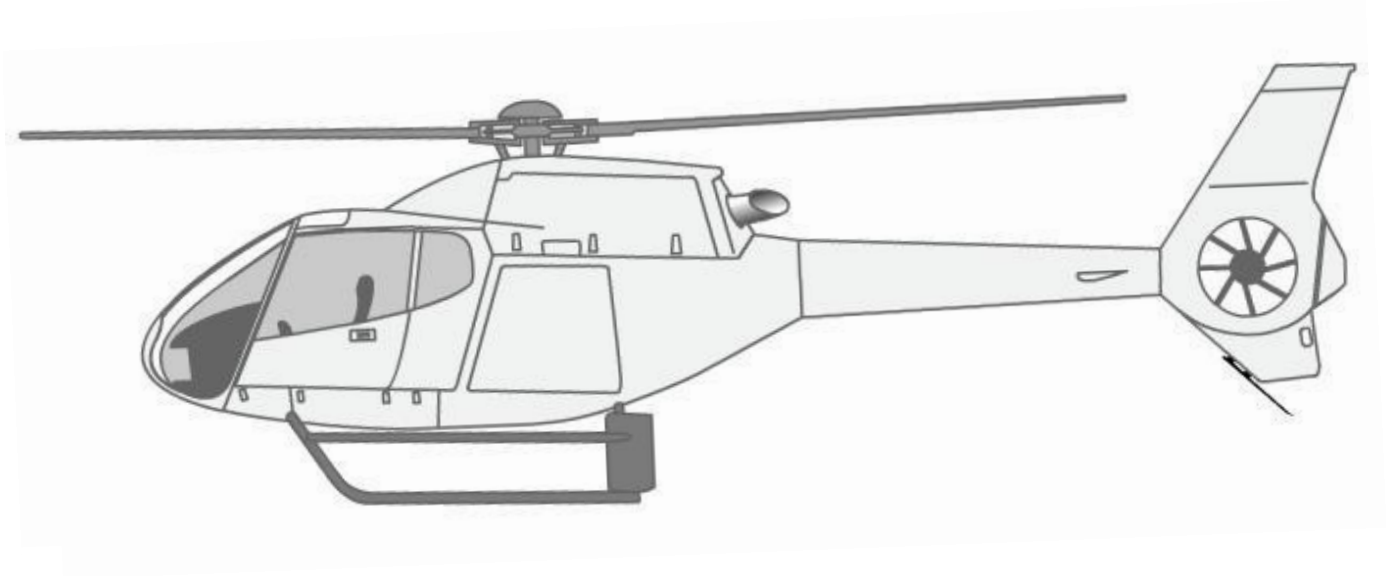


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INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
AIRBUS EC120B
AIR CONDITIONING SYSTEM




**THIS HANDBOOK INCLUDES THE MAINTENANCE INFORMATION
REQUIRED TO BE AVAILABLE BY FAR PART 27**

RESTRICTED DISCLOSURE NOTICE

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RECORD OF REVISIONS

Rev	Date	Description of Change	Approval
0	6/21/2002	Original Issue	N/A
1	10/14/03	Added new placards Page 4-1, updated drawings pg., 7-8, 7-9, added Appendix B.	N/A Prepared by GP
2	07/21/06	Added views of new compressor drive system Pg. 3-1 thru 3-4, 7-3.	N/A Prepared by JB
3	10/20/14	General re-format updates throughout. Pg 7: limitations statement update. Pg 10-12: Inspection procedure updates. Pg 19: Added views of forward evap. Pg 21: Added views of hi-output condenser. Pg 20, 21 & 23: Servicing updates throughout. Pg 33: Added new parts to spares list. Pg 43: Added info to remove/install hi-output condenser. Pg 55-58: Added new electrical diagrams. Pg. 59 & 60: updated plumbing diagrams.	Prepared By: <u>Jim Byrnes</u> 10/20/14 Signature Date ACC Approval: <u>Keith Pharris</u> 10/20/14 Signature Date FAA Acceptance (Major Change): <u>Matt Bryant</u> 10/27/14 Signature Date
4	3/4/2015	Pg 3: updated binary switch values. Pg12: added Sec I conn. inspection. Pg 26: added note to clarify placard wording. Pg 29,30: updated oil amt, change to Ultra PAG oil. Pg 35: changed fitting tightening method to a position reqmt. Pg40-47: several clarifying changes for installing & replacing components.	Prepared By: <u>J Byrnes</u> 3/4/2015 Signature Date ACC Approval: Signature Date FAA Acceptance (Major Change): N/A – Meets Minor Change <u>Agreement MR-100-134</u> 3/4/2015 Signature Date
5	1/27/2016	Belt tension force & deflection values changed to match install drawing values	Prepared By: <u>J Byrnes</u> 1/28/2016 Signature Date ACC Approval:  1/28/16 Signature Date FAA Acceptance (Major Change): N/A – Meets Minor Change <u>Agreement MR-100-134</u> 1/28/2016 Signature Date

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CHAPTER 1

INTRODUCTION

1. Scope

The scope of this manual encompasses scheduled and unscheduled maintenance procedures for continued airworthiness of Air Comm Corporation air conditioning system installed in Airbus EC120B series helicopter.

2. Purpose

The purpose of this manual is to provide aircraft field mechanic necessary information to maintain the air conditioning system.

3. Arrangement

This manual is arranged by chapters which are broken down into paragraphs and subparagraphs. All 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 manual is applicable to Airbus Helicopter model EC120B equipped with Air Comm Corporation kit number EC120-200 air conditioner system.

5. Definitions

The following terms are provided to give a ready reference to the meaning of some words contained within this manual. These definitions may differ from those given by a standard dictionary.

- A. Ambient air temperature:** Temperature of the air surrounding a person or object.
- B. Charging station:** An air conditioning system service unit which is capable of evacuating and charging an air conditioner.
- C. Cold:** The absence of heat.
- D. Condensation:** The process of changing a gaseous phase into a liquid.
- E. Desiccant:** Material used in a receiver/drier bottle, designed to absorb moisture from refrigerant.
- F. Evaporate:** To change from a liquid into a vapor.
- G. Heat load:** The amount of heat which the air conditioner is required to remove from the aircraft cabin.
- H. Inches of mercury:** A measurement of pressure, normally used for pressures below atmospheric, one inch of mercury is equal to approximately one half pound per square inch.
- I. Pressure, ambient:** The pressure of the air surrounding a body, normally measured in pounds per square inch, or PSIG.
- J. Refrigerant:** A fluid which is used in an air conditioning system to absorb heat from the cabin and carry it outside the helicopter where it can be transferred to the outside air.
- K. Relative humidity:** The ratio of the amount of water vapor in the air to the amount of water vapor required to saturate the air at the existing temperature.
- L. Thermostat:** An air conditioning control which senses the temperature of the evaporator coil and causes the system to cycle or by-pass to maintain the proper

temperature of cooling air.

M. Vacuum: A negative pressure, or pressure below atmospheric; it is usually expressed in inches of mercury.

N. Vapor: The gas formed by boiling or evaporating a liquid. A gas at a temperature below its critical temperature.

6. Abbreviations

InHg:	Inches of Mercury
Lbs:	Pounds
Oz:	Ounces
Psig:	Pounds per Square Inch (gauge)
Gr:	Grams
Kg:	Kilograms
Kg/cm:	Kilograms per Centimeter
ml:	Milliliters
mm:	Millimeters
Nm:	Newton-meters

7. Precautions

The following precautions are found throughout this manual, and will vary depending on the seriousness of the Hazard or Condition:

WARNING: May be a maintenance procedure, practice, condition, etc., which could result in personal injury or loss of life.

CAUTION: May be a maintenance procedure, practice, condition, etc., which could result in damage or destruction of equipment.

NOTE: May be a maintenance procedure, practice, condition, etc., or a statement which needs to be highlighted.

8. Units of Measure

All measurements contained within this manual are given in United States standard measurement, followed by metric conversion in parentheses.

9. Information Essential to Continued Airworthiness

This manual provides information which is required for operation and maintenance of the Air Comm air conditioning system installed in the Airbus model EC120B series helicopter. After completion of the air conditioner installation this document must be placed with the appropriate existing aircraft documents.

10. Reference Documents

The approval basis of the system covered by this ICA is Supplemental Type Certificate SR00491DE.

11. Distribution

This document is to be placed with the aircraft maintenance records at the time of system installation.

Changes will be made to this document in response to safety-of-flight or non-safety-of-flight issues. Any changes will result in a revision to this document. Revisions shall be noted in the Record of Revisions and on the List of Revisions of this manual.

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In addition to the revision of the manual, those changes categorized as safety-of-flight shall have a Service Bulletin issued to the operator providing the necessary information to comply with or to correct the safety-of-flight issue.

Replacement or revised copies of this manual can be obtained by contacting:

Air Comm Corporation Service Department
1575 W. 124th Ave.
Westminster, CO.80234
Phone No. 303-440-4075 Fax No. 303-440-6355
Email: Service@aircommcorp.com

12. Changes to Instructions for Continued Airworthiness

Changes made to a line or paragraph of this document will be indicated by a vertical bar in the right hand margin. A complete page change will be indicated by a vertical bar next to the page number.

(Example: Any change will appear with a vertical bar next to that change). 

13. Air Conditioner Features

The refrigerant plumbing for this system installation incorporates insert O-Ring and TORQ LOK® fittings:

- A. INSERT O-RING FITTINGS: These fittings have formed ends that along with an O-Ring create a seal. Caution when assembling these fittings; care should be taken not to damage the O-Ring (i.e. nicking, splitting, or crushing, etc.). These fittings are signified by a green band placed around the outside diameter of the hose or tube they are utilized on. **Black O-Rings must not be used on these fittings.** (See Chapter 7 for torquing procedures).
- B. TORQ LOK® FITTINGS: These fittings have two flat mating surfaces that along with an O-Ring create a seal. Caution when assembling these fittings; care should be taken not to damage the O-Ring (i.e. nicking, splitting, or crushing etc.). **Green O-Rings must not be used on these fittings.** (See Chapter 7 for torquing procedures).

The system is also equipped with a Binary switch. This switch is designed to protect the system against over-pressure situations, or under-pressure in the event of refrigerant loss from the system. The switch also prevents the system from operating in low ambient temperatures below 50° F (10° C).

The switch operating pressures are:

Low Pressure	ON	Rising	2.1 ± 0.3Kg/Cm ²	30 ± 4.3psi
Low Pressure	OFF	Falling	2.0 ± 0.2Kg/Cm ²	28.4 ± 2.8psi
High Pressure	OFF	Rising	20.4 ± 2.0Kg/Cm ²	290±28.4psi
High Pressure	ON	Falling	14.0 ± 3.0Kg/Cm ²	200±42.7psi

14. Description of Vapor Cycle Air Conditioner and Installation

This section contains a general overview of a vapor-cycle air conditioning system and how it functions. This type of system operates in a closed loop, in which the refrigerant absorbs heat from the cabin and ejects it into the outside air. The refrigerant then returns to the cabin to repeat the cycle. The operation of the system is described below (See Figure 1-2).

Liquid refrigerant is contained in the receiver-drier under pressure from the compressor. The receiver-drier also filters the refrigerant through a material known as desiccant. The desiccant insures that the liquid refrigerant leaving this component is free of any water or other contaminants.

The low pressure (suction) line from the compressor is attached to the evaporator lines, and causes the refrigerant to be pulled out of the receiver-drier and through the expansion valves. The expansion valves serve as a controlled spray orifice, to spray the correct amount of refrigerant into the evaporator. This regulation of refrigerant allows the liquid to absorb the heat from the cabin air, and transform it to a vapor state just prior to its exiting the evaporator assembly.

The low pressure vapor is then drawn into the compressor where its pressure is raised to approximately 200 psig (14.06 kg/cm) and its temperature to around 200° F (93.3° C). This high pressure/high temperature vapor then travels to the condenser (a heat exchanger cooled by a flow of outside air). Heat is extracted from the refrigerant, and as it cools it condenses back into a liquid and flows into the receiver-dryer, ready to repeat the cycle.

15.Refrigeration Cycle Illustration

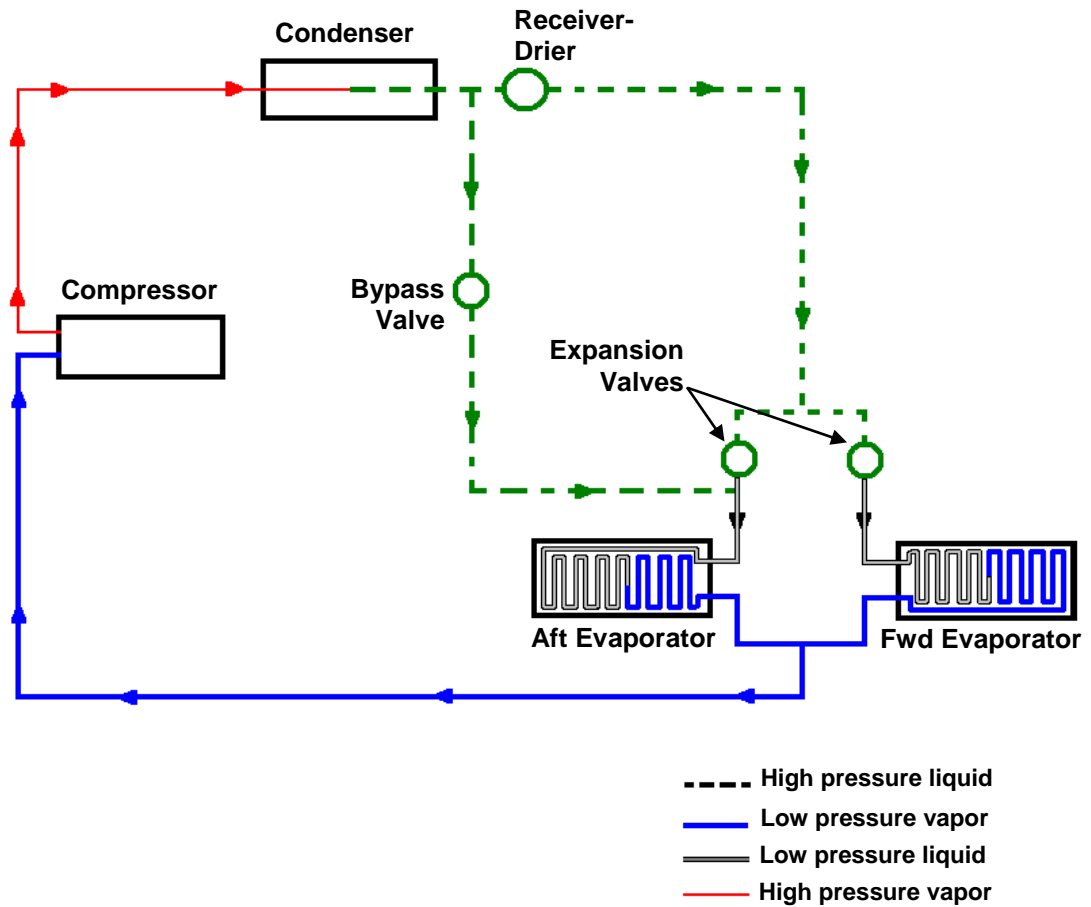


Figure 1-2 – Refrigeration Cycle Illustration

(NOTE: This illustration is provided as a reference only and may not match actual installation)

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CHAPTER 2
AIRWORTHINESS LIMITATION SECTION

1. Airworthiness Limitations

The Airworthiness limitations section is FAA approved and specifies inspections and other maintenance required under Sections 43.16 and 91.403 of Federal Aviation Regulations unless an alternative program has been FAA approved.

“No airworthiness limitations associated with this type design change.”

ACO Representative

DATE

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CHAPTER 3
INSPECTIONS AND OVERHAUL

1. Inspection Requirements

PERIODIC INSPECTIONS
(Hours are aircraft time)

Item	Annual	Every 25 Hours of Operation	Every 100 Hours of Operation	Special Inspection Information
Evaporator Blower Hi/Lo Operation	X		X	Check for operation
Condenser Blower Motor, Scoop Door Actuator	X		X	Check for operation
Forward & Aft Evaporator Blower motor	X		X	Check for operation in Hi and Lo settings
Compressor Drive Belt	X	X	X	Check belt tension, and for signs of excessive wear (example: Glazing, Cracks, and exposed fibers)
Air Conditioner Placards & Markings (see chapter 5)	X		X	Check for security and legibility
Air Conditioner Compressor Assembly	X	X	X	Check for operation, security of attaching hardware, and signs of oil or refrigerant leaks.
Air Conditioner Compressor Mount	X		X	Check mount for cracks, and security of the attaching hardware.
Plumbing and Fittings	X		X	Check for security and signs of oil or refrigerant leaks
Air Conditioner Compressor drive pulley (mounted to tail rotor drive shaft)	X		X	Check for security of attaching hardware.
Blower Electrical connectors	X			Visually inspect for signs of overheating. See sec. 2.1 below for details.

2. Inspection Procedures

NOTE

Refer to Chapter 4, Location and Access, to locate all aforementioned components for inspection.

A. Inspection of the Fwd and Aft Evaporator Blower Motors:

CAUTION

Fans are designed to operate with the resistance of the entire ducting system. Operation of the evaporator fans with any part of the distribution system removed may cause permanent damage to the fan motor.

WARNING

Fans may take up to 10 seconds to start after the switch is turned on. Keep hands away from fan wheels or blades whenever switch is in "Fan" or "A/C" positions.

At the Cockpit's A/C Control Panel place the AIR COND switch in the FAN position and verify:

- 1) That both the fwd and aft fans are activated and operating. Rotate speed control knobs to verify blowers increase and decrease speed accordingly.
- 2) That the condenser fan is non-operational.
- 3) That the compressor clutch is disengaged and the "AIR COND FAIL" message is not illuminated on the ADIU display.

Place the AIR COND switch in the OFF position and verify:

- 1) That both the fwd and aft fans deactivate.
- 2) That the compressor clutch remains disengaged and the "AIR COND FAIL" message is not illuminated on the ADIU display.

B. Inspection of the Condenser:

CAUTION

This procedure requires the temporary installation of a jumper wire across the terminals of the binary switch. This wire **MUST** be removed after this inspection is accomplished.

- 1) Visually inspect condenser air inlet for any obstructions or debris. Airflow in this area is critical for air conditioner operation.
- 2) Disconnect electrical leads from the binary switch and install a jumper between the leads.
- 3) Connect 28V ground power to the aircraft and place the A/C mode switch in the "A/C" position and verify:
 - a. Condenser fan is activated and operating. This fan should pull air into the aircraft through the condenser assembly.
 - b. Compressor clutch is engaged and the "AC COMP FAIL" message is not illuminated on the ADIU display.
 - c. Disconnect one of the electrical leads from the binary switch, remove jumper wire and verify that the "AC COMP FAIL" message is illuminated on the ADIU display.
- 4) Reconnect the electrical leads removed from the binary switch.

- 5) Place the A/C mode switch into the Off position and verify:
 - a. The condenser fan deactivates.
 - b. The compressor clutch disengages and all blowers deactivate.

C. Inspection of the Drive Belt:

- 1) Remove transmission cowling to gain access to compressor drive belt and visually inspect the A/C compressor drive belt for the following:
 - a. Any signs of excessive wear.
 - b. Any signs of glazing.
 - c. Any cracks or missing pieces.
 - d. Any exposed fibers.
- 2) Verify proper belt tension as shown in the illustration shown below. (See Figure 3-1)

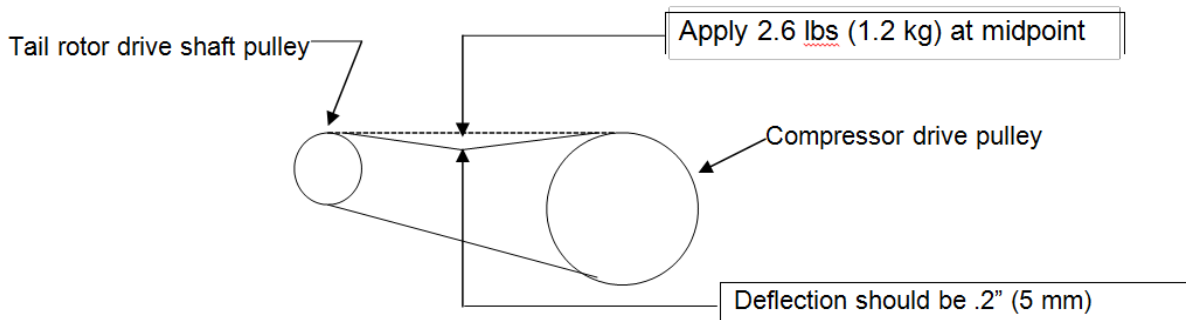


Figure 3-1 – Belt Tension Inspection

D. Inspection of Placards And Markings:

- 1) Check all air conditioner placards and markings for security and legibility.

E. Inspection of Compressor Assembly:

NOTE:

The air conditioning system must be serviced with refrigerant to perform this inspection.

- 1) Connect 28V ground power to the aircraft and place the A/C mode switch in the “A/C” position and verify that the Compressor clutch is engaged and the “AC COMP FAIL” message is not illuminated on the ADIU display.
- 2) Place air conditioner switch to the OFF position and verify that the Compressor clutch is disengaged and the “AC COMP FAIL” message is not illuminated on the ADIU display.
- 3) Visually inspect the compressor assembly for the following.
 - a. Security of all attaching hardware.
 - b. Signs of refrigerant or oil leaks.
 - c. Signs of excessive belt slippage or excessive heat.

F. Inspection of Compressor Mount Assembly:

- 1) Visually inspect compressor mount of any signs of the following:
 - a. Any cracks.
 - b. Security of attaching hardware.
 - c. Elongation of component mounting holes.

G. Inspection of A/C Refrigerant Plumbing:

- 1) Visually inspect for any signs of the following:
 - a. Refrigerant gas leaks.
 - b. Refrigerant oil leaks.
 - c. Chaffing or excessive corrosion.
 - d. Security of attaching hardware.

H. Inspection of Compressor Drive Quill (Part of the EC120 aircraft type design):

- 1) Inspect security of attaching hardware.

I. Inspection Of Blower Electrical Connectors (annual requirement)

- 1) Locate the Molex electrical connectors that power the aft evaporator and condenser blowers. See figures 4-1,2 and 4-9 thru 13. The connectors are at the interface between the blower harness and the aircraft harness and identified by their white plastic housing. Note that the evaporator blowers have an additional connector to inspect located several inches away from the harness connector.

NOTE: Aft evaporators supplied in late 2014 and newer use a gray plastic Deutsch connector and are not part of this inspection requirement.

- 2) De-mate each connector and inspect both mates for signs of overheating (discoloration or plastic deformation). If any signs of overheating of the housing are present the system must be rendered inoperative and the connector housing and contacts replaced before further operation. Contact ACC service dept. for replacement parts if necessary.
- 3) Installation & replacement of the wire harness electrical connectors for the evaporator and condenser blowers.

To avoid potentially serious overheating issues the Molex style connectors (identified by their white plastic housing) installed on the aircraft harness for connecting to the evaporator and condenser blowers must be installed per ACC procedure PPP23 and only using the appropriate terminal crimp tool. This document is available on the ACC website www.aircommcorp.com/customer-support/service-manuals/.

3. Component Overhaul / Replacement Schedule

Description	Part Number	Overhaul / Replacement Hours
Condenser & Forward / Aft Evaporator Blower Motor & Fan replacement	ES61136-12 Condenser Motor for pre-Aug2014 kits ES61082-3 Condenser Motor for post-Aug2014 kits ES61074-1 Fwd. / Aft Evaporator Motor NOTE: This P/N also applies as replacement part for ES61060-2 motors installed pre-2014	The blower manufacturer recommends TBO of 500 hrs. At the discretion of the operator it is acceptable to operate the blower until failure. A blower failure will result in a reduction in cooling, but no safety of flight issues are involved.

CHAPTER 4
LOCATION AND ACCESS

1. Location of Air Conditioner Features

Nomenclature	Description of Location
Air Conditioner Control Panel	The air conditioner control panel is located in the existing center pedestal panel between the pilot & co-pilot seats.
Optional Forward (Cockpit) Evaporator	The forward evaporator is mounted to the center pedestal forward of the instrument panel in the chin bubble area.
Forward Evaporator Blower Assemblies	The forward evaporator blower assemblies are integral to the Forward Evaporator Assembly. (See Forward "Cockpit Evaporator above)
Aft (Main Cabin) Evaporator	Is located on the main cabin roof area just forward of the Main Rotor Transmission.
Condenser Assembly	The condenser assembly is located on the aircraft belly below the passenger compartment.
Compressor	The compressor is mounted to the aft center section of the main transmission deck.
Refrigerant Plumbing	The refrigerant plumbing is routed from the compressor, to the area below the passenger compartment, and forward to the nose area. (As the refrigerant plumbing connects the Compressor, Condenser, and Evaporators, it may at times be necessary to access these components through several panels.
Servicing Ports	The Service Ports for this system are located in the transmission compartment on aircraft.

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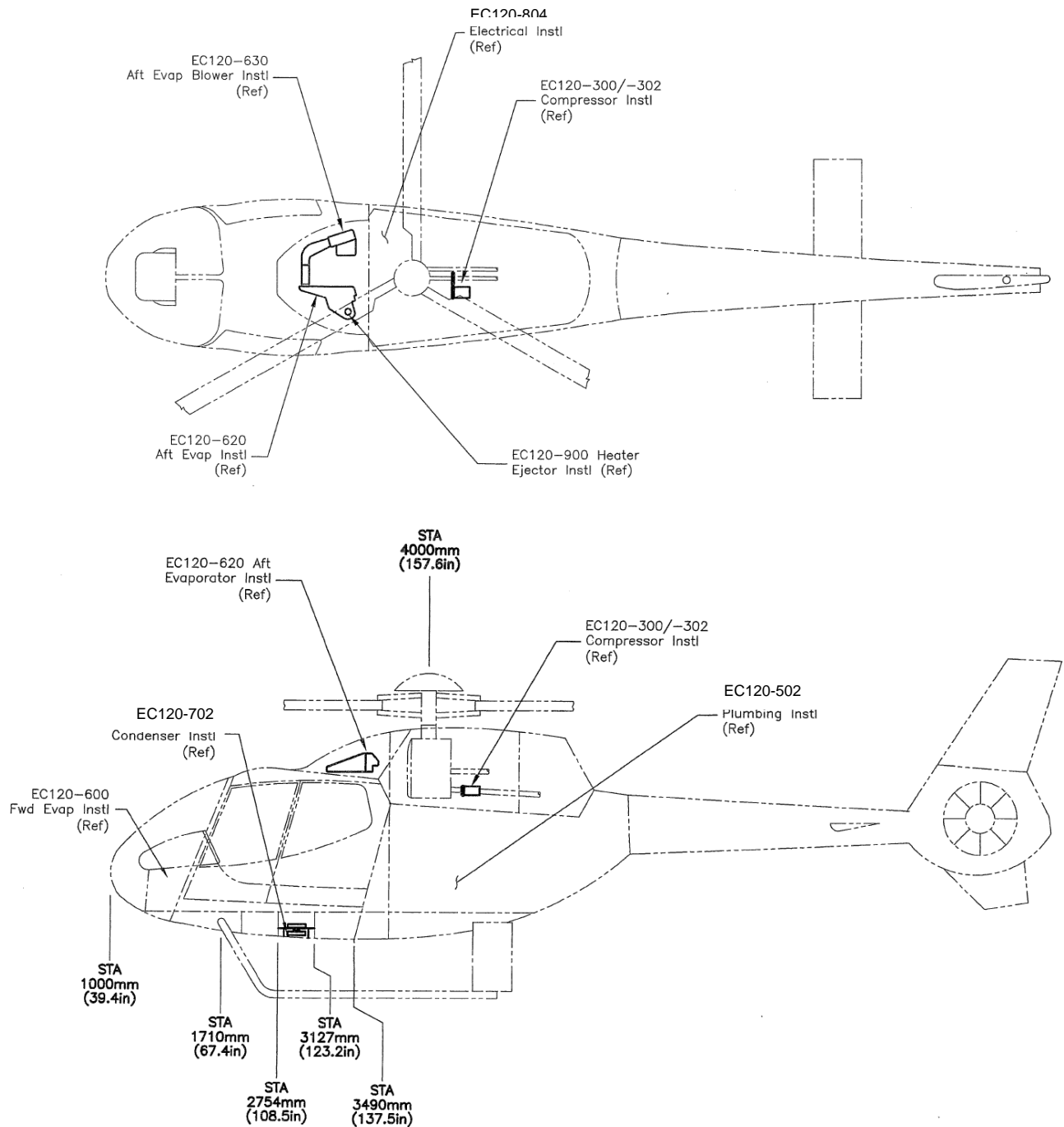


Figure 4-1 Layout of Air Conditioner Features

2. Compressor Installation (view looking down and drive pulley looking fwd.)

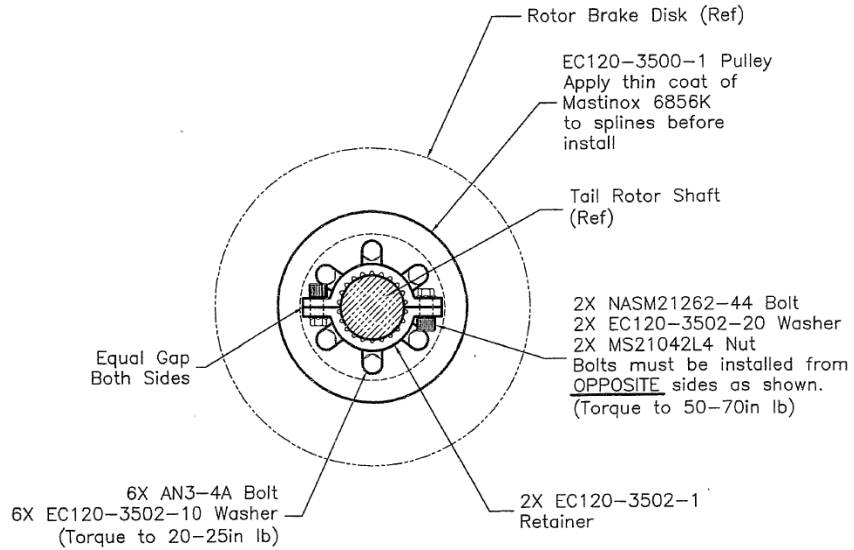
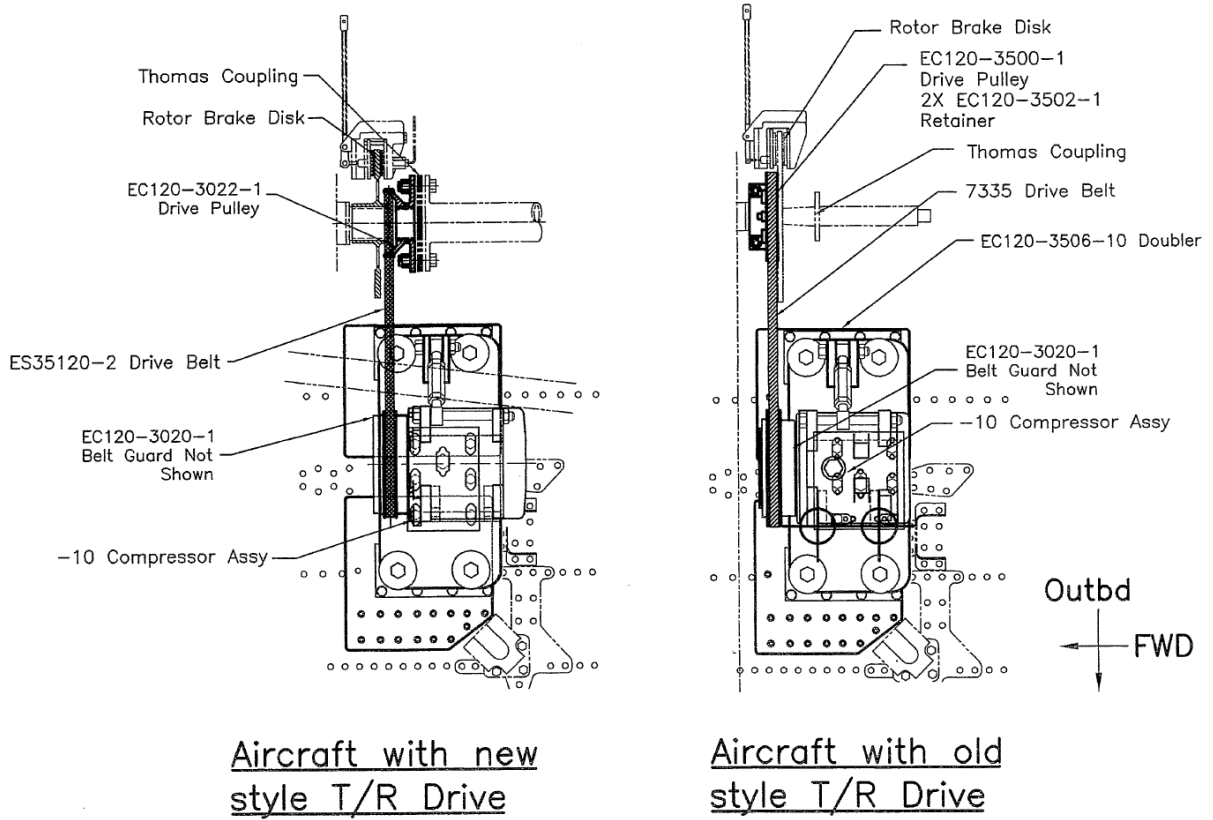


Figure 4-2 Compressor Installation details

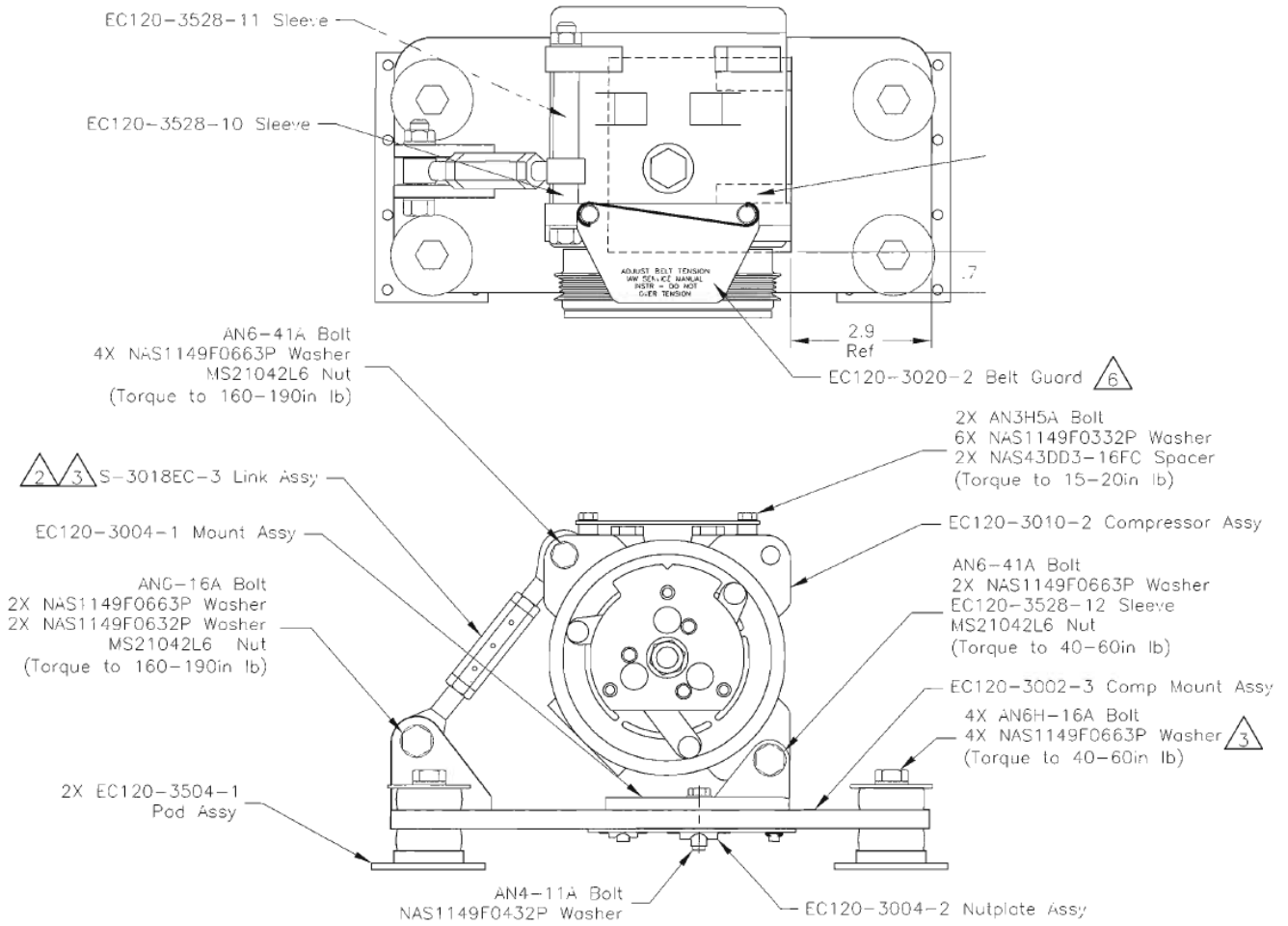


Figure 4-3 Compressor Installation details

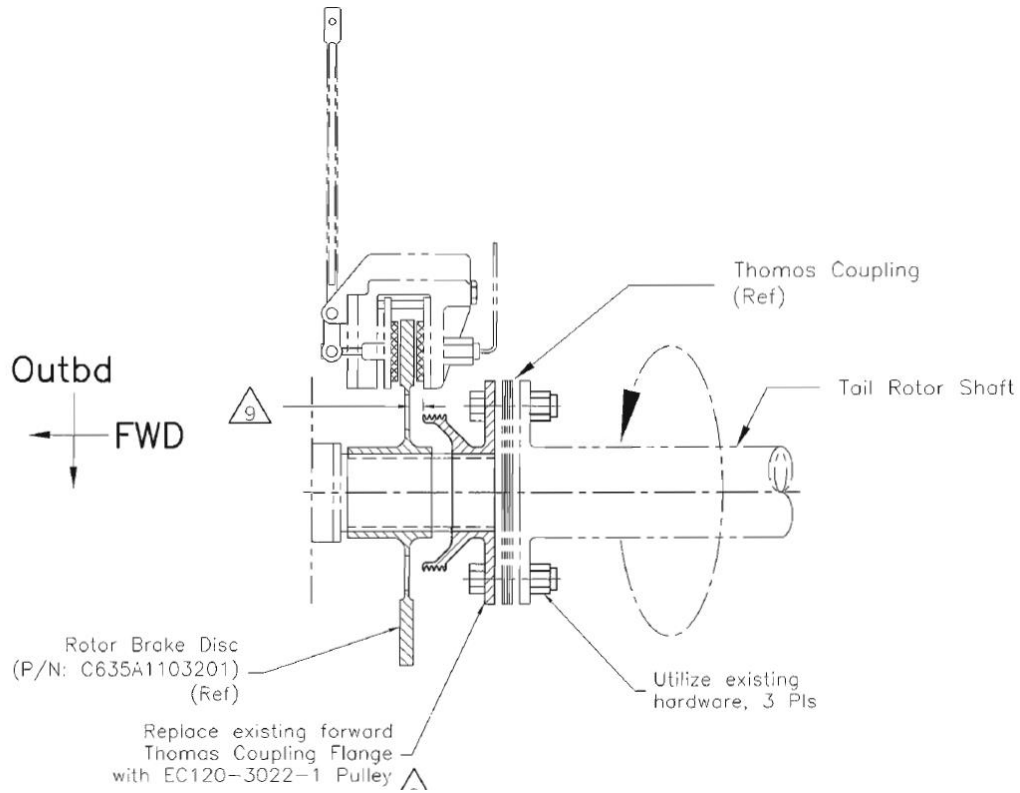


Figure 4-4 Compressor Drive Pulley details

3. Aft Evaporator Installation

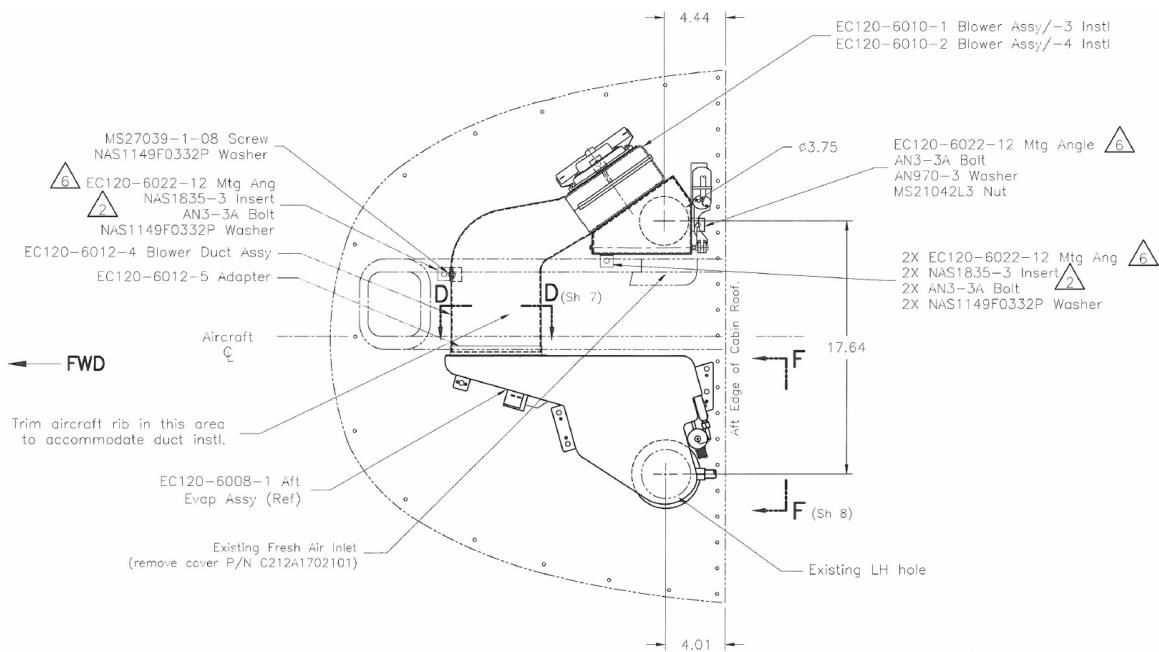


Figure 4-5 Aft Evaporator, looking down

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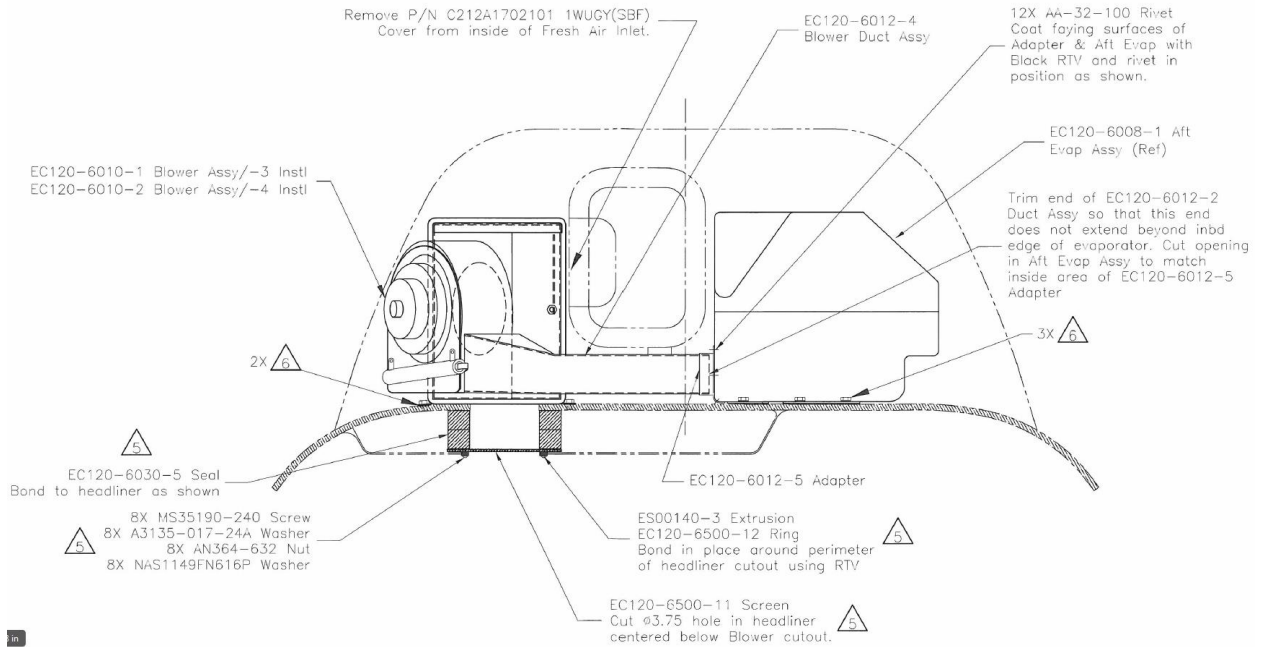


Figure 4-6 Aft Evaporator, looking aft

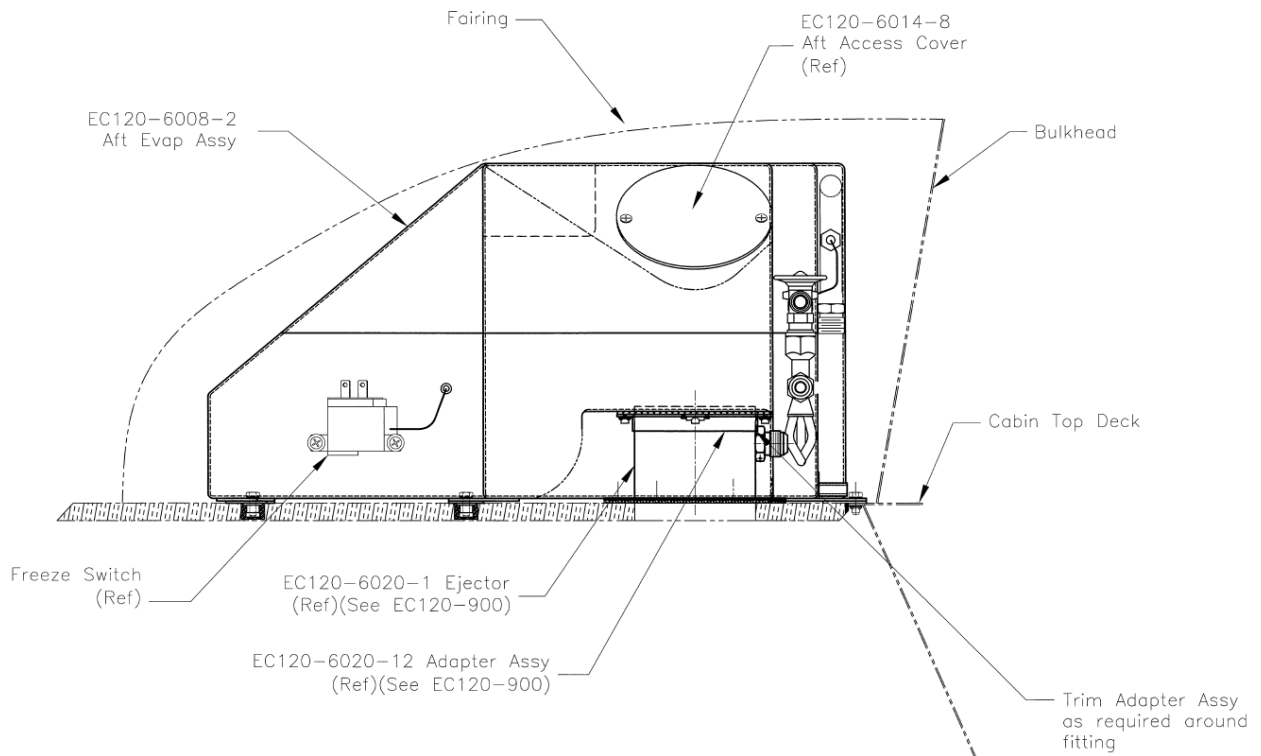


Figure 4-7 Aft Evaporator, looking inboard

4. Forward Evaporator Installation

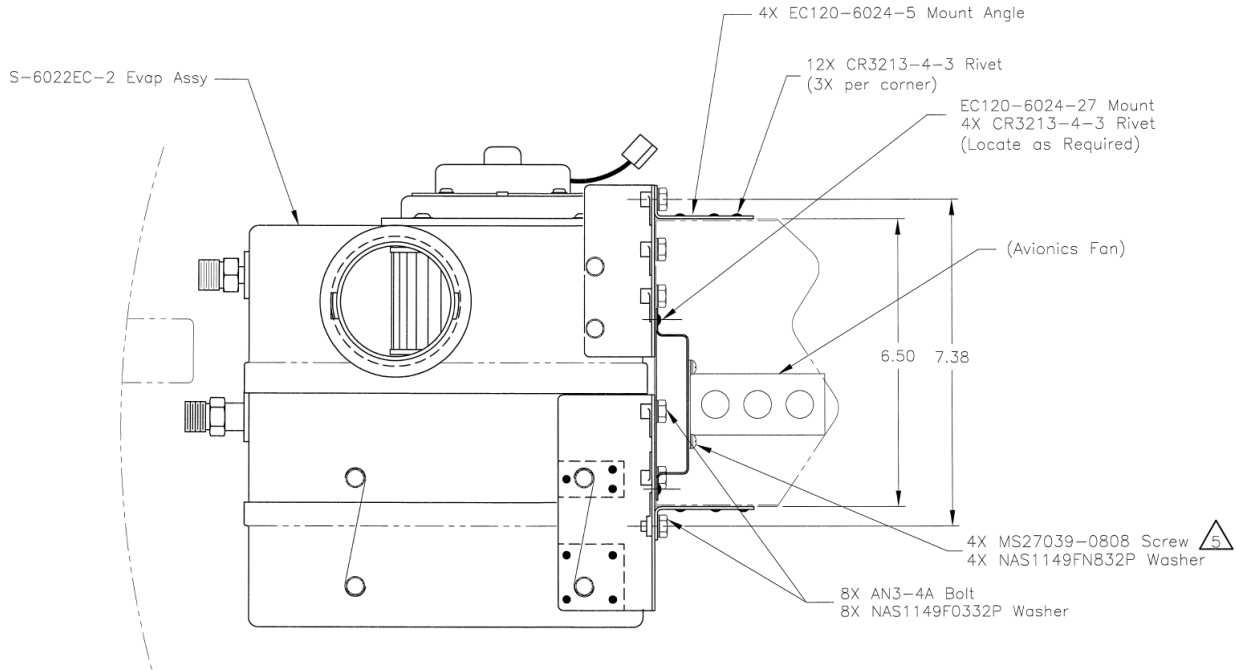


Figure 4-8 Forward Evaporator, looking Down

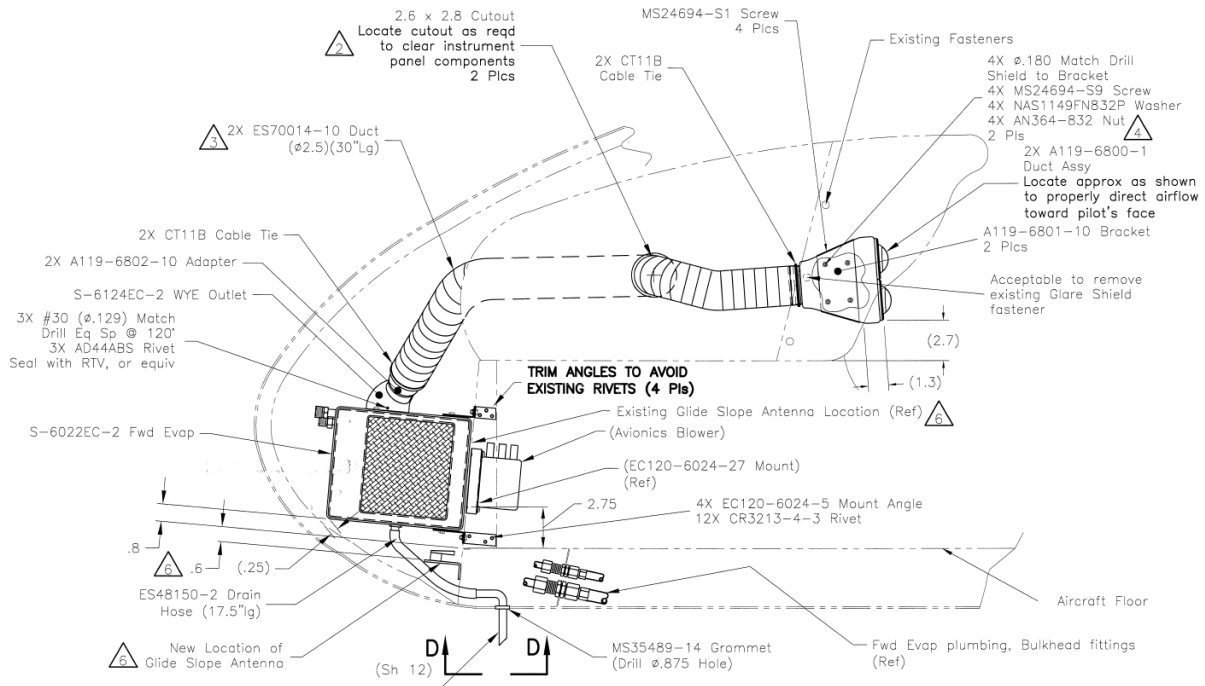


Figure 4-9 Forward Evaporator, looking inboard

5. Condenser Installation

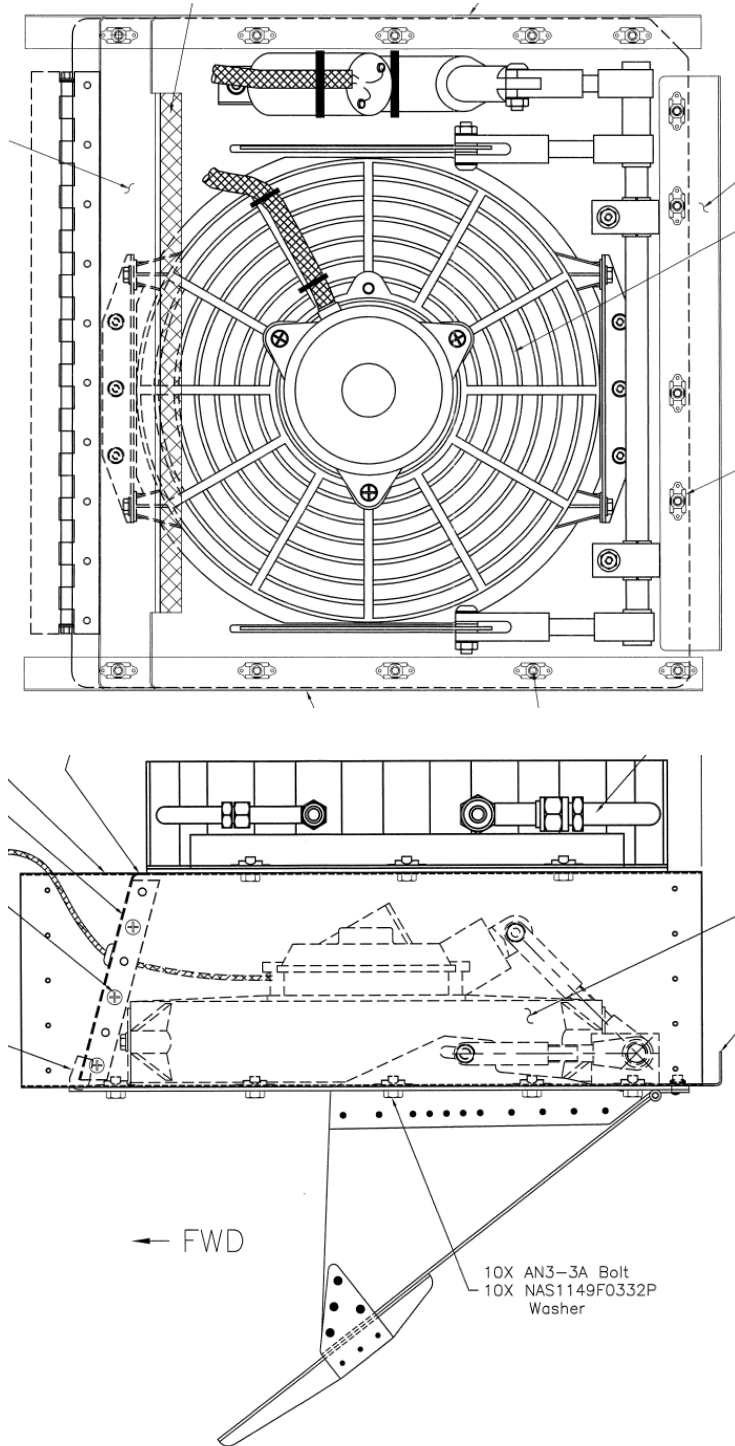


Figure 4-10 Condenser, Pre-Nov 2014 models

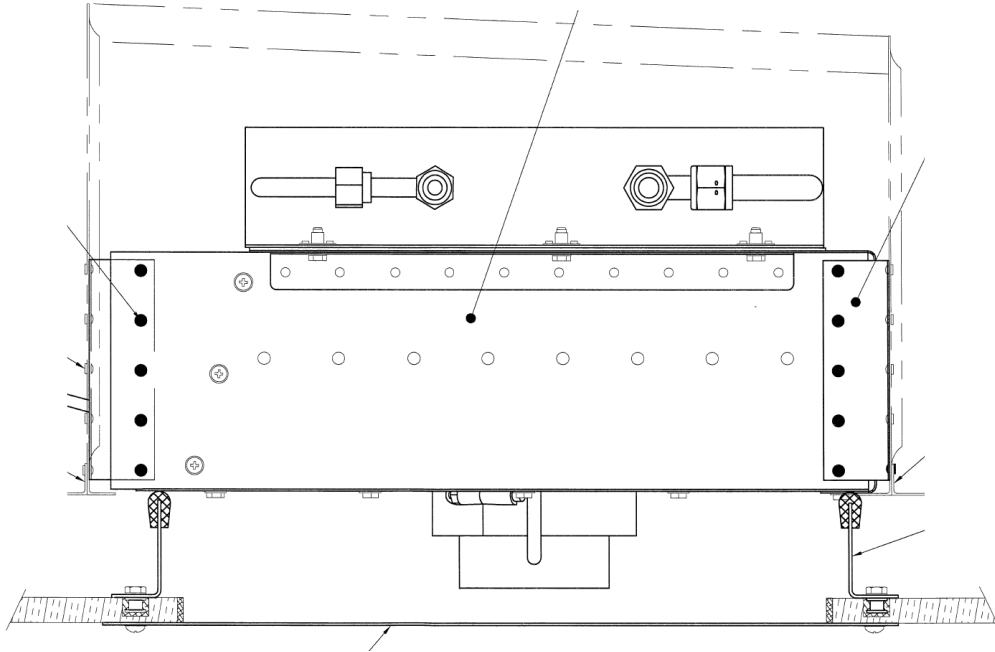


Figure 4-11 Condenser, looking inboard, Post-Nov 2014 models

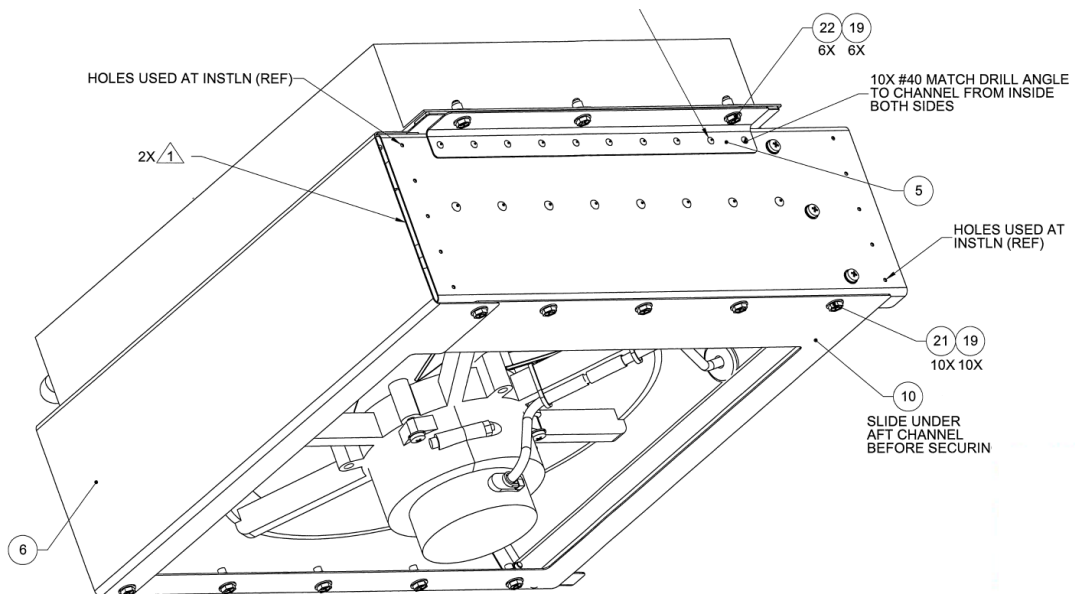


Figure 4-12 Condenser, Post-Nov 2014 models

6. Relay Panel, Single Evaporator Configuration

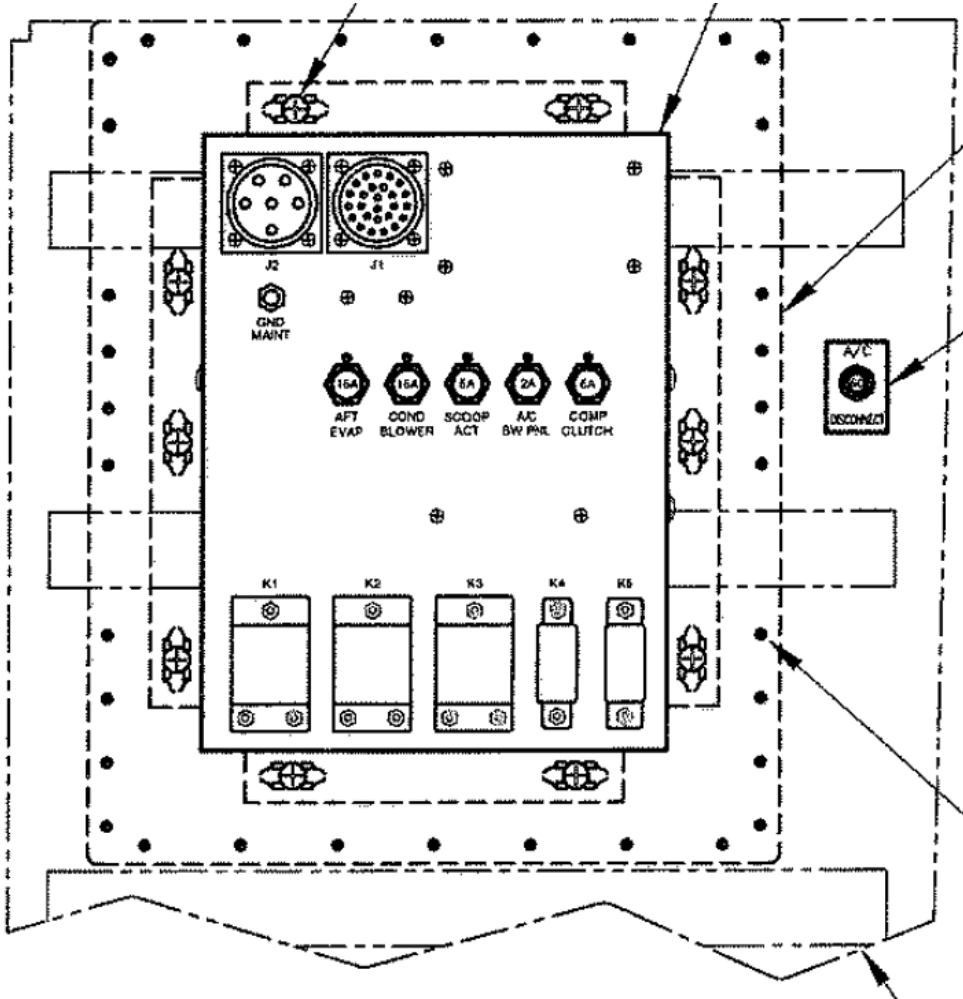


Figure 4-13 Relay Panel, Single Evaporator, Pre-Nov 2014 models shown, Post-Nov 2014 models similar

7. Relay Panel, Dual Evaporator Configuration

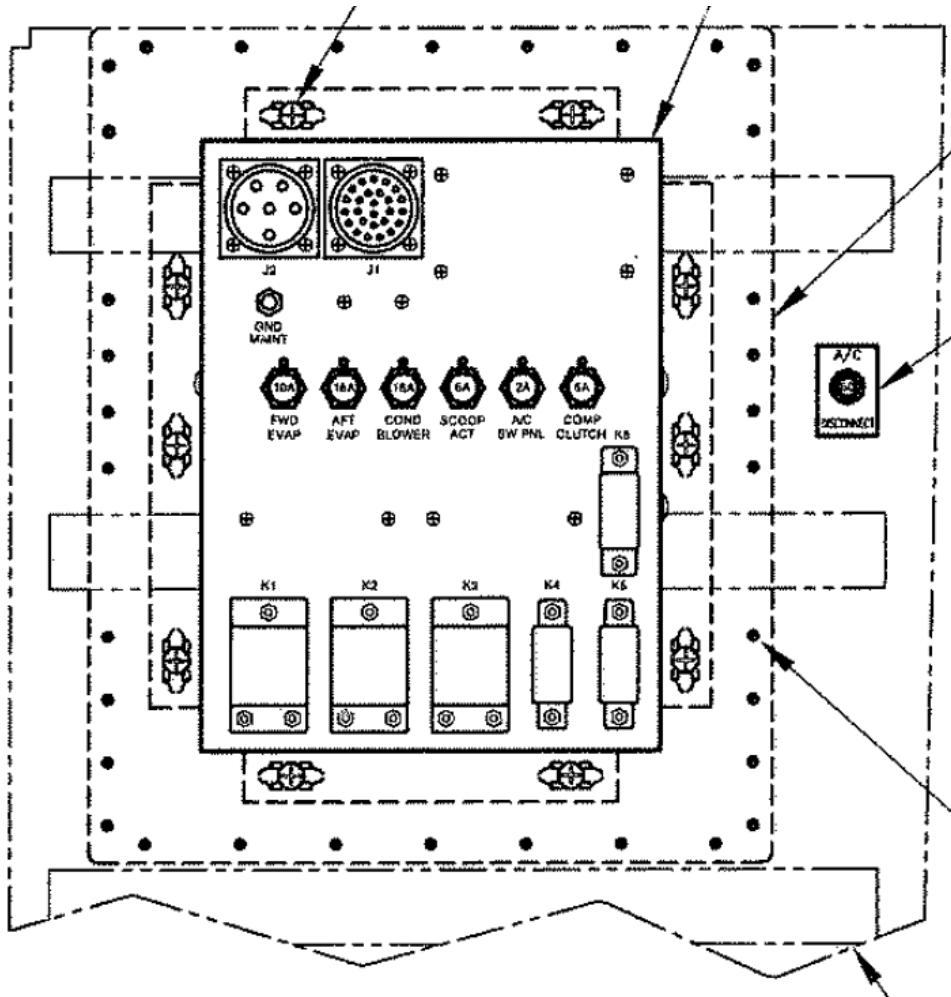


Figure 4-14 Relay Panel, Dual Evaporator, Pre-Nov 2014 models shown, Post-Nov 2014 models similar

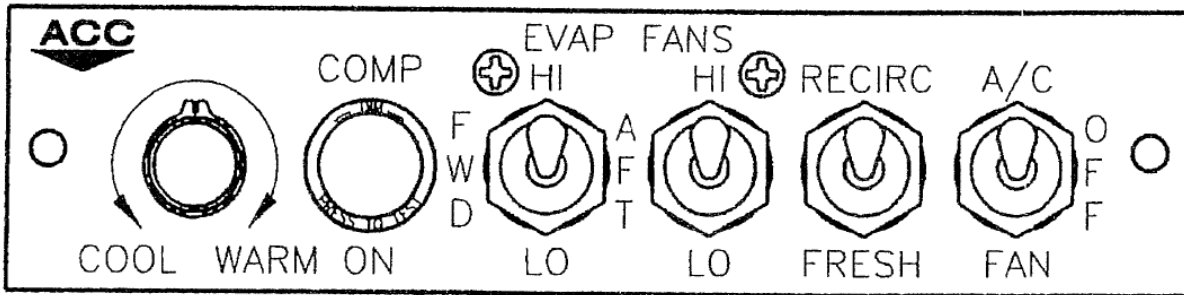
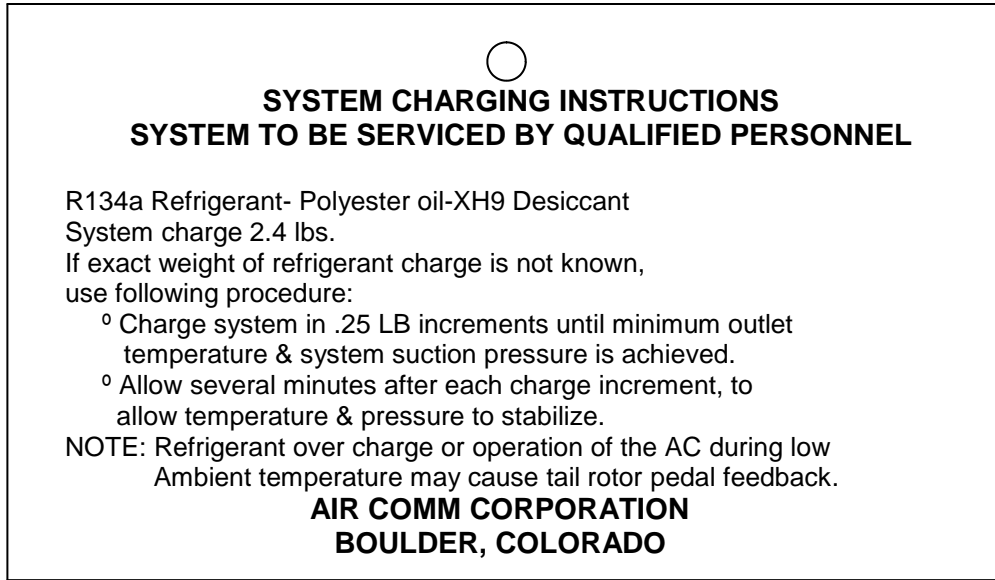


Figure 4-15 – Cockpit A/C Control Panel

**CHAPTER 5
PLACARDS AND MARKINGS**

1. Placard and Marking Information

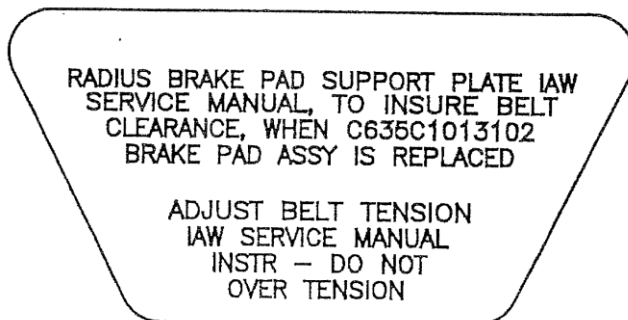
System Charging Instruction Placard



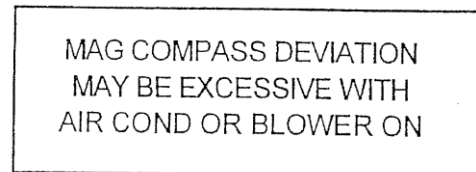
Located on the transmission deck in the proximity of the charging ports

NOTE

Newer placards do not include the "BOULDER,
COLORADO" and may include the use of Ultra PAG oil.



Located on top surface of belt guard



Located at center line on lower edge of
instrument panel

CHAPTER 6

SERVICING

1. Safety Precautions

CAUTION

Refrigeration servicing should be performed by qualified personnel only. Check all local and federal regulations before servicing any refrigerant system or storage device.

The refrigerant used in the air conditioning system is the environmentally safe HFC R134a. This refrigerant is non-explosive, non-flammable, and non-corrosive, has practically no odor, and is heavier than air. However, certain precautions must be observed to ensure the safety of the equipment and any personnel servicing this system.

HFC R134A is stored in a liquid state. It will rapidly evaporate or sublimate when exposed to normal temperature and atmospheric pressure. This rapid evaporation can cause a severe drop in temperature. If liquid refrigerant comes in contact with the skin or eyes it may cause severe frostbite or blindness. Care must be taken to prevent liquid refrigerant from contacting the skin or the eyes.

WARNING

Safety glasses must be worn at all times when servicing the air conditioning system. Should any liquid refrigerant come in contact with the skin or eyes seek medical attention immediately even if the irritation ceases.

WARNING

To avoid a potential explosion NEVER weld, solder, steam clean, use a flame type leak detector, blow torch, bake on aircraft finish, or use excessive heat on, or in the immediate area of refrigerant lines or supply tanks while they are closed to the atmosphere.

WARNING

Refrigerant servicing must be performed in a well-ventilated area to minimize inhalation of the refrigeration gas.

2. Servicing Information

CAUTION

Refrigeration servicing should be performed by qualified personnel only.

NOTE

A list of suggested servicing equipment is provided later in this chapter.

3. Servicing Procedure

- A. Connect the servicing manifold to the servicing ports located on the forward R/H side of the transmission deck. BLUE for low pressure or “Suction” and RED for high pressure or “Discharge.”
- B. After the quick disconnect fittings have been attached to the servicing ports, tighten the knobs on the back of the fittings to engage the schrader valves located inside the charging ports.

NOTE

The schrader valves inside the charging ports **MUST** be engaged to allow servicing of the air conditioner system.

- C. Connect the YELLOW line in the center of the manifold to the vacuum pump. Turn the vacuum pump on and open both valves on the charging manifold. Decreasing the pressure in the closed system to -29.40 InHg causes the moisture in the system to vaporize allowing it to be drawn out by the vacuum pump. Removal of all moisture is crucial to the operation of the A/C system. Any moisture left in the system will be turned into ice causing undesired operation or blockage of one or more expansion valve. Allow the vacuum pump to draw against the system for a minimum of ONE HOUR.

NOTE

Due to a drop in atmospheric pressure with an increase in altitude, the normal vacuum reading will drop 1” (1 kg/cm) for each 1000 ft of altitude gained e.g., Sea Level Reading = 10 InHg, reading at 1000 feet above sea level = 9 InHg.

- D. After the system has been evacuated, turn both valves on the manifold assembly to the “OFF” position and switch the vacuum pump off. Allow the system to hold the vacuum for a minimum of ONE hour to check for vacuum leaks. If the system will not hold the vacuum, the system may have a fitting leak. It may be necessary to charge the system with one to two pounds of refrigerant and conduct a leak check using an electronic leak detector.

CAUTION

To ensure trouble free operation the system must be leak free.

- E. After the leak check has been performed evacuate the system for a minimum of ½ hour before charging with the required amount of HFCR134A as called out later in this chapter.

NOTE

Static charging is the most accurate and safest way to charge an air conditioning system. To accomplish this all of the refrigerant must be charged into the system without the compressor engaged or the system operating.

CAUTION

Operating the air conditioning system with a low refrigerant charge may cause severe damage to the compressor assembly.

- F. If a charging station is not available, charge the A/C system as follows:
- 1) After vacuum and leak check have been performed (Steps A through E) and the system has been proven to be "Leak Free," charge the system with an initial charge of 2.0 Lbs.
 - 2) Engage the compressor and add the remainder of the required charge in .2 lb. increments allowing two minutes to elapse between each addition of refrigerant.

WARNING

If charging is to be accomplished with the compressor engaged it must be accomplished through the LO (BLUE) side only. **Never Charge through the Discharge or "HIGH" (RED) side of the system while the compressor is running. This may cause severe damage to the servicing equipment and may cause personal injury or death.** Care should be taken to ensure the HIGH (RED) side valve stays closed during this procedure and any time the system is operating.

- G. After charging, perform a test run to ensure proper function of the Air Conditioning System.

CAUTION

When reclaiming refrigerant, be sure to note any oil that is removed from the system, and replace the lost oil before or during re-servicing. Maintaining a proper oil and refrigerant charge is critical to the life of the compressor assembly.

4. Lubrication Information

SYSTEM DESCRIPTION	REFRIGERANT CHARGE		OIL CHARGE	
EC120 air conditioning system, single (aft) evaporator	2.4 lbs	1.1 Kg	8.0 fl oz.	238 ml
EC120 air conditioning system, dual evaporator system (1 fwd, 1 aft)	2.4 lbs	1.1 Kg	8.0 fl oz.	238 ml

NOTICE

Prior to mid-2015 this system used polyolester base (POE) 100 grade refrigerant oil. Systems after mid-2015 use Double End Capped Polyalkylene Glycol (DEC PAG, also known as ULTRA PAG). It is acceptable to mix these oils so conversion from polyolester to DEC PAG is permissible without flushing the existing installed system. Note also that regular PAG oil is not compatible with Polyolester and is not to be used, even for new installed systems.

AIR CONDITIONER SERVICE MANUAL EC120-200M-1

If oil is spilled during installation / maintenance, or is lost due to a leak in the system, it is necessary to approximate the amount of lost oil and add this amount to the system. See paragraph B. Component Replacement below. This oil, if required, should be added to the compressor discharge line prior to system charging.

This system may be serviced with either Polyolester (POE) or Double End Capped Polyalkylene Glycol (DEC PAG). Polyalkylene Glycol is preferred due to its superior lubricating properties and improved compressor service life. There are several types of PAG available. Only the "Double End Capped" type is permissible in Air Comm Corporation air conditioning systems. Double End Capped PAG oil is available from Air Comm Corporation in 8 ounce bottles (P/N ES94006-13). Mixing of POE and PAG is acceptable. Disregard previous statements to the contrary. They referenced PAG oil that was not "Double End Capped". Current versions of compressors are designed to be operated using PAG oil. Testing by Air Comm Corporation has shown that "Double End Capped" PAG is compatible with POE and can therefore be mixed. "Double End Capped" is a reference to the chemical structure of the molecule and not to the container.

(Do not use Mineral oil in this system with R134a refrigerant. Do not use any refrigerant oil other than Double End Capped Polyalkylene Glycol (also known as "ULTRA PAG") or Polyolester (also POE)).

Containers of DEC PAG or POE will absorb moisture if left open (hygroscopic). Keep containers tightly capped when not in use and keep all system components capped while servicing system.

The quantity of lubrication in the system is critical. If too little lubrication is in the system the compressor life may be reduced. No other component in the A/C system requires lubrication. Too much lubricant in the system will retard heat transfer in the evaporator and condenser coils and reduce the cooling capacity of the system.

The Service Ports for this system are located in the forward transmission deck area adjacent to the compressor.

CAUTION

This system is serviced with either Polyester Based Refrigerant Oil (POE) or Double end capped Polyalkylene oil (DEC PAG, aka Ultra PAG). The use of Mineral Oil or Polyalkylene (PAG) in this system will cause damage to the air conditioner compressor and expansion valves.

- A. **New Installations** - The total system oil charge is 8.0 fl oz. (238 ml.) of Double End Capped Polyalkylene Glycol (DEC PAG). The oil is initially contained within the compressor as shipped from the factory so no additional oil is required when installing a new system.
- B. **Component Replacement** - Once a system is in operation the lubrication is circulated through the system along with the refrigerant. The refrigerant becomes saturated with the oil and carries it throughout the system, lubricating the compressor internal parts. No other component in the air conditioning system requires lubrication. Excessive oil in the system causes a reduction in heat transfer and will result in poor air conditioning performance.

AIR CONDITIONER SERVICE MANUAL EC120-200M-1

When reclaiming refrigerant, be sure to measure and note any oil that is removed from the system. If a measurement is not available use 1.5 oz. as the estimated loss. Replace any lost oil before or during re-servicing. Reduced compressor life will result if the total system oil charge is not maintained.

Make note of any oil lost due to spillage or leaks during time of installation or maintenance. This oil must be replaced before the air conditioner is returned to service.

The following chart may be used to calculate the amount of oil to be added in case a component is being replaced with a new part. The additional oil must be added to the compressor discharge (RED) line prior to charging.

CAUTION

Never add oil to the suction (BLUE) side of the system.

Component	Oil Amount
Compressor	See Instructions this section
Evaporator	1.0 oz. per evaporator
Condenser	1.5 oz.
Receiver Drier	1.5 oz.
Hose - Vapor	1.0 oz. per 10 foot
Hose – Liquid	1.0 oz. per 20 foot

C. **Compressor Replacement** – To properly calculate the amount of oil required in the replacement compressor, it is necessary to pour the oil out of the old compressor into a clean container. Drain the oil out of the fill plug hole and then pour oil out of the suction and discharge ports while rotating the center shaft clockwise. Measure the total amount of oil removed from the old compressor. Add ½ oz. to the total measured to account for unrecoverable oil in the old compressor. This total is what is needed in the new compressor. New compressors come from Air Comm charged with 8 oz. (240 cc) of oil. This should be adjusted according to the amount of oil recovered from the old compressor and any other components being replaced. The receiver drier should always be replaced when the compressor is replaced or when the system has been open for an appreciable time, which accounts for another 1.5 oz. of oil that should be added.

D. Below is an example of a compressor and receiver drier replacement for illustration:

Draining the old compressor recovered 2.0 oz. of oil. Adding 0.5 oz. of residual unrecoverable oil in the compressor gives 2.5 oz. The new receiver/drier requires an additional 1.5 oz., plus 1.5 oz. lost when the refrigerant was evacuated from the system. So the total oil needed in the replacement compressor for this case is 5.5 oz. Since the new compressor comes with 8 oz. of oil, remove the oil fill plug and pour out 2.5 oz. of oil.

5. System Leak Check

- A. It is important to identify and eliminate refrigerant leaks at system connections to ensure trouble free operation of the air conditioning system.

A new or empty system can be pressurized with R134a at 50 psi (3.5 kg-cm) to conduct a leak survey. Do not pressurize the system with compressed air. Compressed air will introduce moisture into the system, which will degrade the operation of the system.

The preferred method is to use an electronic leak detector in conjunction with a small charge of R134a refrigerant. All checks done in this manner should be conducted with the air conditioner off. Since the refrigerant is heavier than air, leaks are most likely to be detected on the underside of hoses and fittings. In some cases, leaking refrigerant gas may collect in low areas of the aircraft and provide erroneous leak detection. A stream of compressed air from a nozzle may be useful in clearing the area just prior to conducting a leak test.

- B. If a leak is detected at an O-Ring fitting, check to insure proper torque has been applied to the fitting. If the system continues to leak, reclaim the refrigerant and install a new O-Ring.

NOTE

Be sure that the O-Ring is lubricated with refrigerant oil prior to its installation.

A small amount of leakage (approximately one ounce per year) past the compressor shaft seal is normal. Most leak detectors are sensitive enough to show a leak of this magnitude.

6. Suggested Equipment for Servicing

Recovery / Recycling / Recharging Station
(Example: Snap-on Model ACT 3340, Robinair Model 34700, or equivalent)

Electronic Leak Detector (R134a compatible)
(Example: Micro-Tech III, Robinair, Snap-on, or equivalent)

Manifold and gauge set (R134a compatible)
(Example: Robinair, Snap-on, or equivalent)

7. Consumable Materials

- A. Refrigerant: This system is to be charged with Dupont (or equivalent) HFC R134a refrigerant.

- B. Lubricant: This system may be serviced with either Polyolester (POE) or Double End Capped Polyalkylene Glycol (DEC PAG).
- C. O-Rings: This system utilizes the refrigerant HFC R134a. Consequently, the system must also utilize Highly Saturated Nitrile (HSN O-Rings) the insert O-Ring fittings (as previously described in this manual) require the use of Green HSN O-Rings while the TORQ LOK® Fittings (As previously described in this manual) require the use of the Black HSN O-Rings.
- D. Loctite thread sealer 554 (or equivalent).
- E. Torque-Seal Anti Sabotage Lacquer.

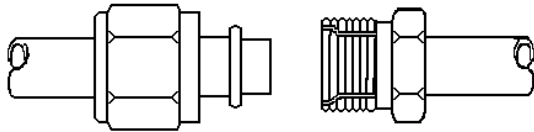
8. Suggested Spares List

<u>Item</u>	<u>Part Number</u>
Blower Motor – Aft & Forward Evaporator [all models]	ES61072-1
Blower Motor – Condenser, pre-Aug 2014 [deployable scoop intake]	ES61136-1
Blower Motor – Condenser, post-Aug 2014 [fixed grille]	ES61082-3
Compressor Assembly	EC120-3010-1
Compressor Drive Belt	7335
Receiver / Drier Bottle	ES43030-5
Binary Switch	ES57010-1
By-pass Valve	ES26112-4
Condenser Blower replacement, pre-Aug 2014 [deployable scoop]	ES73186-1
Condenser Blower replacement, post-Aug 2014 [fixed grille]	S-6063EC-2
Pressure Relief Valve [post-Aug 2014 models only]	ES49035-1
HSN O-rings; Insert type (Green)	
<u>Size</u>	
#6 O-ring	AIR 440-840
#8 O-ring	AIR 440-841
#10 O-ring	AIR 440-842
HSN O-rings; Torq-Lok Type (Black)	
<u>Size</u>	
#6 O-ring	2-012-N1173
#8 O-ring	2-014-N1173
#10 O-ring	2-016-N1173

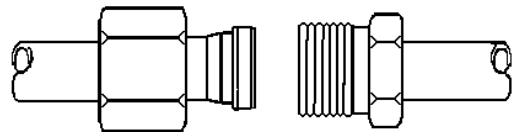
CHAPTER 7
STANDARD PRACTICES AND INFORMATION

1. Fitting Torque Procedures and Values

INSERT O-RING FITTINGS



TORK-LOK® FITTINGS



Apply a thin coating of refrigerant oil to O-Ring and Female side of fitting.
Confirm there is no damage (nicks, dirt, etc.) on fittings.
Slide B-nut back away from the end of the tube so you can see the O-Ring as you slide the fitting together.

Be careful not to pinch O-Ring during assembly.

Engage the male end into the female fitting being careful to maintain alignment.

The male flange should seat fully against the female fitting without the O-Ring being pinched.

It is important to hold the fitting together while sliding the B-nut forward and engaging the threads. Tighten the B-nut by hand and then torque as follows:

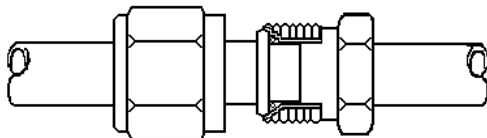
Tightening specifications

CAUTION: ALWAYS USE BACK UP WRENCH. EXCESSIVE TORQUE WILL DAMAGE THE JOINT, COMPROMISING THE INTEGRITY OF THE SEAL.

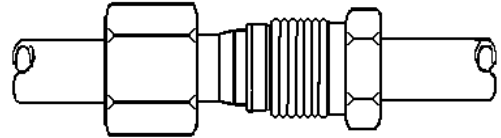
Insert O-Ring Fittings (regardless of size): Hand tighten, then turn an additional 60 deg. (one flat on the nut).

TORQ-LOK ® fittings (regardless of size): Hand tighten, then turn an additional 30 deg.

INSERT O-RING FITTINGS



TORK-LOK® FITTINGS



Once the system is charged, check each fitting with an electronic leak detector.

An electronic leak detector is the only reliable method of checking for refrigerant leaks.

Once the fittings have been checked and are found to be free of leaks, torque seal as appropriate.

2. Removal, Replacement & Adjustment of Compressor Drive Belt

REMOVAL

- A. It is necessary to access the transmission compartment to remove, replace, or adjust the Compressor Drive Belt.
- B. Cut safety wire on the Compressor Belt Tensioning Link and the Belt Tensioning link Jam Nuts, and loosen the respective Jam Nut(s).
- C. Before attempting to adjust the drive belt tension, insure that the compressor mounting / attaching bolts have been loosened, to allow free movement of the compressor body on the compressor mount.
- D. Remove the Compressor Drive Pulley in accordance with the instructions given in paragraph 4. "Removal, Installation / Replacement of Compressor Drive Pulley" of this manual.
- E. Adjust the Belt Tension Link to loosen the belt, and remove belt from the compressor & drive pulley.

REPLACEMENT

- A. Install the drive belt on the compressor & drive pulleys.
- B. Replace the Compressor Drive Pulley in accordance with the instructions given in paragraph 4. Removal, Installation / Replacement of Compressor Drive Pulley of this manual.
- C. Adjust belt tension (See Adjustment below).
- D. Tighten the Belt Tensioning Link Jam Nuts and re-safety using .032 safety wire.
- E. Re-torque the Compressor Mounting / Attaching bolts to 80 to 100 inch lbs. (9.04 – 11.30 Nm).

NOTE

Care should be taken to insure that the new belt is not damaged (nicked or cut) during installation.

ADJUSTMENT

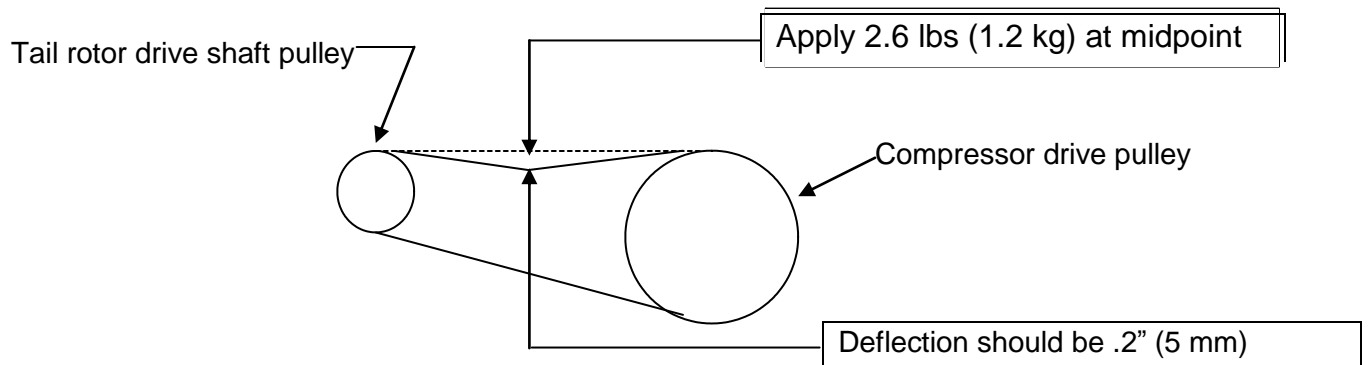
NOTE

Proper belt tension is important to insure a long belt service life and to avoid excessive loads on the compressor, and bearing assemblies.

A. The correct belt tension for the belt is 2.6 lbs. (1.2 kg.) This can be achieved with the aid of a **belt tensioning tool** (Kent-Moore® BT-33-73F Belt Tension Gauge or Equivalent).

(This is the preferred method of obtaining proper belt tensioning).

B. An alternate method is to observe a .2" (5 mm) belt deflection when 2.6 lbs (1.2 kg.) of force is applied at the midpoint of the belt.



NOTE

The belt tension should be checked, and re-adjusted, if necessary after the first two hours of operation for a newly installed belt.

3. Removal, installation / replacement of compressor assembly

REMOVAL

A. See Removal, Replacement, & Adjustment of Compressor Drive Belt prior to the removal of the air conditioner compressor assembly.

B. It will be necessary to evacuate (discharge) the refrigerant from the system to remove and replace the air conditioner compressor. Instructions for servicing of the system are found in Chapter 6, p.27 of this manual.

CAUTION

Refrigeration servicing should be performed by qualified personnel only!

C. Disconnect the refrigerant hoses from the suction and discharge ports located on the aft end of the compressor housing.

- D. Remove the attaching hardware from the top of the belt tensioning link and the compressor mount assembly. Remove the mounting bolt that attach the compressor body to the top of the compressor mount, and remove compressor assembly.

CAUTION

Before removing the compressor attaching hardware it is necessary to seek assistance in supporting the compressor, due to the weight and position of this component. Failure to do so may result in damage to the aircraft.

INSTALLATION / REPLACEMENT

- A. Locate the compressor on its mount. Torque attaching hardware to 80 to 100 inch lbs (9.04 – 11.30 Nm).
- B. Replace the O-rings on the refrigerant hoses, and re-connect the hoses to the compressor housing. Torque the fittings per the specifications on p.35.
- C. Re-install the belt tension link attaching hardware to the compressor, and torque to 95 – 110 inch lbs (10.9-12.6 Nm).
- D. Adjust the belt adjustment per the procedure shown on page 36
- E. Recharge the refrigerant per the servicing instructions on page 27.

CAUTION

Refrigeration servicing should be performed by qualified personnel only!

NOTE

An electronic leak detector should be used any time a component is replaced or the system has been opened, to insure trouble free operation of the air conditioner system.

4. Removal, installation / replacement of compressor drive pulley

REMOVAL

- A. See Removal, Replacement & Adjustment of Compressor Drive Belt (page 36) prior to the removal of the air conditioner tail rotor driveshaft compressor drive pulley.

See Removal, Installation / Replacement of Compressor Assembly (page 37) prior to the removal of the air conditioner tail rotor driveshaft compressor drive pulley.
- B. Remove the (2) two NASM21262-44 retaining bolts forward of the compressor drive pulley installation.

CAUTION

Insure that the drive pulley assembly is supported prior to the removal of the retaining bolts to prevent damage to the driveshaft, and the driveshaft coupling.

- C. Remove the (6) six NASM21262-29 Bolts that retain the EC120-3500-1 Drive Pulley to the tail rotor driveshaft.

CAUTION

During the removal of the Compressor Drive Pulley, care should be taken not to damage the driveshaft, or other drive train components.

INSTALLATION / REPLACEMENT

- A. Install the Compressor Drive Pulley EC120-3500-1 on the tail rotor Driveshaft, by placing the pulley tightly against the face of the tail rotor driveshaft spline.

CAUTION

As the driveshaft will need to be held during the installation of the Compressor Drive Pulley, care should be taken not to damage the driveshaft, or other drive train components.

- B. Reinstall retaining hardware and torque nuts to 50 to 70 Inch Lbs (5.7 – 10.0 Nm)

5. Removal, installation / replacement of forward evaporator assembly

REMOVAL

- A. It will be necessary to evacuate (discharge) the refrigerant from the system to remove or replace the forward evaporator assembly. Instructions for servicing of the system are found in Chapter 6, p.27.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

- B. Remove attaching hardware (AN3-5A Bolts) (4) four places in mounting brackets on aft of evaporator assembly.
- C. Disconnect the ducting that attaches the forward evaporator to the forward blower outlets.
- D. Disconnect the electrical connector from the forward evaporator assembly.
- E. Disconnect drain line from bottom of evaporator housing.
- F. Disconnect refrigerant plumbing from fittings and hoses located under the evaporator assembly area.

CAUTION

Always use a backup wrench when removing, or installing refrigerant line fittings.

INSTALLATION / REPLACEMENT

- A. Locate the evaporator assembly into its mounting location. Install the mounting hardware through the 4 mounting brackets and tighten.
- B. Install the ducting, drain line, and electrical connections.
- C. Replace all fitting o-rings and torque the refrigerant line connections per the specifications on p.35

CAUTION

Always use a backup wrench when removing, or installing refrigerant line fittings.

- D. Recharge the refrigerant per the servicing instructions on Page 27.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

NOTE

An electronic leak detector should be used any time a component is replaced or the system has been opened, to insure trouble free operation of the air conditioner system.

6. Removal, Installation / Replacement of Aft Evaporator Assembly

REMOVAL

- A. Remove the forward transmission cowling.
- B. Remove the (6) six AN3-3A screws that retain the Aft Evaporator to the cabin roof.
- C. It will be necessary to evacuate (discharge) the refrigerant from the system to remove or replace the aft evaporator assembly. Instructions for servicing of the system are found in Chapter 6, p.27.
- D. Disconnect the refrigerant lines at the fittings to the evaporator housing.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

- E. Disconnect wiring to Temperature control module on the Aft Evaporator assembly by disconnecting the Molex connector.

INSTALLATION / REPLACEMENT

- A. Locate the evaporator assembly on the transmission deck. Install and torque the (6) six AN3-3A mounting screws.
- B. Mate the molex connector.
- C. Make the refrigerant line connections and torque the fittings per the specifications on p.35.

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

- B. Recharge the refrigerant per the service instructions on Page 27.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

7. Removal, Installation / Replacement of Aft Evaporator Blower Motor

REMOVAL

CAUTION

It is recommended that the battery and external power be disconnected before starting work.

- A. Access the roof area forward of the main transmission.
- B. Disconnect electrical connection to the Aft Evaporator Blower Assembly.
- C. Pry away the 5 spring clips that retain the blower housing halves together.
- D. Remove the 4 sets of motor attaching hardware and remove the motor.

INSTALLATION / REPLACEMENT

- A. Locate the replacement blower on the outboard blower housing shell and install the 4 sets of attaching hardware.
- B. Locate the motor/housing assembly onto the inboard blower housing on the aircraft. Re-install the 5 spring clips.
- C. Mate the blower electrical connection.

8. Removal, installation / replacement of the condenser scoop assembly

REMOVAL

CAUTION

It is recommended that the battery and external power be disconnected before starting work.

- A. Remove the AN3-3A screws that attach the EC120-7007-1 Condenser Scoop Assembly to the lower contour of the belly panel. This will allow the Condenser Scoop Assembly to pivot on the forward hinged support plate.

CAUTION

Be sure to support this assembly when removing the attaching hardware to prevent damage to the Condenser Scoop Assembly, or the aircraft.

- B. Remove the AN525-10R Screws that attach the forward hinge support plate to the aircraft belly panel.
- C. Disconnect the Molex Connector that attaches the power wires from the Condenser Scoop Assembly to the aircraft wiring, and remove the EC120-7007-1 Condenser Scoop Assembly from the aircraft.

INSTALLATION / REPLACEMENT

- A. Locate the Condenser Scoop Assembly and install the AN525-10R screws to attach the forward hinge support plate to the aircraft belly panel.
- B. Mate the blower Molex connector.
- C. Rotate the assembly into position and install the AN3-3A screws.

NOTE

Perform a maintenance operational check of the Condenser Scoop Assembly on completion of the installation, to insure that there is no rubbing or binding of the Scoop Door.

NOTE

The Condenser Scoop Door is rigged at the factory with a .20 to .40 inch gap between the Scoop Door and the Scoop Plate assemblies with the Scoop Door in the full up position.

CAUTION

Do not attempt to disassemble or readjust the Scoop Door, as altering the rigging may damage the Scoop Door Bellcrank, or Scoop Door Actuator.

9. Removal, Installation / Replacement of Condenser Assembly with deployable scoop

REMOVAL

- A. Remove the Condenser Scoop Assembly EC120-7007-1 per section 8, p.42.
- B. Discharge the refrigerant from the system. Instructions for servicing the system are found in Chapter 6 Servicing.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

CAUTION

It is recommended that the battery and external power be disconnected before starting work.

- C. Disconnect the Condenser Assembly from the refrigerant lines that attach to the condenser assembly.

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

- D. Remove the AN3-3A bolts that attach the Condenser to the belly of the aircraft, and remove the Condenser Assembly by sliding it inboard and out through the opening.

INSTALLATION / REPLACEMENT

- A. Locate the condenser assemblies and install the AN3-3A attachment screws.
- B. Replace all O-rings and secure refrigerant lines per tightening specifications on p.35.
- B. Recharge the refrigerant per the servicing instructions on Page 27.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

NOTE

There should be no air leakage around the condenser assembly other than inlet and outlet. Seal all other openings, including those around the Condenser Refrigerant tubes.

10. Removal, Installation / Replacement of Condenser Assembly with fixed Grille Intake

REMOVAL

- A. Remove the Outlet Screen EC120-7012-1.
- B. Discharge the refrigerant from the system. Instructions for servicing the system are found in Chapter 6 Servicing.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

CAUTION

It is recommended that the battery and external power be disconnected before starting work.

CAUTION

Be sure to support the blower assembly when removing the attaching hardware to prevent damage to the condenser housing, blower assembly, or the aircraft.

- C. Disconnect the refrigerant lines from the Condenser Assembly.

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

- D. Remove the AN3-3A bolts that attach the Condenser to the belly of the aircraft and remove the Condenser Assembly by sliding it out through the opening.

INSTALLATION / REPLACEMENT

- A. Locate the condenser assembly and install the AN3-3A attachment screws.
- B. Replace all O-rings and secure refrigerant lines per tightening specifications on p.35.
- C. Recharge the refrigerant per the servicing instructions on Page 27.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

NOTE

There should be no air leakage around the condenser assembly other than inlet and outlet. Seal all other openings, including those around the Condenser Refrigerant tubes.

11. Removal and replacement of condenser blower motor & fan assembly for deployable air scoop configuration

REMOVAL

CAUTION

It is recommended that the battery and external power be disconnected before starting work.

- A. Remove the AN3-3A Bolts that attach the EC120-7007-1 Blower assembly to the lower contour of the belly panel. This will allow the condenser scoop assembly to pivot on the forward hinged support plate.

CAUTION

Be sure to support the blower assembly when removing the attaching hardware to prevent damage to the condenser housing, blower assembly, or the aircraft.

- B. Remove safety wire that secures the (4) AN3H-3A bolts (2) two on each side that attach the ES73186-1 Blower motor & Fan assembly to the condenser scoop assembly, and remove bolts.
- C. Disconnect the ES73186-1 Blower motor & Fan assembly at the Molex connector.
- D. Once the mounting bolts have been removed, the blower can be removed.

REPLACEMENT

- A. Locate the replacement blower assembly onto the condenser scoop assembly and secure with the mounting hardware and safety wiring.
- B. Reconnect the Molex connector.
- C. Reinstall the AN3-3A bolts that secure the EC120-7007-1 Blower assembly to the lower contour of the belly panel.
- D. Apply power, and operate the Air conditioner by placing the control switch in the A/C position several times to insure there is no binding and for proper operation of the Blower motor & Fan assembly.

12. Removal, Installation / Replacement of Receiver Drier Bottle

REMOVAL

- A. Access refrigerant plumbing to the Receiver Drier Bottle.
- B. Discharge the refrigerant from the system. Instructions for servicing the system are found in Chapter 6 Servicing.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

- C. Disconnect refrigerant lines from both sides of the receiver drier connection fittings.

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

- D. Loosen the retaining clamp holding the receiver drier bottle to the support bracket.
- E. Remove the receiver drier bottle.

INSTALLATION / REPLACEMENT

- A. Locate the receiver drier bottle and secure it with the retaining clamp.
- B. Replace the o-rings on the refrigerant lines and secure the lines to the bottle per the tightening instructions on p. 35.
- C. Recharge the refrigerant per the servicing instructions on Page 27.

NOTE

Never reuse a receiver drier bottle. Keep new receiver drier bottles capped until just prior to their installation.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

13. Removal, Installation / Replacement of Binary Switch

REMOVAL

- A. Access the Binary Switch adjacent to the receiver-drier bottle near the condenser assembly.
- B. Disconnect electrical connectors from bottom of binary switch.
- C. Unscrew switch from the Schrader valve located on outlet tube from the receiver drier bottle. Remove switch. Note that it is not necessary to discharge the refrigerant for this servicing operation.

NOTE

Use the flats provided on the top of the switch body to tighten, do not attempt to tighten, or loosen the pressure switch by hand.

INSTALLATION / REPLACEMENT

- A. Install the binary pressure switch on the Schrader valve and tighten.
- B. Mate the electrical connector to the switch.

14. Removal, Installation/ Replacement of By-Pass Valve Assembly

REMOVAL

- A. Access the By-pass Valve. Refer to plumbing schematics Figures 8.9 & 8.10. The valve is located near the Aft Evaporator on the transmission deck.
- B. Discharge the refrigerant from the system. Instructions for servicing the system are found in Chapter 6 Servicing.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

- C. Disconnect the electrical connector to the by-pass valve assembly.
- D. Disconnect the refrigerant lines from both sides of the by-pass valve assembly.
- E. Remove safety wire and mounting screws that attaches the support bracket to the valve coil assembly.

CAUTION

Always use a backup wrench when removing or installing refrigerant line fittings.

- F. Remove the by-pass valve.

INSTALLATION / REPLACEMENT

- A. Mount the by-pass valve onto the support bracket.
- B. Install new o-rings and secure the refrigerant lines to the valve. Tighten the fittings per the tightening instructions on p.35
- C. Mate the electrical connector.
- D. Recharge the refrigerant per the servicing instructions on Page 27, steps A through I.

CAUTION

Refrigerant servicing should be performed by qualified personnel only!

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**CHAPTER 8
TROUBLESHOOTING**

1. System Troubleshooting

Prior to troubleshooting a defective system, it is advisable to conduct a visual inspection for general condition and obvious signs of damage or failure.

The following matrix lists the easiest checks and the most likely problems.

Problem	Probable Cause	Corrective Action
System not Cooling (Evaporator blowers still operating)	System is low or empty of refrigerant	Evacuate the system, determine the origin of the refrigerant leak if applicable, and re-charge the system.
	Moisture or air in the system	Evacuate the system, replace the receiver drier, and place the system under a vacuum for a minimum of 30 minutes before recharging the system.
	Compressor	If the compressor has failed, it must be replaced.
	Compressor drive belt	If the compressor drive belt has failed it will need to be replaced and adjusted.
	By-pass valve	Check to insure the temperature control knob on the A/C control panel in the cockpit is in the full cold position, and the temperature control circuit breaker has not tripped. If the valve remains open (by-passing refrigerant) the valve will need replacement.
	Condenser blower motor / fan assembly	Check to insure the condenser blower motor/fan assembly are receiving power, and the circuit breaker has not tripped; if the blowers still do not function, they may have failed internally and must be replaced.
	Condenser Blockage	Check to insure the condenser fins are clear and free of any blockage. This will cause higher than normal discharge pressure in the system.
System not cooling (Evaporator blowers not operating)	Air conditioner control circuit breaker tripped	Reset circuit breaker; if breaker will not reset, check for short in circuit.
	Forward or Aft evaporator blower circuit breaker tripped	Reset circuit breaker; if breaker will not reset, check for short in circuit.

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Problem	Probable Cause	Corrective Action
System not cooling (Evaporator blowers not operating)	Forward and aft evaporator blower motor(s)	Check for power to the motor(s), and for the free movement of the blower wheel; if the motor shaft does not turn smoothly the motor must be replaced
Loss of cooling limited to one evaporator	Expansion valve malfunction	If cooling is lost in only one of the evaporators, and the blowers continue to function, it is most likely a blockage at the expansion valve orifice, this is most often caused by dirt in the system forming a blockage as the refrigerant passes through the valve. Evacuating the system and changing the receiver drier should cure this problem. If the above actions do not resolve the problem, the evaporator assembly must be replaced.
External moisture (Condensate) in the area of forward / aft evaporator	Leak in evaporator, or evaporator drainage system The suction or low side of the evaporator refrigerant plumbing may be cold and will condense moisture.	Water noted in the area near the evaporator is normally caused by a loose, cracked, plugged, or disconnected drain line. To test, pour water into the face of the evaporator checking for proper drainage and note any leaks. NOTE The drain line consists of a tube which extends from the lower surface of the evaporators through the outer contour of the helicopter. Cover line with a layer of insulating cork tape.

(Contact Air Comm Corporation Service Department for current pricing and availability of replacement components and parts)

2. System Schematics

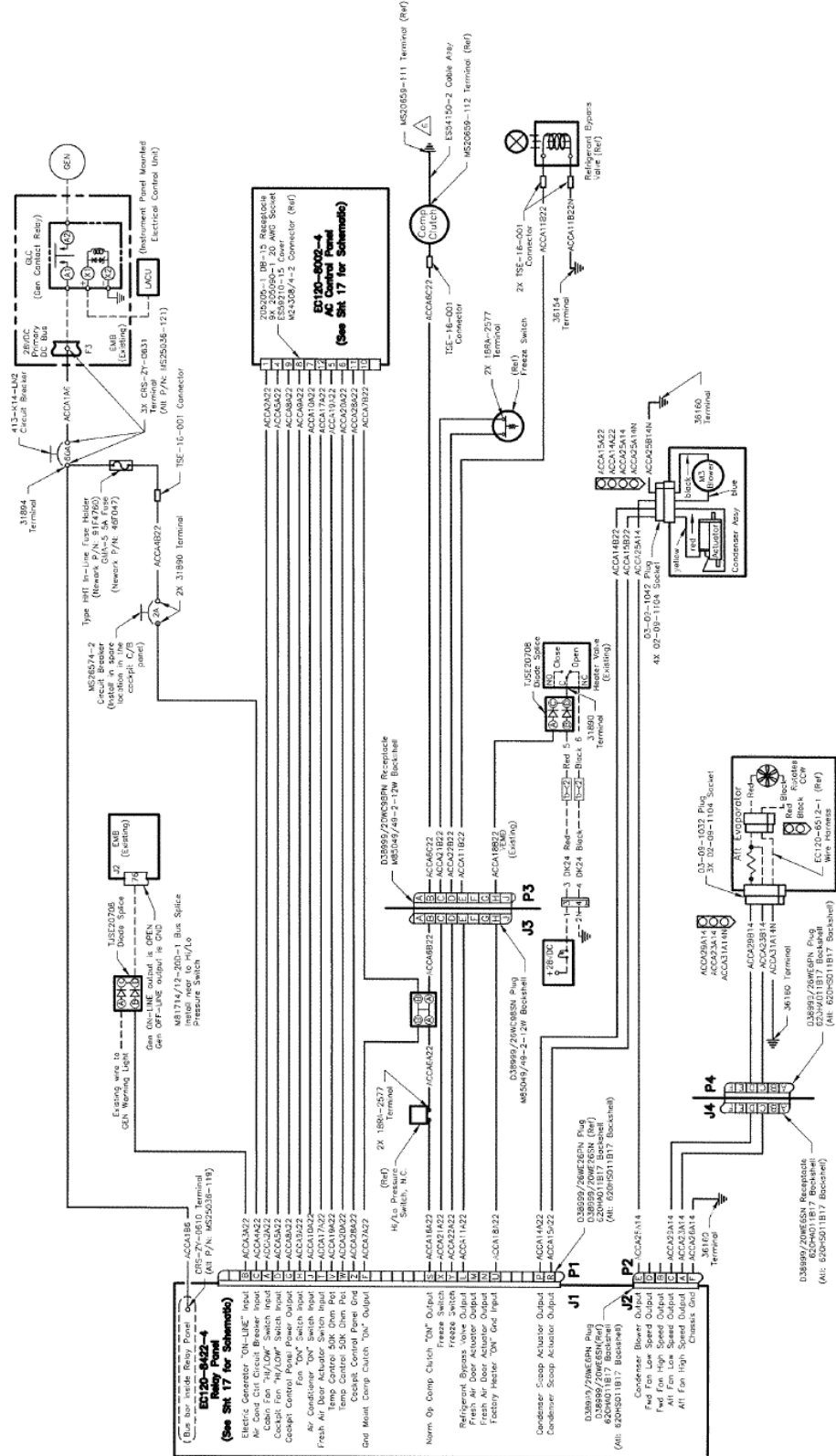


Figure 8.1 Pre Nov 2014 shipped kit AC System Electrical Schematic, Aft Evaporator only, w/o Fresh Air Duct

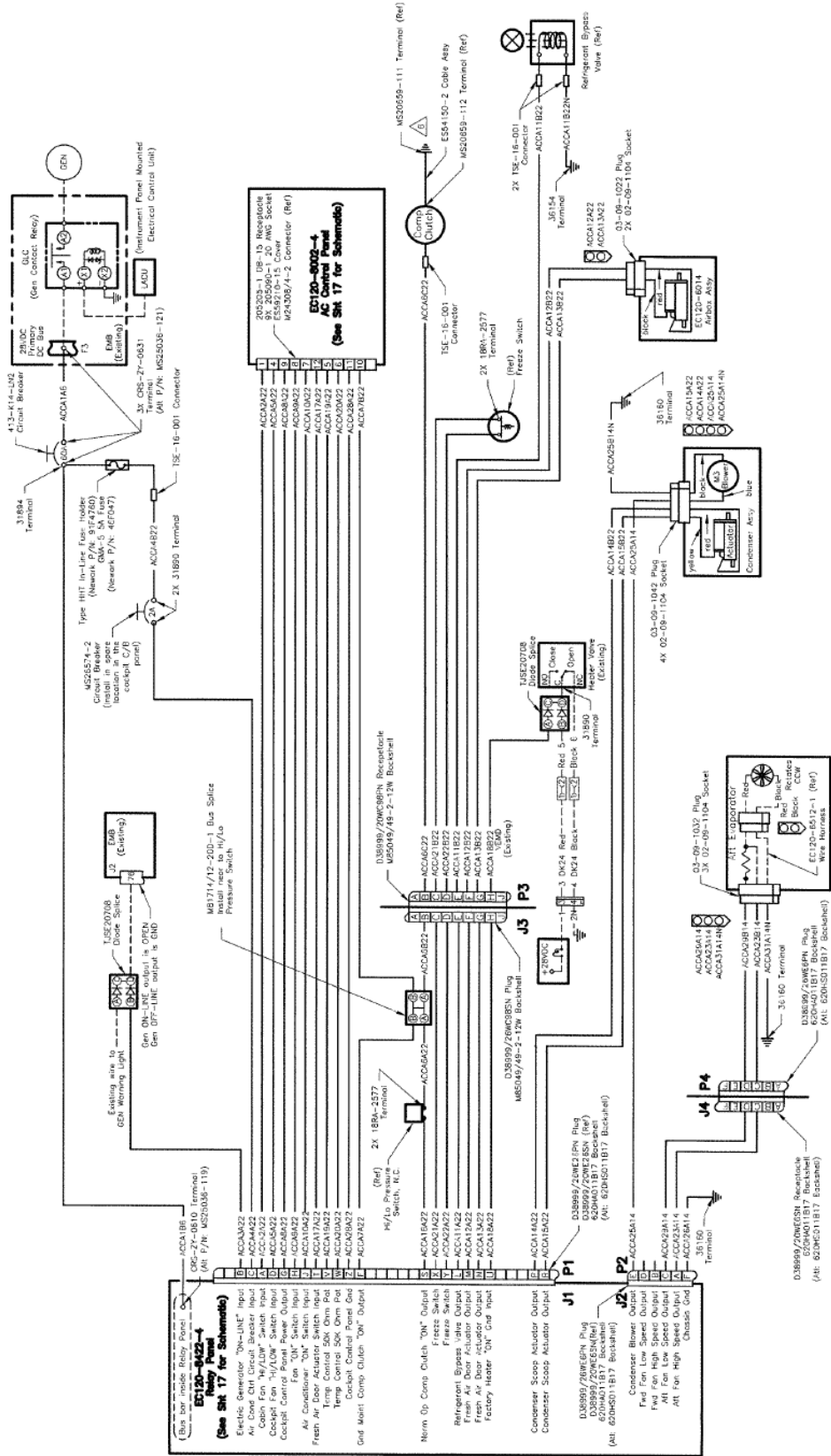


Figure 8.3 Pre Nov 2014 shipped kit AC System Electrical Schematic, Aft Evaporator only, w/ Fresh Air Duct

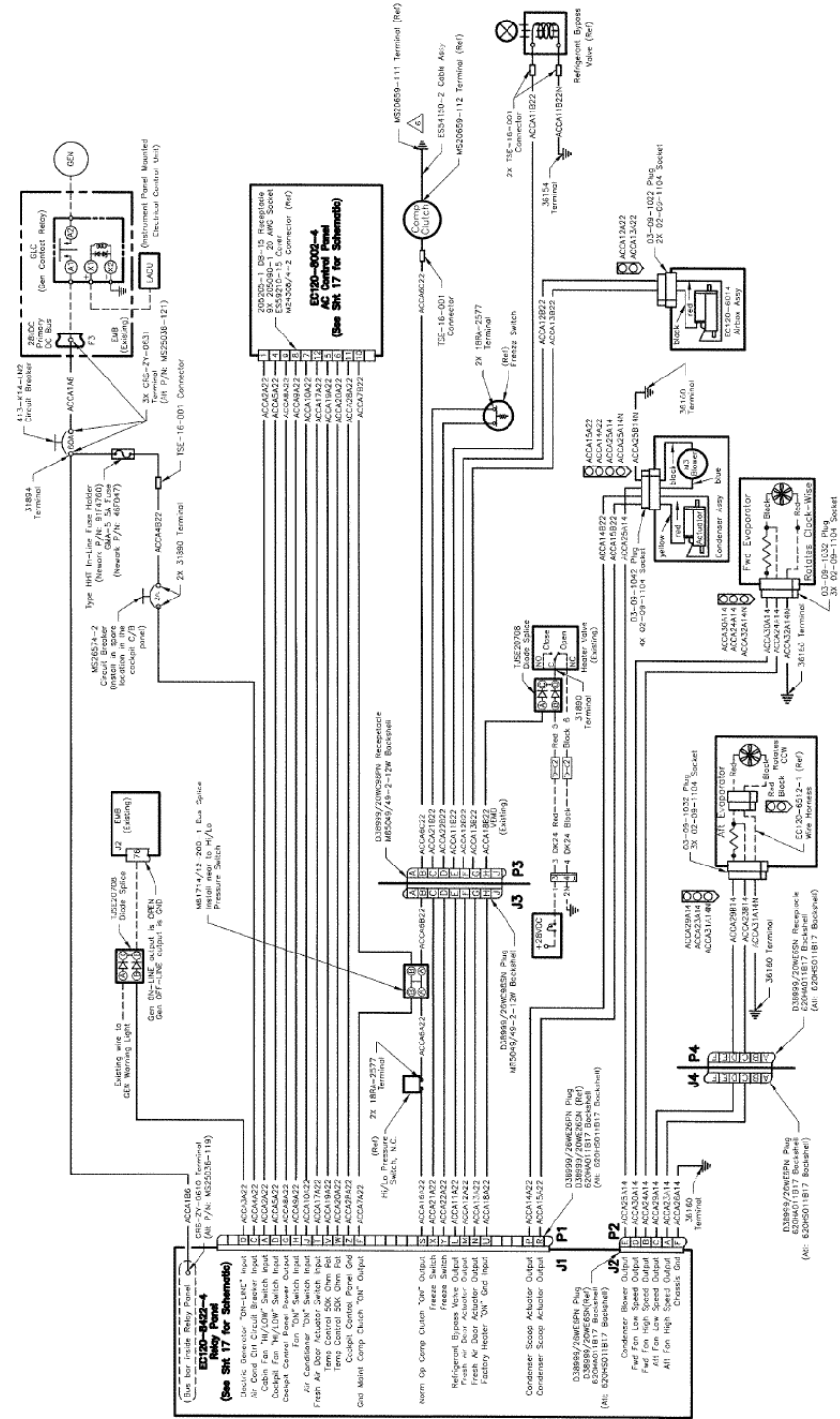


Figure 8.4 Pre Nov 2014 shipped kit AC System Electrical Schematic, Fwd & Aft Evaporators w / Fresh Air Duct

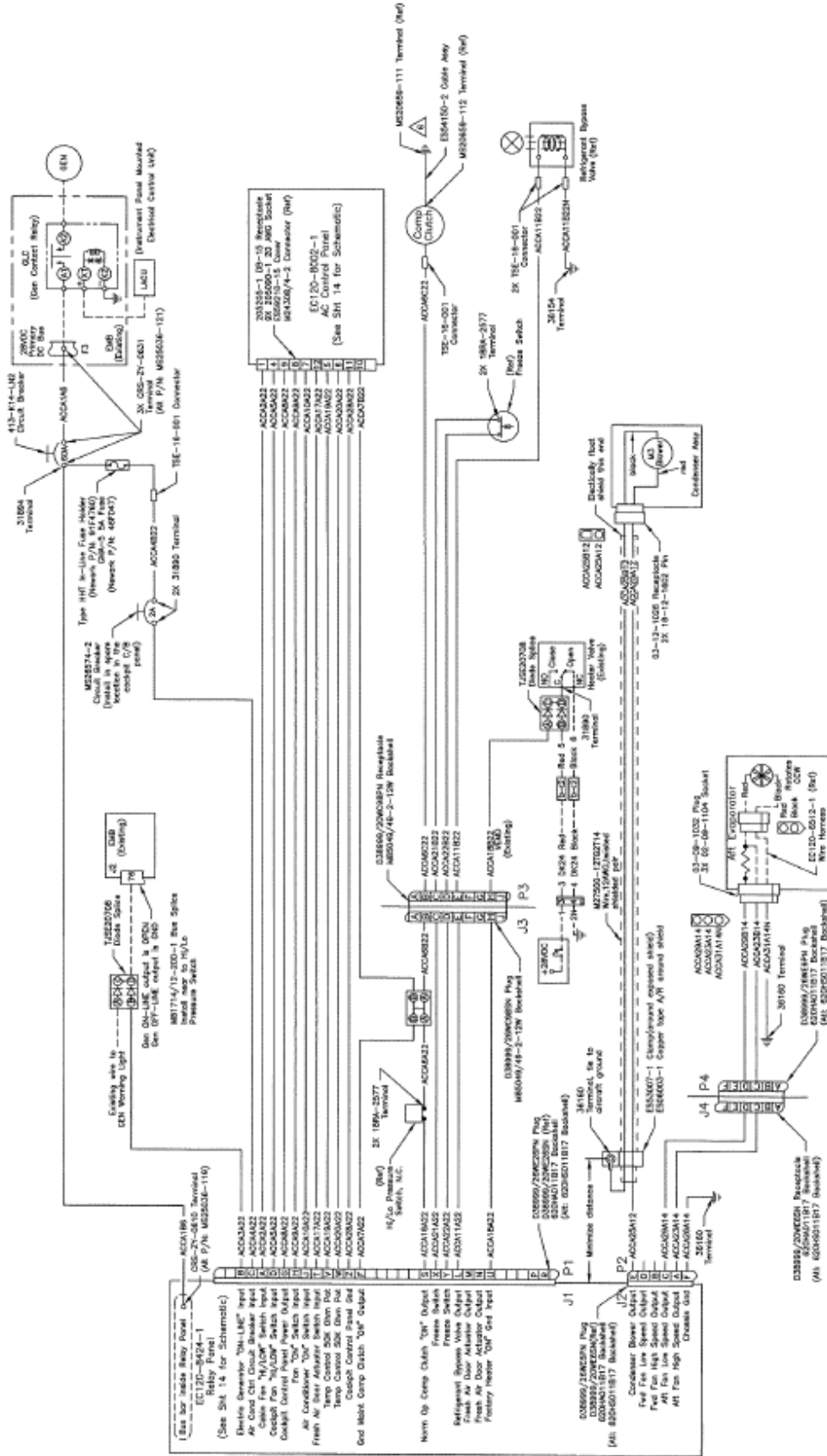


Figure 8.5 Post Nov 2014 shipped kit AC System Electrical Schematic, Aft Evaporator only, w/o Fresh Air Duct

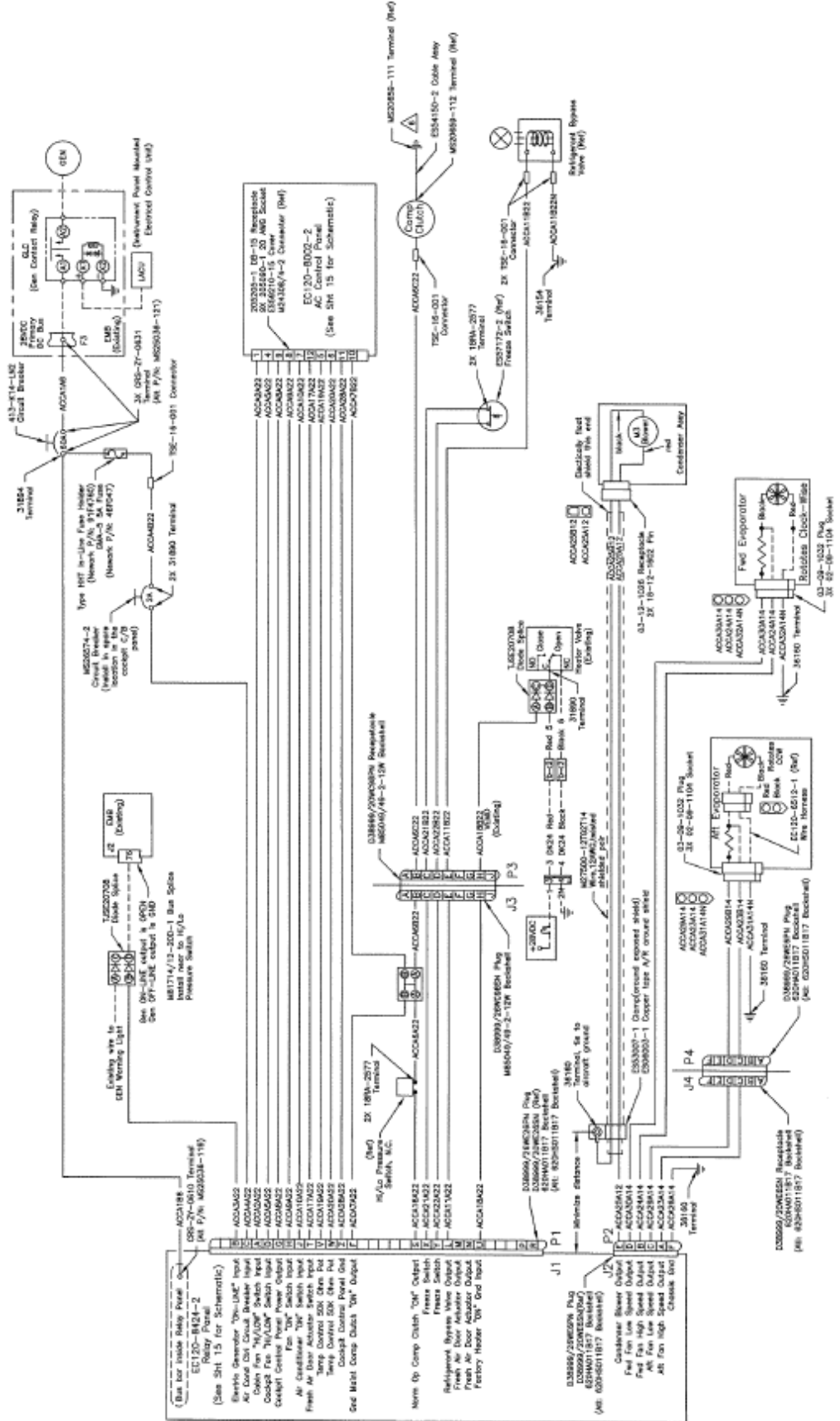


Figure 8.6 Post Nov 2014 shipped kit AC System Electrical Schematic, Fwd & Aft Evaporator w/o Fresh Air Duct

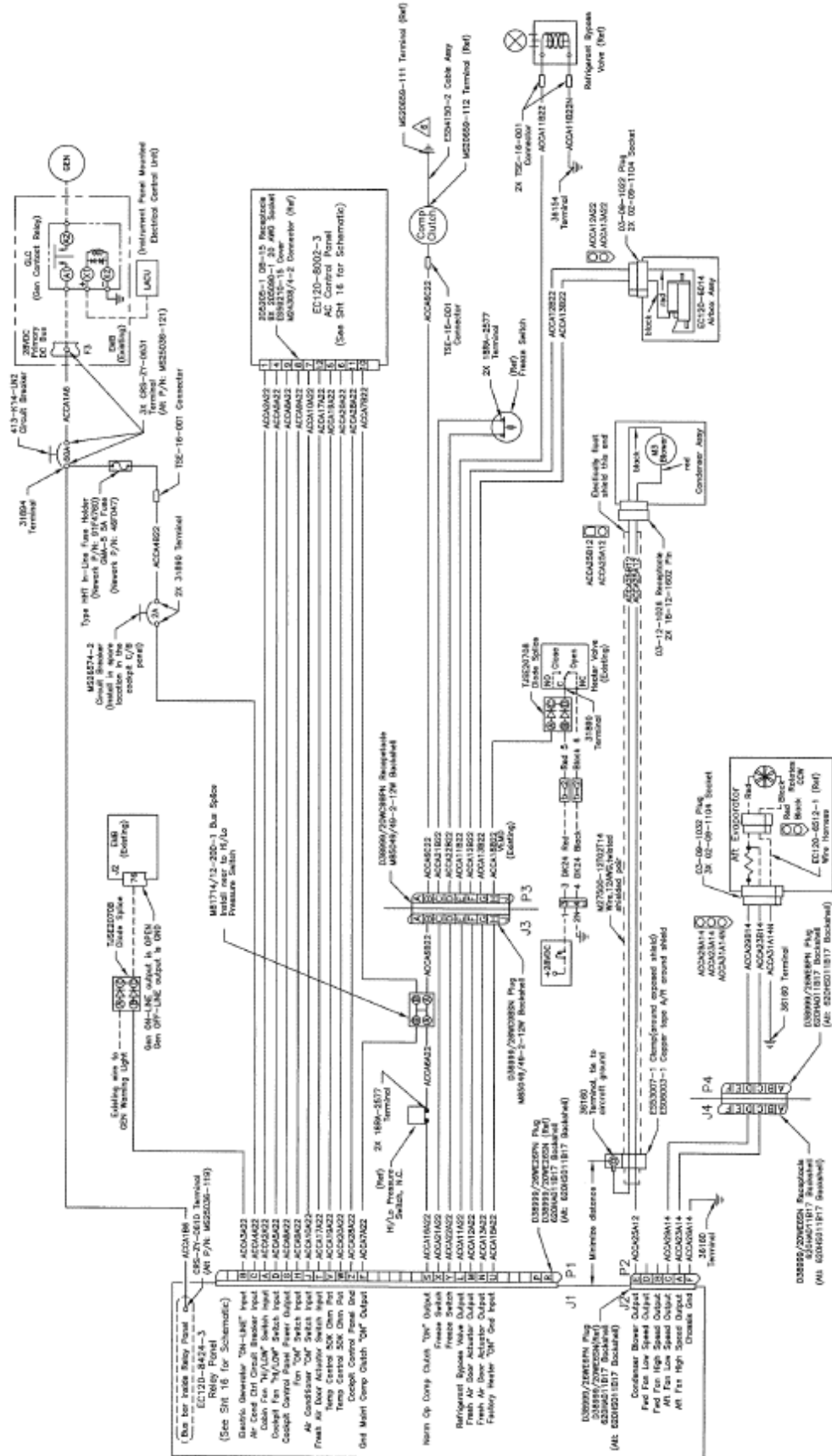


Figure 8.7 Post Nov 2014 shipped kit AC System Electrical Schematic, Aft Evaporator only, w/ Fresh Air Duct

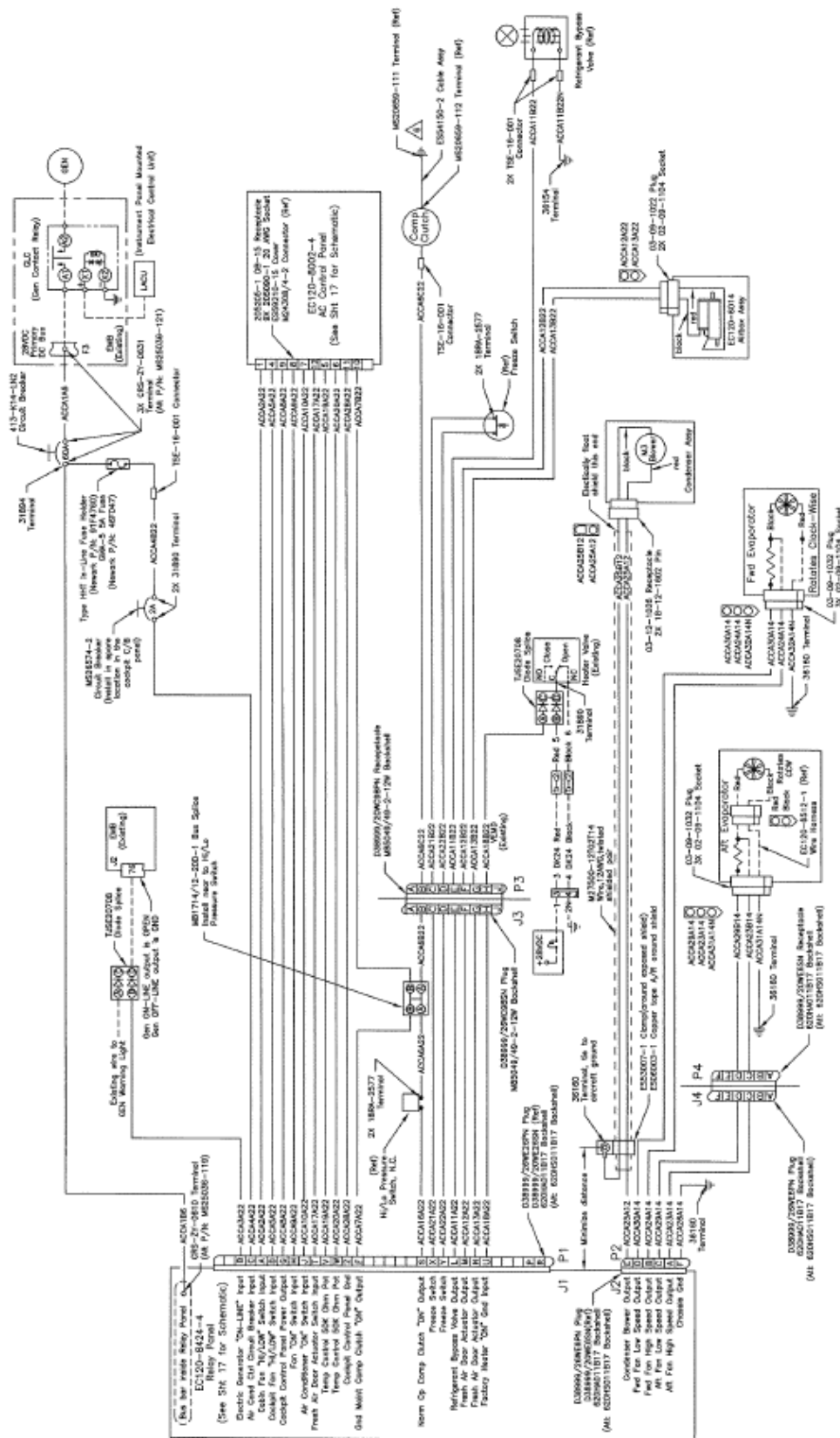


Figure 8.8 Proct Nov 2014 shipped kit AC System Electrical Schematic, Fwd & Aft Evaporators w / Fresh Air Duct

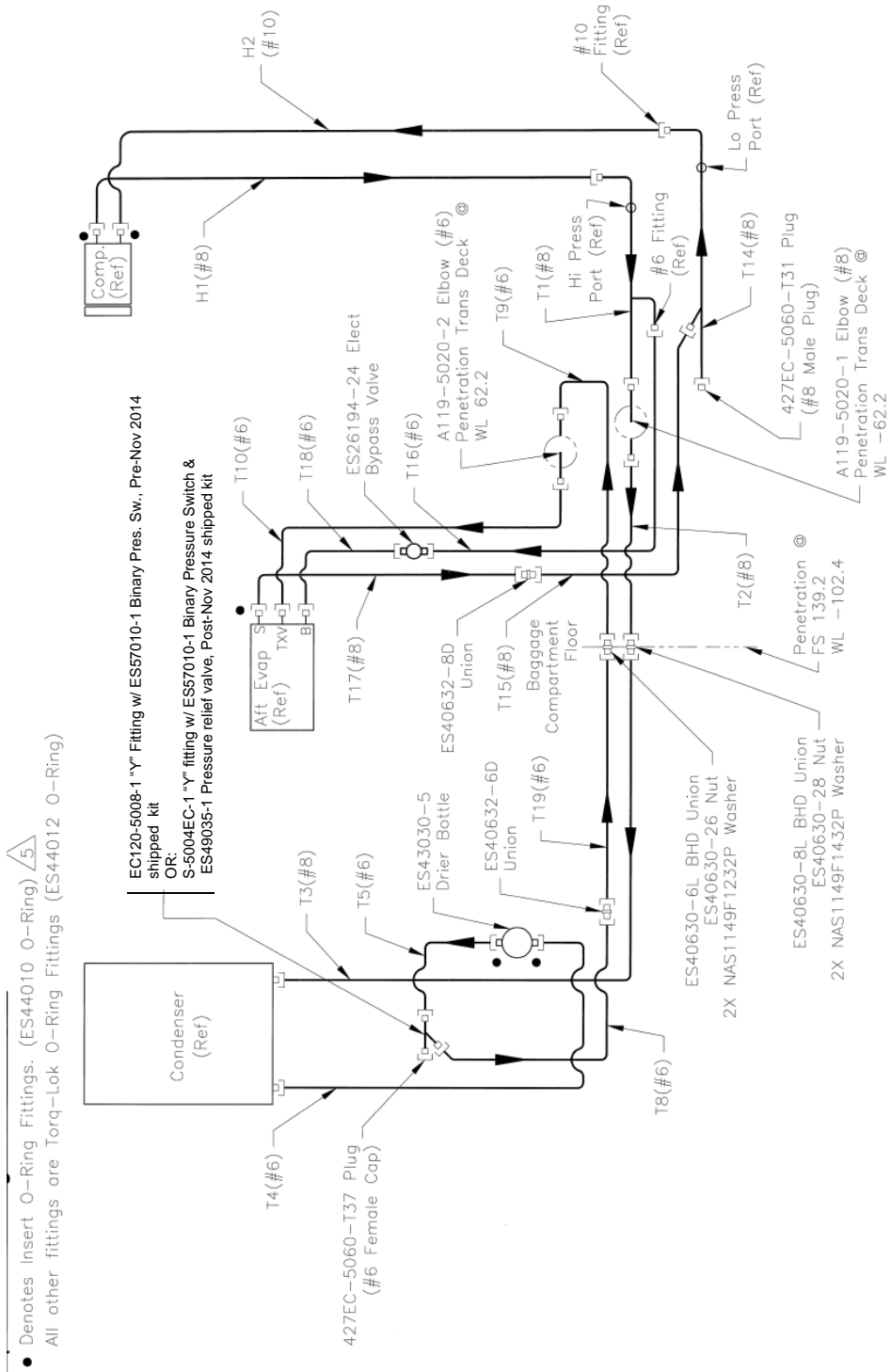


Figure 8.9 AC System Plumbing Schematic, kit w/Aft Evaporator only

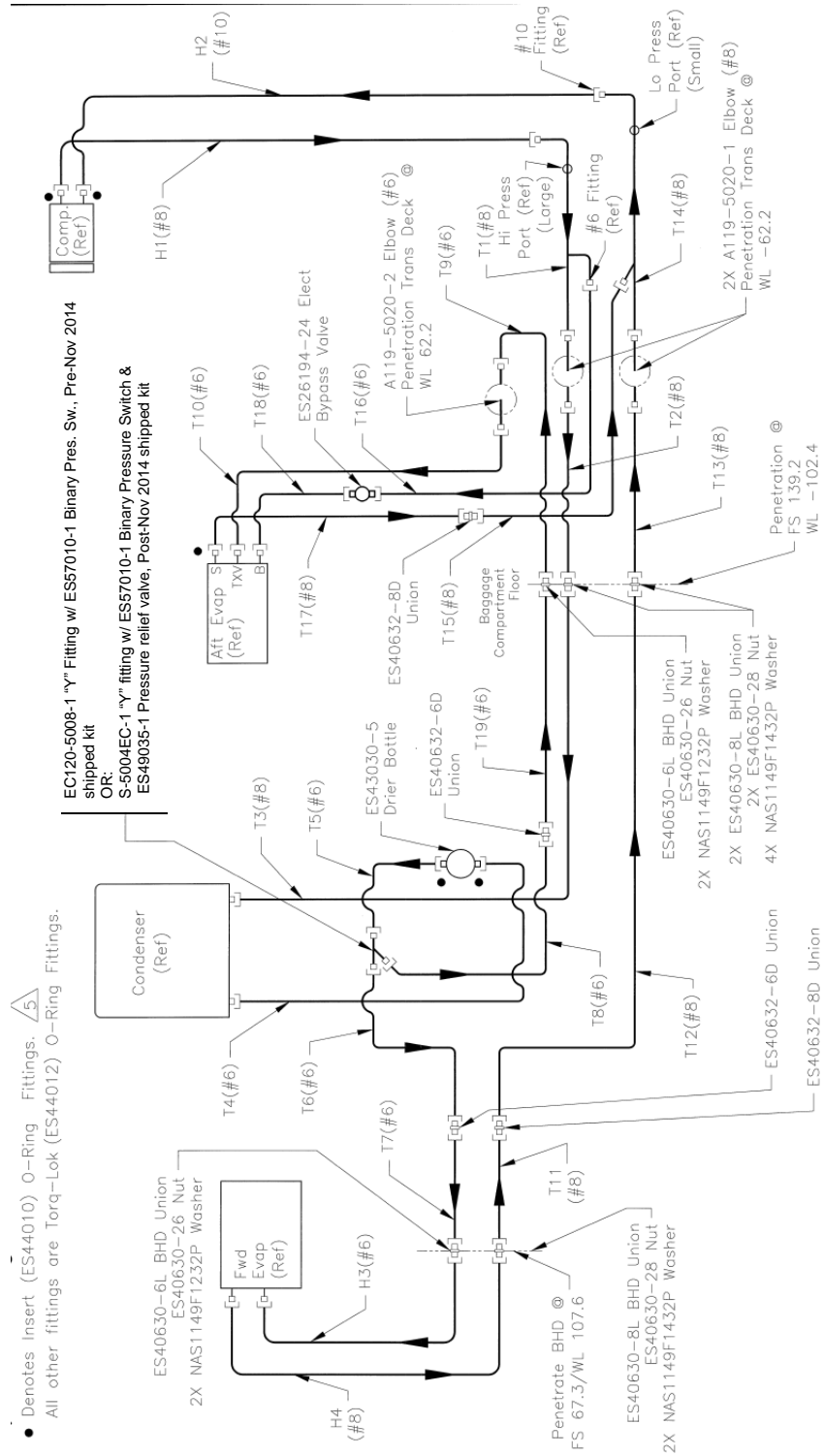


Figure 8.10 AC System Plumbing Schematic, kit w/Fwd & Aft Evaporator

APPENDIX A
WEIGHT AND BALANCE INFORMATION

Weight breakdown – Airbus EC120B Air Conditioner System:
Ref. Dwg. EC120-200

Item	Wt. (lbs)	X-Arm (in)	X-M (in-lb.)	Y-Arm (in)	Y-M (in-lb)
Total EC120B with Single Aft Evaporator	62.98	142.7	8990	-2.5	-162
Total EC120B with Single Forward & Aft Evaporator	75.48	128.4	9694	-2.1	-162

APPENDIX B

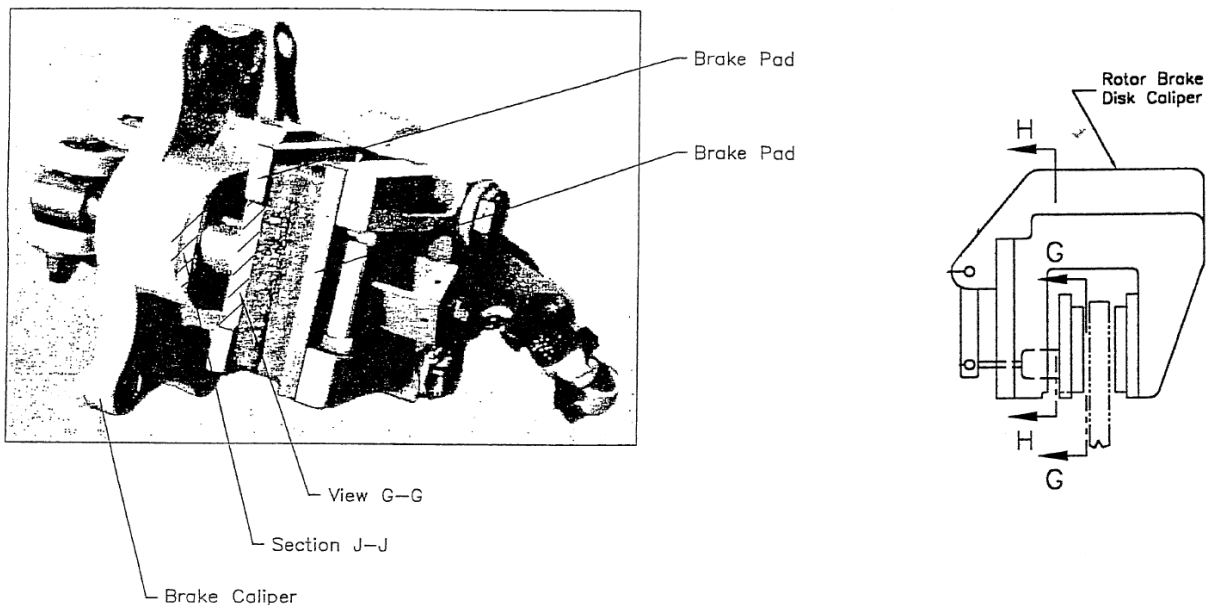
Modification Instructions for the Rotor Brake Pad Support Plate:

NOTE

During installation of the Air Conditioner kit, or any time the Rotor Brake Pads are replaced it will be necessary to modify the Rotor Brake Assembly. This section provides the information necessary to insure the proper clearance between the Compressor Drive Pulley and the Rotor Brake Assembly.

NOTE

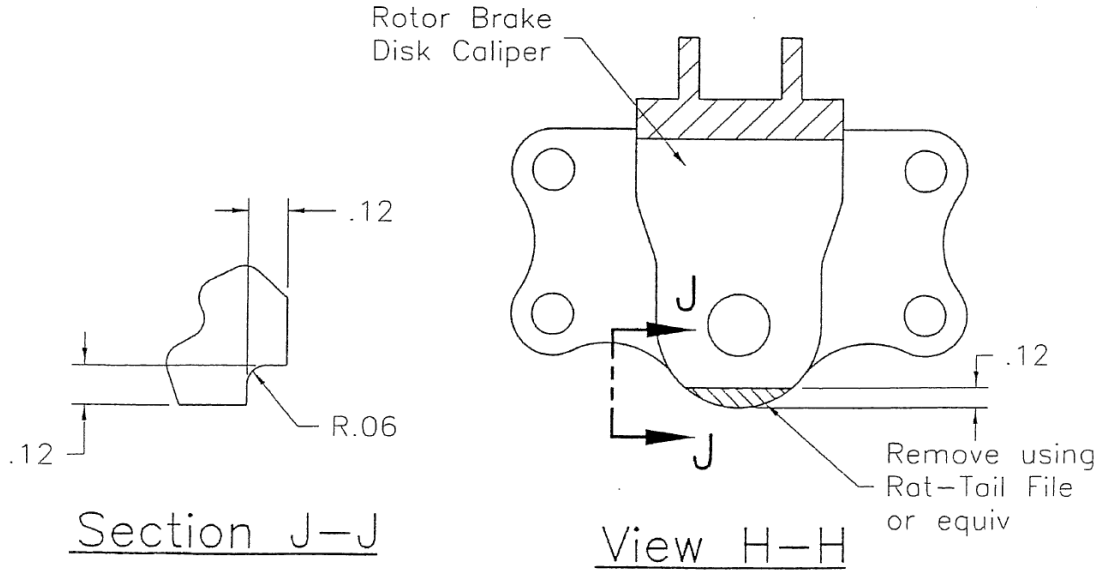
Consult the EC120 B Maintenance Manual for Removal, Inspection, and Replacement / Installation instructions for the Rotor Brake Pads.



Reference views for modification to Rotor Brake Assembly.

1. Using a "Rat Tail" file or Equivalent, remove .12 inch from the Rotor Brake Disk Caliper as shown in Section J-J or View H-H below.

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2. Using a "Rotary" file or Equivalent, Remove .06 inch X 1.12 inch from the top of the Rotor Brake Pad as shown in View G-G Below.

