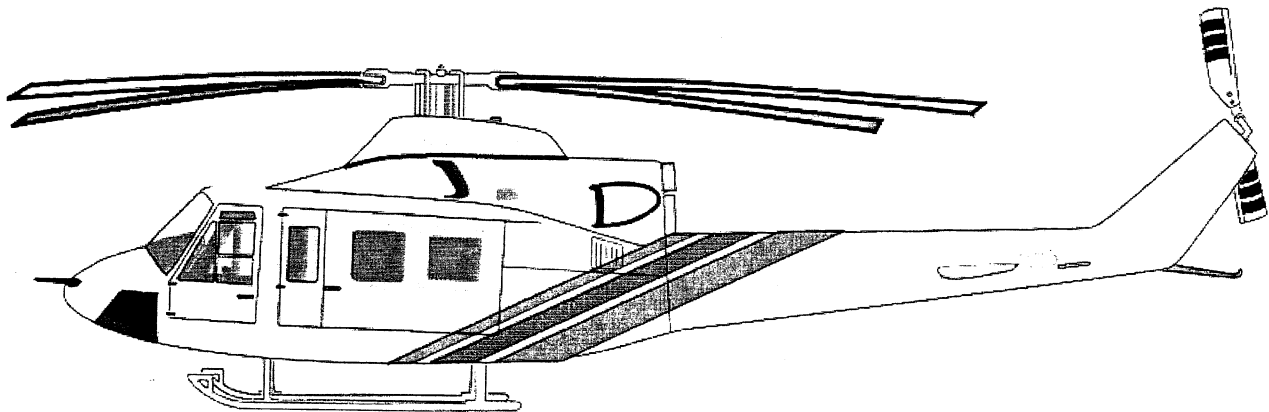


**AIR COMM CORPORATION
3300 AIRPORT ROAD
BOULDER, CO. 80301**

**DOCUMENTATION FOR THE INSTALLATION OF THE
BELL MODEL 412 CABIN AIR CONDITIONING SYSTEM**

WITH GROUND COOLING OPTION



INSTALLATION DOCUMENTATION 412AC-210D

LIST OF EFFECTIVE PAGES

LIST OF REVISIONS

Revision 0 (Original Issue)...January 11, 2002
Revision 1 New FMS.....December 2, 2002

LIST OF EFFECTIVE PAGES

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CHAPTER 0 INTRODUCTION

This document contains information, which is required for the installation and operation of the Air Comm Corporation's air conditioning system installed in the bell 412 series helicopter. After completion of the installation of the air conditioner system the Weight & Balance Information, Flight Manual Supplement, and the Supplemental Type Certificate must be removed from this document and placed with the appropriate existing aircraft documents.

1. SCOPE

The scope of this document encompasses the general procedures and reference documentation necessary to install the Air Comm Corporation air conditioning system in the Bell 412 series helicopter.

2. PURPOSE

The purpose of this document is to provide the aircraft mechanic in the field the necessary information and documentation to install the air conditioning system.

3. ARRANGEMENT

This manual is arranged by chapters, which are broken down into paragraphs and sub-paragraphs. All of the chapters and paragraphs are listed in the front of this manual in the Table of Contents, and are further identified by their individual page number.

4. APPLICABILITY

This document is applicable to Bell Helicopter models 412, 412SP, 412HP, and 412EP that are equipped with the Air Comm Corporation kit number 412AC-106-1, or 412AC-106-2 air conditioner system.

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CHAPTER 1 GENERAL INSTALLATION PROCEEDURE & REFERANCE DOCUMENTS LIST

1. GENERAL INSTALLATION PROCEEDURE

This section is intended to supplement the information contained on the installation drawings. All details and notes contained on the drawings should be reviewed carefully. As instructions for installation are provided on the installation drawing where appropriate, and are not repeated in this document.

It will be necessary to remove the transmission cowlings, the main cabin headliner, Chin bubbles, and the lower nose avionics access panel to facilitate the installation of this kit.

The system components and associated hardware are packaged separately. Prior to beginning the installation it is recommended that the hardware be inventoried and placed in separate (labeled) boxes to prevent mixing.

Care should be taken to prevent contamination of the air conditioner system! All plugs on the plumbing assemblies and system components should *not* be removed until just prior to installation of the part. The exception to this procedure is the installation of the receiver / drier bottle. The receiver / drier should be left capped and not installed until just prior to servicing the system with refrigerant. This prevents the desiccant inside the bottle from becoming saturated with water.

2. REFERANCE DOCUMENTS LIST

The documents that are listed below are General Arrangement and Installation drawings packages. While these drawings are primarily for the installation of the air conditioner system, they are of equal importance in aiding the operator and mechanic in the field to insure the continued airworthiness of the system.

1. Dwg. 412AC-106-1 / -2 General Arrangement – Bell Model 412, 412EP, 412HP, and 412SP Air Conditioning system with Temperature Control.
2. Dwg. 412AC-304 Compressor Installation.
3. Dwg. 412AC-510 Plumbing Installation.
4. Dwg. 412AC-600 Forward Evaporator Installation.
5. Dwg. 412AC-604 Aft Evaporator Installation.
6. Dwg. 412AC-712 Condenser Installation.
7. Dwg. 412AC-810 Electrical Installation.
8. Dwg. 412AC-910 Ground Cooling Module.

**CHAPTER 2
WEIGHT & BALANCE INFORMATION**

This page must be removed and placed with the appropriate existing aircraft documents.

Weight breakdown – Bell 412 series air conditioning system with Ground Cooling
Option:
Dwg. 412AC-106-1 / -2

Weight & Balance

<u>Item</u>	<u>Wt (lbs)</u>	<u>Arm (in)</u>	<u>M (in-lb.)</u>
Total (-1 / -2 installation)	238.7	137.5	32832

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CHAPTER 3
FLIGHT MANUAL SUPPLEMENT

1. FLIGHT MANUAL SUPPLEMENT

The following document must be removed and placed with the appropriate existing aircraft documents.

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AIR COMM CORPORATION
 3300 AIRPORT ROAD
 BOULDER, COLORADO 80301

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

FAA APPROVED
 SUPPLEMENT

Log of Pages

FLIGHT MANUAL
 MODEL 412 & 412EP

CABIN AIR CONDITIONING SYSTEM

Log of Pages			
Original.....	0		
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			

FAA APPROVED Jul 10, 1997

**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 thermostat/electronic temperature control unit. The thermostat 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 feature 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.)

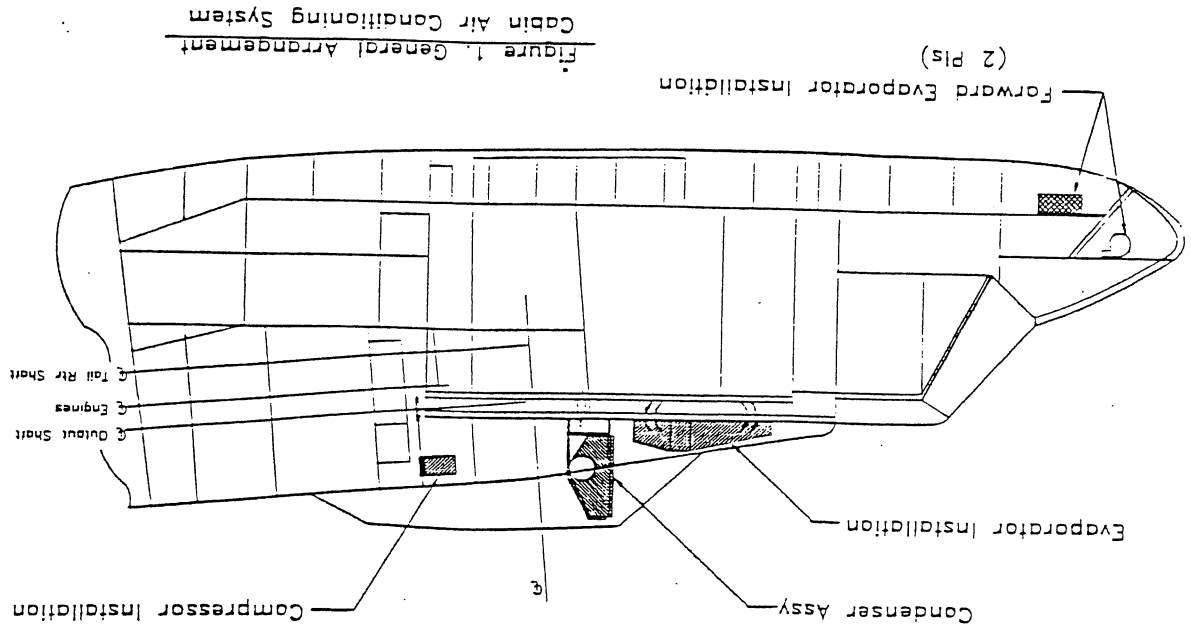


Figure 1. General Arrangement
Cabin Air Conditioning System

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

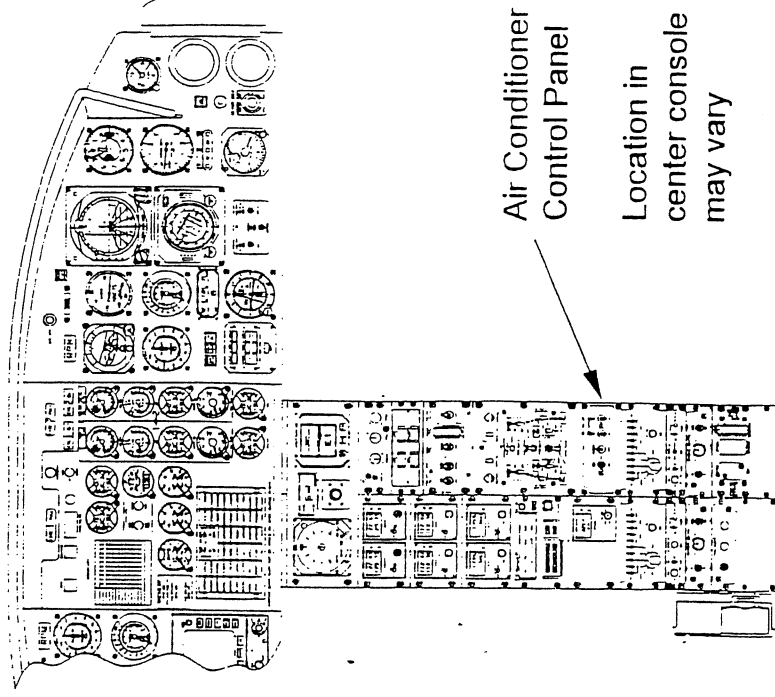


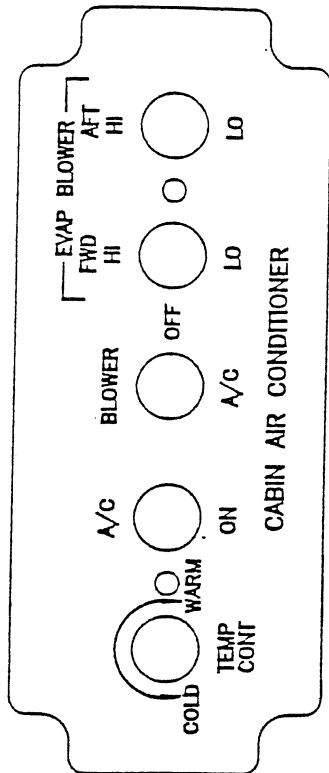
Figure 2. RH Instrument Panel/Center Console

MODEL 412 & 412EP AIR CONDITIONER

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)

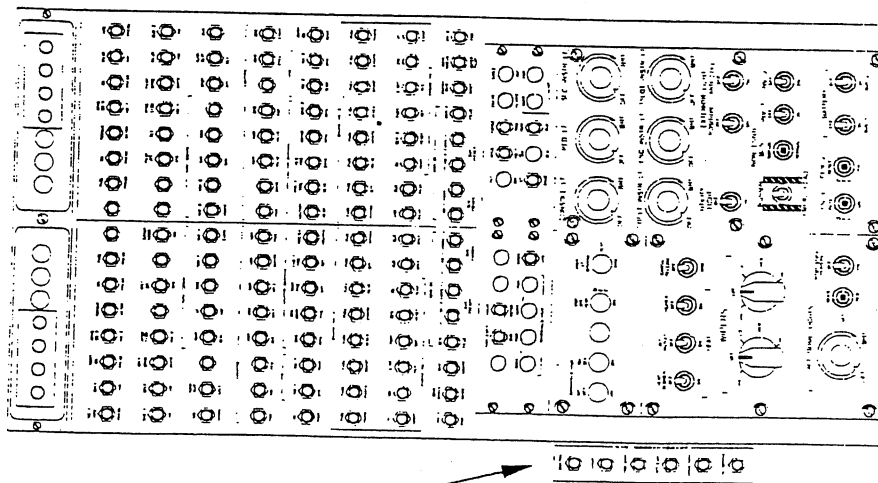
- Ground Cooling System Operation
- Attach external power source to ground power plug. Electrical loading: 294 amps @ 28VDC
 - Operate air conditioner using cockpit mounted control panel.
 - Use window reflectors (supplied) for max cooling performance.
 - System will not operate when engines are operating.

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

REVISÉ NOV 29 2002

FAA APPROVED Jul 10, 1997

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

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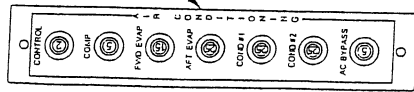
Jul 10, 1997

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MODEL 412 & 412EP AIR CONDITIONER

SECTION 1 (cont) LIMITATIONS

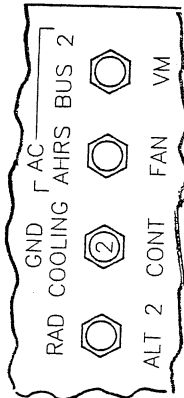
1.2 Placards & Markings



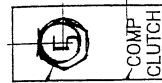
Air Conditioning Circuit Breaker Panel Assembly

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 29 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

MODEL 412 & 412EP AIR CONDITIONER

SECTION 3 EMERGENCY PROCEDURES

SECTION 4 PERFORMANCE DATA

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.

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

RATE OF CLIMB

Δ R/C = 111 ft/min

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.

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".

CHAPTER 4
SUPPLEMENTAL TYPE CERTIFICATE

1. SUPPLEMENTAL TYPE CERTIFICATE

The following document must be removed and placed with the appropriate existing aircraft documents.

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Supplemental Type Certificate

Number SR00066DE

This certificate, issued to **Air Comm Corporation**

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 29 of the Federal Aviation Regulations.

Original Product—Type Certificate Number: H4SW
 Make: Bell Helicopter Textron
 Model: 412, 412EP

Description of the Type Design Change:

Installation of vapor cycle cockpit/cabin air conditioning system in accordance with Air Comm Corp. Master Drawing List Report DL-412AC, Rev. E, dated July 2, 1997, or later FAA approved revision.

Limitations and Conditions:

1. FAA Approved Rotorcraft Flight Manual Supplement 412AC-100, dated July 10, 1997, or later FAA approved Revision is required for Air Comm Corp. Drawing 412AC-100 configuration (No temperature control).
2. FAA Approved Rotorcraft Flight Manual Supplement 412AC-104, dated July 10, 1997, or later FAA approved Revision is required for Air Comm Corp. Drawing 412AC-102 configuration (with temperature control).
3. Approval of this change in type design applies to the above model rotorcraft only. This approval should not be extended to aircraft designated by the attached model list on which previously approved modifications are incorporated unless it is determined that the interrelationship between this change and any of those other previously approved modifications, including changes in type design, will introduce no adverse effect upon the airworthiness of that rotorcraft.
4. A copy of this certificate must be maintained as part of the permanent records for the modified rotorcraft.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: July 23, 1993

Date reissued:

Date of issuance: December 13, 1993

Date amended: 7/29/94, 12/22/94; July 10, 1997



By direction of the Administrator

[Signature]
 RONALD F. MAY (Signature) Manager
 Denver Aircraft Certification Office
 Northwest Mountain Region, Denver, Colorado
 (Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.