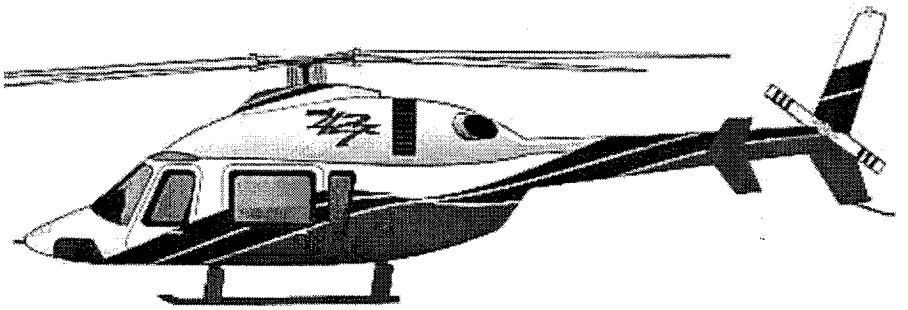
AIR COMM CORPORATION
3300 AIRPORT ROAD
BOULDER, CO. 80301

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
BELL HELICOPTER 427
AIR CONDITIONING SYSTEM



Revision 2

28 January 2008

RECORD OF REVISIONS

REVISION NUMBER	ISSUE DATE	DATE INSERTED	BY	REVISION NUMBER	ISSUE DATE	DATE INSERTED	BY
1	05/19/05	05/19/05	GP				
2	1/28/2008	1/28/2008	RM				

LIST OF EFFECTIVE PAGES

LIST OF REVISIONS

Revision 0 (Original Issue).....February 15, 2000
Revision 1 Addition of Compressor Drive Poly V Belt
May 19,2005(I,ii,3-4,3-5,3-13 thru 3-18,3-25,4-1,4-2,5-5,6-3)
Revision 2 Changed obsolete ES57008-2 to current
ES57010-1 January 28, 2008

LIST OF EFFECTIVE PAGES

Title	Page(s)	Revision No.
Record of Revisions	i	2
List of Effective Pages	ii	2
Table of Contents	iii to iv	1
Chapter 0 Introduction	0-1 to 0-7	1
Chapter 1 Airworthiness Limitation Section	1-1	1
Chapter 2 Inspections	2-1	1
Chapter 3 Location and Access	3-1 to 3-26	2
Chapter 4 Placards and Markings	4-1 to 4-2	1
Chapter 5 Servicing	5-1 to 5-5	2
Chapter 6 Standard Practices	6-1 to 6-10	1
Chapter 7 Troubleshooting	7-1 to 7-12	1

THIS AREA INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

(continued)

TABLE OF CONTENTS (continued)

This Area intentionally left blank

CHAPTER 0
INTRODUCTION

1. SCOPE

The scope of this manual encompasses the scheduled and unscheduled maintenance procedures for the continued airworthiness for the Air Comm Corporation air conditioning system installed in the Bell 427 helicopter.

2. PURPOSE

The purpose of this manual is to provide the aircraft mechanic in the field the necessary information to maintain 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 manual is applicable to Bell Helicopter models 427 that are equipped with the Air Comm Corporation kit number 427EC-200 air conditioner system.

5. DEFINITIONS

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

Ambient air temperature: The temperature of the air surrounding a person or object.

Charging station: An air conditioning system service unit which is capable of evacuating and charging an air conditioner.

Cold: The absence of heat.

Condensation: The process of changing a vapor into a liquid.

Desiccant: A material used in the receiver/drier bottle, designed to absorb moisture from the refrigerant.

Evaporate: To change from a liquid into a vapor.

Heat load: The amount of heat which the air conditioner is required to remove from the aircraft cabin.

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.

(continued)

5. DEFINITIONS (continued)

Pressure, ambient: The pressure of the air surrounding a body, normally measured in Pounds Per Square inch, or PSIG.

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.

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.

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.

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

Vapor: The gaseous state of a material.

6. ABBREVIATIONS

InHg:	Inches of Mercury
Lbs:	Pounds
oz:	Ounces
Psig:	Pounds Per Square Inch (gauge)
gr:	Grams
kg:	Kilograms
Kgcm:	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 MEASUREMENT
All measurements contained within this manual are given in the United States standard measurement, followed by the metric conversion in parentheses.

9. INFORMATION ESSENTIAL TO THE CONTINUED AIRWORTHINESS OF THE AIR CONDITIONER.

This manual provides information which is required for operation and maintenance of the Air Comm air conditioning system installed in the Bell model 427 series helicopter. After completion of the air conditioner installation this document must be placed with the appropriate existing aircraft documents.

10. REFERENCE DOCUMENTS

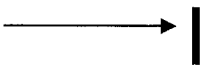
The approval basis of the system covered by this ICA is Supplemental Type Certificate **SR00418DE**

11. DISTRIBUTION

This document is to be placed with the aircraft maintenance records at the time of system installation. It is not intended to update previously supplied manuals unless a change is required which involves safety issues. In this case a service bulletin shall be issued to provide the information.

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, while 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. DESCRIPTION AND OPERATION OF AIR CONDITIONER SYSTEM

The air conditioner is a vapor cycle type which provides conditioned air to the cabin during ground and flight operation of the aircraft. The system utilizes the R134a refrigerant.

The basic components of the system are listed below.

Component

a. Compressor Installation
b. Condenser Installation
c. Evaporator Installation (one fwd Standard, two fwd Optional)
d. Evaporator Installation (two aft)
e. Plumbing Installation (aluminum tubing)
f. Electrical System Installation

The compressor is mounted to the main rotor transmission and is belt driven by a drive pulley which is bolted to the tail rotor output Quill.

The condenser is mounted below the baggage compartment floor.

The forward evaporators are mounted on either side of the instrument panel console. Two "aft mounted" evaporators are mounted behind the hat shelf.

The system controls feature AC-OFF-Blower functions incorporated on a single "three position" switch. Two additional "two position" switches are provided for HI and LO blower selection for the forward and rear evaporators. The forward and aft evaporators can be operated independently of each in the high or low blower positions.

An outlet air temperature control knob is included in the switch panel. This control can be used to adjust the set-point of a capillary type switch to adjust the conditioned air outlet temperature. Capillary type temperature control switches are incorporated in both the forward and aft evaporators for air temperature control and/or coil freeze-up prevention. These switches control a solenoid operated refrigerant bypass valve. This arrangement provides system control without compressor clutch cycling.

The system incorporates a binary pressure switch. This switch is designed to protect the system in case of loss of refrigerant (low pressure) or in case of a system overpressure. The system cut-out pressures are 50 and 325 psig for the low and high pressures, respectively. This switch prevents operation below ambient conditions of 50° F (10° C).

Continued

13. DESCRIPTION AND OPERATION OF AIR CONDITIONER SYSTEM

The air conditioner control panel includes a compressor ON light for visual confirmation of the system status.

The air conditioning electrical system logic is provided as follows:
The electrical schematic as provided in Chapter 3 Pg. 3-13 reflects the power-off condition.

The compressor on light is controlled by a temperature switch located on the compressor assembly. Should the compressor clutch temperature rise above 220° F the power will be cut to the compressor clutch, and a locking relay will be energized to disable the air conditioning system until such time as maintenance personnel can determine the cause of the compressor clutch overtemp and reset the relay.

From the aircraft's RH DC Bus power is supplied to the Circuit Breaker Bus bar. From the aircraft's overhead switch panel power is supplied through a 2A CB to the A/C control panel. When the A/C switch is switched to the "ON" position, the Condenser Scoop Relay is energized allowing the scoop to open and the condenser blower motor to turn on. The compressor clutch is engaged. At the same time the Fwd and Aft Crydom Relays are energized allowing the Fwd and Aft blowers to operate.

With the A/C switched "ON", power is supplied through the thermostat switch (in the control panel) and the Thermostat Switch in the LH Aft Evap, which energizes the temperature control relay. If the pilot selects a temperature that is warmer than the current temperature selection, the thermostat switch will open, allowing the relay to deenergize. Power will then be supplied to the refrigerant bypass valve, bypassing the refrigerant, thus resulting in a higher air temperature leaving the evaporators. If the temperature setting remains in the selected position, the bypass valve will cycle on and off to maintain the selected temperatures. If the aft evaporator coil approaches the freezing temperature, the thermostat switch will open and allow refrigerant to bypass, thereby preventing coil freeze-up.

Blower speed control is achieved by switching the blowers from parallel to series (Lo) using a blower speed relay.

If at any time the refrigerant charge is lost, the Hi/Lo pressure switch will open resulting in the deenergizing of the compressor clutch.

When the "OFF" position on the A/C control panel is selected, the condenser scoop relay will be deenergized and power will be supplied to the scoop actuator allowing the scoop to retract. Because the actuator has internal limit switches the power will be cut when full travel has been accomplished.

In the "Blowers" mode, the Fwd and Aft Crydom Relays will be energized and power the Fwd and Aft evaporator blowers. If the "LO" setting on the A/C control panel is selected, the blower speed relays will be energized, switching the blowers from parallel to series and lowering the blower speed. The condenser and compressor are not activated in the blower mode.

14. THEORY OF OPERATION OF THE BASIC VAPOR CYCLE AIR CONDITIONER

This section presents a brief overview of the theory of operation of the vapor cycle air conditioner. It is recommended that service personnel be thoroughly trained before attempting to service this system.

The system is shown schematically by figure 0-1.

The function of the compressor is to pump refrigerant throughout the closed loop system.

The compressor compresses the refrigerant into a high pressure, high temperature vapor and forces it to the condenser heat exchanger.

The condenser blower forces outside air across the heat exchanger. The exchange of heat changes the refrigerant to a liquid.

The receiver-drier acts as a reservoir and a filter. Additionally, the drier bottle filter contains a desiccant which serves to remove any residual moisture in the refrigerant. Moisture in the refrigerant can cause corrosion and loss of cooling due to freeze-up at the evaporator expansion valves.

From the drier bottle the high pressure liquid refrigerant is pumped to the evaporators where it is expanded to a vaporous state. This change of state removes heat and moisture from the air, thus cooling the cabin. Water vapor from the cabin air collects on the evaporator heat exchanger fins and is drained overboard.

The compressor suction pumps the low temperature refrigerant vapor back to the compressor where the cycle starts over again.

The bypass valve serves to control the temperature of the conditioned air and/or to prevent condensation from freezing on the evaporator heat exchanger.

Continued

14. THEORY OF OPERATION OF THE BASIC VAPOR CYCLE AIR CONDITIONER (continued)

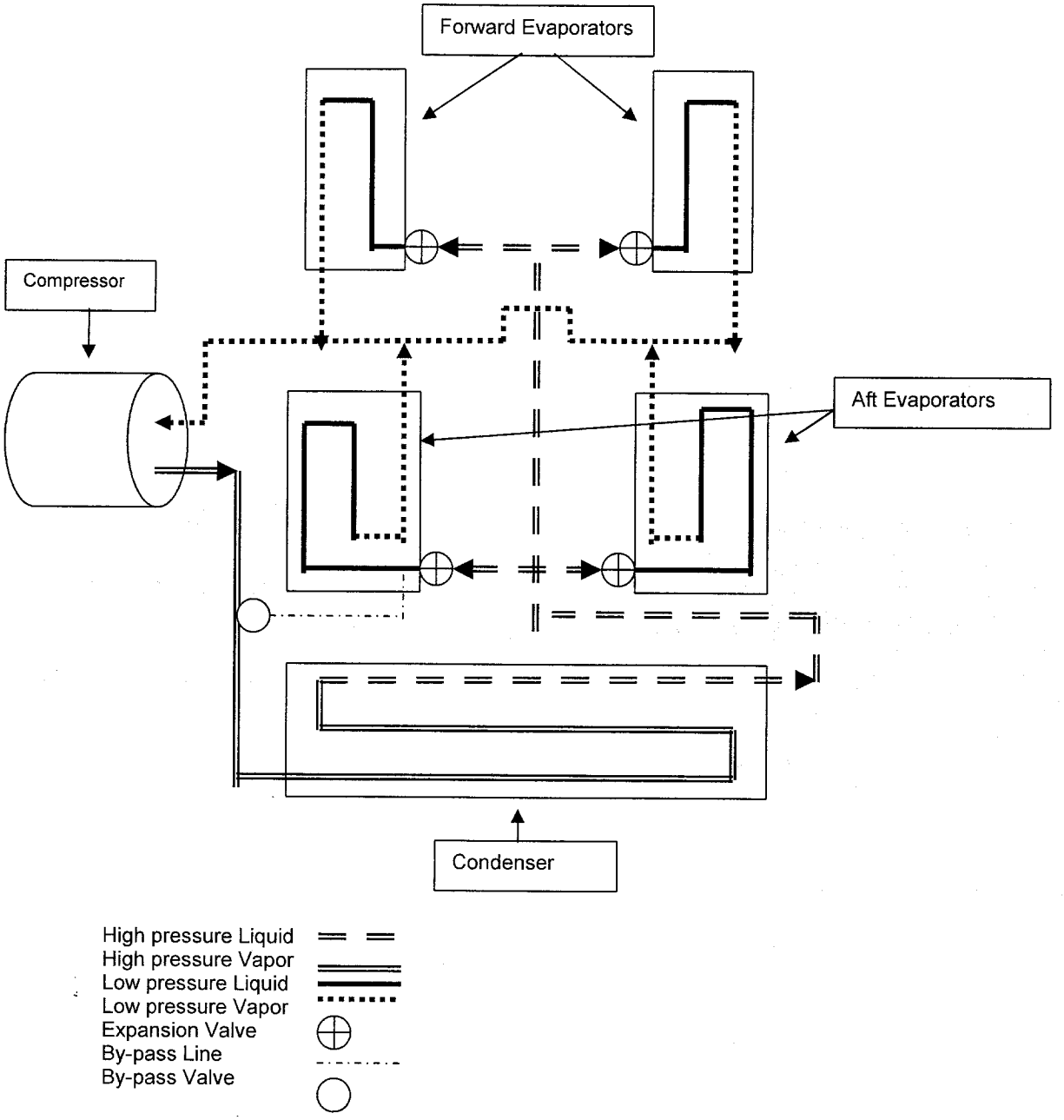


Figure 0-1 Basic Vapor Cycle Air Conditioning System Schematic

CHAPTER 1
AIRWORTHINESS LIMITATION SECTION

1. Airworthiness Limitations

Baggage compartment floor placarded as " MAXIMUM BAGGAGE Wt: 228 LBS (103 Kg)"

THIS AREA INTENTIONALLY LEFT BLANK

CHAPTER 2
INSPECTIONS

1. INSPECTION REQUIREMENTS

PERIODIC INSPECTIONS
(Hours are aircraft time)

Item	Prior to Cooling Season	Every 25 Hours of Operation	Every 100 Hours of Operation	Special Inspection Information
Evaporator Blower Hi/Lo Operation	X		X	Check for operation and security
Condenser Blower Motor & Scoop Assembly.	X		X	Check for operation and security.
Condenser Assembly. Mounting & Housing	X		X	Check for blockage of heat exchanger fins, operation, and security
Compressor Drive Belt	X	X	X	Check belt tension, and for signs of excessive wear (example: Glazing, Cracks, and exposed fibers)
Placards & Markings	X		X	Check for security and legibility
Compressor Assembly.	X	X	X	Check for operation, security of attaching hardware, and signs of oil or refrigerant leaks.
Compressor Mount	X	X	X	Check mount for cracks, and security of the attaching hard - ware
Aft Evaporator Foam Insulation	X		X	Check for security and signs of deterioration, replace as necessary
Plumbing and Fittings	X		X	Check for security and signs of oil or refrigerant leaks
Compressor Drive Pulley	X	X	X	Check for security of attaching hardware.

2. COMPONENT OVERHAUL/REPLACEMENT SCHEDULE

System component failure will result in loss of cabin cooling, and no safety of flight issues are involved. Thus there are no component overhaul or replacement requirements.

CHAPTER 3
LOCATION AND ACCESS

1. LOCATION OF AIR CONDITIONER FEATURES

Nomenclature	Figure	Description of Location
General Arrangement Standard System – Single Fwd Evap.	3.1	For Reference only.
General Arrangement Option – Dual Fwd Evap.	3.2	For Reference only.
Compressor Installation	3.3	Located on RH side of main rotor transmission.
Forward Evaporator Installation	3.4	Located on the sides of the forward keel structure at station 104.
Aft Evaporator Installation	3.5	Located on the WL57 panel at station 270.
Condenser Installation	3.6	Located below baggage compartment floor.
Electrical Schematic	3.7	For Reference only.
Air Conditioner Control Panel (Dual & Single forward Evaporator)	3.8	Located in the center console between the Pilot/Co- Pilot.
Circuit Breaker Installation Panel	3.9	Located in the upper RH corner of the baggage compartment.
Relay Panel Installation	3.10	Located on the RH side of the WL57 panel at station 260.
Refrigerant Plumbing Schematic	3.11	For Reference only
Receiver Drier Bottle Location & Service Ports Location	3.12	Located behind the LH side panel of the baggage compartment.
Refrigerant Bypass Valve & Hi/Lo Pressure Switch Installation	3.13	Located below the baggage floor at station 275.
Forward Evaporator Refrigerant Tube Connections	3.14	Located in center pedestal between the forward evaporators.
Refrigerant Plumbing Routing	3.15	For Reference only
Compressor / Idler Mount Installation	3.16	Located on the aft side of the Main Transmission housing.
Forward Evaporator Air Outlet Installation	3.17	Located on each side of the Cockpit Instrument Panel (Typical both sides)

2. LAYOUT OF AIR CONDITIONER SYSTEM (Continued).

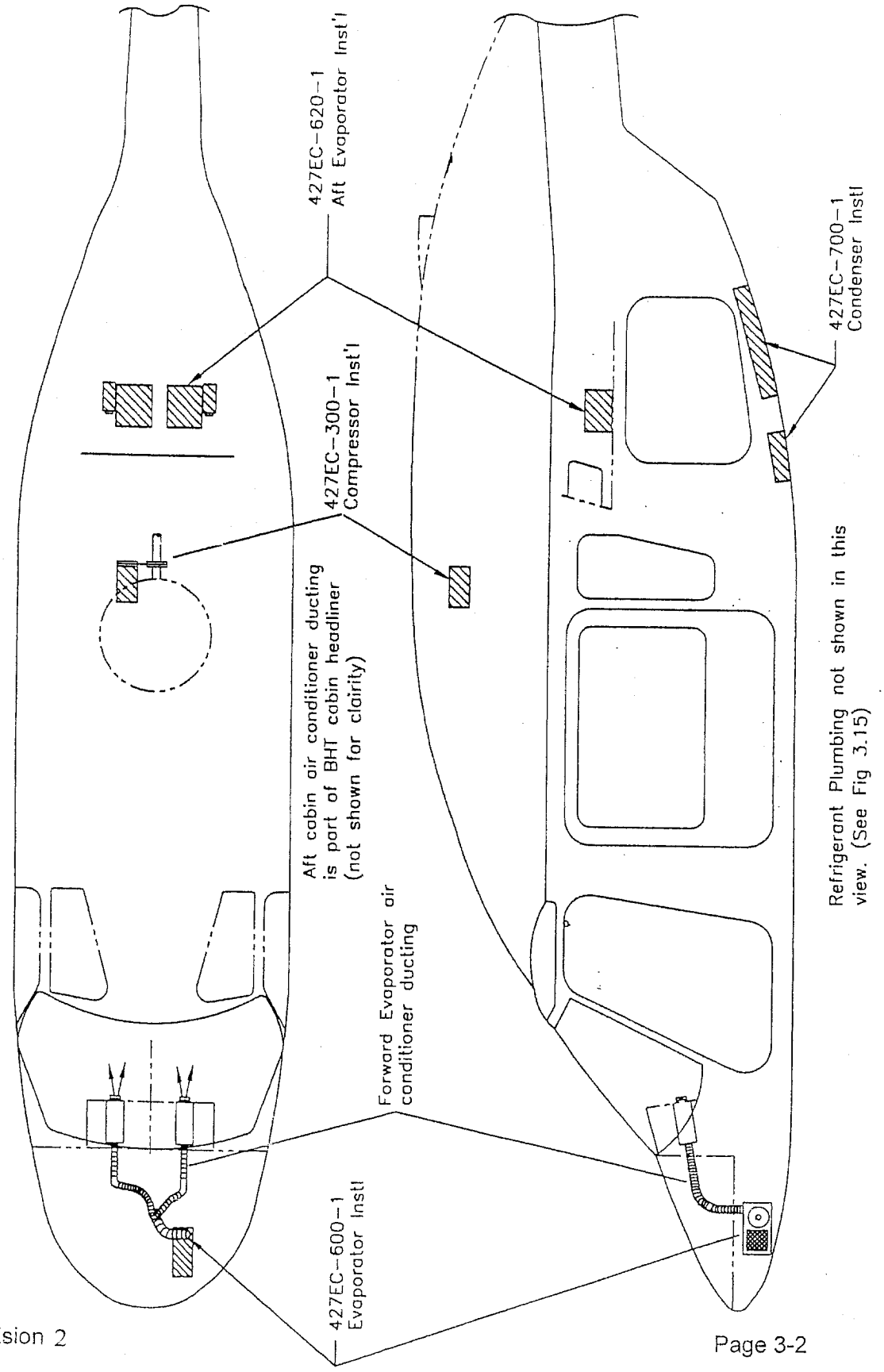


Figure 3.1 Standard System – One Forward and Two Aft Evaporators

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

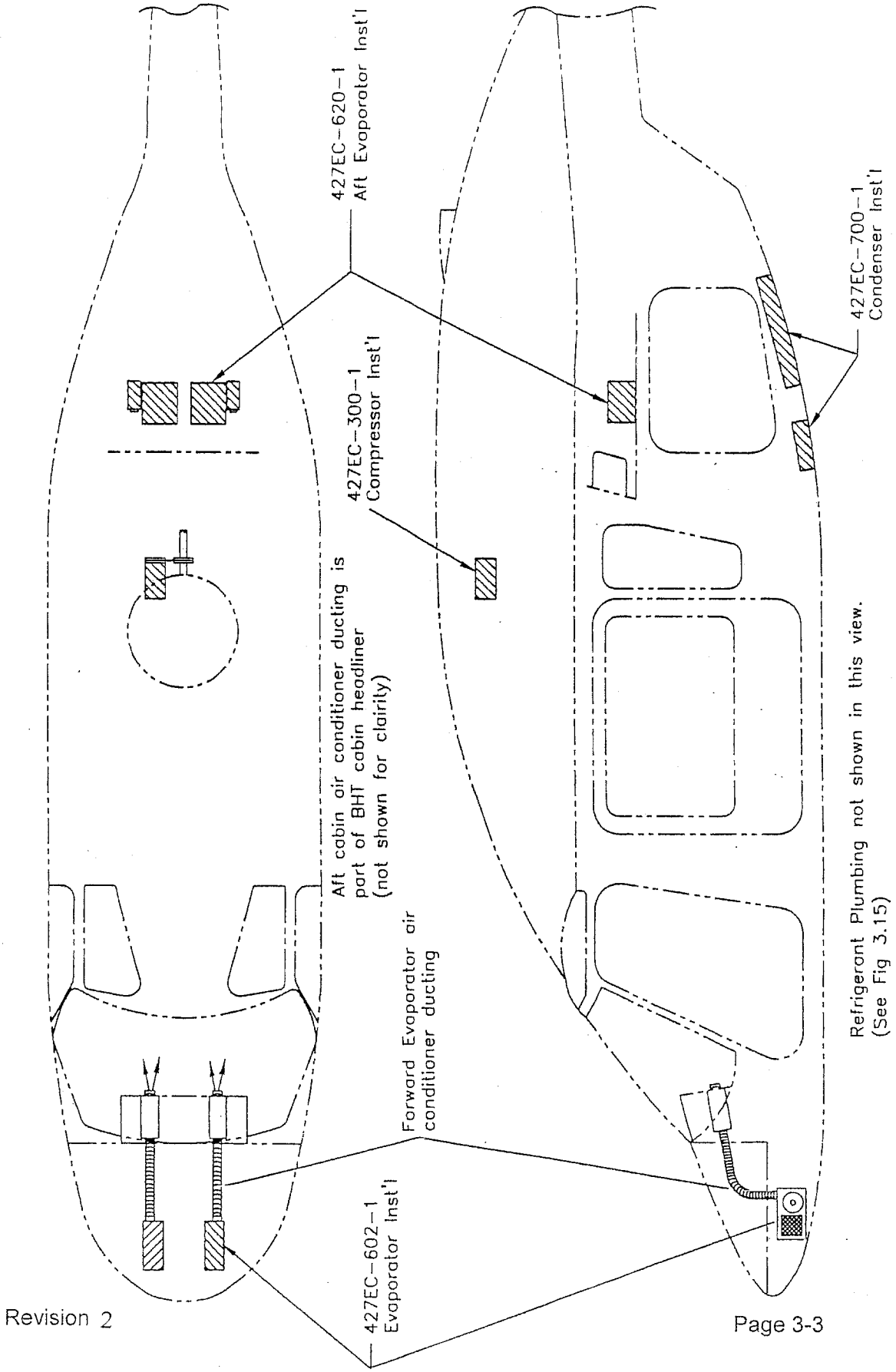


Figure 3.2 Optional High Output System – Two Forward & Two Aft Evaporators

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

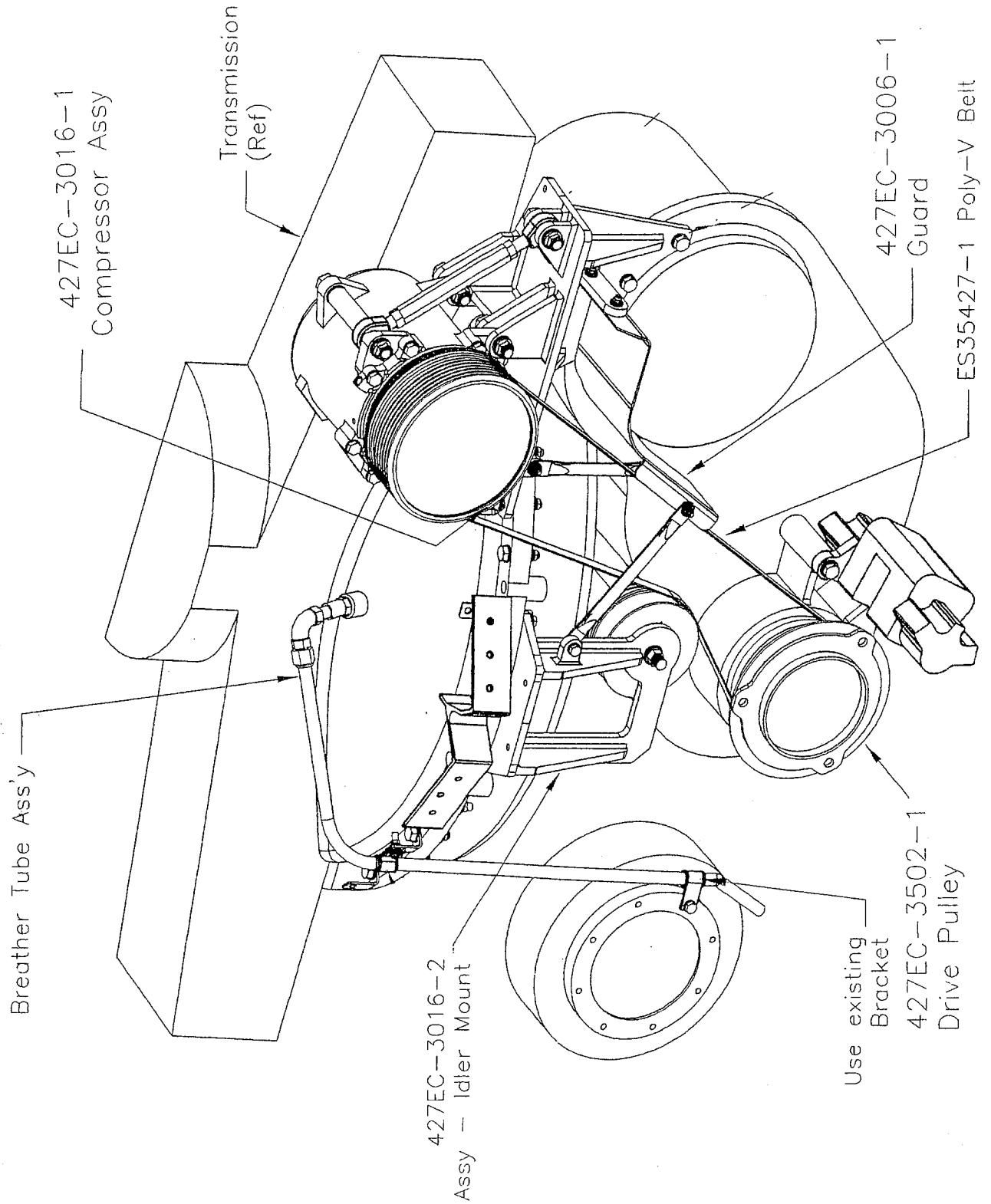


Figure 3.3 Compressor Installation (Sheet 1 of 2)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

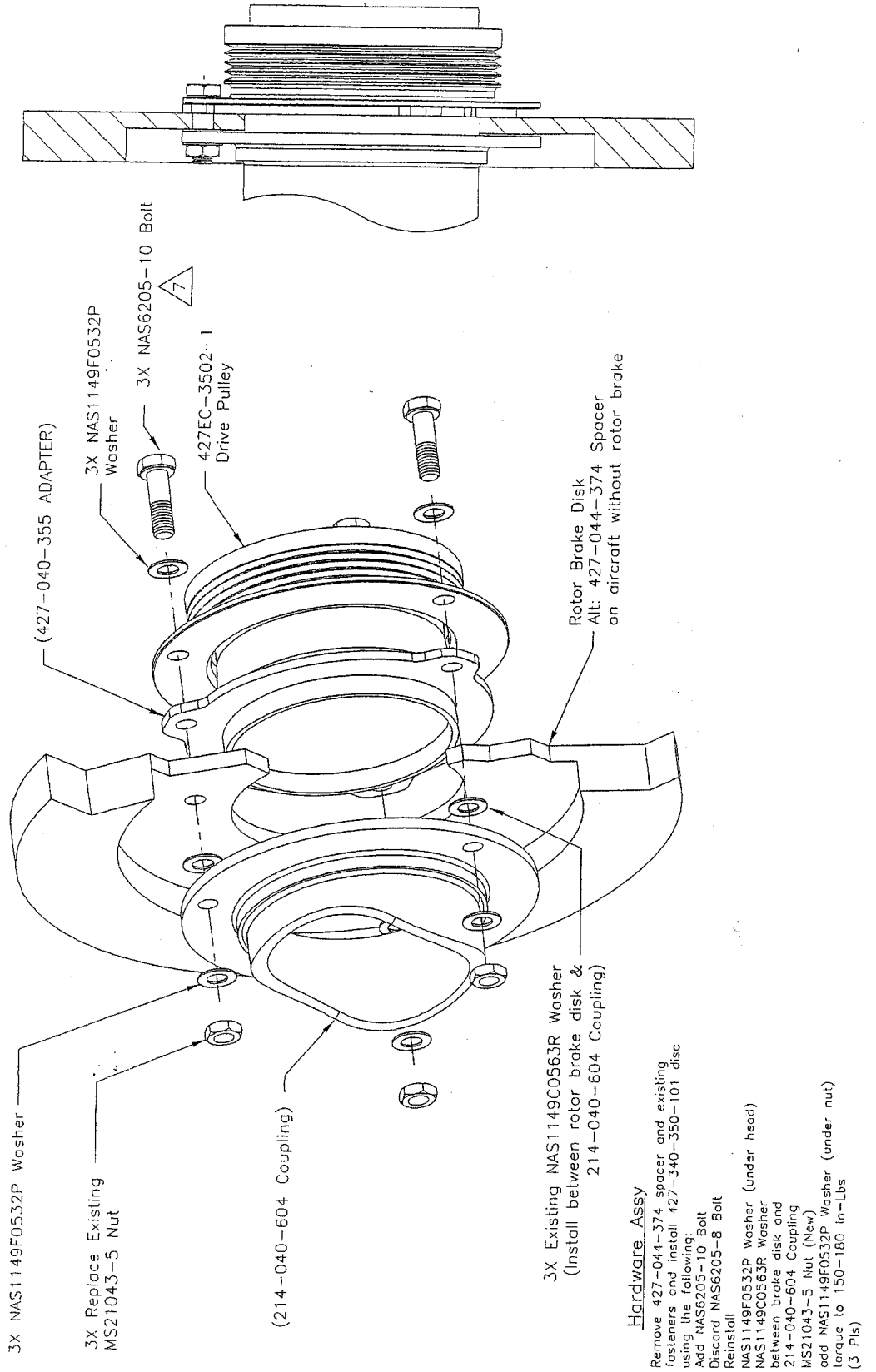


Figure 3.3 Compressor Installation (Sheet 2 of 2)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

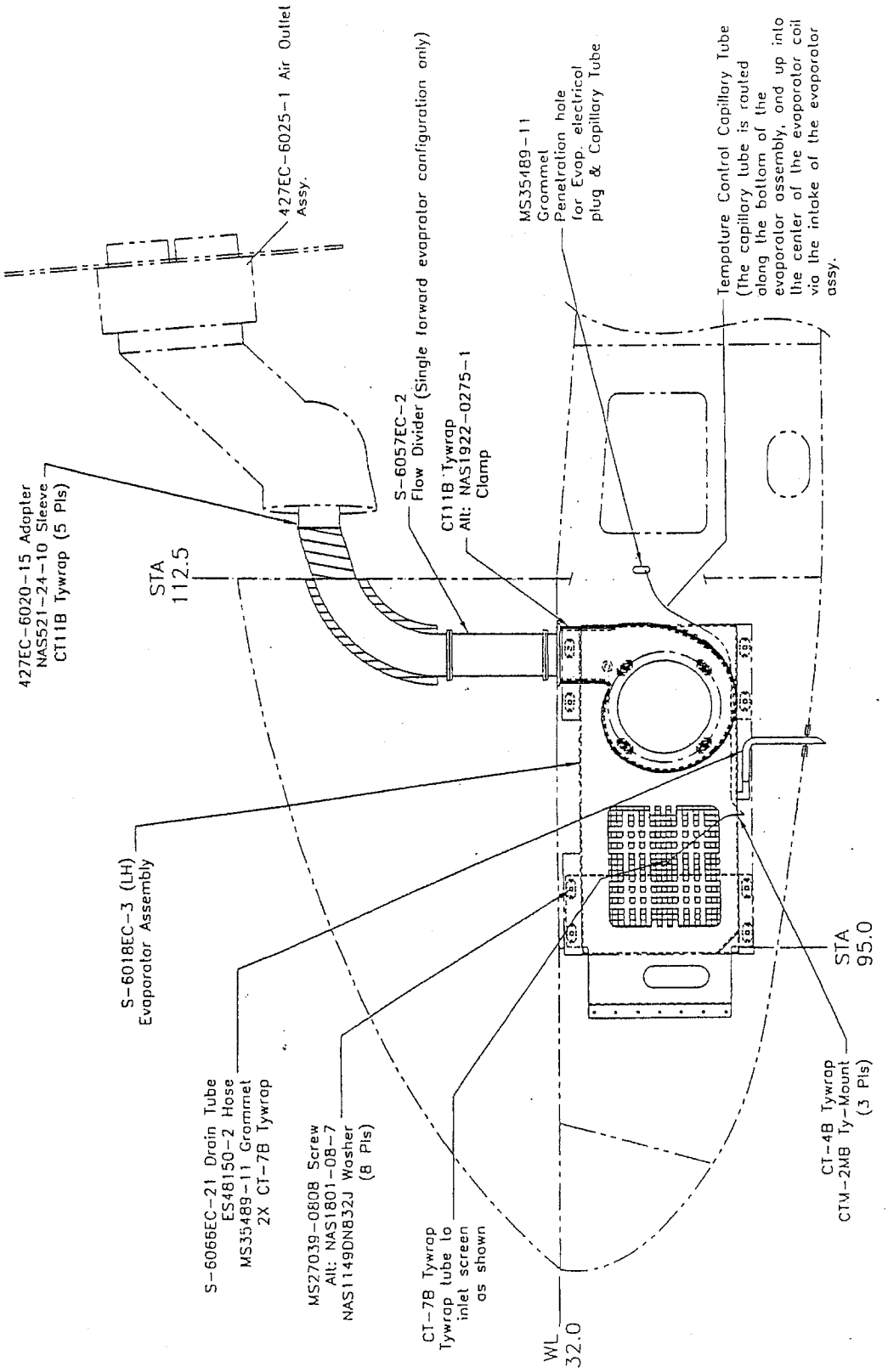


Figure 3.4 Forward Evaporator Installation

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

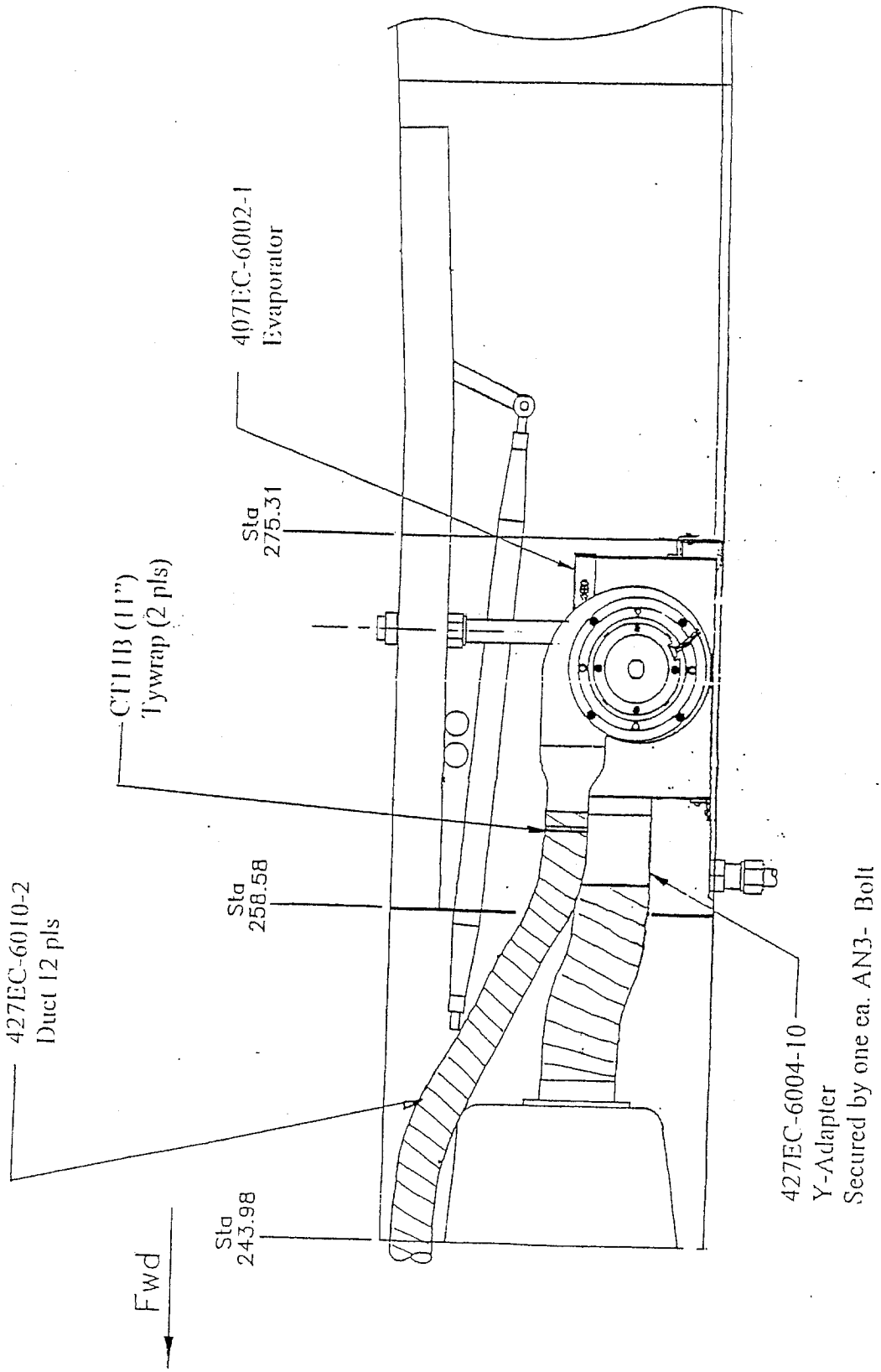


Figure 3.5 Aft Evaporator Installation – Looking Inboard (Sheet 1 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

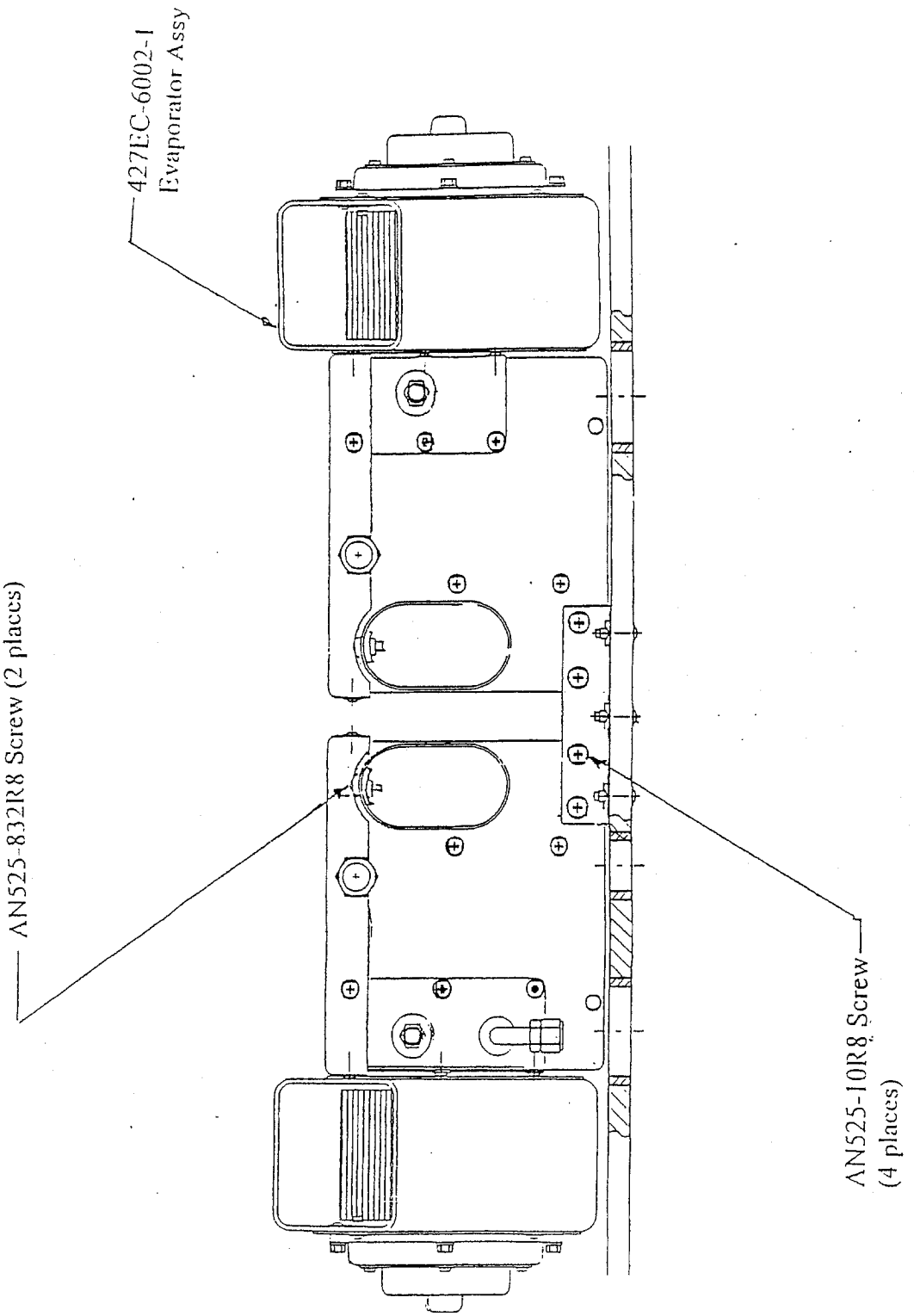


Figure 3.5 Aft Evaporator Installation – Looking Aft (Sheet 2 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

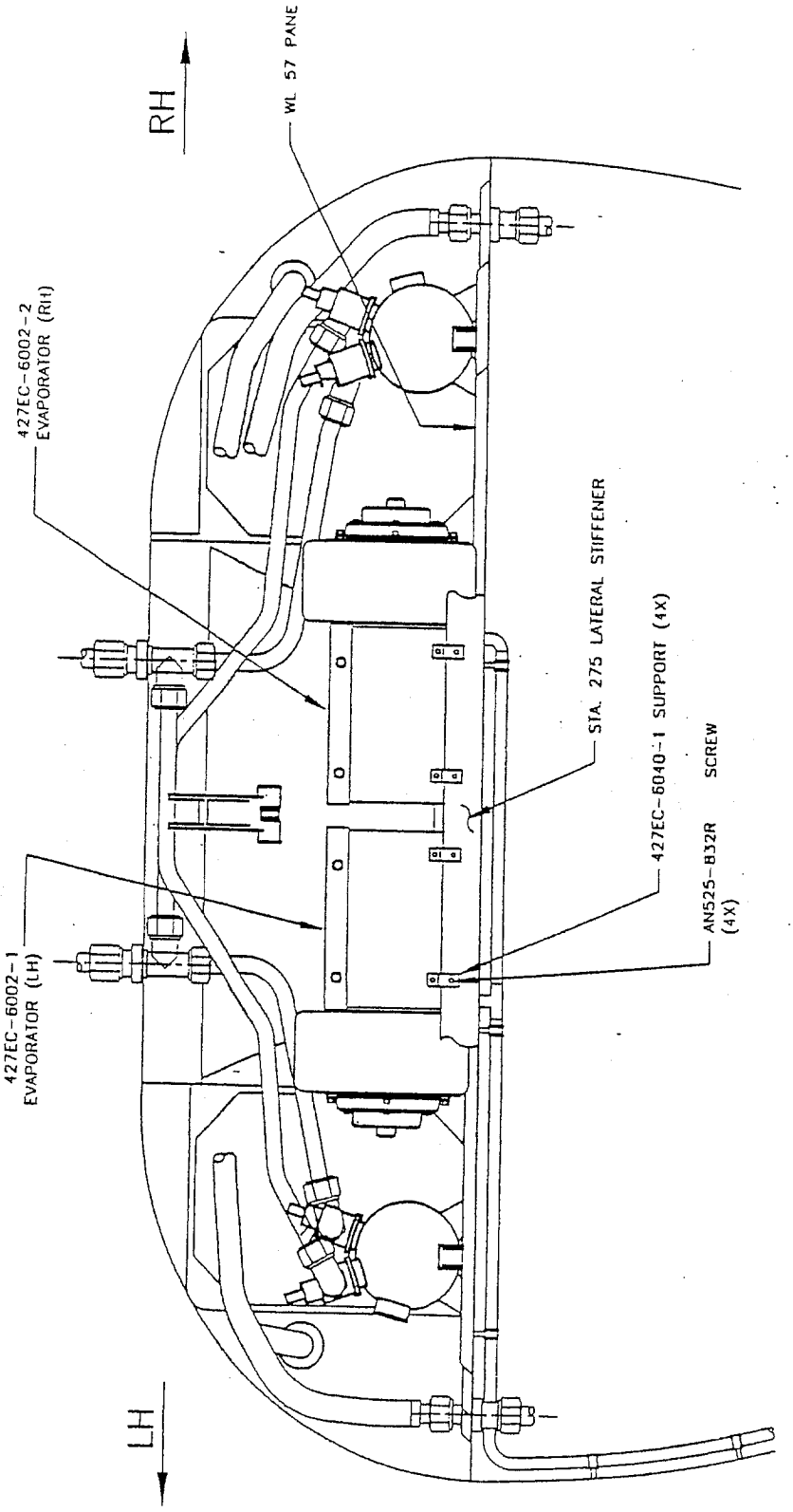


Figure 3.5 Aft Evaporator Installation – Looking Forward (Sheet 3 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

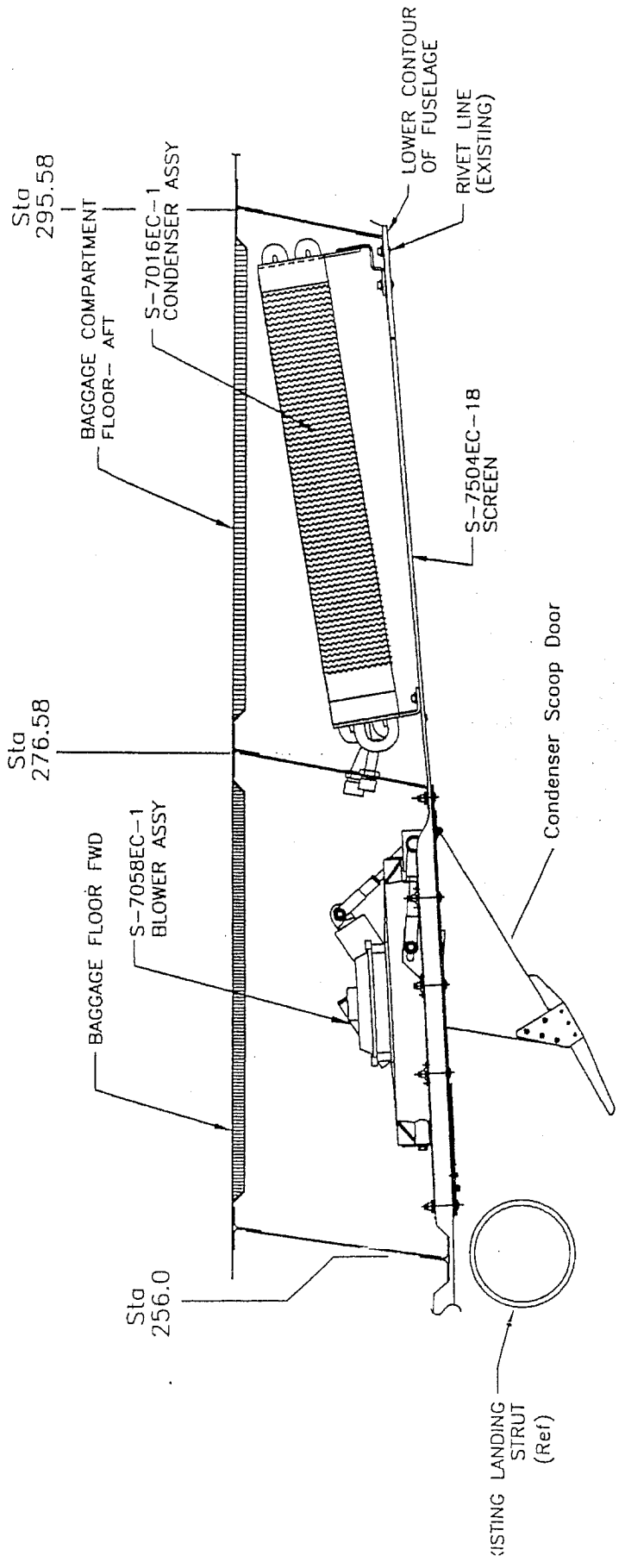


Figure 3.6 Condenser Installation (Sheet 1 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

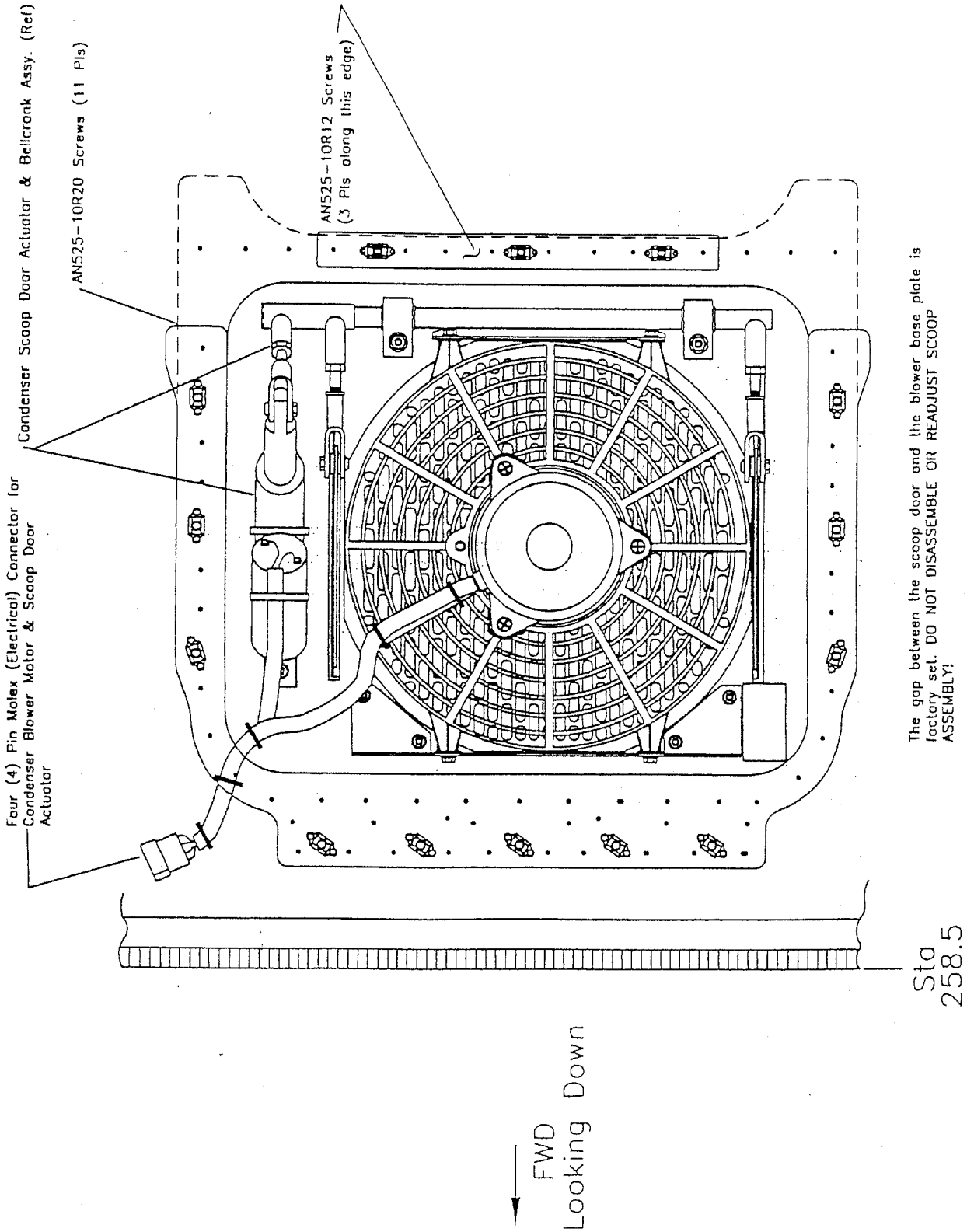


Figure 3.6 Condenser Installation (Sheet 2 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

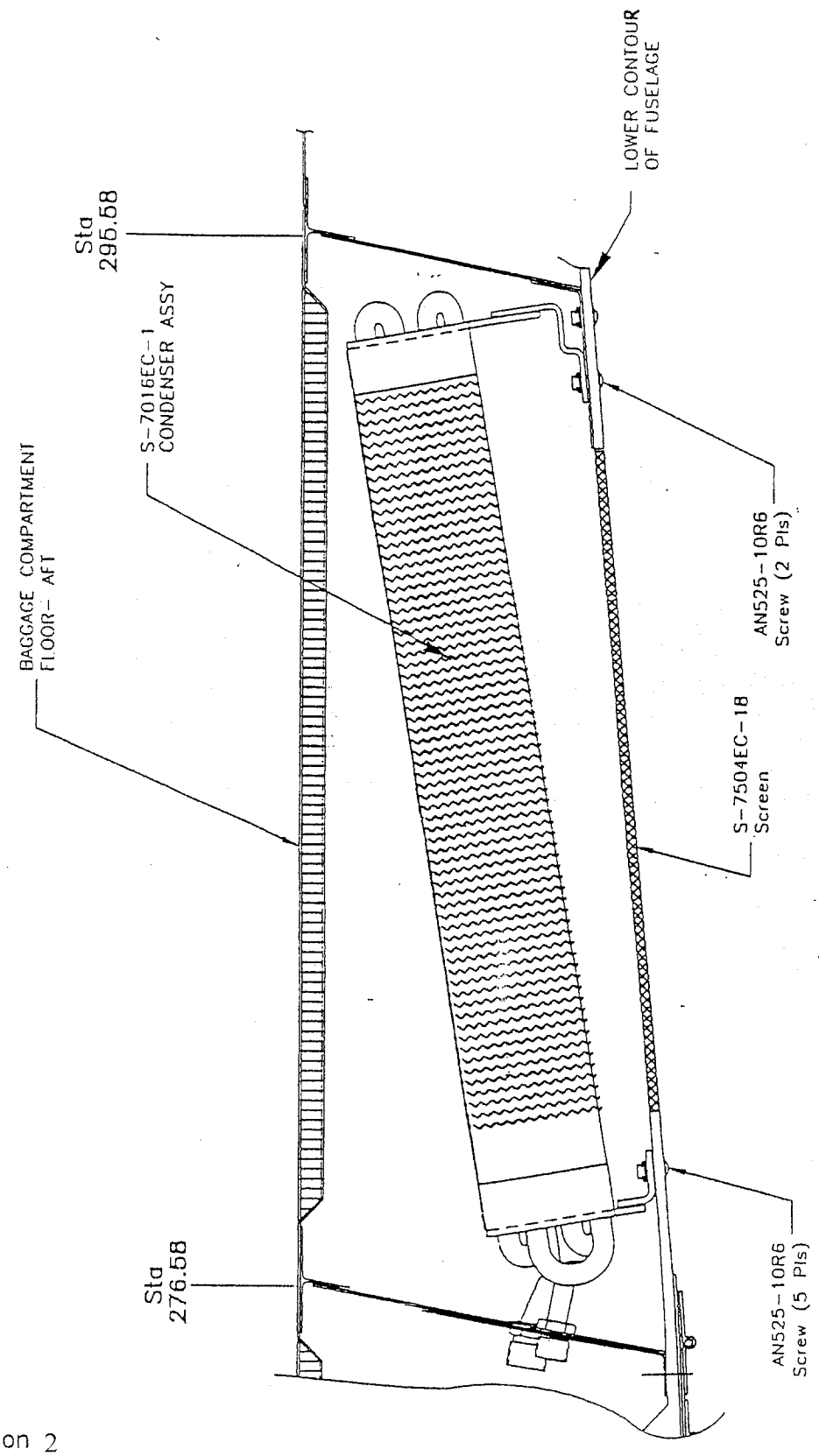


Figure 3.6 Condenser Installation (Sheet 3 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

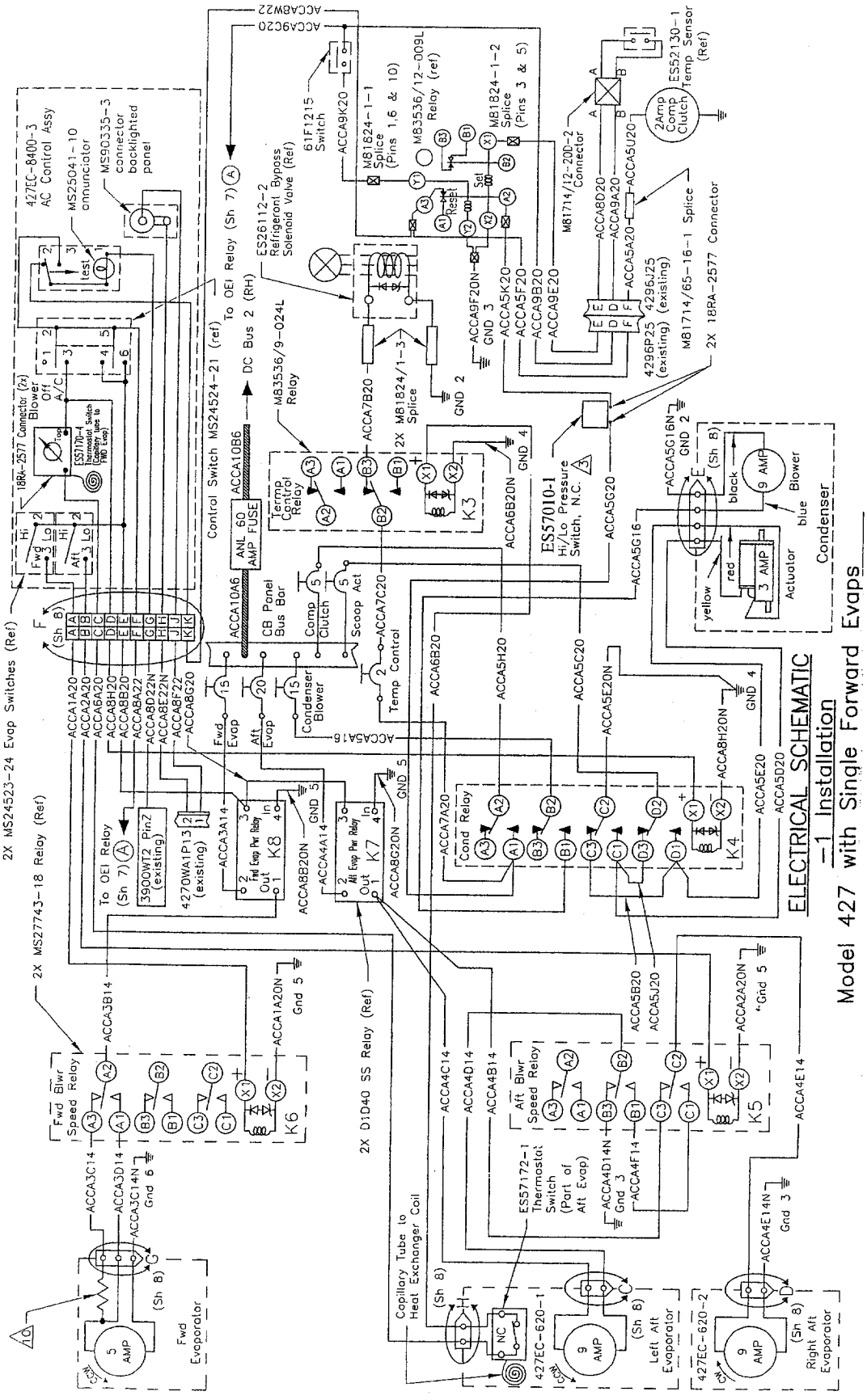


Figure 3.7 Electrical Schematic (Sheet 1 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

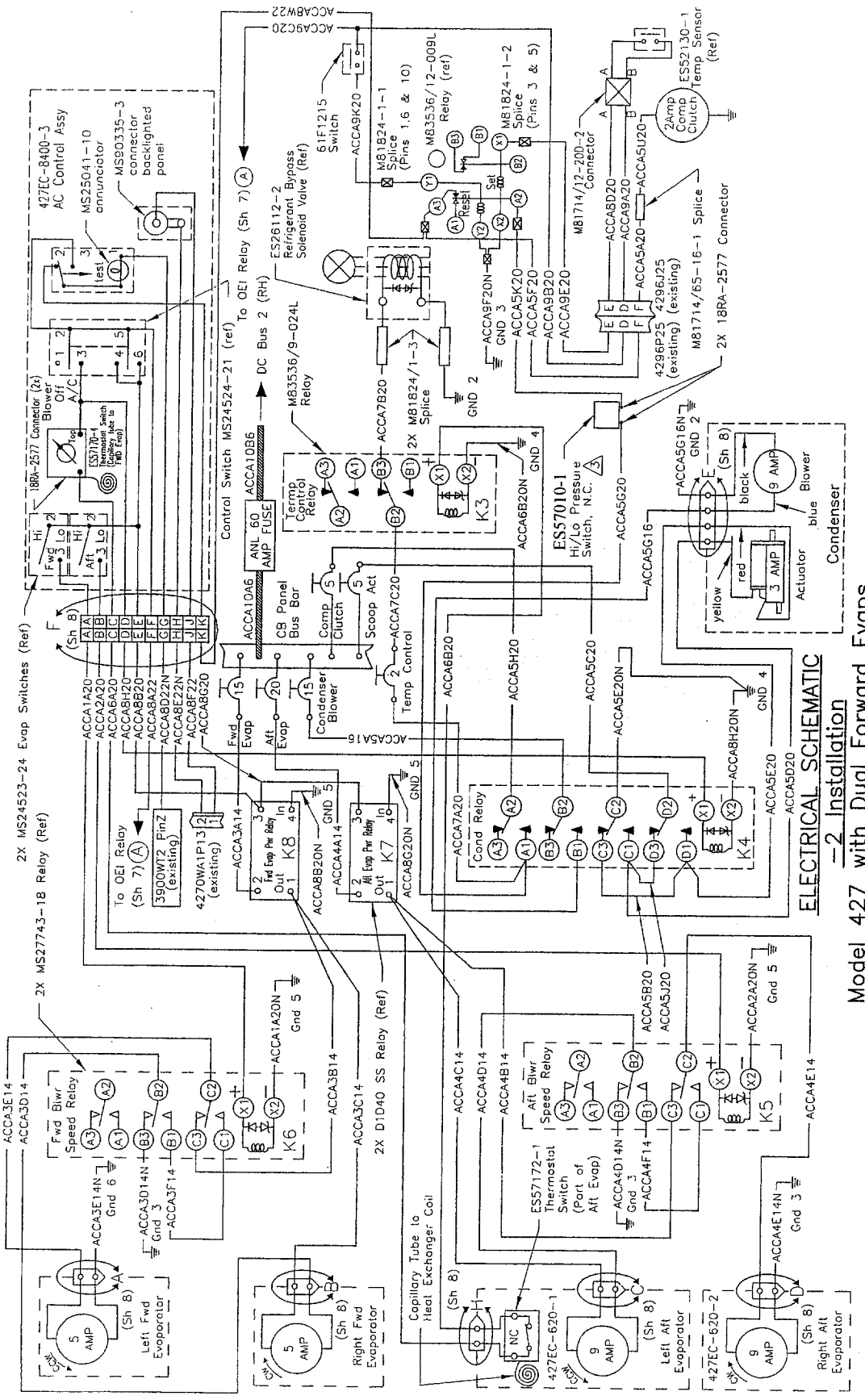


Figure 3.7 Electrical Schematic (Sheet 2 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

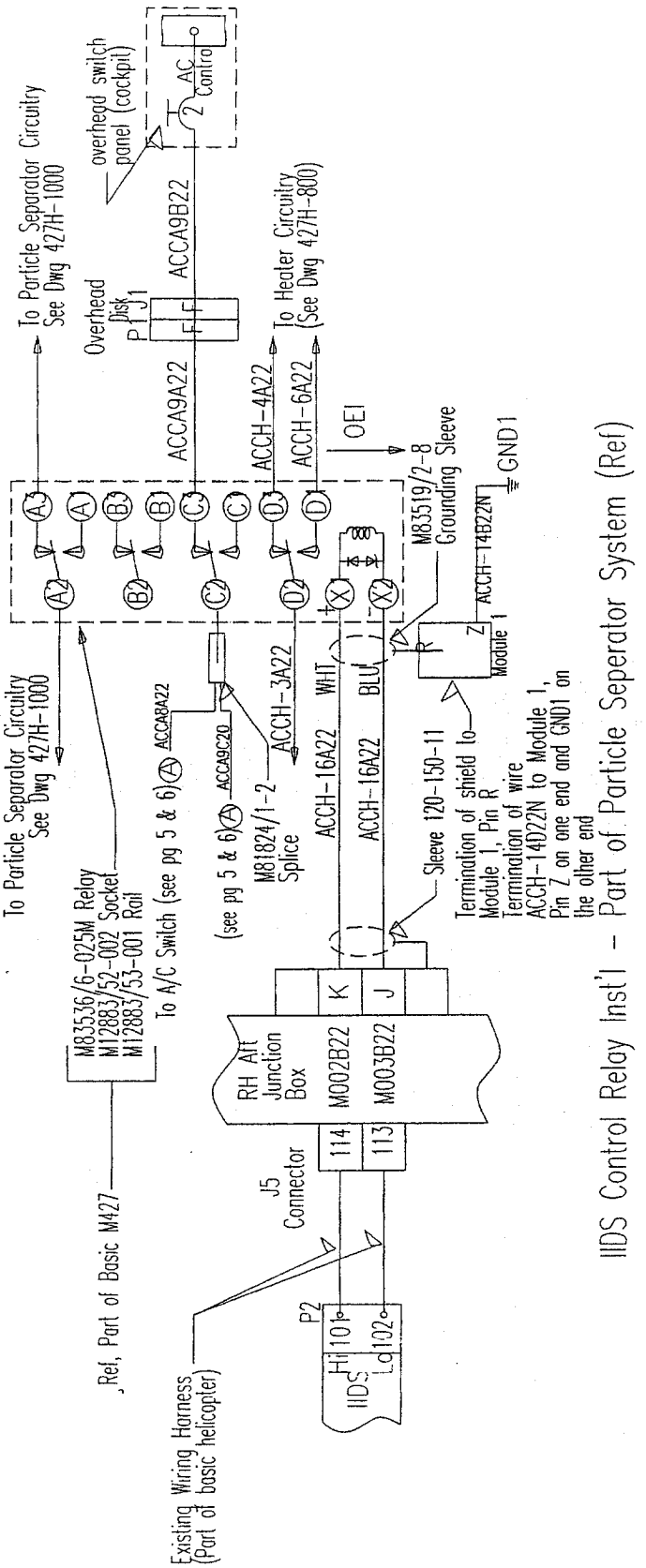


Figure 3.7 Electrical Schematic (Sheet 3 of 3)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

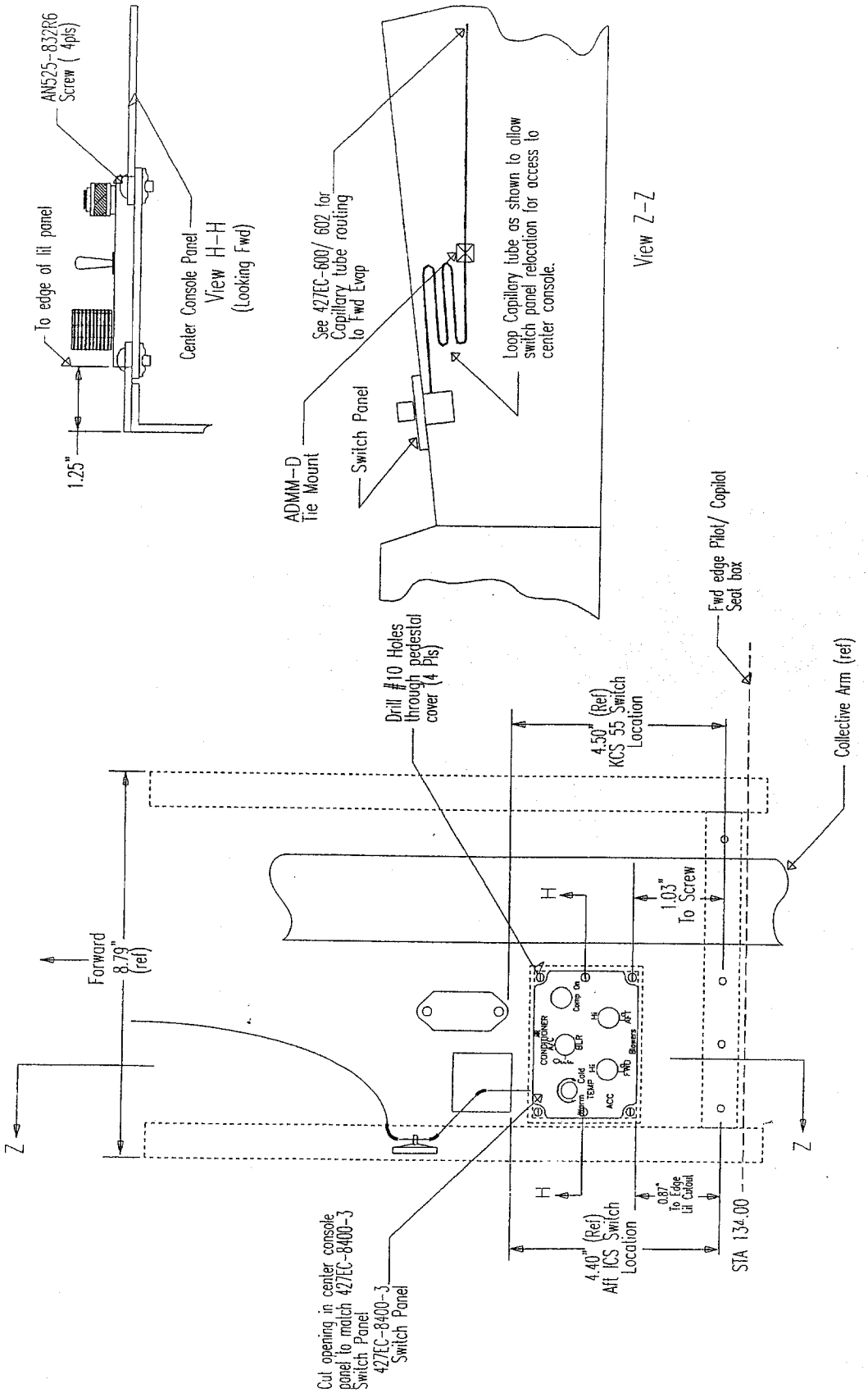


Figure 3.8 Air Conditioner Control Panel Installation (Dual & Single forward Evaporator)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

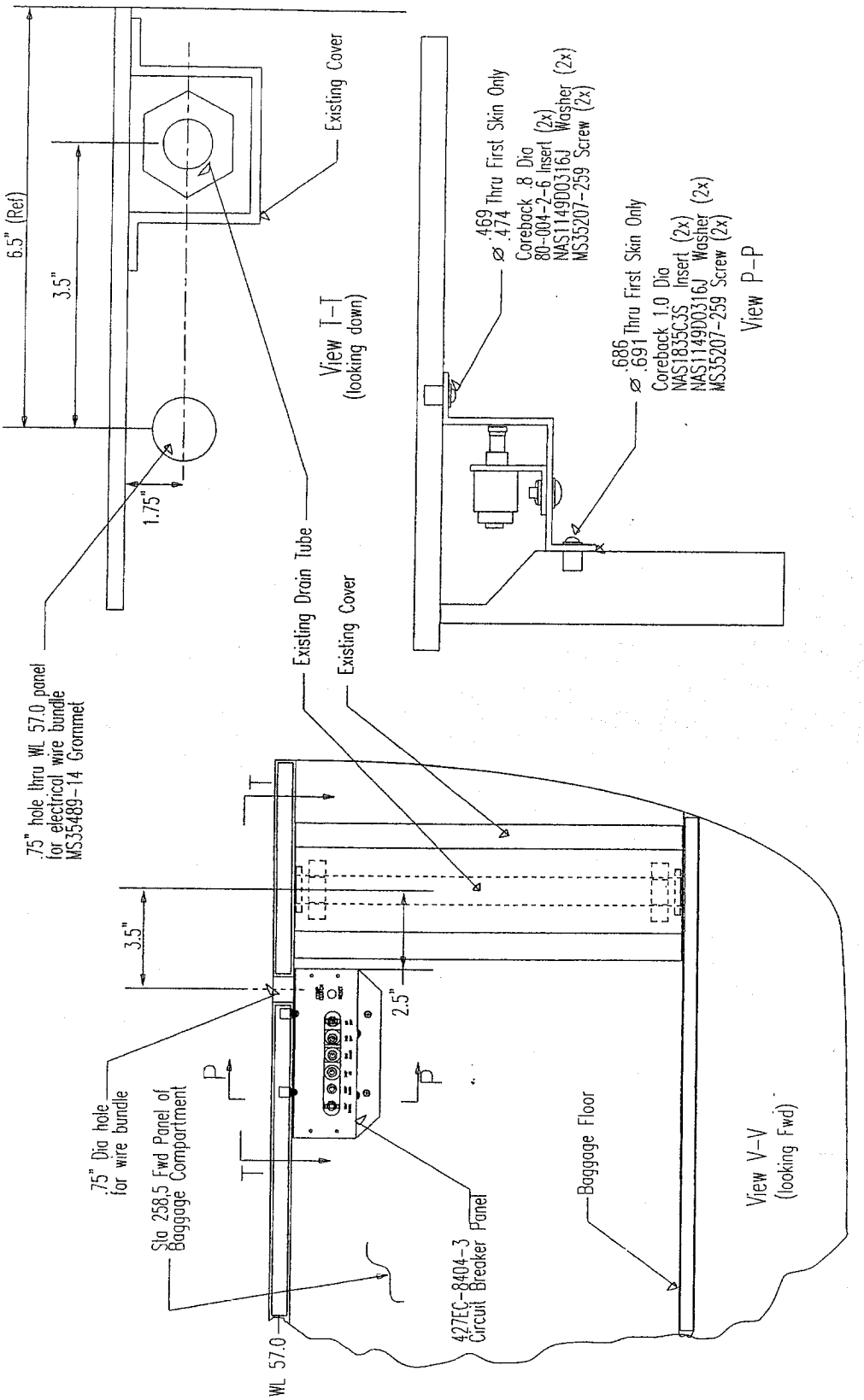


Figure 3.9 Circuit Breaker Panel Installation

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

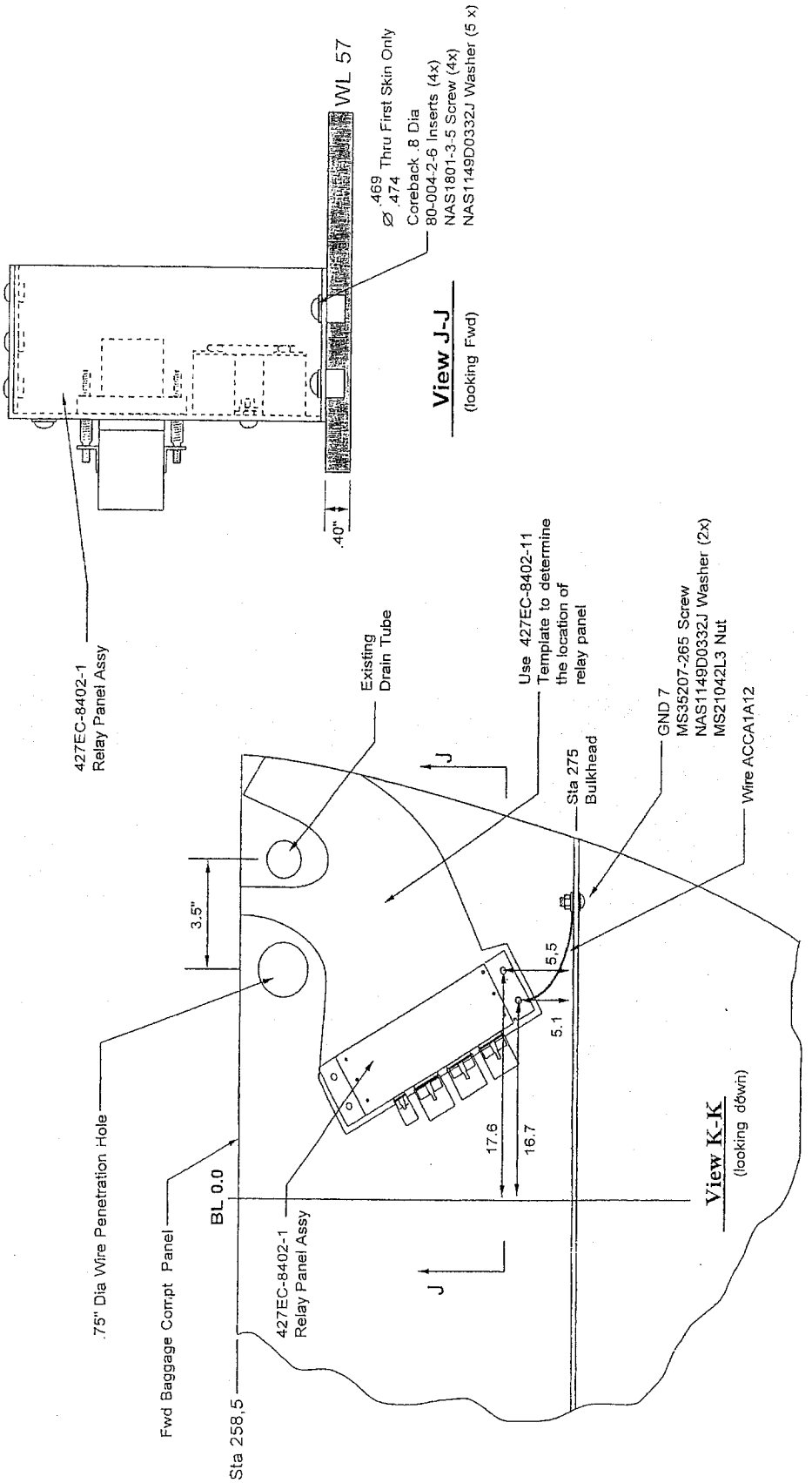


Figure 3.10 Relay Panel Installation

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

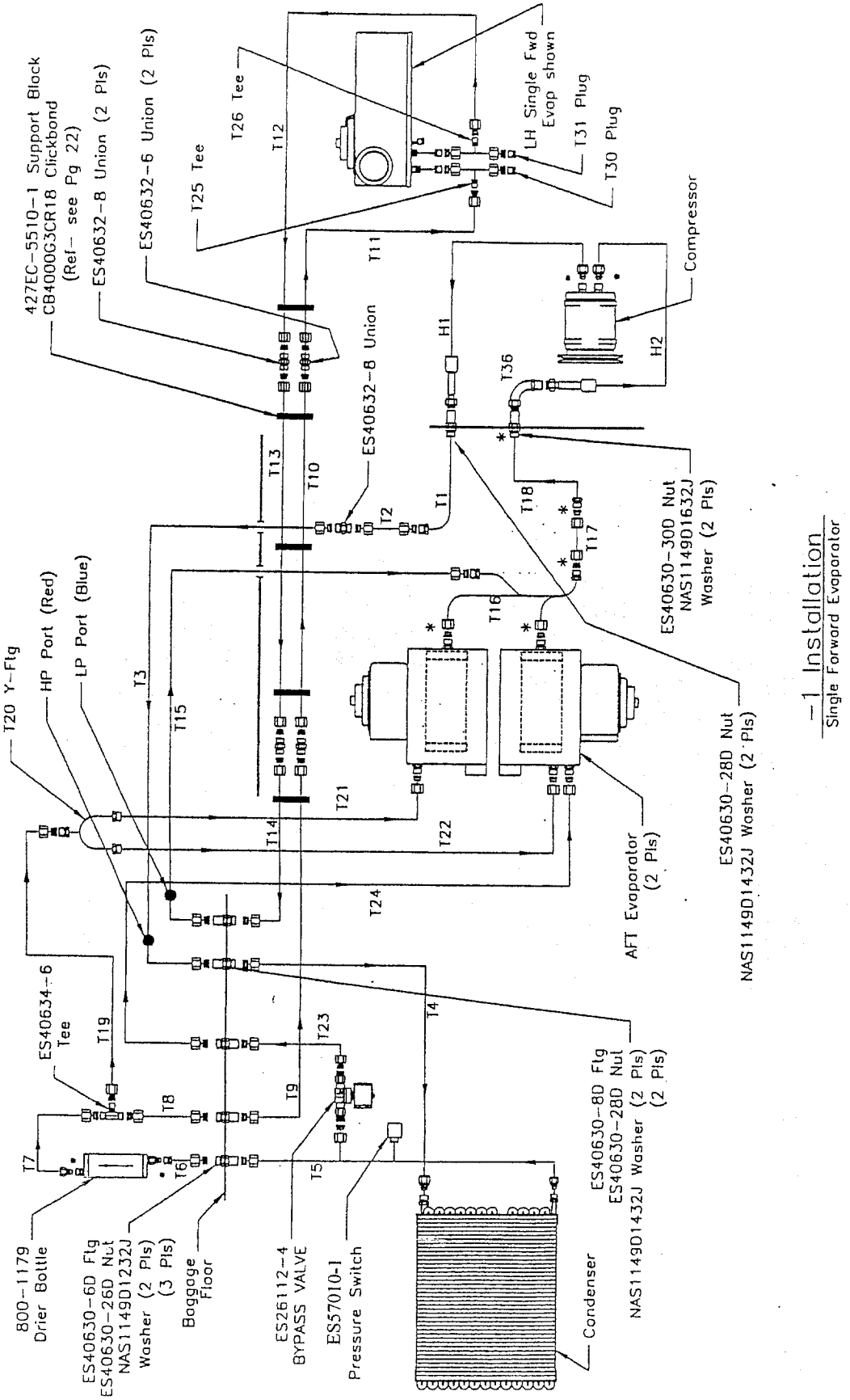


Figure 3.11 Refrigerant Plumbing Schematic (Sheet 1 of 2)

3. LAYOUT OF AIR CONDITIONER SYSTEM (continued)

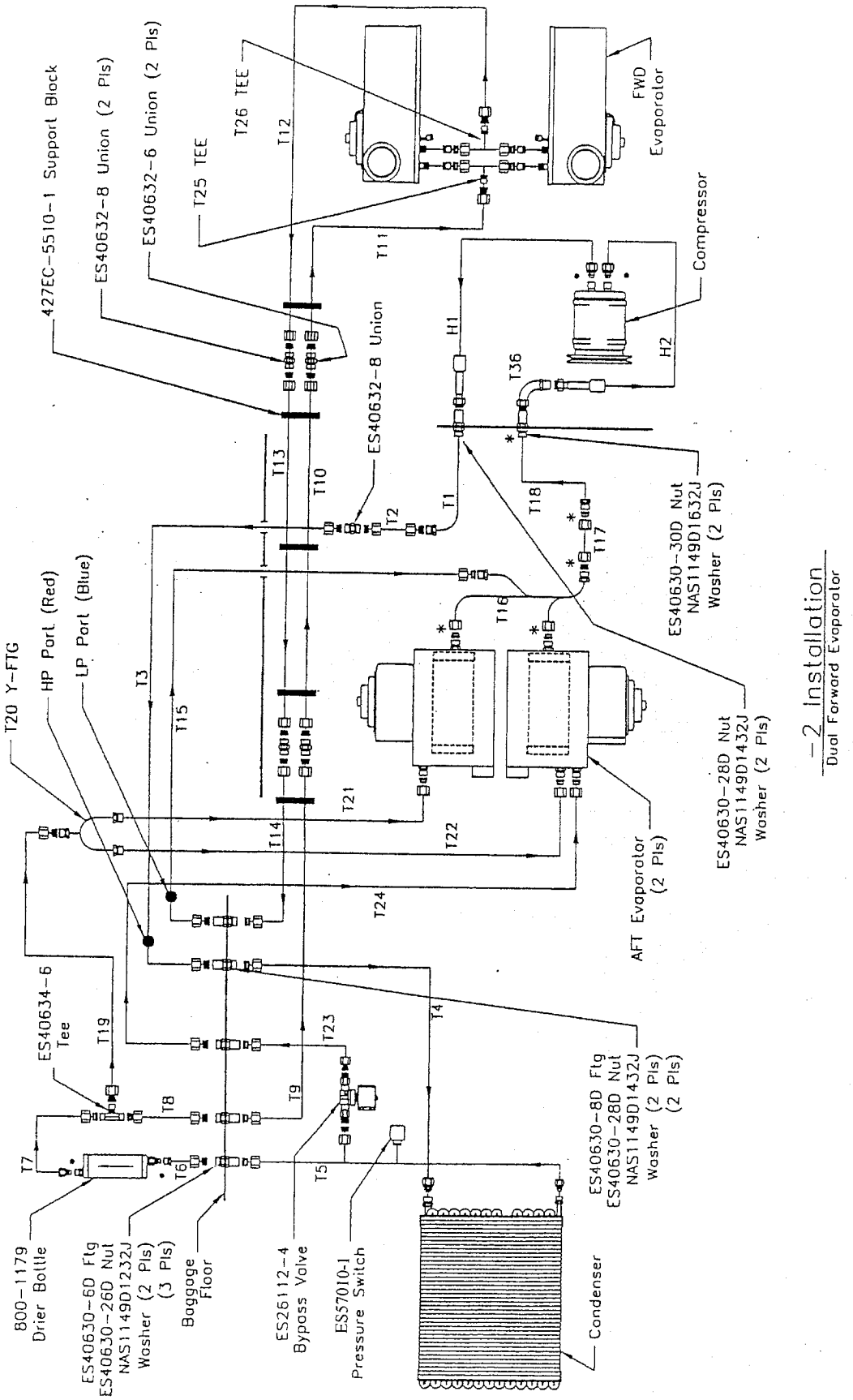


Figure 3.11 Refrigerant Plumbing Schematic (Sheet 2 of 2)

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

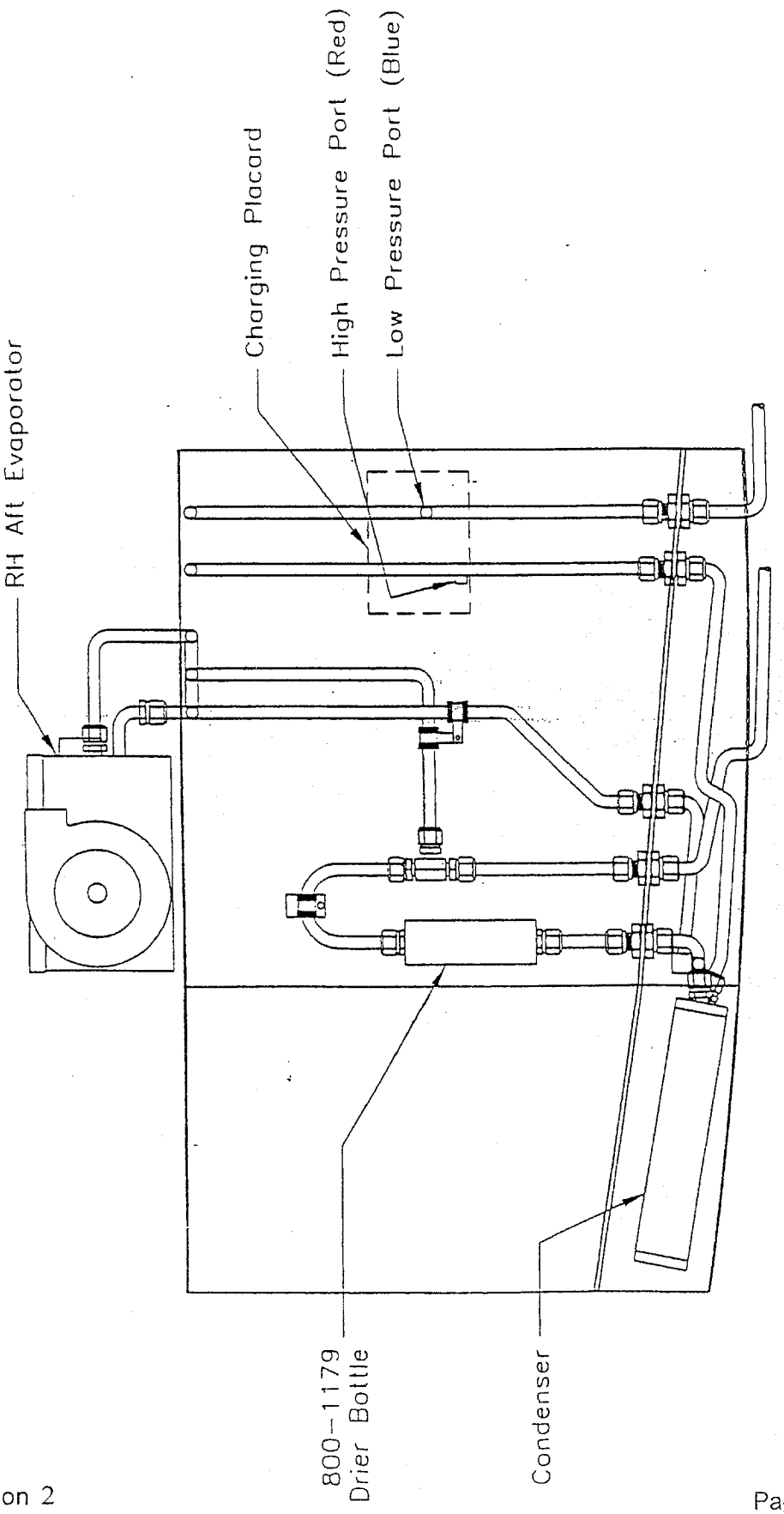


Figure 3.12 Receiver / Drier Bottle & Service Ports Location

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

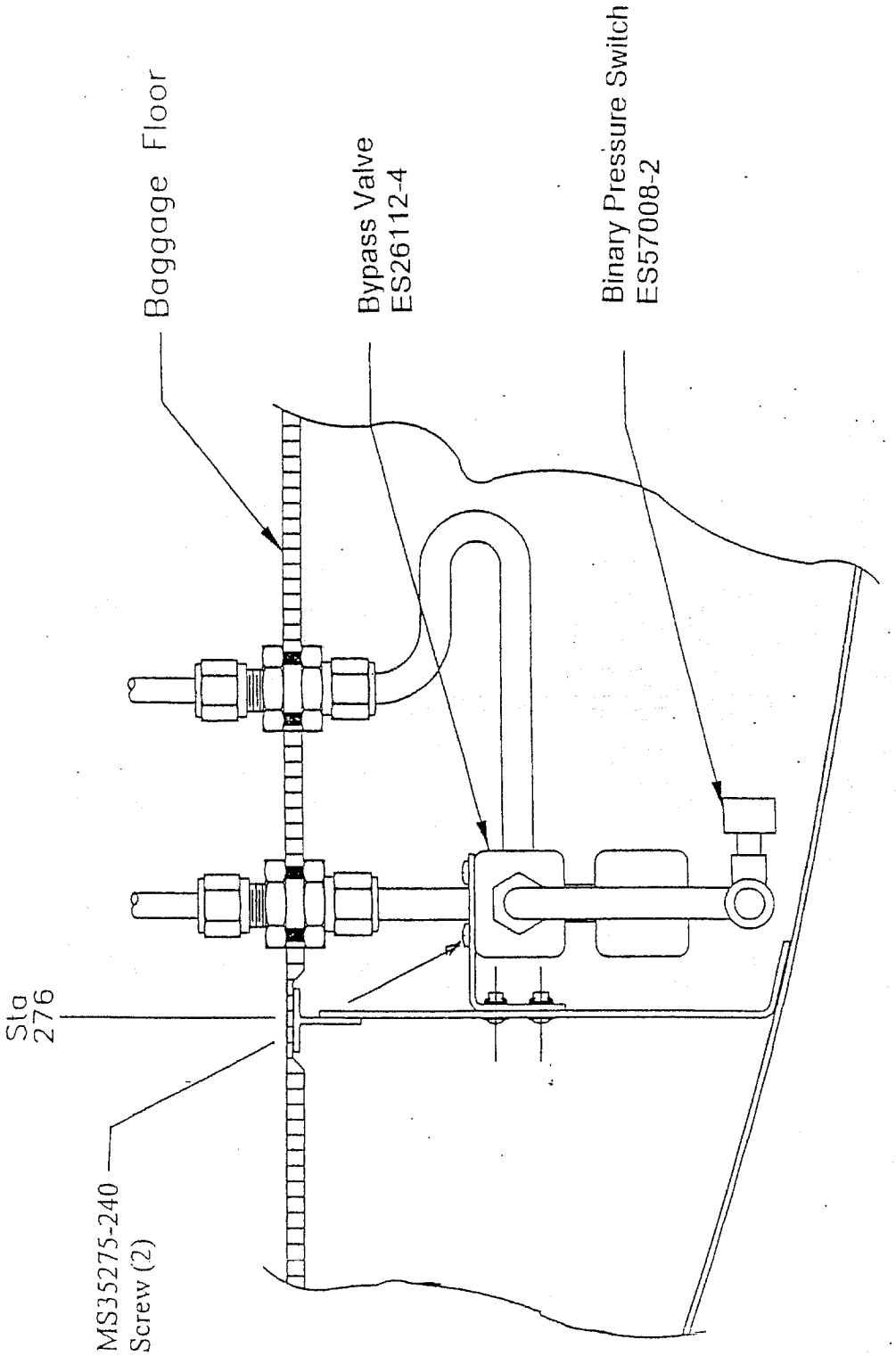


Figure 3.13 Refrigerant Bypass Valve & Binary Pressure Switch Installation

2. LAYOUT OF AIR CONDITIONER SYSTEM (continued).

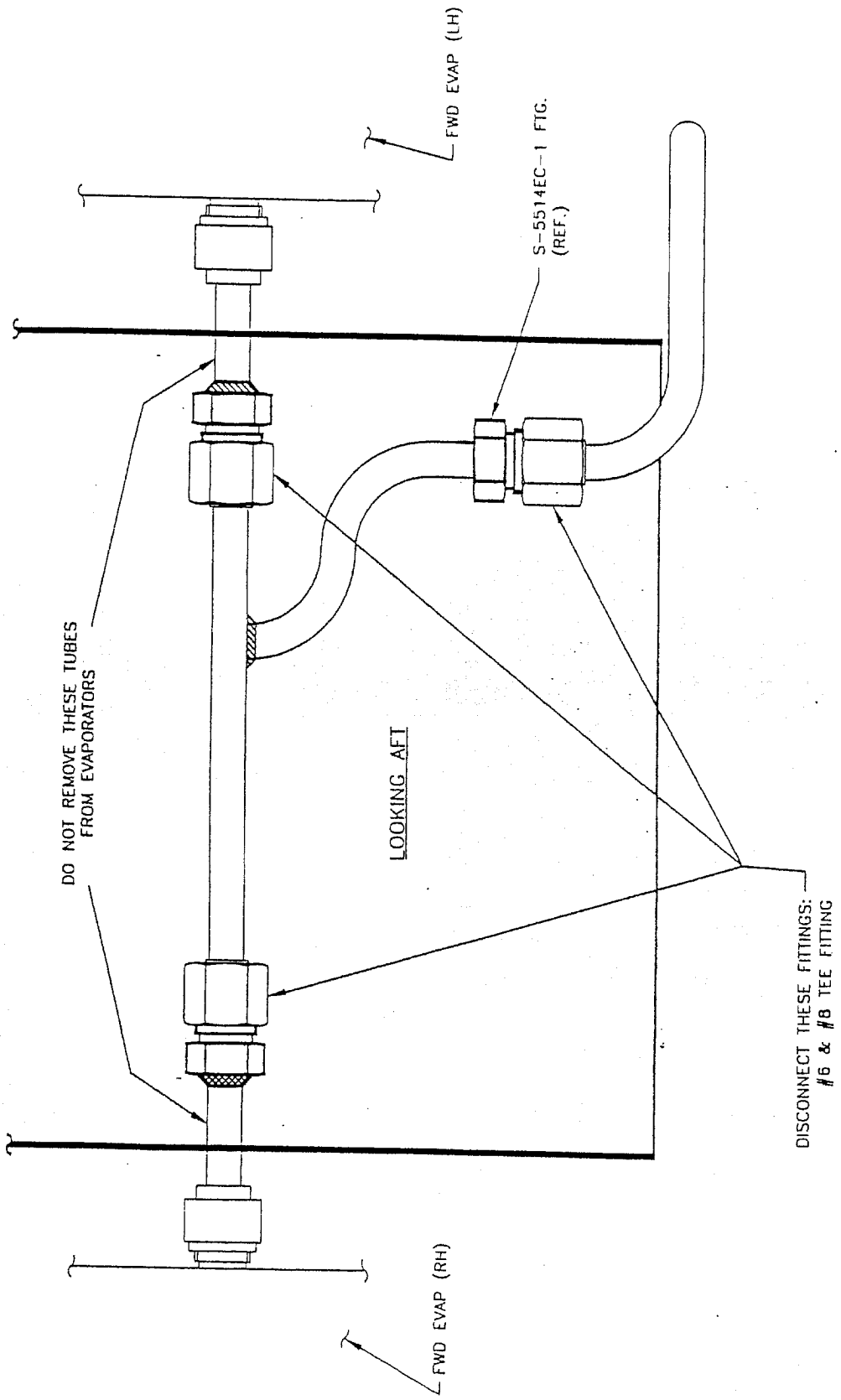


Figure 3.14 Forward Evaporator Refrigerant Tube Connections

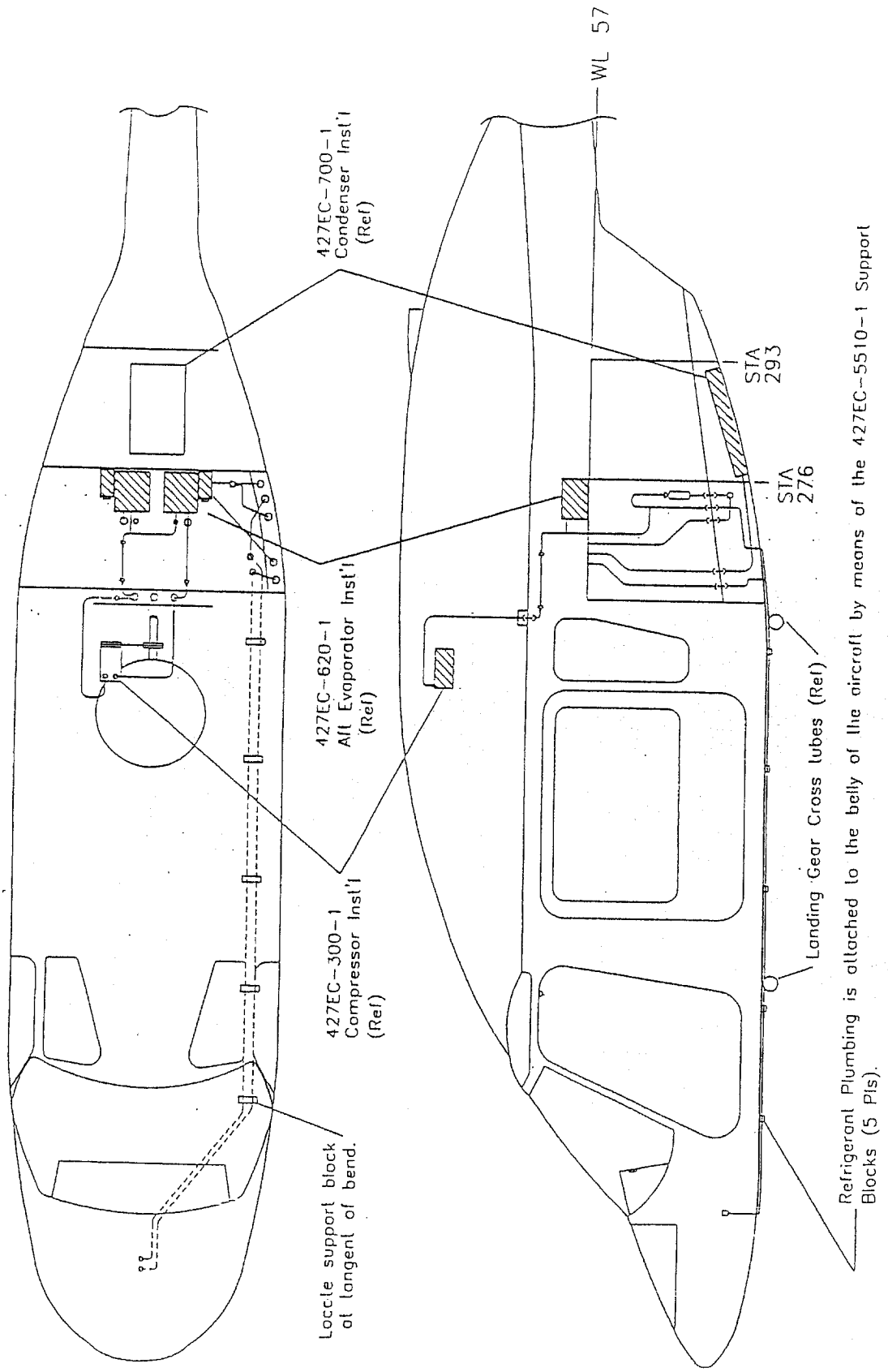


Figure 3.15 Refrigerant Plumbing Routing

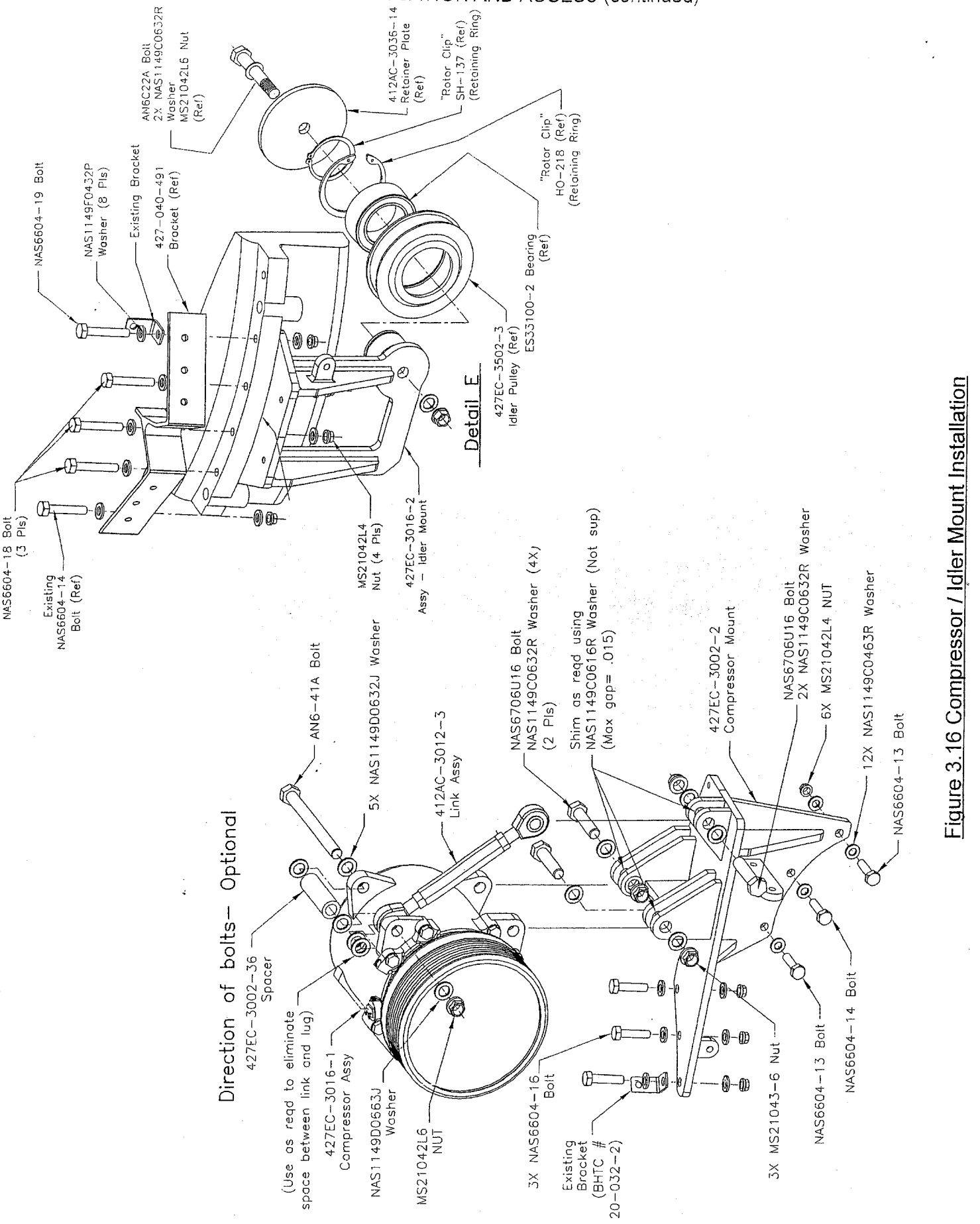


Figure 3.16 Compressor / Idler Mount Installation

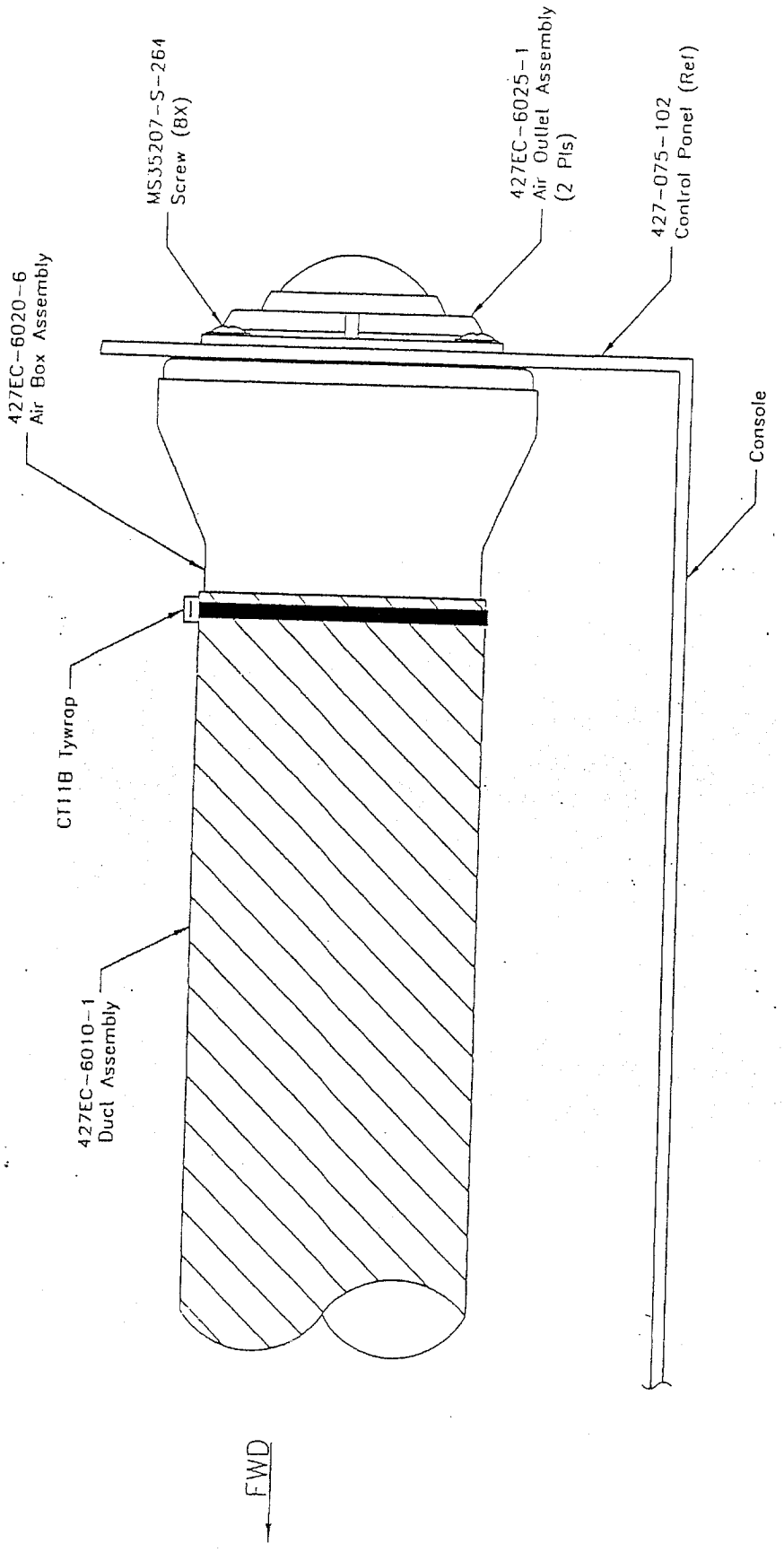
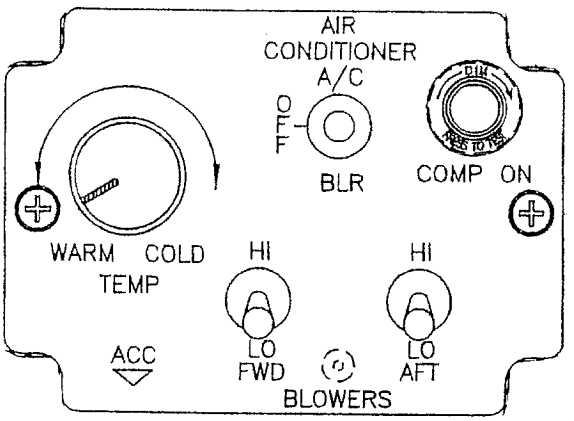
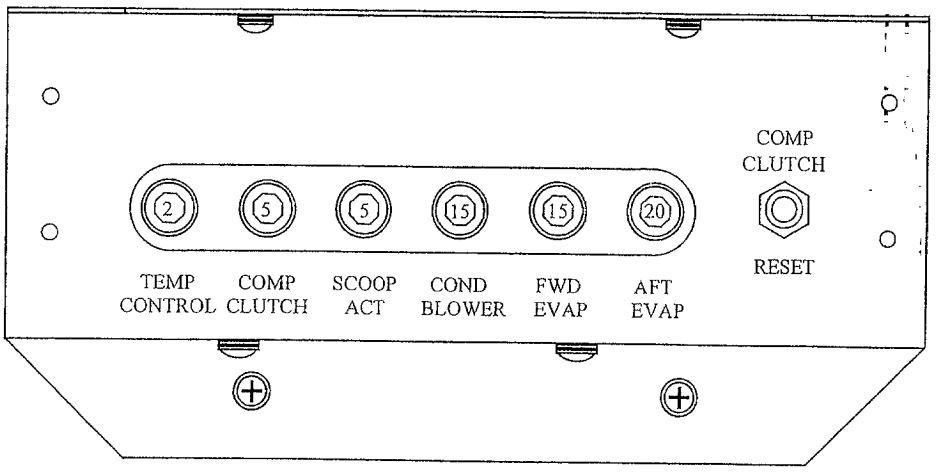


Figure 3.17 Forward Evaporator Air Outlet Installation

1. PLACARD AND MARKING INFORMATION



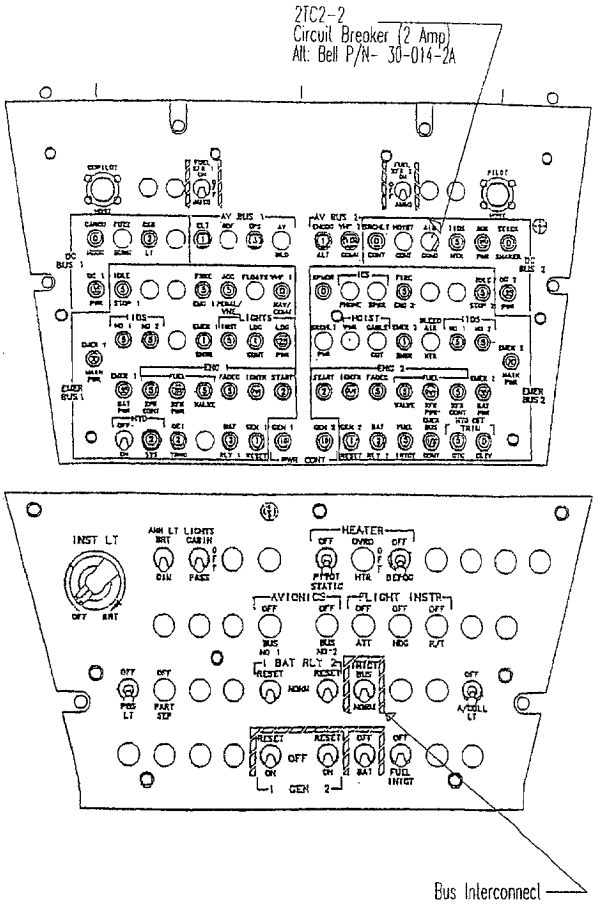
Located in center console



Located in upper forward edge of the baggage compartment

Continued

2. PLACARD AND MARKING INFORMATION (continued)



Located in overhead switch panel

SYSTEM CHARGING INSTRUCTIONS
SYSTEM TO BE SERVICED BY QUALIFIED PERSONNEL

R134a Refrigerant–Polyester oil–XH9 Desiccant

System charge: [ ] lbs.

If exact weight of refrigerant charge is not known, use following procedure:

- Charge system in .25 lb increments until minimum outlet temperature & system suction pressure is achieved.
- Allow several minutes after each charge increment, to allow temperature & pressure to stablize.

NOTE: Reduce refrigerant charge if vibration is felt in tail rotor control pedeals.

AIR COMM CORPORATION
BOULDER, COLORADO

(See Chapter 5 for Servicing Information)

Located on L/H side of baggage compartment

CHAPTER 5
SERVICING

1. SAFETY PRECAUTIONS

CAUTION

Refrigeration servicing should be performed by qualified personnel only!

The refrigerant used in the air conditioning system is the environmentally safe HFC R134a. This refrigerant is non-explosive, non-flammable, non- corrosive, has practically no odor, and is heavier than air. Although R134a is classified as a safe refrigerant, certain precautions must be observed to protect the parts involved and the person working on the unit.

Liquid R134a at normal atmospheric pressure and temperature evaporates so quickly that it tends to freeze anything that it contacts. Care must be taken to prevent any refrigerant from coming into contact with the skin, especially the eyes!

WARNING

Always wear safety goggles when servicing any part of the refrigerant system. Should any liquid refrigerant contact the skin or eyes, seek medical attention immediately even if the irritation ceases.

WARNING

Never weld, use a flame-type leak detector, blow torch, solder, steam clean, bake on aircraft finish, or use excess amounts of heat on, or in the immediate area of refrigerant supply tank.

2. SERVICING INFORMATION

A. This system should be serviced by QUALIFIED PERSONNEL ONLY!

B. A list of suggested servicing equipment is provided later in this chapter (Page 5-4).

C. Connect the service manifold and vacuum pump to the service ports located in the upper aft right hand corner of the baggage compartment.

D. Turn on the vacuum pump and open both valves to evacuate the system. When the pressure drops to 29.40 InHg (1.9 KgCm) moisture vaporizes and is drawn out of the system by the vacuum pump. Complete removal of moisture is important to prevent blockage of the expansion valves with ice. Leak check the system as described later in this chapter.

NOTE

Due to the drop in atmospheric pressure with an increase in altitude, the normal vacuum reading will drop approximately 1" InHg (1 KgCm) for each 1000 ft. (304.8 m) of altitude.

E. After the system has been evacuated, turn off both manifold valves, and then turn the vacuum pump off. Allow a minimum of one hour to check for vacuum leaks (if the system will not hold a vacuum, the system has a fitting leak). It may be necessary to charge the system with one or two lbs (.45 to .86 Kg.) of refrigerant and conduct a leak check survey using an electronic leak detector. (Continued)

Chapter 5
SERVICING (continued)

2. SERVICING INFORMATION (Continued)

CAUTION

IT IS MANDATORY THAT THE SYSTEM BE LEAK FREE TO INSURE TROUBLE FREE OPERATION. CONTINUOUS OPERATION OF THE SYSTEM WITH INSUFFICIENT CHARGE WILL RESULT IN REDUCED COMPRESSOR LIFE.

F. After the system is proven to be leak free, the system should be evacuated for a minimum of ½ hour before being charged with HFC R134a.

G. The most accurate method of charging is to add the exact amount of refrigerant to the system. The proper charge is listed below.

System Refrigerant Charge
Single forward evaporator – 2.4 lbs (1.10 Kg)
Dual forward evaporator – 2.6 lbs (1.18 Kg)

H. If unable to add the exact charge, the following procedure should be followed. Add an initial refrigerant charge of 1.5 lbs (.68 Kg.) then continue to add refrigerant until the evaporator outlet air temperature and system suction pressures reach a minimum. When adding the refrigerant after the initial charge, it should be done in increments of 0.2 lbs (.09 Kg.) and two minutes allowed to elapse before adding each additional 0.2 lbs. (.09 Kg.) refrigerant charge. The optimum charge occurs when evaporator outlet temperatures are at a minimum. Any additional refrigerant will cause the outlet air temperature to increase and system performance to be degraded.

WARNING

If the system is to be charged by operating the compressor it must be charged through the Lo (Blue fitting) pressure (suction) port ONLY!!
Never open the Hi (Red fitting) pressure (discharge) valve while the system is operating!!

I. Test run the system after charging to confirm the system is working properly.

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. Reduced compressor life will result if the total system oil charge is not maintained.

This Area Intentionally Left Blank

3. LUBRICATION INFORMATION

The oil charge is continuously circulated by the refrigerant during the operation of the system. A quantity of oil is trapped by the compressor.

NOTE

Maintaining the correct amount of refrigerant and refrigerant oil in the system is critical for ensuring the long life of the compressor.

The total system oil charge is 7.5 fl oz. (222 ml.) of R134a Polyester Refrigerant Oil. The compressor is charged with 3.5 fl oz. (103 Ml.) of oil at the factory, an additional 4.0 fl oz. (118 ml.) must be added at the time of the system installation. This oil should be added to the compressor discharge line prior to system charging.

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

This Area Intentionally Left Blank

4. SYSTEM LEAK CHECK

Identification and elimination of system fitting leaks is extremely important to insure a trouble free operation of this system.

A system which contains a partial charge of refrigerant can be leak tested with the aid of an electronic leak detector, and be recharged without evacuating the system.

A new or empty system can be pressurized with nitrogen 70-80 psi (5.1-5.6 kgcm) or R134a 50 psi (3.5 kgcm) to conduct a leak survey. DO NOT USE 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. Refrigerant will collect in low areas 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.

If the nitrogen method is used, it will be necessary to mix together a water and mild soap solution. Each fitting or suspected leak area should be brushed with this soap solution and watched for evidence of bubbles formed by the escaping nitrogen.

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 system of 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.

5. 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).

6. CONSUMABLE MATERIALS

Refrigerant:

This system is to be charged with Dupont, or equivalent HFC R134a refrigerant only.

Lubricant:

This system is to be serviced with R134a compatible Polyester Refrigerant Oil.
(Do not use Polyalkylene glycol (PAG), or Mineral Oil in this system).

(Continued)

6. CONSUMABLE MATERIALS (continued)

O-rings:

As this system is charged with R134a refrigerant, it must be fitted with Highly Saturated Nitrates (HSN) O-rings. This system incorporates two different O-ring fittings, Tork-Lok and Insert. The HSN O-rings for the Tork-lok fittings are BLACK in color, and the HSN O-ring for the Insert fittings are GREEN in color.

7. SUGGESTED SPARES LIST

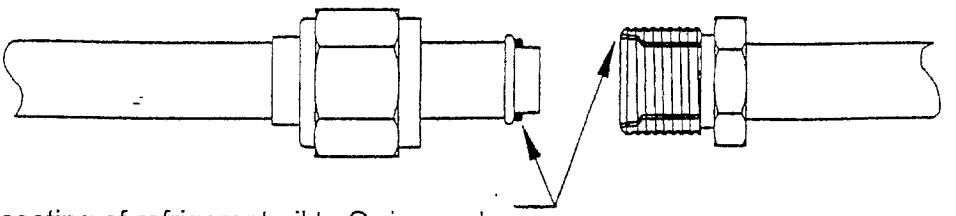
Item	Part Number
Blower Motor – Fwd. Evaporator	ES61060-2
Blower Motor – Aft Evaporator	ES61060-2
Compressor Assembly	427EC-3016-1
Compressor Drive Belt	ES35427-1
Receiver / Drier Bottle	800-1179
Binary Switch	ES57010-1
By-pass Valve	ES26112-2
Condenser Blower Motor	ES61136-1
HSN O-rings; Insert type (Green)	
Size	
#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)	
Size	
#6 O-ring	2-012-N1173
#8 O-ring	2-014-N1173

This Area Intentionally Left Blank

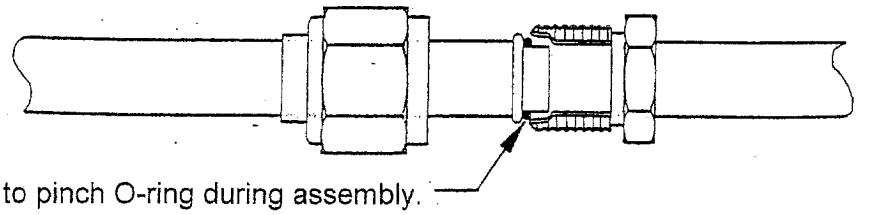
CHAPTER 6
STANDARD PRACTICES INFORMATION

1. FITTING TORQUING PROCEDURES AND TORQUE VALUES

INSERT O-RING 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.

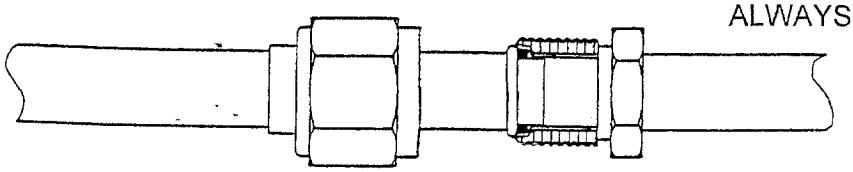
Engage the male end into the female fitting being careful to maintain alignment.

The male flange should seat fully against the female fitting with out 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.

6 Fittings: 30 – 35 in/lbs. (3.4-4.0 Nm)
8 Fittings: 40 – 45 in/lbs. (4.6-5.1 Nm) DO NOT OVER TORQUE!
#10 Fittings: 50 – 55 in/lbs. (5.7-6.3 Nm)

ALWAYS USE BACK UP WRENCH



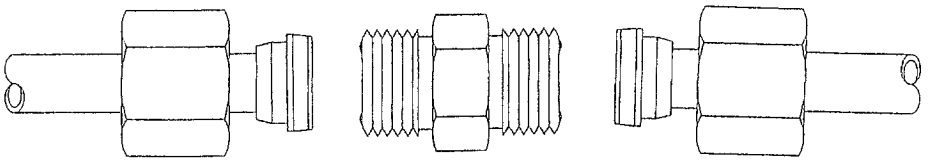
Once the system is charged, check each fitting with an electronic leak detector.
(An electronic leak detector is the only reliable method of checking for refrigerant leaks)
Once the fittings have been checked and are found to be free of leaks, torque seal as appropriate.

Continued

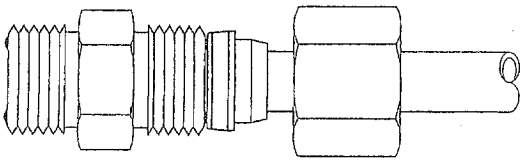
Chapter 6
STANDARD PRACTICES INFORMATION (continued)

1. FITTING TORQUING PROCEDURES AND TORQUE VALUES (continued)

TORQ-LOK O-RING FITTING



Apply a thin coating of refrigerant oil to O-ring, and
To both sides of the mating surfaces.
Confirm there is no damage (nicks, dirt, etc.) on the fitting surfaces.



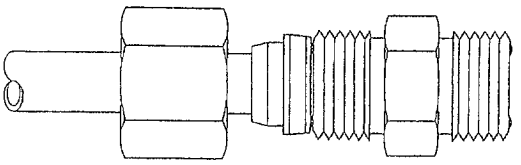
Insure that the O-ring is properly seated in the O-ring
Channel in the union or tee fitting.

Engage the male fitting up to the flat end of the tube assembly. Use caution not damage the O-ring, or allow the O-ring to slip out of place.

Hold the fittings together while sliding the B-nut forward and engaging the threads. Tighten the B-nut by hand and then torque as follows.

6 Fitting: 30 – 35 in/lbs. (3.4-4.0 Nm)
8 Fitting: 40 – 45 in/lbs. (4.6-5.1Nm) DO NOT OVER TORQUE!
#10 Fitting: 50 – 55 in/lbs. (5.7-6.3 Nm)

ALWAYS USE A BACK UP WRENCH



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.

Chapter 6
STANDARD PRACTICES INFORMATION (continued)

2. REMOVAL, REPLACEMENT & ADJUSTMENT OF COMPRESSOR DRIVE BELT

REMOVAL (See Figure 3.3)

A. It is necessary to remove the main rotor transmission cowling to gain access to the Compressor and Drive Belt for replacement and adjustment procedures.
B. Cut safety wire on the Compressor Belt Tensioning Link and the Belt Tensioning Bolt, 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 first tail rotor driveshaft segment in accordance with the Bell Helicopter, BHT-427MM, Chapter 65-00.
E. Adjust the Belt Tension Link to loosen the belt.

REPLACEMENT

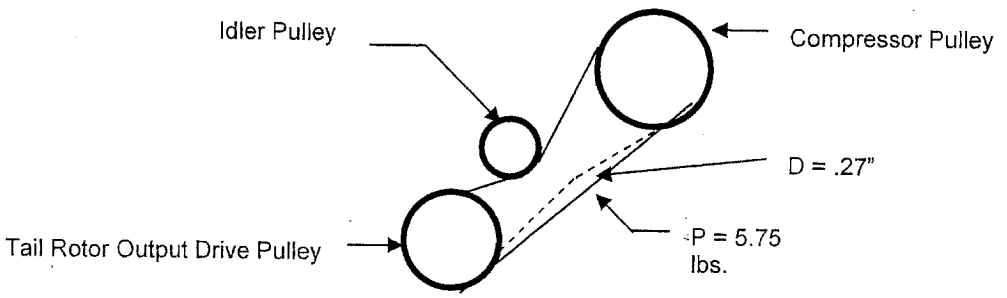
A. Replace the first tail rotor driveshaft segment in accordance with item D, above.
B. Replace the drive belt in the reverse order of its removal.

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 Poly-V belt is 5.75 lbs. 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 .27" (6.85 mm) belt deflection when 5.75 lbs (2.15 kg.) is applied to the midpoint of the belt span.



C. Tighten the Belt Tension Link Check Nuts and the Compressor pivot bolt nut after setting the belt tension.
D. The belt tension should be reset after four to six hours of operation of a new belt.

(Continued)

3. REMOVAL, INSTALLATION / REPLACEMENT OF COMPRESSOR ASSEMBLY.

REMOVAL (See Figure 3.3)

A. Evacuate the refrigerant from the system in accordance with procedures provided in chapter 5.

B. Disconnect the refrigerant hoses from the compressor.

C. Cut the Check Nut safety wire and remove the Belt Tension Link.

D. Remove the Compressor pivot bolts and remove the compressor.

INSTALLATION/ REPLACEMENT

A. Install the compressor in the reverse order of removal.

B. Torque the Pivot Bolts and Check Nuts to 95-110 in-lbs (10.9 to 12.6 Nm).

C. Replace the Refrigerant Hose O-Rings and connect the hoses to the compressor. Torque the No. 8 and No. 10 hose fittings to 40-45 in-lbs (4.6 – 5.1 Nm) and 50 – 55 in-lbs (5.7 – 6.3 Nm), respectively.

D. Tighten the Belt Tension Link & Check Nut(s) and re-safety using .032 safety wire.

This Area Intentionally Left Blank

(Continued)

4. REMOVAL, INSTALLATION / REPLACEMENT OF COMPRESSOR DRIVE PULLEY.

REMOVAL (See Figure 3.3)

A. See Removal, Replacement & Adjustment of Compressor Drive Belt (Page 6-3) prior to the removal of the air conditioner tail rotor driveshaft drive pulley.

B. Remove the 427-040-355 Adapter in accordance with the Bell Helicopter BHT-427MM, chapter 63-00.

C. Remove the three mounting bolts and remove the drive pulley.

INSTALLATION / REPLACEMENT

A. Install the Drive Pulley in the reverse order of removal. Torque the Drive Pulley mounting bolts to 150 –180 in-lbs (17 – 21 Nm).

B. Re-install and adjust the drive belt as described on page 6-3.

This Area Intentionally Left Blank

5. REMOVAL, INSTALLATION / REPLACEMENT OF FORWARD EVAPORATOR ASSEMBLY

REMOVAL

Refer to figure 3-4 for this operation.

A. Evacuate the refrigerant from the system in accordance with procedures provided in chapter 5.

B. Remove the landing light cover from the aircraft.

C. Disconnect the plumbing fittings shown by Figure 3-14.

D. Remove the Capillary Tube from the Evaporator.

NOTE

Using your fingers, gently remove Temperature Control Capillary Tube from Evaporator Fins by pulling out straight out. (Note: in the dual forward evaporator configuration the capillary tube is located in the left hand evaporator. Single forward evaporator configurations, right or left hand the capillary will be mounted in the respective evaporator assembly).

E. Disconnect the Evaporator Drain Hose.

F. Remove the CT11 Tywrap and disconnect the 427EC-6010-1 Duct Assembly.

G. Disconnect the Evaporator Electrical plug.

H. Remove the AN525-832R8 Evaporator support screws and remove the Evaporator Assembly.

INSTALLATION / REPLACEMENT

A. Install the forward Evaporator Assembly in the reverse order of its removal.

This Area Intentionally Left Blank

6. REMOVAL, INSTALLATION / REPLACEMENT OF AFT EVAPORATOR ASSEMBLY.

REMOVAL

Refer to figure 3.5 for this operation.

A. Evacuate the refrigerant from the system is accordance with the procedures provided in chapter 5.

B. Remove the Cabin Hat Shelf and the WL 57 access panel in the upper surface of the baggage compartment.

C. Disconnect all refrigerant lines from the Evaporator.

D. Disconnect the Condensate Drain lines from the Evaporator.

E. Disconnect the Electrical Plugs from Evaporator Blowers.

F. Cut the CT11B Tywraps and disconnect the 427EC-6010-2 Ducts.

G. Remove the two AN525-832R8 Screws and remove the 427EC-6004-10 Y-Fitting.

H. Remove the four AN525-10R8 mounting screws at the forward edge of the Evaporator.

I. Remove the four AN525-832R8 mounting screws from the aft edge of the Evaporator.

J. Remove the Evaporator units through the WL 57 access (upper surface of baggage compartment).

REPLACEMENT

A. Install the Aft Evaporator Assembly in the reverse order of its removal.

B. Mold the cork sealant (existing) at the aft edge of the 427EC-6004-10 Y-Fitting to form a fillet seal around the perimeter of the Fitting.

7. REMOVAL & REPLACEMENT OF CONDENSER BLOWER ASSEMBLY.

REMOVAL

Refer to figure 3.6 for this operation

A. The Condenser Blower Assembly consists of the Blower, Scoop & Actuator.

B. Remove the nine screws along the sides and aft edge of the condenser. The assembly is hinged and can now be rotated to the vertical position.

C. Disconnect the blower electrical plug.

D. Remove the five screws along the forward hinge, and remove the assembly.

REPLACEMENT

A. Replace the Condenser Blower Assembly in the reverse order of removal.

This Area Intentionally Left Blank

8. REMOVAL, INSTALLATION / REPLACEMENT OF RECEIVER DRIER BOTTLE.

REMOVAL

Refer to figure 3.12 for this operation.

A. Evacuate the refrigerant from the system in accordance with the procedures provided in chapter 5.

B. Remove the LH forward side panel of the baggage compartment, to gain access to the Bottle.

C. Disconnect the upper and lower Receiver Drier Bottle fittings and remove the bottle.

REPLACEMENT

A. Replace the Receiver Drier Bottle in the reverse order of removal.

9. REMOVAL, INSTALLATION / REPLACEMENT OF BINARY SWITCH.

REMOVAL

Refer to figure 3.13 for this operation.

A. Evacuate the refrigerant from the system in accordance with the procedures provided in chapter 5.

B. Swing the Condenser Blower Assembly to the vertical position in accordance with step B of Section 7. This provides access to the Binary Switch.

C. Disconnect the switch electrical wires.

D. The Binary Pressure Switch (see Pg. 3-20) can now be removed from its threaded fitting.

REPLACEMENT

A. Replace the Binary Switch in the reverse order of removal.

10. REMOVAL, INSTALLATION/ REPLACEMENT OF BY-PASS VALVE ASSEMBLY.

REMOVAL

Refer to figure 3.13 for this operation.

A. Evacuate the refrigerant from the system in accordance with the procedures provided in chapter 5.

B. Swing the Condenser Blower Assembly to the vertical position in accordance with step B of Section 7. This provides access to the By-Pass Valve Assembly.

C. Disconnect the valve electrical wires.

D. Disconnect the inlet and outlet plumbing fittings on the valve.

E. Remove the two MS35275-240 screws from the valve mounting and remove the valve.

REPLACEMENT

A. Replace the Bypass Valve in the reverse order of removal.

This Area Intentionally Left Blank

CHAPTER 7
TROUBLESHOOTING

1. SYSTEM TROUBLESHOOTING

The following table provides a troubleshooting matrix. In addition, system pressure – diagnostic data is provided on pages 7-3 through 7-11.

Problem	Probable Cause	Solution
System not Cooling (Evaporator blowers still operating)	a. System is low or empty of refrigerant.	a. Evacuate the system, determine the origin of the refrigerant leak, and re-charge the system as prescribed in chapter 5.
	b. Moisture, or air in the system.	b. Evacuate the system, Replace the receiver / drier, and place the system under a vacuum for a minimum of 30 minutes before recharging the system. [1]
	c. Compressor	c. If the compressor has failed, it must be replaced, as shown in chapter 6. [1]
	d. Compressor drive belt	d. If the compressor drive belt has failed it will need to be replaced. Replace and adjust compressor drive belt as shown in chapter 6. [1]
	e. By-pass valve	e. 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. The temperature control relay is normally closed. Failure of this relay will cause the Bypass Valve to open resulting in complete loss of cooling.
	f. Condenser blower motor & fan assembly	f. Check to insure the condenser blower motor and fan assembly is receiving power, and the circuit breaker has not tripped. If the blower still doe's not function, it may have failed internally and must be replaced as shown in chapter 6. [1]
System not cooling (Evaporator blowers not operating)	g. Air conditioner control circuit breaker tripped.	g. Reset circuit breaker. If breaker will not reset, check for short in circuit.

(Continued)

Chapter 7
TROUBLESHOOTING (continued)

1. SYSTEM TROUBLESHOOTING (continued)

Problem	Probable Cause	Solution
System not cooling (Evaporator blowers not operating)	h. Forward or Aft evaporator blower circuit breaker tripped.	h. Reset circuit breaker. If breaker will not reset, check for short in circuit.
System not cooling (Evaporator blowers not operating)	i. Forward and aft evaporator blower motor(s)	i. 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, as shown in chapter 6. [1]
Loss of cooling limited to one evaporator.	j. Expansion valve malfunction.	j. 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 should be returned to Air Comm Corporation for repair. [1]
External moisture (Condensate) in the area of forward / aft evaporator	k. Leak in evaporator, or evaporator drainage system.	k. If water is noted in the area near the evaporators. The cause is normally a loose, cracked, plugged, or disconnected drain line. **NOTE** The drain line consists of a tube which extends from the lower surface of the evaporators through the outer contour of the helicopter.

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

This Area Intentionally Left Blank

Chapter 7
TROUBLESHOOTING (continued)

Diagnosis Based on System Pressures

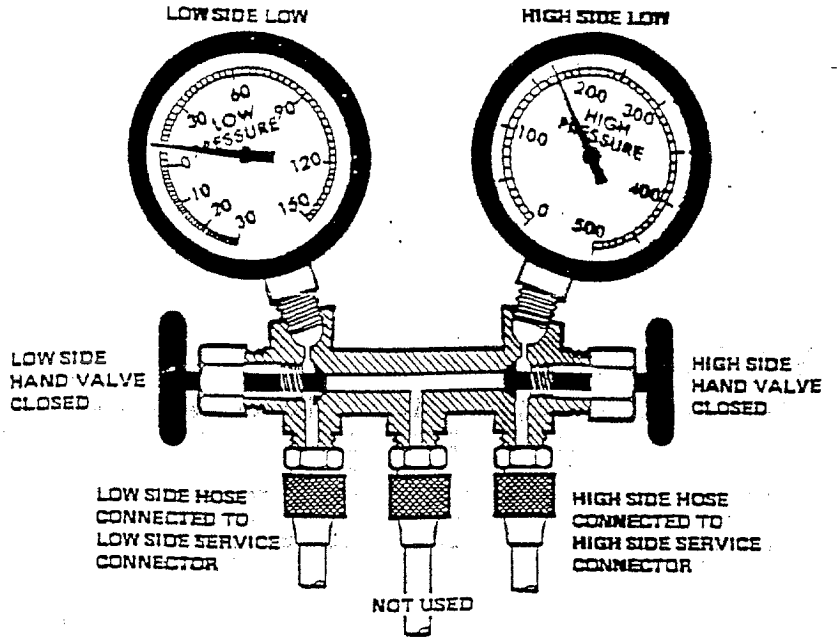
Test Procedure #1

COMPLAINT

Little or no cooling.

CAUSE

Refrigerant slightly low.



CONDITIONS*

1. Low side pressure too low. Gauge should read 30-35 psi.
2. High side pressure too low. Gauge should read 210-225 psi.
3. Bubbles in sight glass.
4. Evaporator air not cold.

CORRECTIVE PROCEDURES

1. Leak test the system.
2. Repair leaks (Discharge the system, replace lines or components.)
3. Check compressor oil to assure no loss.
4. Evacuate the system.
5. Charge the system.
6. Performance test the system.

Diagnosis
Refrigerant is low. May be caused by small leaks

Diagnosis Based on System Pressures

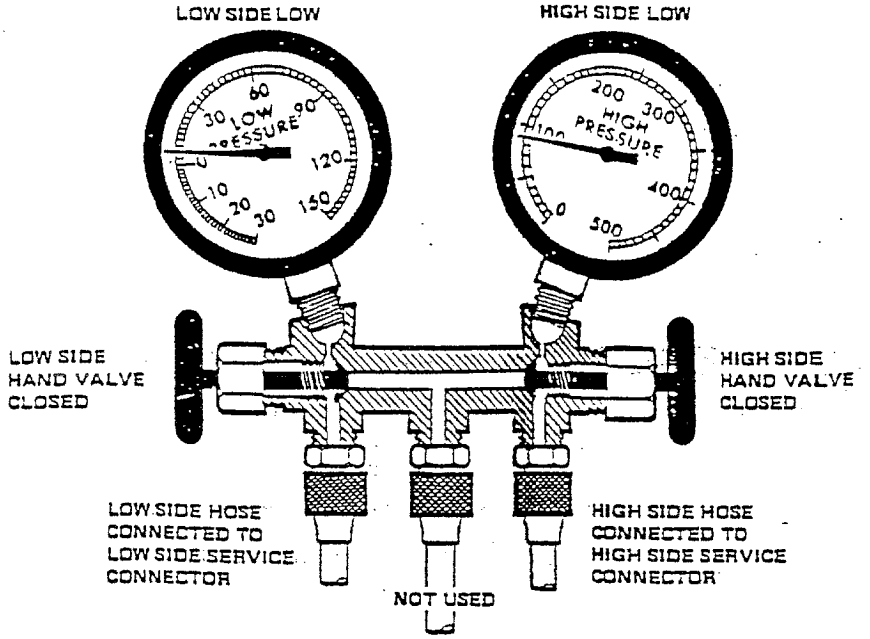
Test Procedure #2

COMPLAINT

Insufficient cooling.

CAUSE

Refrigerant excessively low.



CONDITIONS*

1. Low side pressure very low. Gauge should read 30-35 psi.
2. High side pressure too low. Gauge should read 210-225 psi.
3. No liquid or bubbles in sight glass.
4. Evaporator air warm.

CORRECTIVE PROCEDURES

1. Leak test the system.
2. Discharge the system.
3. Repair leaks.
4. Check compressor oil level to assure no loss.
5. Evacuate the system.
6. Charge the system.
7. Performance test the system.

Diagnosis

System refrigerant is extremely low. A serious leak is indicated.

Diagnosis Based on System Pressures

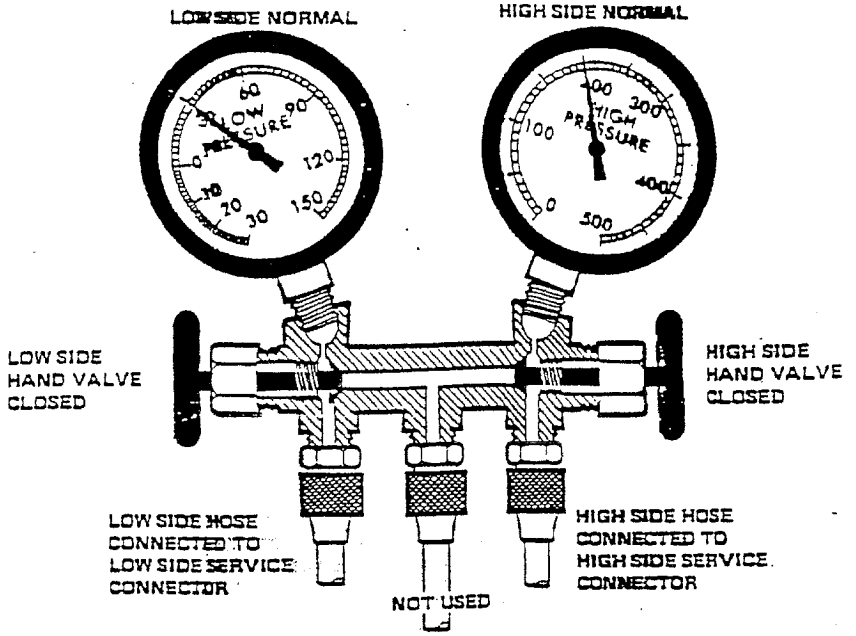
Test Procedure # 3

COMPLAINT

Insufficient cooling.

CAUSE

Air in system.



CONDITIONS*

Low side pressure reading does not change. With a thermostatic control, pressure should drop until compressor cycles; with a suction control, pressure should modulate.

2. High side pressure reading slightly high or slightly low (with auxiliary fan). Should read 210-225 psi.

3. Few or no bubbles in sight glass.

4. Evaporator air not cold.

CORRECTIVE PROCEDURES

1. Leak test the system.

   NOTE: Give special attention to the compressor seal area.

2. Discharge the system.

3. Repair leaks.

4. Replace the dehydrator and receiver.

5. Check compressor oil level to assure no loss.

6. Evacuate the system.

7. Charge the system.

8. Performance test the system.

Diagnosis
Non-condensable (air or moisture) present. / system not fully charged

Diagnosis Based on System Pressures

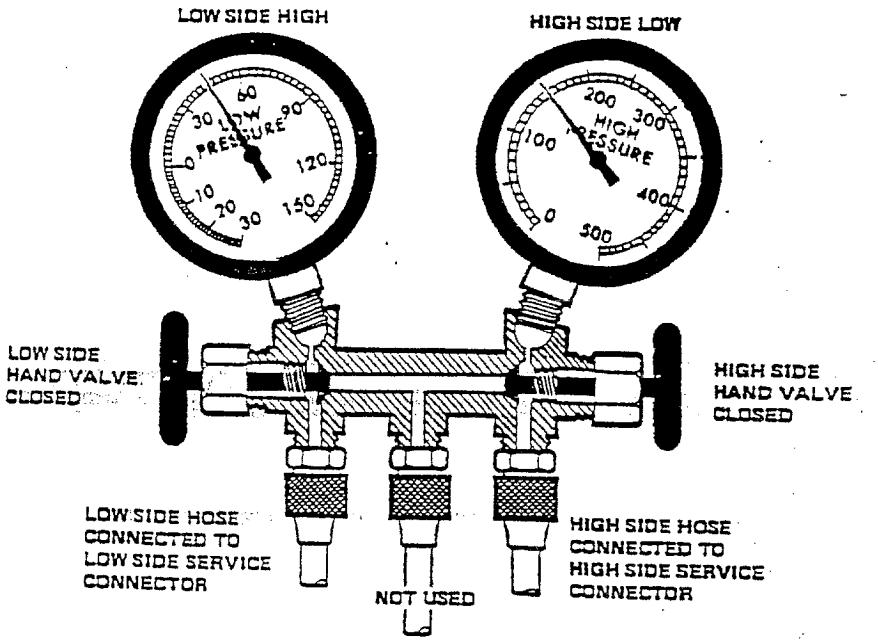
Test Procedure # 4

COMPLAINT

Insufficient cooling.

CAUSE

Compressor malfunction.



CONDITIONS*

1. Low side pressure reading too high. Should read 30-35 psi.
2. High side pressure reading too low. Should read 210-225 psi.
3. No bubbles in sight glass (system fully charged).
4. Evaporator air not cold.

CORRECTIVE PROCEDURES

1. Repair the compressor.

Diagnosis
Internal leak in compressor caused by worn or scored pistons, rings, or cylinders

Chapter 7
TROUBLESHOOTING (continued)

Diagnosis Based on System Pressures — Test Procedure 5

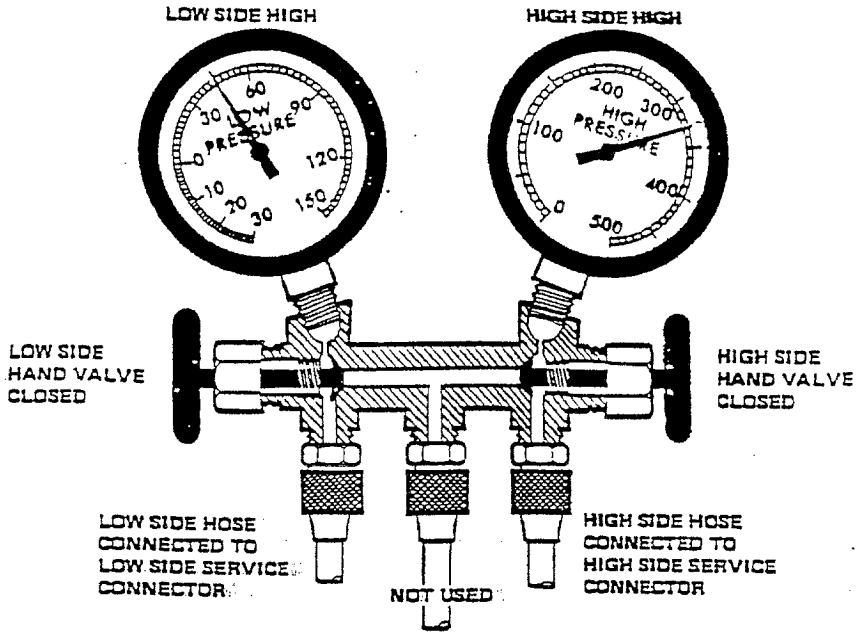
COMPLAINT

Insufficient or no cooling.

Engine overheats in some cases.

CAUSE

Condenser not functioning properly.



CONDITIONS*

1. Low side pressure reading too high. Should read 30-35 psi.
2. High side pressure reading too high. Should read 210-225 psi.
3. Bubbles in sight glass occasionally.
4. Liquid line hot.
5. Evaporator air warm.

CORRECTIVE PROCEDURES

1. Check belt tension. Loose or worn drive belts could cause excessive pressures in the compressor head.
2. Look for clogged passages between the fins and coil of the condenser, a plugged bug screen, or other obstructions that could reduce the air flow through the condenser.

CORRECTIVE PROCEDURES (Cont'd)

Check for overcharge of refrigerant, and correct as follows:

a. Discharge refrigerant until bubbles appear in sight glass and both gauge readings drop below normal.

b. Add new refrigerant until evaporator temperatures reach a minimum and suction pressures start to increase above 35 psi.

(Operate the system, and recheck the performance: if the gauge readings are still too high, proceed as follows.)

Discharge the system.

Remove the condenser, and clean and flush it to ensure a free flow of refrigerant – or, if the condenser appears to be unduly dirty or plugged, replace it.

Replace the dehydrator and receiver.

Evacuate the system, and recharge it.

Performance test the system.

Diagnosis

Lack of cooling caused by too high pressure on high side, resulting from improper operation of condenser. (May also be the result of system over charging).

Diagnosis Based on System Pressures

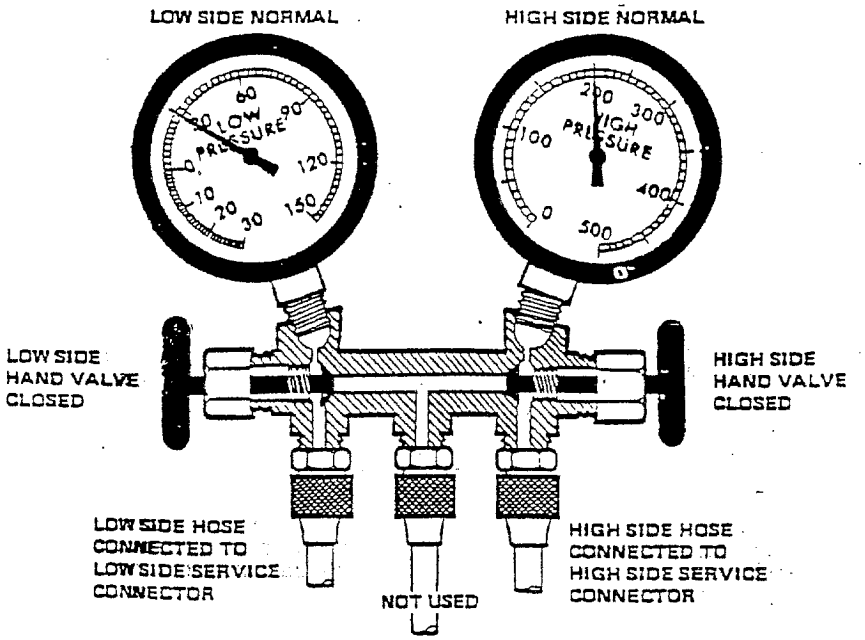
Test Procedure # 6

COMPLAINT

Insufficient cooling during hottest part of hot days.

CAUSE

Moisture in the system.



CONDITIONS*

1. Low side pressure reading is normal (30-35 psi), but it drops to a vacuum reading during testing.
2. High side pressure reading is normal (approximately 210-225 psi), but it drops when low side reading shows a vacuum.
3. Tiny bubbles in sight glass.
4. Evaporator air is sufficiently cold until low side pressure gauge shows a vacuum reading, then it becomes warm.

CORRECTIVE PROCEDURES

1. Discharge the system.
2. Replace the dehydrator and receiver.
3. Evacuate the system.
4. Charge the system.
5. Performance test the system.

Diagnosis

Excessive moisture in the system. Drying agent in receiver drier bottle is saturated. This moisture collects and freezes in the expansion valve, thus preventing a flow of refrigerant through the evaporator.

Diagnosis Based on System Pressures

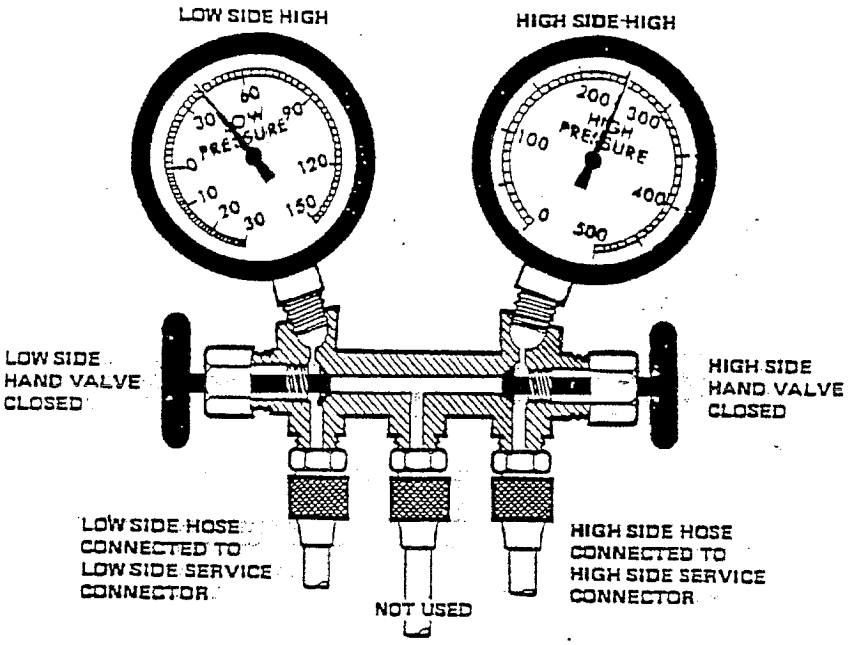
Test Procedure # 7

COMPLAINT

Insufficient or no cooling.

CAUSE

Large amount of air in system.



CONDITIONS*

1. Low side pressure too high. Should read 30-35 psi.
2. High side pressure too high. Should read 210-225 psi.
3. Occasional bubbles in sight glass.
4. Evaporator air not cool.

CORRECTIVE PROCEDURES

1. Discharge the system.
2. Replace the dehydrator and receiver.
3. Evacuate the system.
4. Charge the system.
5. Performance test the system.

Diagnosis

Air in system. This and the moisture in the air is contaminating the refrigerant, causing the system to operate improperly.

Chapter 7
TROUBLESHOOTING (continued)

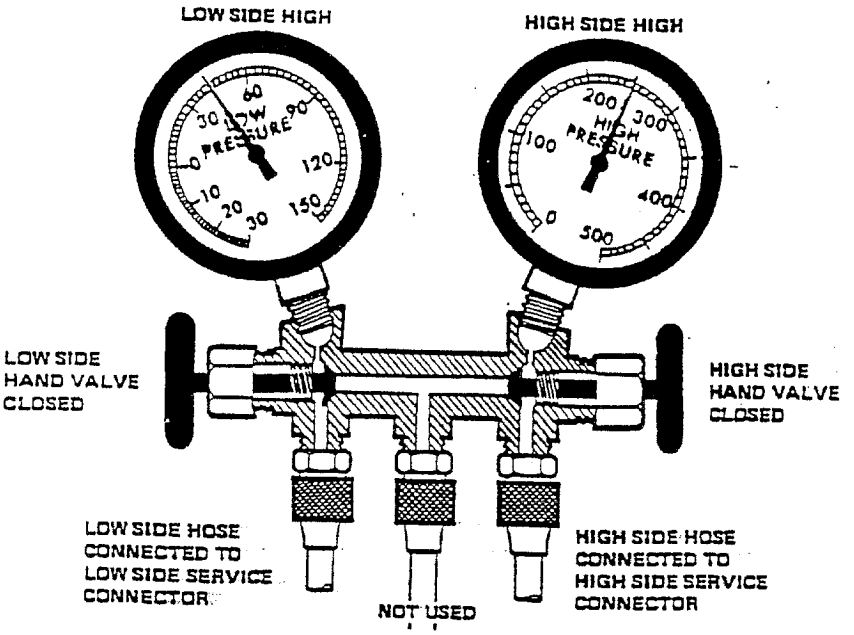
Test Procedure # 8

COMPLAINT

Insufficient or no cooling.

CAUSE

Improper operation of thermostatic expansion valve (stuck open).



CONDITIONS*

1. Low side pressure too high. Should read 30-35 psi.
2. High side pressure too high. Should read 210-225 psi.
3. Evaporator air warm.
4. Evaporator and suction hose (to compressor) surfaces show considerable moisture.

CORRECTIVE PROCEDURES

1. Check for sticking expansion valve or incorrect mounting of temperature sensing bulb:
   a. Operate the system at maximum cooling.
   b. Spray refrigerant on head of expansion valve and/or temperature sensing bulb (if accessible).
   c. Check low side gauge. It should show a vacuum reading.
2. If the test (above) shows that the expansion valve operation is satisfactory, proceed as follows:
   a. Clean the surface of the evaporator outlet pipe and the temperature sensing bulb, and clamp the bulb to the pipe.
   b. Operate the system and check its performance.
3. If test indicates that the expansion valve is defective, proceed as follows:
   a. Discharge the system.
   b. Replace the expansion valve.
   c. Evacuate the system.
   d. Charge the system.
   e. Performance test the system.

Diagnosis

Thermostatic expansion valve is allowing too much refrigerant to flow through the evaporator coils. The valve may be stuck open, or the temperature sensing bulb may be mounted incorrectly.

Chapter 7
TROUBLESHOOTING (continued)

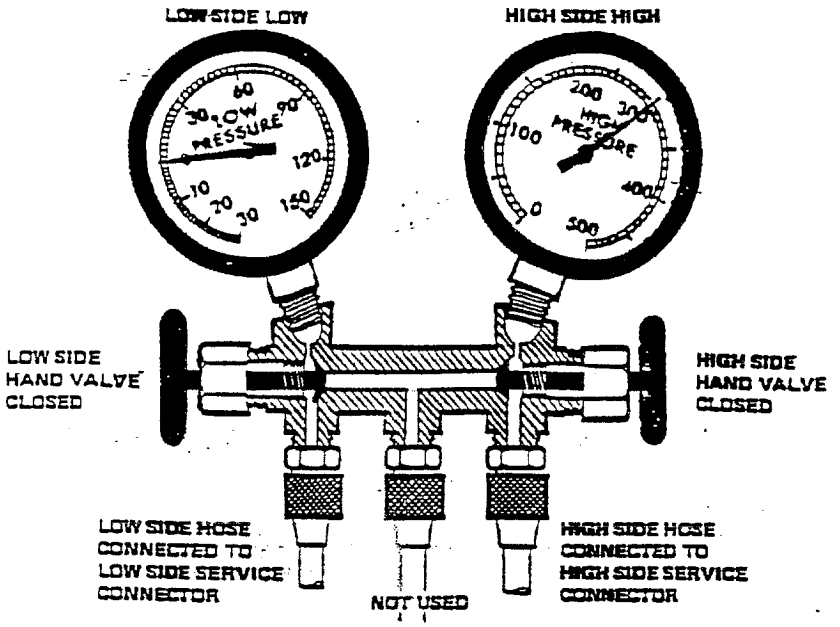
Test Procedure # 9

COMPLAINT

Insufficient cooling.

CAUSE

Improper operation of thermostatic expansion valve (stuck closed).



CONDITIONS

1. Low side gauge reading too low (0 psi or vacuum). Should read 30-35 psi.
2. High side pressure too high. Should read 210-225 psi.
3. Evaporator air cool, but not sufficiently cold.
4. Expansion valve inlet pipe surface shows considerable moisture or frost.

CORRECTIVE PROCEDURES

1. Place finger on expansion valve inlet. If too cold to touch, proceed as follows:
   a. Operate system at maximum cooling.
   b. Spray refrigerant on head of valve and/or temperature sensing bulb (if accessible).
   c. Check low side gauge. It should show a vacuum reading
2. If the test (above) shows that the expansion valve is operating satisfactorily, clean the surface of the evaporator outlet pipe and the temperature sensing bulb, and clamp the bulb to the pipe.
3. If the expansion valve inlet surface shows frost or heavy moisture, proceed as follows:

CORRECTIVE PROCEDURES (Cont'd)

   a. Discharge the system.
   b. Disconnect the inlet line from the expansion valve, and inspect the screen.
   c. Clean the screen, replace it, and reconnect inlet line to the valve.
4. If the corrective procedure (Step 1 above) shows that the expansion valve is defective, proceed as follows:
   a. Discharge the system.
   b. Replace the expansion valve.
5. After performing Steps 3 and/or 4 above, proceed as follows:
   a. Make sure temperature sensing valve is properly mounted on the evaporator outlet pipe.
   b. Evacuate the system.
   c. Charge the system.
   d. Performance test the system.

Diagnosis

Expansion valve is not permitting a sufficient flow of refrigerant. Causes include: Valve stuck in restricted or closed position, or insufficient amount of refrigerant in the temperature sensing bulb.

Chapter 7
TROUBLESHOOTING (continued)

Diagnosis Based on System Pressures

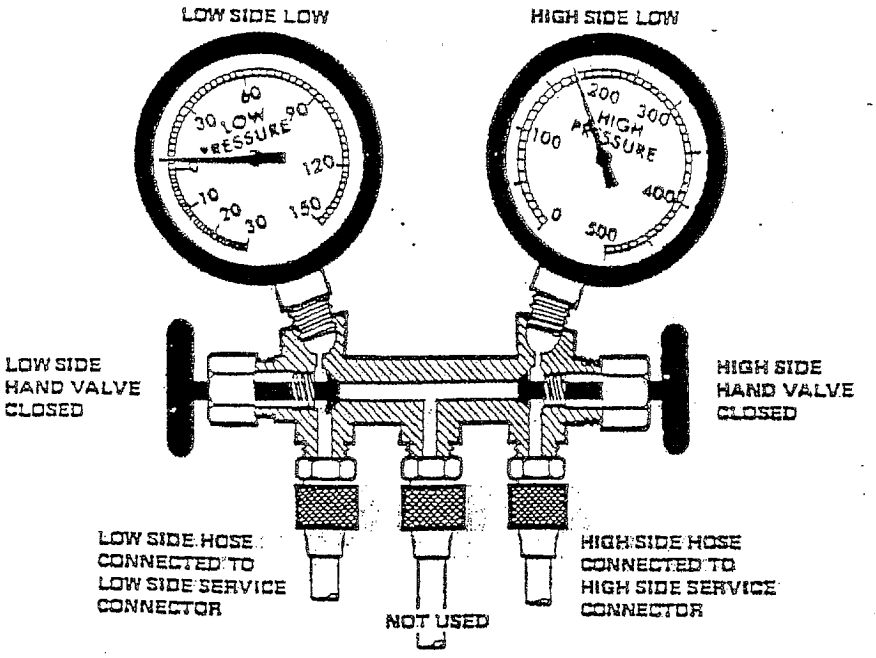
Test Procedure #10

COMPLAINT

Insufficient cooling.

CAUSE

Restriction in high side of system.



CONDITIONS*

1. Low side pressure too low. Should read 30-35 psi.
2. High side pressure too low. Should read 210-225 psi.

   NOTE: A normal or high reading of the high side pressure gauge, under these conditions, indicates that the system is overcharged or that the condenser or the dehydrator and receiver are too small.
3. Evaporator air only slightly cool.
4. Liquid line and dehydrator and receiver are cool to touch, and show frost or considerable moisture.

CORRECTIVE PROCEDURES

1. Discharge the system.
2. Replace the liquid lines, dehydrator and receiver, or other obstructed components.
3. Evacuate the system.
4. Charge the system.
5. Performance test the system.

Diagnosis

There is a restriction in the liquid line and / or the receiver drier bottle "starving" the evaporator. (Compressor removing refrigerant from the evaporator faster than it can enter).