capsule opens a valve and connects the control chamber to the outside, hence opening the outflow valve and causing depressurization of the cabin.

The negative pressure relief valve allows the outflow valve to open when the external pressure is higher than the cabin internal pressure.

## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

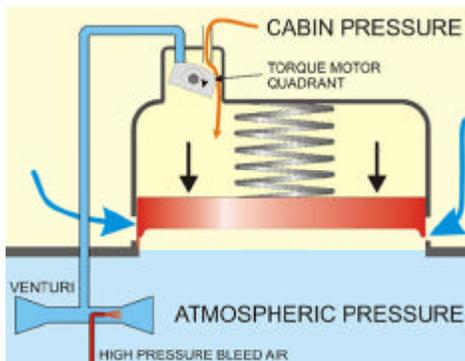
### Pneumatic emergency outflow valve

The emergency outflow valve is identical to the electro-pneumatic valve and comprises:

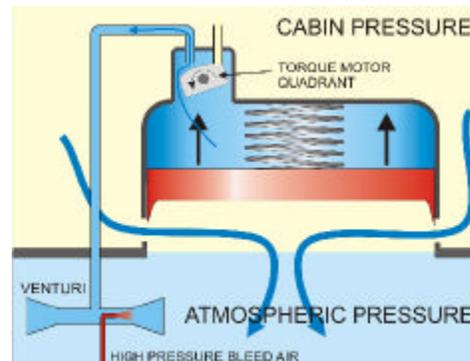
- a pneumatic relay,
- an overpressure limitation capsule,
- a cabin altitude limitation capsule,
- a quick-closing electric valve to induce rapid closing for take-off,
- a negative pressure relief valve.

The emergency outflow valve is pneumatically operated. Pneumatic operation is based on pressure difference between controlled and actual cabin pressure as determined by a pneumatic relay.

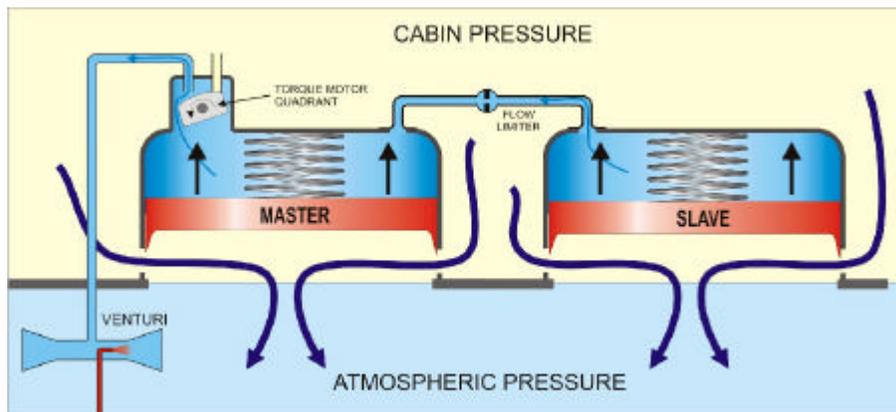
The control chambers of the two outflow valves interconnect so that in automatic mode the pneumatic valve is slaved to the electro-pneumatic valve, whereas in manual mode the pneumatic valve operates on its own, with the electro-pneumatic valve closed.



OUTFLOW VALVE IN CLOSED POSITION



OUTFLOW VALVE IN OPEN POSITION



MAIN AND EMERGENCY OUTFLOW VALVES

### Vaccum jet pump

The vacuum jet pump produces a flow from a line supplied by No 1 and 2 engines HP bleed air or by the APU bleed air system when the airplane is on ground. The vacuum jet pump provides negative pressure produced by venturi-effect to operate the main and emergency outflow valves during automatic operation and during manual control of the pressurization system.

As the vacuum jet pump is supplied only by engines No 1 and 2 or APU bleed air, when the No 3 engine is used in lieu of the APU on the ground (in case of APU failure), it is not possible to open the outflow valves, neither in automatic nor in manual mode. In that case, it is necessary to maintain the door or the pilot sliding window open as long as the engines No 1 or 2 are not running, in order to avoid inflating the airplane cabin.

## **PRESSURIZATION SYSTEM OPERATION**

### **Automatic pressurization mode**

In automatic mode, the CPC automatically controls cabin altitude and pressurization rate of change according to programmed laws and landing field elevation.

The automatic mode has two main laws of operation:

- the normal law (NORM),
- the Flight Level law (FL),

with, in either mode, a LOW cabin altitude rate of change option.

The system allows high altitude landing and take-off.

It also provides on the ground:

- automatic pressurization during take-off, by pre-pressurizing the cabin at the outside pressure + 11 hPa, in order to avoid cabin pressure bump during take off rotation,
- automatic depressurization sequence after landing, by de-pressurizing cabin at outside pressure, in order to cancel cabin differential pressure.

#### ■ **NORM law**

This mode provides the most comfortable pressurization mode by limiting the cabin pressure rate of change during climb and descent based on airplane altitude and vertical speed.

#### ■ **FL law**

This mode is intended to maintain a low cabin altitude of 1,000 ft until airplane reaches 23,000 ft ( $\Delta P = 8.2$  psi). Climb to 51,000 ft is possible in this mode but cabin pressure variation is less comfortable above 23,000 ft.

## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

### ■ LOW cabin rate

LOW cabin altitude rate of change can be activated with either NORM or FL laws to limit the rate of change to lower values: + 500 / - 300 ft/min instead of + 650 / - 400 ft/min.

### ■ High altitude landing and take off

High altitude landing and take-off ranging from 8,000 ft to 14,000 ft are made possible by automatically shifting the treshold of the **CABIN ALTITUDE** CAS message. Without any additional crew action, the nominal treshold (9,700 ft) of the CAS message is automatically modified, by the pressurization system, during descent or take-off, and set at the landing field elevation + 1,700 ft (limited to 14,500 ft).

### **MAN pressurization mode**

This mode is to be selected in case of failure of the automatic pressurization mode. The crew directly controls the cabin altitude rate of climb or descent with the manual pressurization control knob.

### **EMER pressurization mode**

This mode allows an emergency pressurization by closing the CABIN conditioning valve and driving the CKPT temperature control valve to the full hot position.

### **DUMP depressurization mode**

In case of failure of the pressurization system to achieve the correct cabin pressure at destination, the cabin pressure can be dumped by forcing the outflow valves to full open position.

## **BAGGAGE COMPARTMENT PRESSURIZATION**

The baggage compartment is normally pressurized at approximately the same differential pressure as the cabin area. The baggage compartment can be isolated completely from the pressurization system by selecting bleed air "BAG ISOL" pushbutton.

➤ *For more information, refer to CODDE 1 / Chapter 02 / ATA 36.*

## **NOSE CONE PRESSURIZATION**

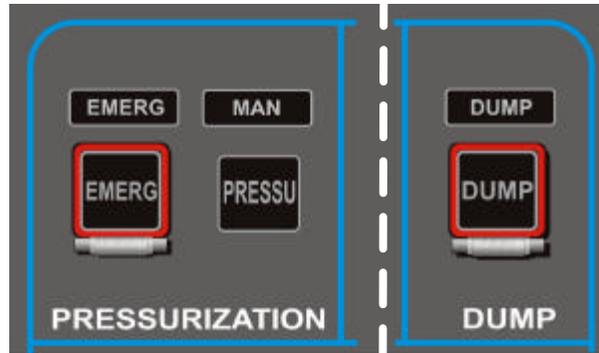
The nose cone is ventilated during ground and low altitude flight operations. It is also pressurized in normal flight conditions and the transition from ventilation to pressurization is entirely automatic.

The function of the pressurization is to ensure a positive differential pressure of the nose cone in order to achieve sufficient sealing.

**CONTROL AND INDICATION**

**CONTROL**

**Overhead panel**



**OVERHEAD PANEL**

**Instrument panel**

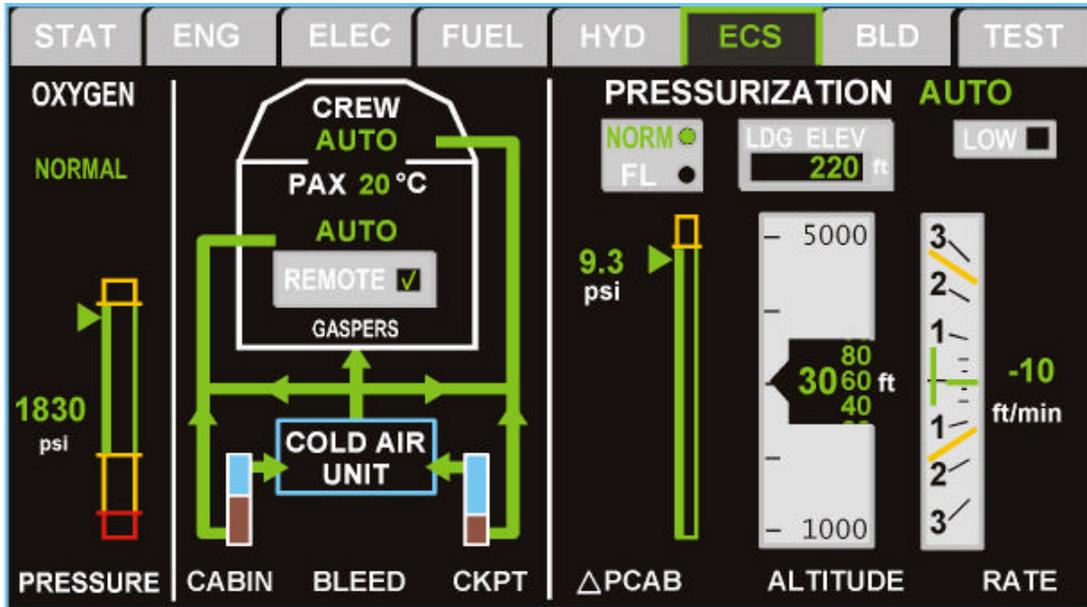


**MANUAL PRESSURIZATION CONTROL KNOB**

The manual pressurization control knob allows to control the rate of climb from - 1,500 ft/min to + 2,500 ft/min. A constant cabin pressure may be achieved by adjusting the manual pressurization control knob, within the white area, until the cabin altitude rate of change indicator stabilizes at zero.

The rest position is in front of the green line in automatic mode. Prior to the selection of the MAN mode, put the knob into the white area. In MAN mode, turn the knob until the desired cabin altitude rate of change is achieved.

ECS synoptic



ECS SYNOPTIC

Through the ECS synoptic boxes with the CCD, the flight crew can:

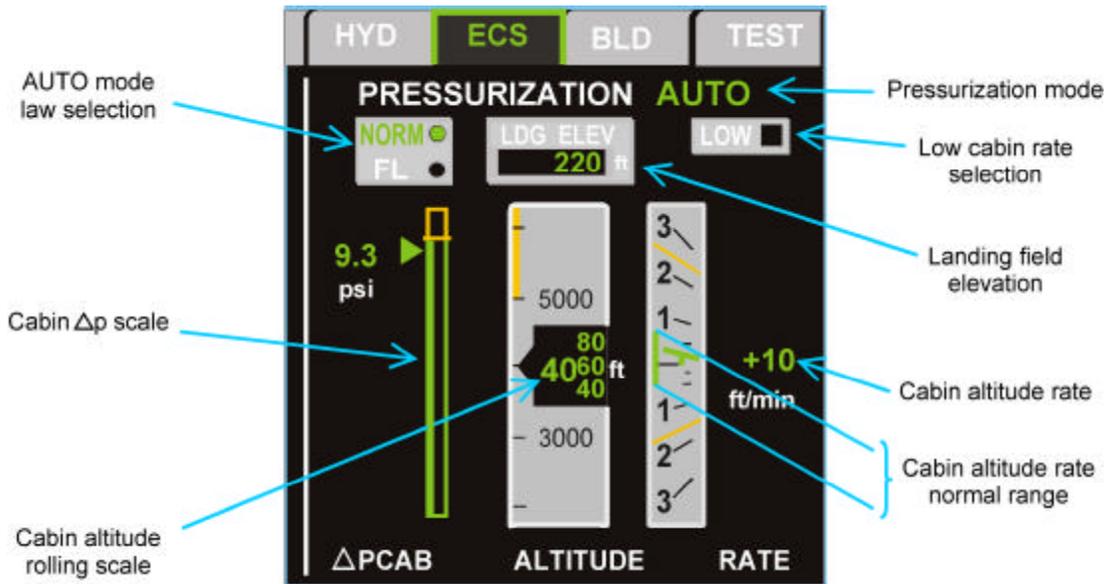
- activate mode selection of NORMAL or FLIGHT LEVEL laws,
- enter and override the destination landing field elevation through the LDG ELEV box,
- activate the selection of LOW Cabin Rate.

Synthetic table

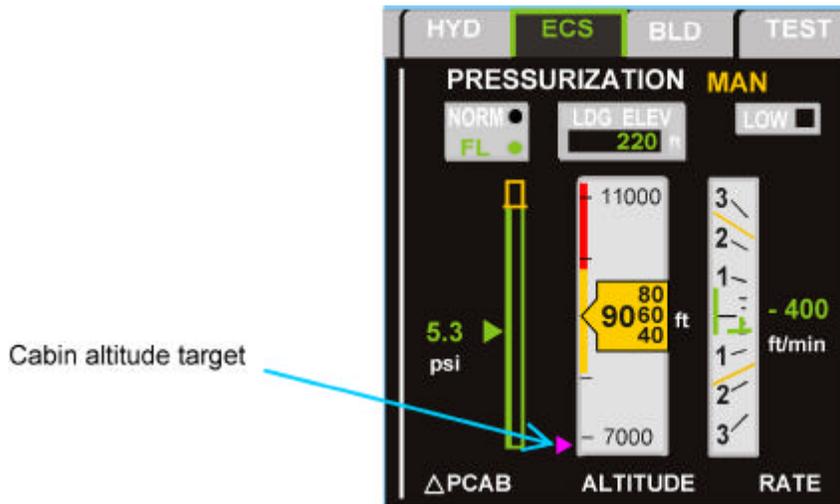
CONTROL	FUNCTION	TO ACTIVATE	SYNOPTIC
		TO DEACTIVATE	
status light  pushbutton	<ul style="list-style-type: none"> <li>- Allows the selection of automatic / MAN mode of the pressurization system</li> <li>- In MAN mode, use the manual pressurization control knob</li> </ul>	Push on: MAN mode   Push off: automatic mode 	  
status light  guarded pushbutton	<ul style="list-style-type: none"> <li>- Closes the CABIN conditioning valve and drives the CKPT temperature control valve to the fully hot position</li> </ul>	Raise the guard and push on: EMERG mode 	Air conditioning synoptic 
status light  guarded pushbutton	<ul style="list-style-type: none"> <li>- Allows a rapid depressurization by forcing the outflow valves to fully open</li> </ul>	Raise the guard and push on: DUMP mode   Guarded: automatic mode 	  

**INDICATION**

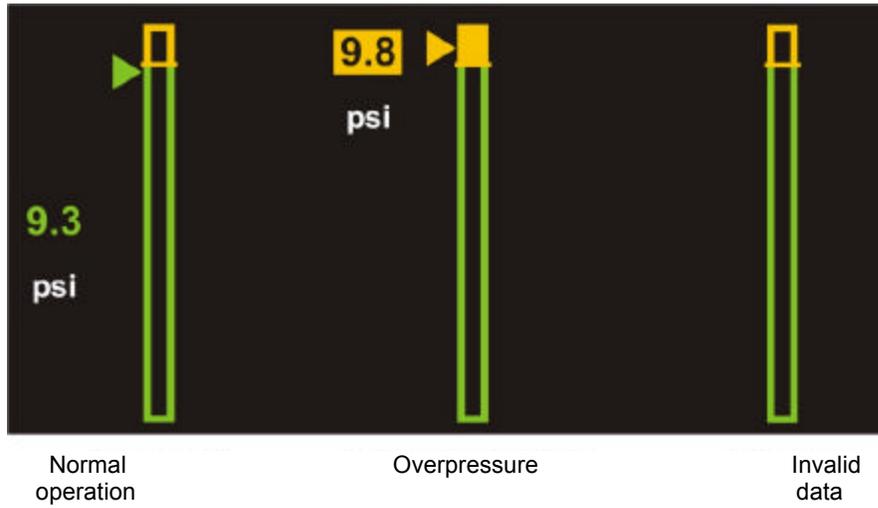
**ECS synoptic**



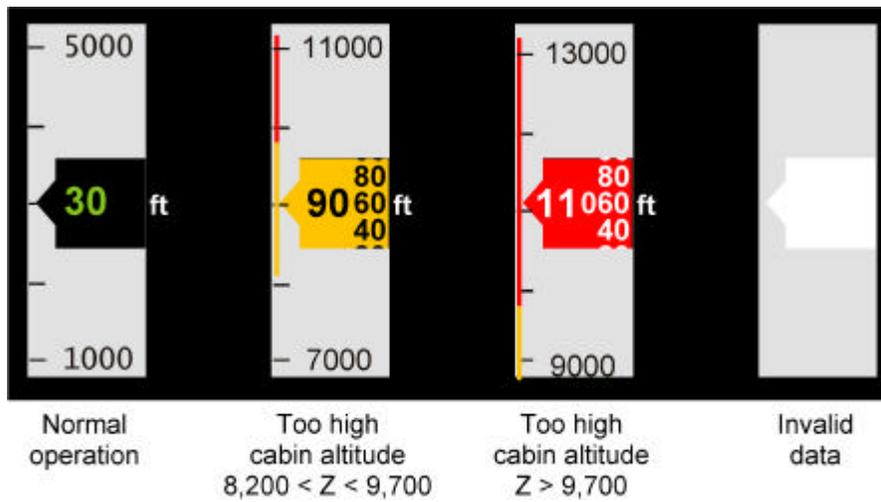
**ECS SYNOPTIC IN AUTOMATIC MODE**



**ECS SYNOPTIC IN MAN MODE**

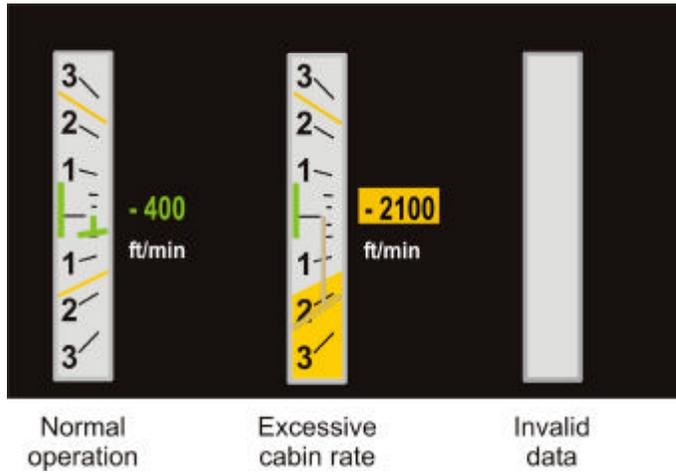


**CABIN DIFFERENTIAL PRESSURE INDICATIONS**



**CABIN ALTIMETER INDICATIONS**

# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]



**CABIN VARIOMETER INDICATIONS**

## STAT synoptic



**STAT SYNOPTIC**

### **SYSTEM PROTECTION**

#### **CIRCUIT BREAKERS**

The electrical circuit protection is provided by conventional trip-free circuit breakers located above the overhead panel (refer to Air conditioning).

#### **PRESSURIZATION SYSTEM PROTECTION**

Pressurization system protection consists of maximum differential pressure limitation, negative differential pressure prevention and cabin altitude limitation. Each outflow valve performs all protections.

##### **Maximum differential pressure limitation**

The CPC automatically maintains a normal differential pressure limit of 9,3 psi. An overpressure limitation capsule, located in each outflow valve, controls the maximum cabin differential pressure at 9.6 psi.

##### **Maximum cabin altitude limitation**

An altitude limitation capsule contained in each outflow valve maintains the cabin pressure altitude of 14,500 ft in case of depressurization due to:

- CPC failure,
- DUMP pushbutton activation,
- permanent cabin rate of climb in manual mode.

##### **Negative differential pressure prevention**

The negative pressure relief valve protects the structure from the effects of negative differential pressure (external pressure above cabin pressure). Only negative pressure relief valve can override the maximum cabin altitude limitation.

#### **BAGGAGE COMPARTMENT PRESSURE RELIEF VALVES**

Positive and negative pressure relief valves are installed in the baggage compartment.

If the heating valve fails to close when the BAG pushbutton is activated the positive pressure relief valves limits the baggage compartment-to-cabin pressure differential at 0.07 psi.

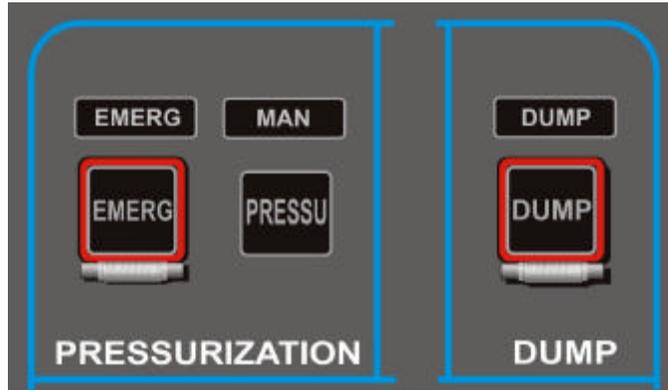
When the baggage compartment is isolated, negative differential pressure during descent is prevented by the negative pressure relief valves, which open when the baggage compartment-to-cabin pressure differential reaches 0.28 psi.

#### **NOSE CONE BULKHEAD PRESSURE RELIEF VALVE**

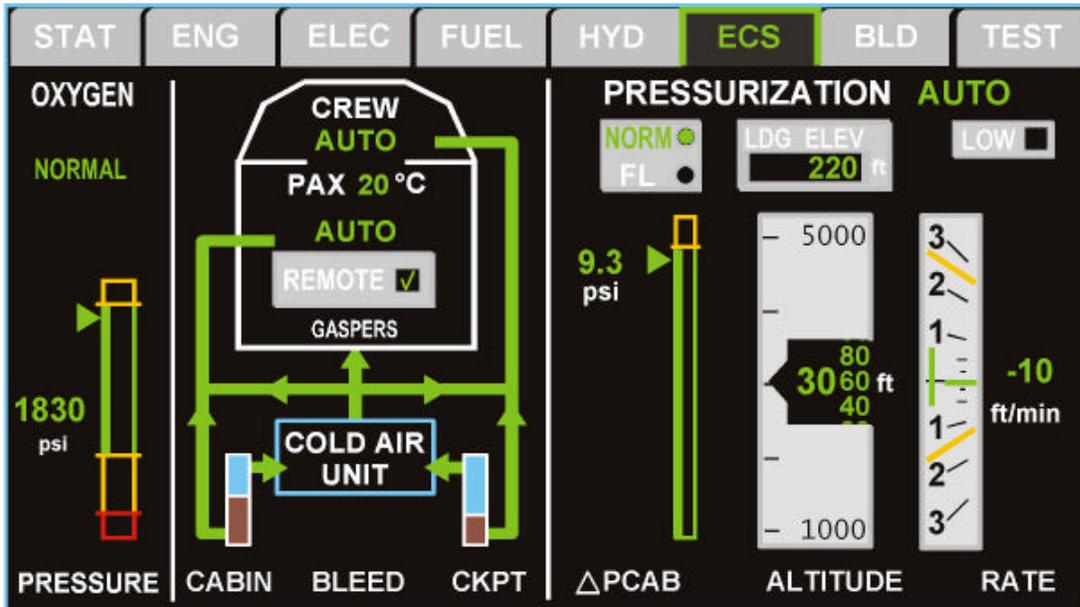
A pressure relief valve in the nose cone bulkhead provides structural protection in case the calibrated holes provided for airflow evacuation are clogged. The relief valve is intended to operate when the difference between nose cone pressure and atmospheric pressure reaches 1.37 psi.

**NORMAL OPERATION**

In the following, typical in-flight situation has been selected to help the crew to understand the symbols provided in the various panels and displays.



OVERHEAD PANEL



ECS SYNOPSIS

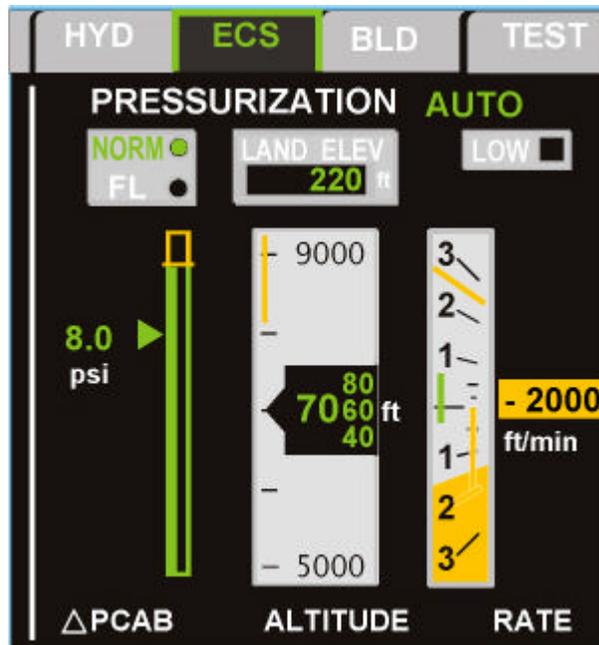
**ABNORMAL OPERATION**

**INTRODUCTION**

In the following, abnormal operation has been selected to help the crew to understand the symbols provided in the various panels and displays.

**PRESSURIZATION WITH COMPUTER FAILURE**

**Abnormal status**

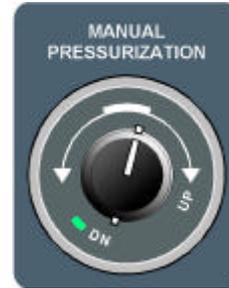


**ECS SYNOPSIS**

CONTEXT	RESULT
<p>CABIN Pressure Control System (CPCS) failure</p>	<p><b>PRESSURE CMPTR FAIL</b> CAS message</p> <p>+  <b>MASTER CAUTION</b> light on</p>

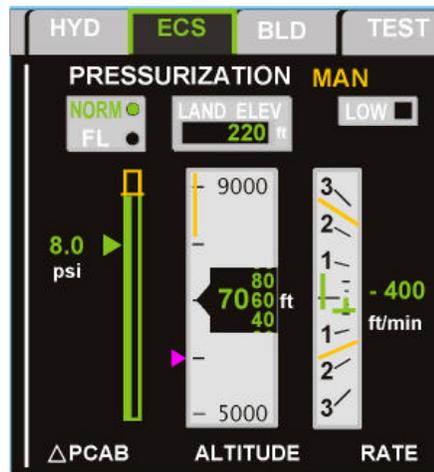
# Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

After procedure complete



PRESSURIZATION OVERHEAD PANEL

MANUAL PRESSURIZATION CONTROL KNOB



ECS SYNOPTIC

ACTION	RESULT
Manual pressurization control knob set to the white area PRESSU pushbutton depressed	<ul style="list-style-type: none"> <li>- Pressurization in manual mode</li> <li>- Emergency outflow valve becomes the master valve</li> <li>- MAN status light in amber</li> </ul>
Manual pressurization control knob adjusted (turned counterclockwise to decrease cabin altitude)	<ul style="list-style-type: none"> <li>- Target altitude is pointed in magenta on the left side of the altitude scale</li> </ul>

## Falcon 900EX EASY [Air Conditioning & Pressurization Summary]

CAS MESSAGES	
CAS MESSAGE	DEFINITION
<b>CABIN ALTITUDE</b>	Cabin altitude above 9,700 +/- 500 ft excepted in high altitude landing and take-off
<b>BAG ISOL</b>	Baggage compartment is isolated
<b>CABIN PRESSURE TOO HIGH</b>	$\Delta P$ cabin above 9.7 psi
<b>CABIN SELECT LAND ELEV</b>	No landing elevation selected when starting descent
<b>CHECK CABIN ALTITUDE</b>	Cabin altitude above 8,200 ft
<b>PRESSURE CMPTR FAIL</b>	Pressurization computer failure
<b>CHECK CABIN RATE</b>	$V_{zcab} < - 1,200 \text{ ft/mn}$ or $V_{zcab} > 1,200 \text{ ft/mn}$