

AIR COMM CORPORATION  
3300 AIRPORT ROAD  
BOULDER, COLORADO 80301

FAA APPROVED  
SUPPLEMENT

BELL HELICOPTER MODEL 412 & 412EP

FLIGHT MANUAL SUPPLEMENT  
FOR  
AIR CONDITIONING SYSTEM

412AC-104

FAA APPROVED

The information contained in this document is FAA approved material, which must be carried in the basic Flight Manual, after the rotor-craft has been modified by installation of the cabin air conditioning system in accordance with Air Comm Corporation STC No. SR00066DE.

The information in this document supplements or supersedes the basic manual only in the items contained herein. For Limitations, Procedures, and Performance Data not contained in this supplement, consult the basic Flight Manual.

FAA APPROVED Jul 10, 1997  
REVISED Dec. 10, 1997

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Log of Pages

FLIGHT MANUAL  
MODEL 412 & 412EP

CABIN AIR CONDITIONING SYSTEM

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Pages	Date	Appl	Rev No.
1 - 12	JUL 10 1997	RFM	N/C
1, 4 and 10	12/10/97	<i>[Signature]</i>	1
2 and 9	5/15/00	<i>[Signature]</i>	2
4, 8 and 9	NOV 29 2002	<i>[Signature]</i>	3
FAA APPROVAL DATE: <u>JUL 10 1997</u> APPROVED: <i>[Signature]</i> Ron May, Manager Denver Aircraft Certification Office, Northwest Mountain Region, Denver, Colorado			

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**MODEL 412 & 412EP AIR CONDITIONING SYSTEM  
DESCRIPTION**

The vapor cycle system installation consists of two forward evaporators, one aft evaporator, a condenser and a compressor which is driven by the main rotor drive shaft. these components provide "conditioned air" through the existing air distribution system when the engines are operating during both ground and flight operations.

Component locations are shown by figures 1,2 and 3.

The system can be operated in either the AC or BLOWER mode.

Fresh air can be circulated in the cabin by opening the forward vents and by selecting AC-OFF Blowers switch to the blower mode.

The blowers can be operated on either HI or LOW speed.

The cabin heater can be operated simultaneously with the AC to achieve desired cabin temperature or to defog cabin windows.

The compressor is mounted on the main rotor transmission, and the drive pulley is bolted to the Main Rotor Transmission Adapter. Power is transmitted to the compressor by means of a drive belt.

**MODEL 412 7 412EP AIR CONDITIONING SYSTEM  
DESCRIPTION (continued)**

The air flow pumping action through the condenser heat exchanger is provided by two 28 VDC vane axial blowers.

The air conditioning system is connected electrically to the aircraft non-essential bus. This bus is designed to drop off-line in the case of failure of either engine.

A system annunciator light is provided to indicate the AC system is on. The annunciator light is located on the air conditioning system control panel.

The aft evaporator assembly is equipped with a thermister/electronic temperature control unit. The thermister probe is located in the core of the evaporator heat exchanger. This unit performs two functions. It acts to prevent coil freeze-up by limiting the minimum coil temperature to 32°F. It also acts as a cabin air temperature control system. The temperature control is located on the system switch panel. The system control is achieved by a valve which by-passes refrigerant when triggered by the electronic control.

An optional ground cooling features is available for precoding of the aircraft while parked on the ramp. This system consists of a six hp DC motor/compressor pallet which is mounted on the RH aft compartment. Window reflectors are provided to reduce the solar heat load on the cabin.

MODEL 412 & 412EP AIR CONDITIONER  
SYSTEM DESCRIPTION (cont.)

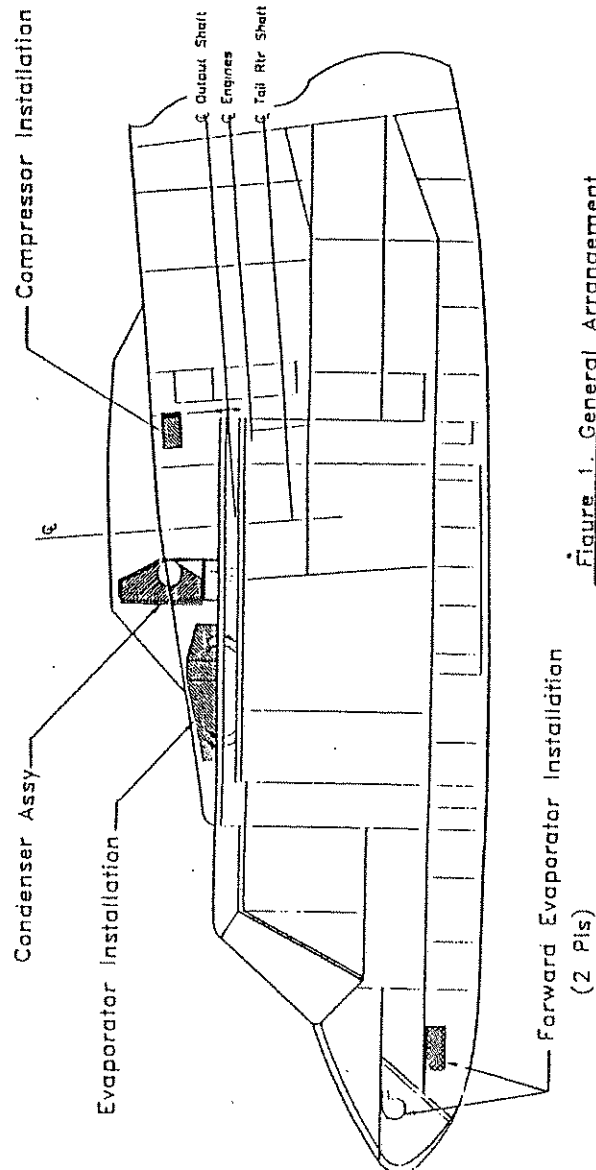


Figure 1. General Arrangement  
Cabin Air Conditioning System

MODEL 412 & 412EP AIR CONDITIONER  
SYSTEM DESCRIPTION (cont)

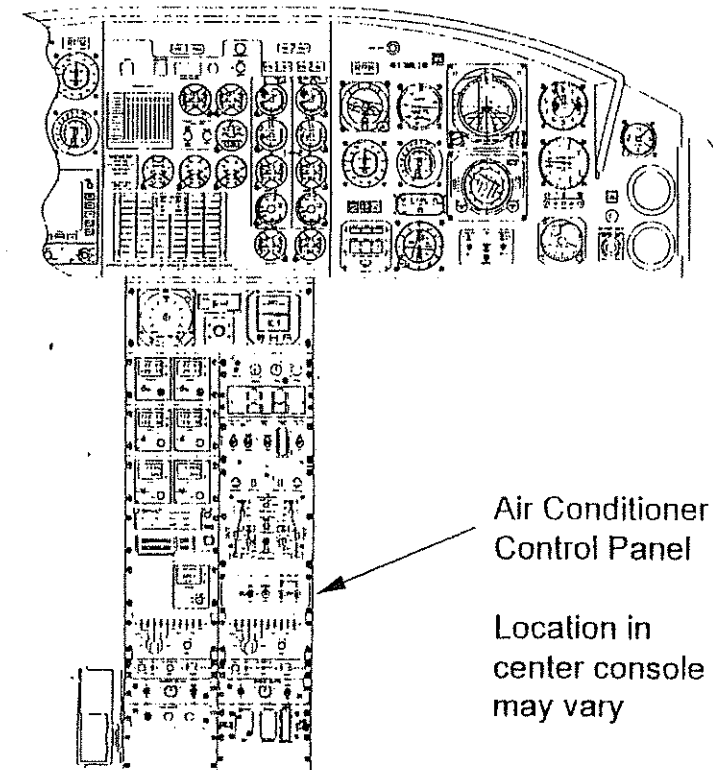


Figure 2. RH Instrument Panel/Center Console

MODEL 412 & 412EP AIR CONDITIONER  
SYSTEM DESCRIPTION (cont)

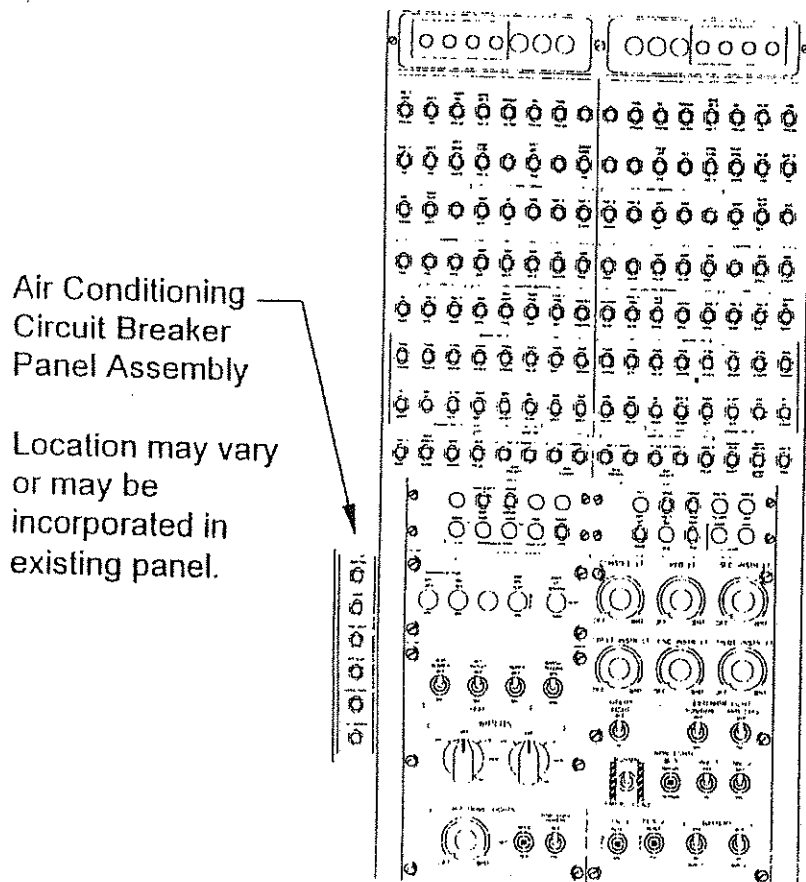


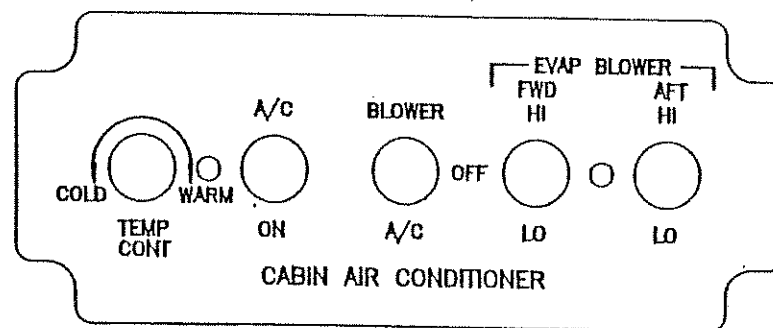
Fig 3. Overhead Panel

MODEL 412 & 412EP AIR CONDITIONER

SECTION 1  
LIMITATIONS

1.1 The Air Conditioning System shall be OFF during engine start -up and shut-down.

1.2 Placards & Markings



**AC Control Panel** - Located in center console. (see fig 2)

Ground Cooling System Operation

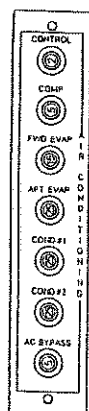
- Attach external power source to ground power plug. Electrical loading: 294 amps @ 28VDC
- Operate air conditioner using cockpit mounted control panel.
- Use window reflectors (supplied) for max cooling performance.
- System will not operate when engines are operating.

Optional – Located on ground cooling Pallet in RH aft compartment.

# MODEL 412 & 412EP AIR CONDITIONER

## SECTION 1 (cont) LIMITATIONS

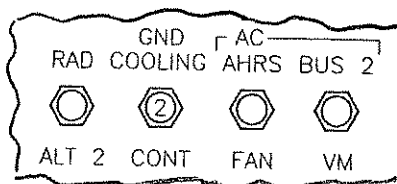
### 1.2 Placards & Markings



Air Conditioning  
Circuit Breaker  
Panel Assembly

Located in overhead  
switch panel.

Location may vary or  
may be incorporated in  
existing panel.



Located in RH overhead CB Panel



Located on Gnd Cooling Unit Relay Box

FAA APPROVED JULY 10, 1997  
REVISED MAY 15, 2000  
REVISED NOV 20 2002

# MODEL 412 & 412EP AIR CONDITIONER

## SECTION 2 PROCEDURES

ENGINE PRESTART CHECK  
A/C Switch - OFF

BEFORE TAKEOFF  
A/C Switch - ON as desired.  
Select HI/LO Blowers as desired.

IN FLIGHT OPERATIONS  
A/C Switch - ON as desired.  
Select HI/LO Blowers as desired.

DESCENT AND LANDINGS  
A/C Switch - ON as desired.  
Select HI/LO Blowers as desired.

FAA APPROVED July 10, 1997  
REVISED Dec 10, 1997

**MODEL 412 & 412EP AIR CONDITIONER**

**SECTION 3                      EMERGENCY PROCEDURES**

**A/C Switch OFF if any of the following occurs:**

Engine Failure.  
Smoke or fumes in the cabin.  
Engine over-temperature.  
Insufficient power.  
Generator failure.  
Unusual engine, airframe, or control system  
vibration.

**NOTE**

The AC system is wired to the aircraft non-essential bus. This bus, and thus the AC system, will automatically drop "off line" in case of failure of either engine or generator. Power can be manually restored to the non-essential bus and air conditioning system, if sufficient power is available.

Lack of cooling may be an indication of loss of refrigerant. Turn A/C to OFF, or BLOWER to preclude damage to the compressor.

**MODEL 412 & 412EP AIR CONDITIONER**

**SECTION 4                      PERFORMANCE DATA**

When the A/C is operating, the performance data in the Flight Manual should be reduced as shown below.

**RATE OF CLIMB**

$\Delta R/C = 111 \text{ ft/min}$

**HOVER CEILING GROSS WEIGHT DEGRADATION**

Add 150 lbs. to the hover ceiling chart to determine hover ceiling when the air conditioner is operating.

To achieve the take-off and landing performance shown in the Flight Manual the air conditioner must be OFF.

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**MODEL 412 7 412EP AIR CONDITIONING SYSTEM  
DESCRIPTION (continued)**

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MODEL 412 & 412EP AIR CONDITIONER  
SYSTEM DESCRIPTION (cont.)

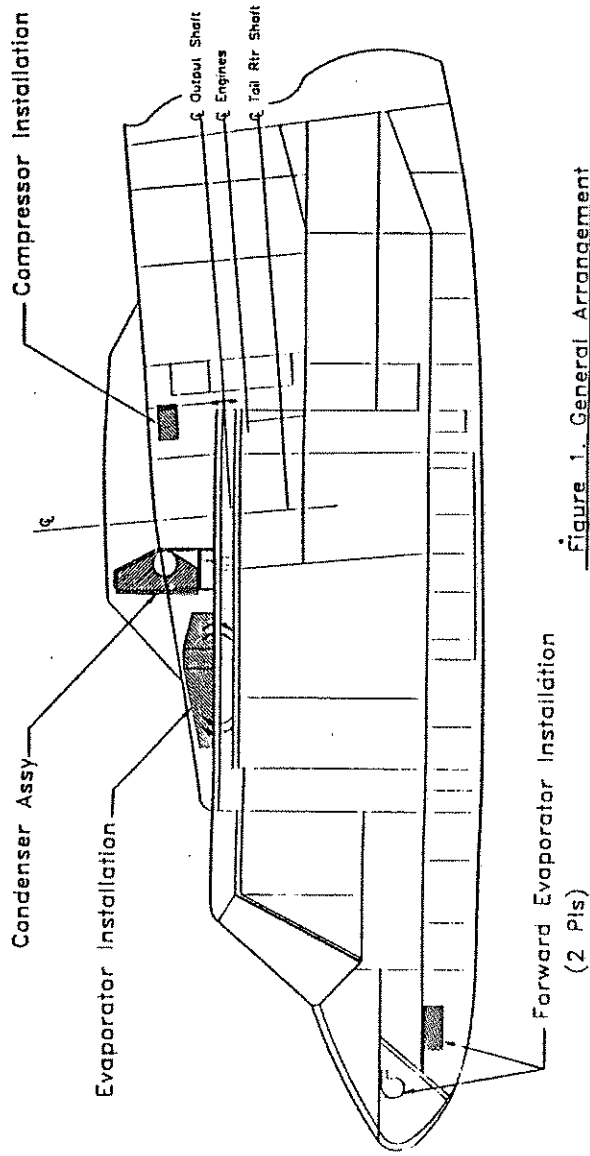


Figure 1. General Arrangement  
Cabin Air Conditioning System

MODEL 412 & 412EP AIR CONDITIONER  
SYSTEM DESCRIPTION (cont)

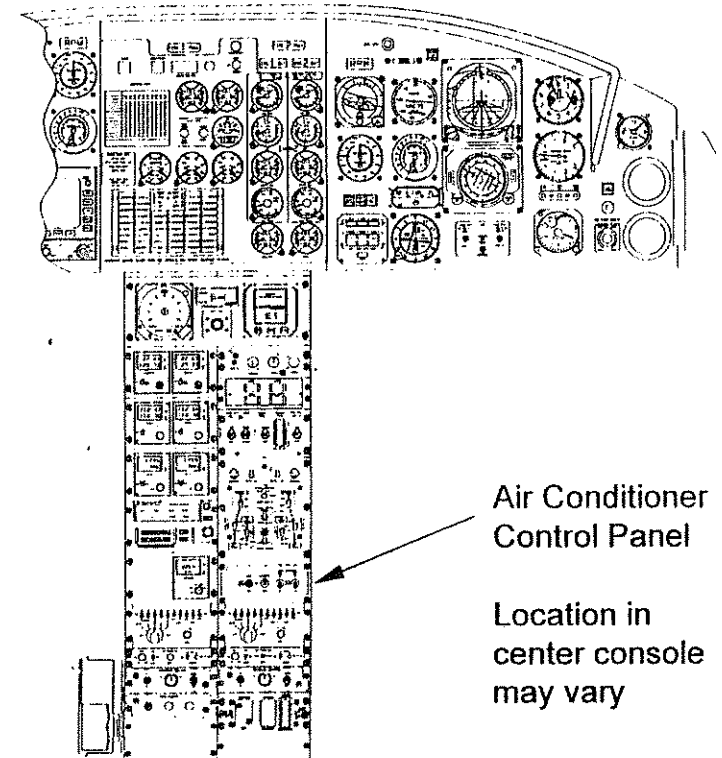
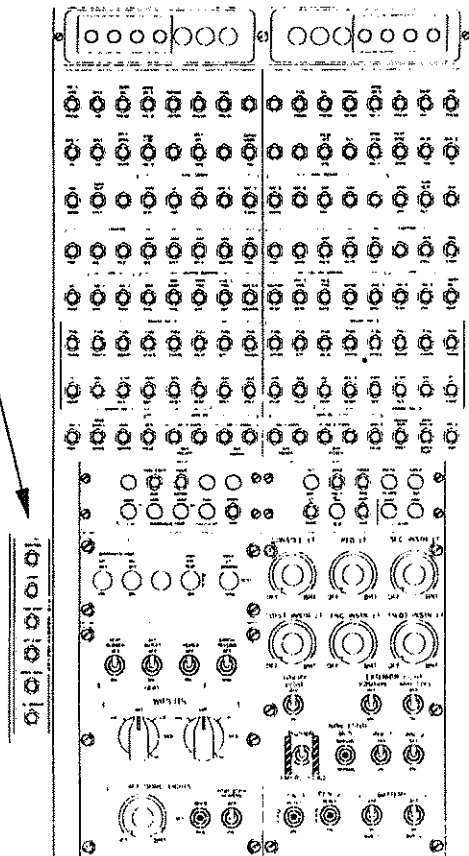


Figure 2. RH Instrument Panel/Center Console

**MODEL 412 & 412EP AIR CONDITIONER  
SYSTEM DESCRIPTION (cont)**

Air Conditioning  
Circuit Breaker  
Panel Assembly

Location may vary  
or may be  
incorporated in  
existing panel.



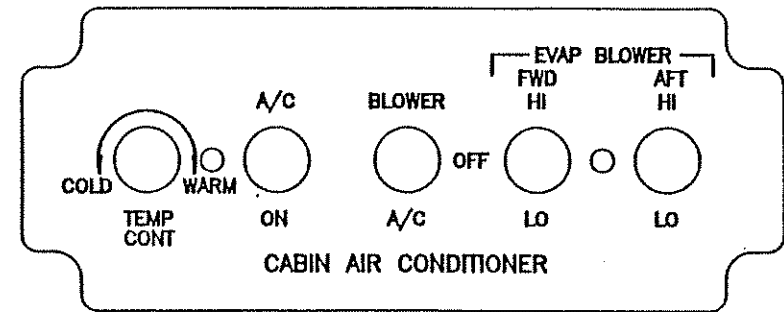
**Fig 3. Overhead Panel**

**MODEL 412 & 412EP AIR CONDITIONER**

**SECTION 1  
LIMITATIONS**

**1.1** The Air Conditioning System shall be OFF during engine start -up and shut-down.

**1.2 Placards & Markings**

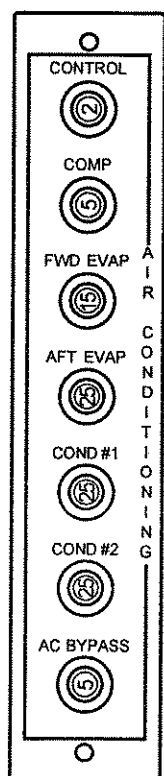


**AC Control Panel - Located in center console. (see fig 2)**

MODEL 412 & 412EP AIR CONDITIONER

SECTION 1 (cont)  
LIMITATIONS

1.2 Placards & Markings



Air Conditioning  
Circuit Breaker  
Panel Assembly

Located in overhead  
switch panel.

Location may vary or  
may be incorporated in  
existing panel.

MODEL 412 & 412EP AIR CONDITIONER

SECTION 2  
PROCEDURES

ENGINE PRESTART CHECK

A/C Switch - OFF

BEFORE TAKEOFF

A/C Switch - ON as desired.

Select HI/LO Blowers as desired.

IN FLIGHT OPERATIONS

A/C Switch - ON as desired.

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DESCENT AND LANDINGS

A/C Switch - ON as desired.

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**MODEL 412 & 412EP AIR CONDITIONER**

**SECTION 3                      EMERGENCY PROCEDURES**

**A/C Switch OFF if any of the following occurs:**

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Unusual engine, airframe, or control system  
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Lack of cooling may be an indication of loss of refrigerant. Turn A/C to OFF, or BLOWER to preclude damage to the compressor.

**MODEL 412 & 412EP AIR CONDITIONER**

**SECTION 4                      PERFORMANCE DATA**

When the A/C is operating, the performance data in the Flight Manual should be reduced as shown below.

**RATE OF CLIMB**

$\Delta R/C = 111 \text{ ft/min}$

**HOVER CEILING GROSS WEIGHT DEGRADATION**

The power drain to the air conditioner includes the compressor power requirement.

DW = 150 lbs.

To achieve the take-off and landing performance shown in the Flight Manual the air conditioner must be "OFF".