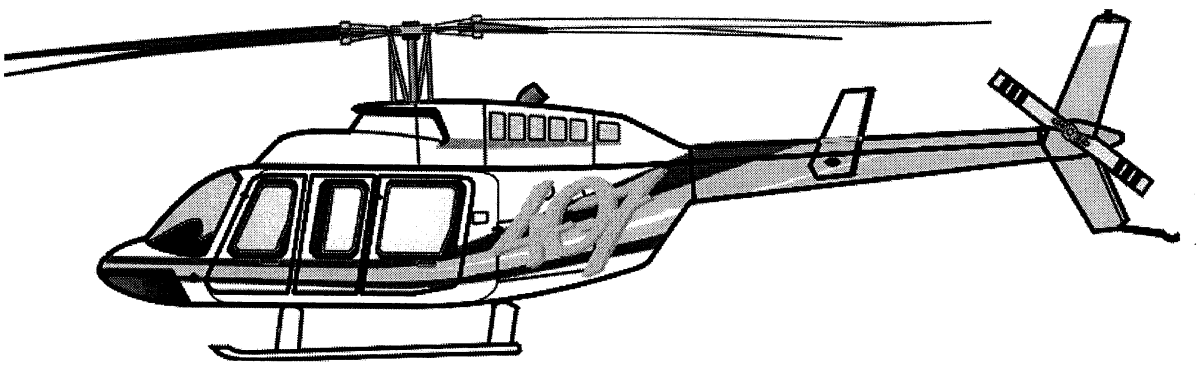
CABIN VENTILATION SYSTEM SERVICE MANUAL 407V-300M

AIR COMM CORPORATION
3300 AIRPORT ROAD
BOULDER, CO. 80301

CABIN VENTILATION SYSTEM
INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
BELL HELICOPTER 407



Revision 0

11 April, 2000

RECORD OF REVISIONS

REVISION NUMBER	ISSUE DATE	DATE INSERTED	BY	REVISION NUMBER	ISSUE DATE	DATE INSERTED	BY

LIST OF EFFECTIVE PAGES

LIST OF REVISIONS

Revision 0 (Original Issue).....April 11, 2000

LIST OF EFFECTIVE PAGES

Title	Page(s)	Revision No.
Record of Revisions	i	0
List of Effective Pages	ii	0
Table of Contents	iii	0
Chapter 0 Introduction	0-1 to 0-5	0
Chapter 1 Airworthiness Limitation Section	1-1	0
Chapter 2 Inspections	2-1	0
Chapter 3 Location and Access	3-1 to 3-13	0
Chapter 4 Placards and Markings	4-1 to 4-2	0
Chapter 5 Servicing	5-1	0
Chapter 6 Standard Practices Information	6-1 to 6-4	0
Chapter 7 Troubleshooting	7-1	0
Appendix A Suggested Spares List	A-1	0
Appendix B Weight and Balance Information	B-1	0

These Instructions for Continued Airworthiness (ICA) except for the Airworthiness Limitations Section have been reviewed and found to comply with the applicable requirements of Appendix A to Federal Aviation Regulation Part 22.

FAA Acceptance E. Richard Thomas Date 05-04-2000
Fort Worth Aircraft Evaluation Group

THIS AREA INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

CHAPTER 0
INTRODUCTION

1. SCOPE

The scope of this manual encompasses the scheduled and unscheduled maintenance procedures for the continued airworthiness of the Air Comm Corporation Ventilation System installed in the Bell 407 helicopter.

2. PURPOSE

The purpose of this manual is to provide the aircraft mechanic in the field the necessary information to maintain the ventilation 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 407 that are equipped with the Air Comm Corporation kit number 407V-102 Cabin Ventilation system STC # SR00230DE.

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.

6. ABBREVIATIONS

Lbs: Pounds

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 VENTILATION SYSTEM.

This manual provides information which is required for operation and maintenance of the Air Comm ventilation system installed in the Bell model 407 series helicopter. After completion of the ventilation system installation this document must be placed with the appropriate existing aircraft documents.

10. REFERENCE DOCUMENTS

Flight Manual Supplement 407V-1

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", and 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 (page i), and on the List of Revisions (page ii) of this manual.

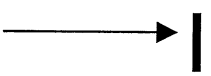
In addition to the revision of the manual, those changes categorized as "Safety of Flight" shall have a Service Bulletin issued to the operator providing the necessary information to comply with, and or to correct, the "Safety of Flight" issue.

Replacement , and or revised copies of this manual maybe purchased by contacting:

Air Comm Corporation Service Department
3300 Airport Road
Boulder, CO. 80301
Phone No. 303-440-4075 Fax No. 303-440-6355

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). 

(Continued)

Chapter 0
INTRODUCTION (continued)

13. DESCRIPTION AND OPERATION OF VENTILATION SYSTEM

This system provides fresh forced air directly on both the cockpit and cabin occupants.

The system consists of a 28 VDC cabin ventilation blower mounted behind the "hat shelf", Two cockpit ventilation blowers and two air ducts mounted to each side of the instrument panel. The aft ventilation blower utilizes existing headliner ducting to distribute the fresh air to the cabin occupants.

The system is operated by opening the existing nose mounted fresh air vents, and activating the ventilation blowers. In the cockpit, fresh air is pulled through the vent openings to the individual blowers and then flows directly onto the pilot and copilot. This results in both a supply of fresh air and wind-chill cooling in the "greenhouse" part of the cabin.

In the cabin, fresh air is pulled through a fuselage cutout to the high output blower and then flows to the occupants through existing headliner mounted air outlets. This also results in both a supply of fresh air and wind-chill cooling similar to the forward vent blowers. The aft ventilation blower is mounted above the baggage compartment and the fresh air opening is located on the left side of the aircraft.

A cabin exhaust vent (Page 0-5) is utilized to increase the air exchange rate throughout the cockpit and cabin. The 3" cabin exhaust air duct is provided as shown on page 3-2 and 3-3, to allow a continuous exchange of air throughout the helicopter. The vent opening is located on the bottom of the aircraft aft lower right contour.

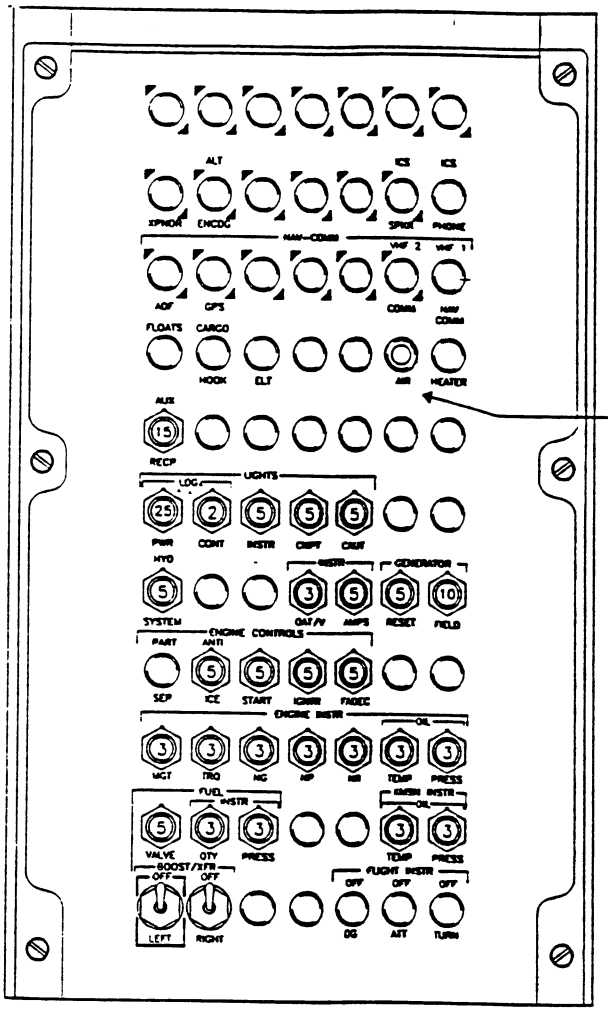
Additional Cabin air exhaust venting exists through the control column tunnel into the transmission cowling area.

The cockpit ventilation blowers are standard and the cabin ventilation blower is optional.

The fresh air ventilation (ON) BLO/OFF switch (Page 0-4), Blower Speed Control Switches (Page 0-4), and the Cabin Ventilation System Control Circuit Breaker (Page 0-4) are located on the overhead control panel in the cockpit. In addition to the cockpit controls there is a circuit breaker panel located above the baggage compartment containing circuit breakers for the Forward Blowers, Ventilation Control, and the Aft Blowers (if applicable) (figure 0-2)

Instructions for the operation of the Cabin Ventilation System are found in the Flight Manual Supplement 407V-1.

Continued



Cabin Ventilation System control circuit breaker. Located in overhead console.

Blower Speed control switches

Fresh Air Ventilation On (BLO) / OFF Switch

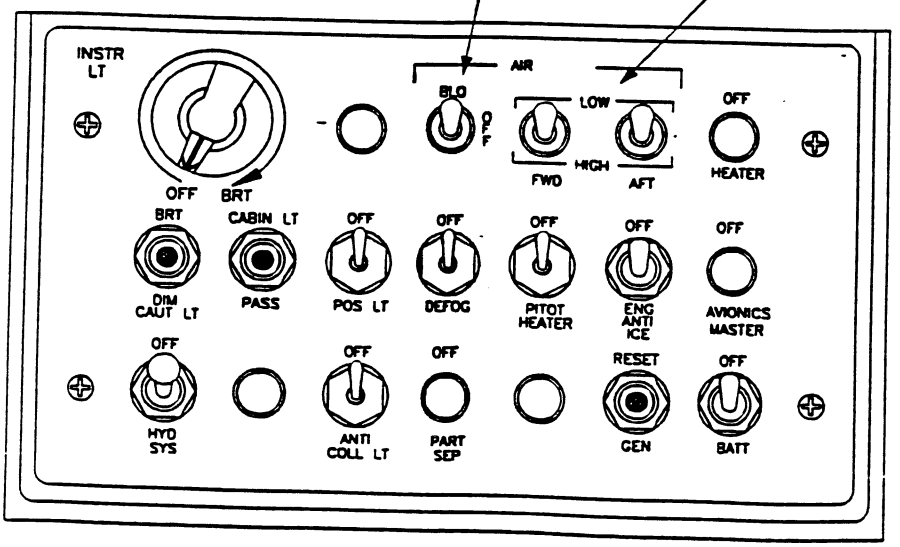
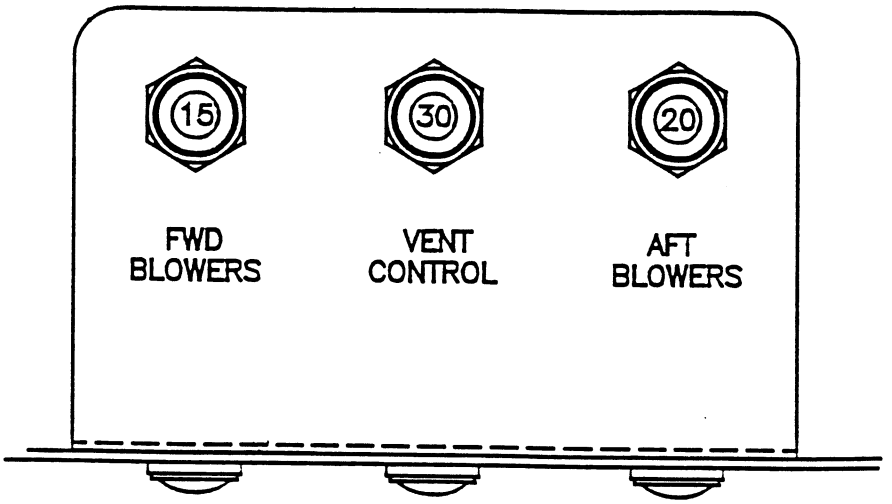
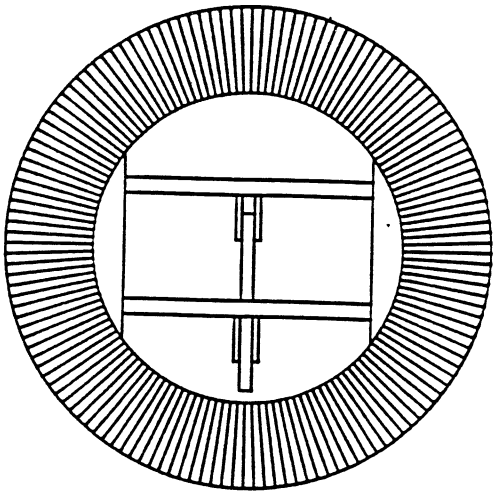


Figure 0-1 Switch Panel and Control Circuit Breaker Location



Circuit Breakers for Ventilation Control, Forward and Aft Blowers. Circuit Breaker panel located above baggage compartment.



EXHAUST VENT
PUSH OPEN – CLOSE

OPEN WHEN VENT BLOWER IS ON FOR MAXIMUM VENTILATION
CLOSE WHEN DESIRED TO ACHIEVE MAX CABIN HTR. EFFECTIVENESS

(located in "Hat Shelf")

Figure 0-2 Exhaust Vent Control Placard & Circuit Breaker Panel

CHAPTER 1
AIRWORTHINESS LIMITATIONS SECTION

1. Airworthiness Limitations

"No airworthiness limitations associated with this type design change."

THIS AREA INTENTIONALLY LEFT BLANK

CHAPTER 2
INSPECTIONS

The Fresh Air Ventilation System consists of three DC electric motors with associated electrical components and mounting hardware. The system requires minimal maintenance or service beyond periodic component inspections.

If the system is not working properly, check that the electrical connections and associated circuitry is in working order and the inlet ducts are not obstructed. Also confirm the nose mounted fresh air vent doors are open and the ES72225-2 Adapter in the "hat shelf" is open.

The following is a periodic inspection schedule for continued airworthiness of the ventilation system.

1. PERIODIC INSPECTIONS AND OVERHAUL SCHEDULE

Item	Annual	Every 100 hr. Operation	Every 500 hr. Operation	Special Inspection Information
Ventilation Blower HI/LOW Switch MS35058-22	X		X	Check for normal operation of blowers Hi/Lo switch
Ventilation Ducting S-6087EC-6 / -7 & CAT ducting	X		X	Check for security and chaffing of ducting
Ventilation Air Inlets and Outlets 206V-2014-1 & 206V-2016-1	X	X	X	Check for obstructions in Inlet and Outlet ducts
Forward and Aft Ventilation Blower Assemblies 206V-2018-3/-4 & S-6078EC-15	X		X	Check security of Blower Assemblies
Placards & Markings S-2500EC-4	X		X	Check for security and legibility
Inlet Assembly 206V-2014-1	X	X	X	Check for security and operation of flapper door
Ventilation Electrical System S-2510EC- Relay panel, S-2510EC-Circuit Breaker Panel, or S-2512EC- Circuit Breaker Panel	X		X	Check security and condition of electrical wiring, components and connections

2. COMPONENT OVERHAUL / REPLACEMENT SCHEDULE

System component failure will result in loss of cabin ventilation and no safety of flight issues are involved. Thus "No scheduled component overhaul required for this STC".

CHAPTER 3
LOCATION AND ACCESS

1. LOCATION OF VENTILATION SYSTEM FEATURES

Nomenclature	Figure	Description of Location
General Arrangement Exhaust Duct Only	3-0	For Reference only
General Arrangement Cockpit Blowers Only	3-1	For Reference only
General Arrangement Cockpit & Cabin Blowers	3-2	For Reference only
Right Hand Cockpit Blower Installation	3-3	Located fwd of the tail rotor control pedals below the instrument panel
Left Hand Cockpit Blower Installation	3-4	Located fwd of the tail rotor control pedals below the instrument panel
Cockpit Blowers Only View Looking Down	3-5	For Reference only
Cabin Blower Installation View Looking Down	3-6	Located between Stations 179.66 & 192.00 aircraft left behind the "hat shelf"
Cabin Exhaust Ventilation Duct	3-7	For Reference only
General Arrangement – Ventilation Blower Electrical Components	3-8	For Reference only
Electrical Schematic Cockpit Blowers Only	3-9	For Reference only
Electrical Schematic Cockpit & Cabin Blowers	3-10	For Reference only
Transient Suppression Circuitry	3-11	For Reference only

THIS AREA INTENTIONALLY LEFT BLANK

Continued

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued)

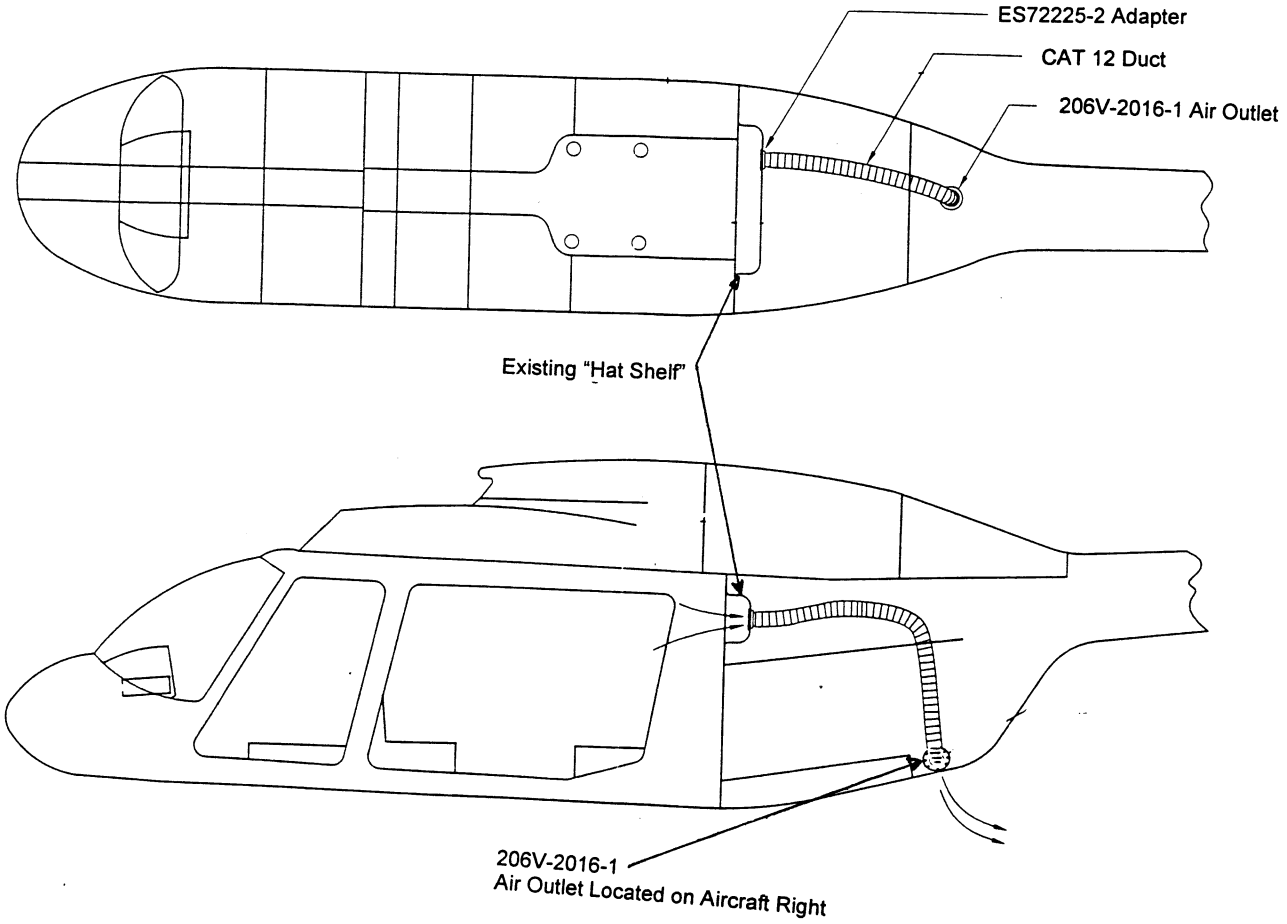


Figure 3-0 Cabin Ventilation System – Exhaust Duct Only

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

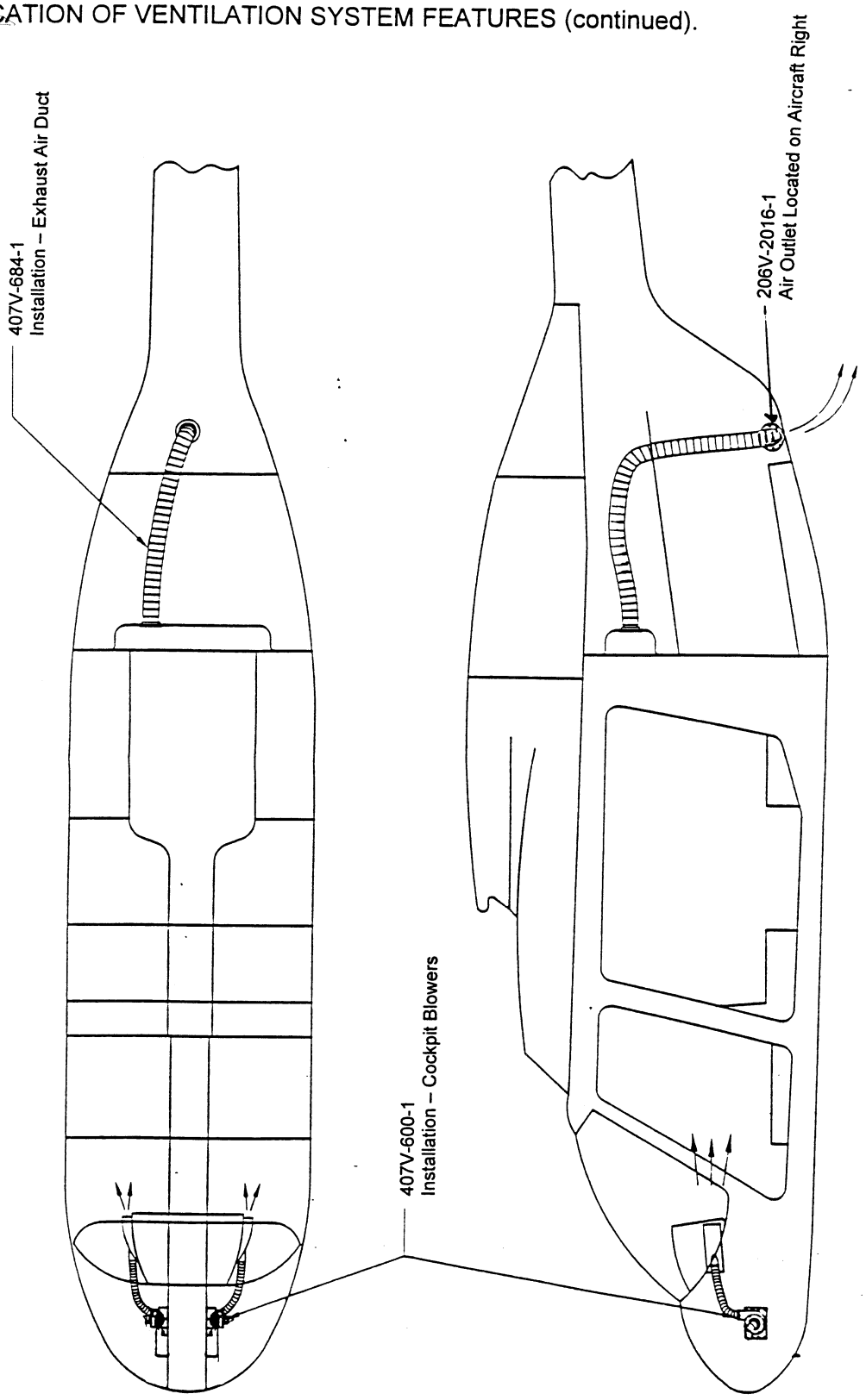


Figure 3-1 Cabin Ventilation System – Cockpit Blowers Only

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

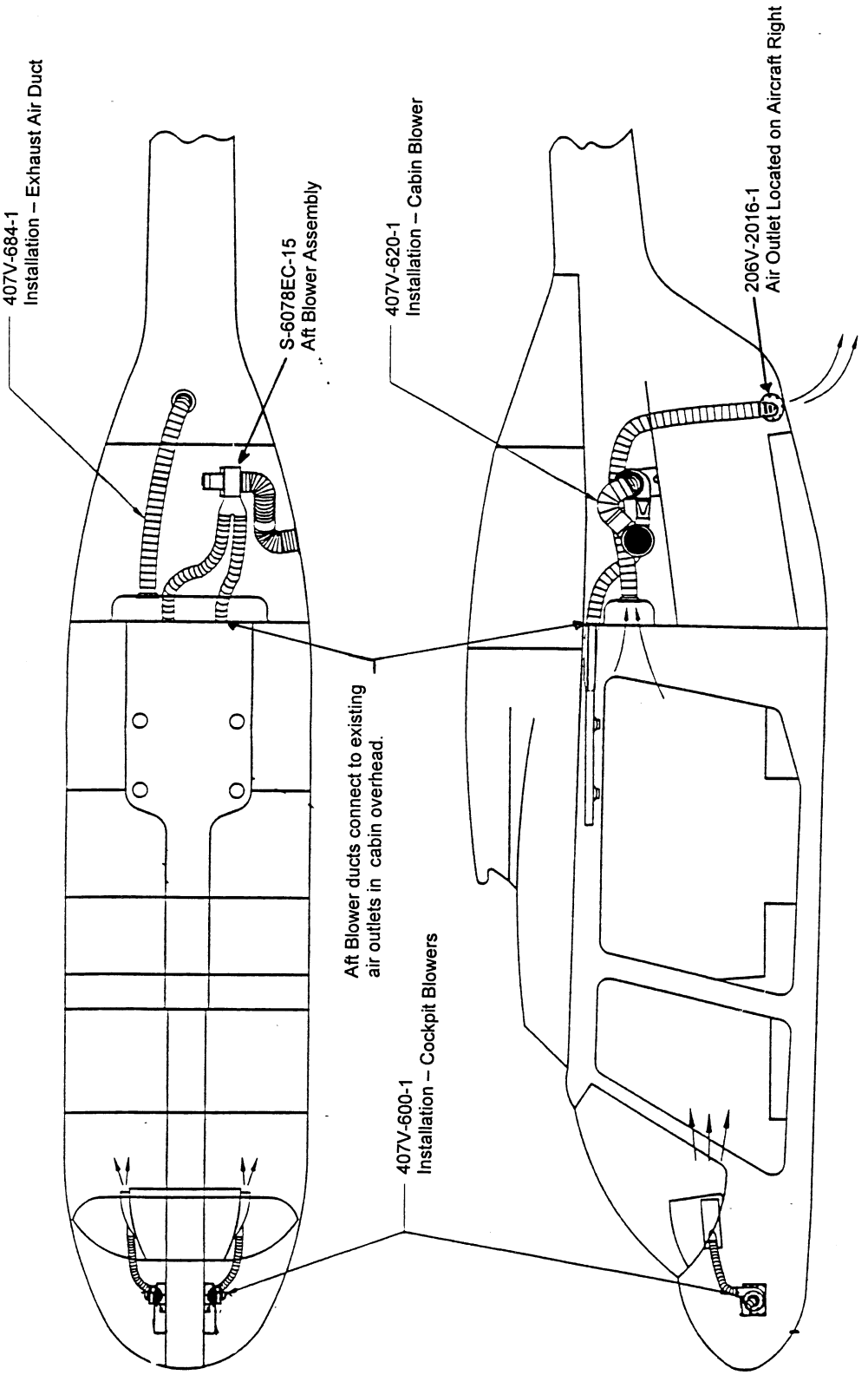


Figure 3-2 Cabin ventilation System – Cockpit & Cabin Blowers

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

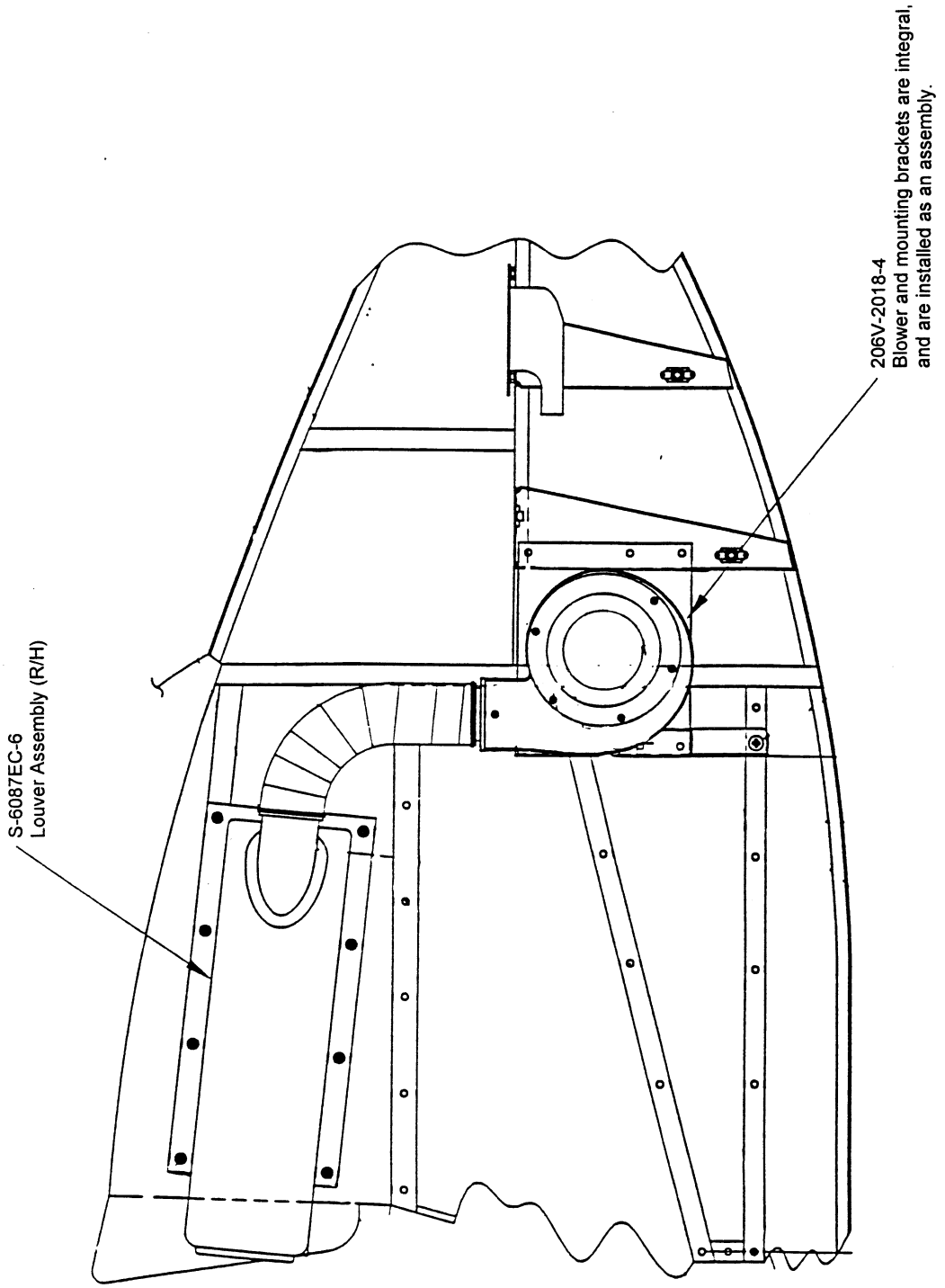


Figure 3-3 RH Cockpit Blower Installation

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

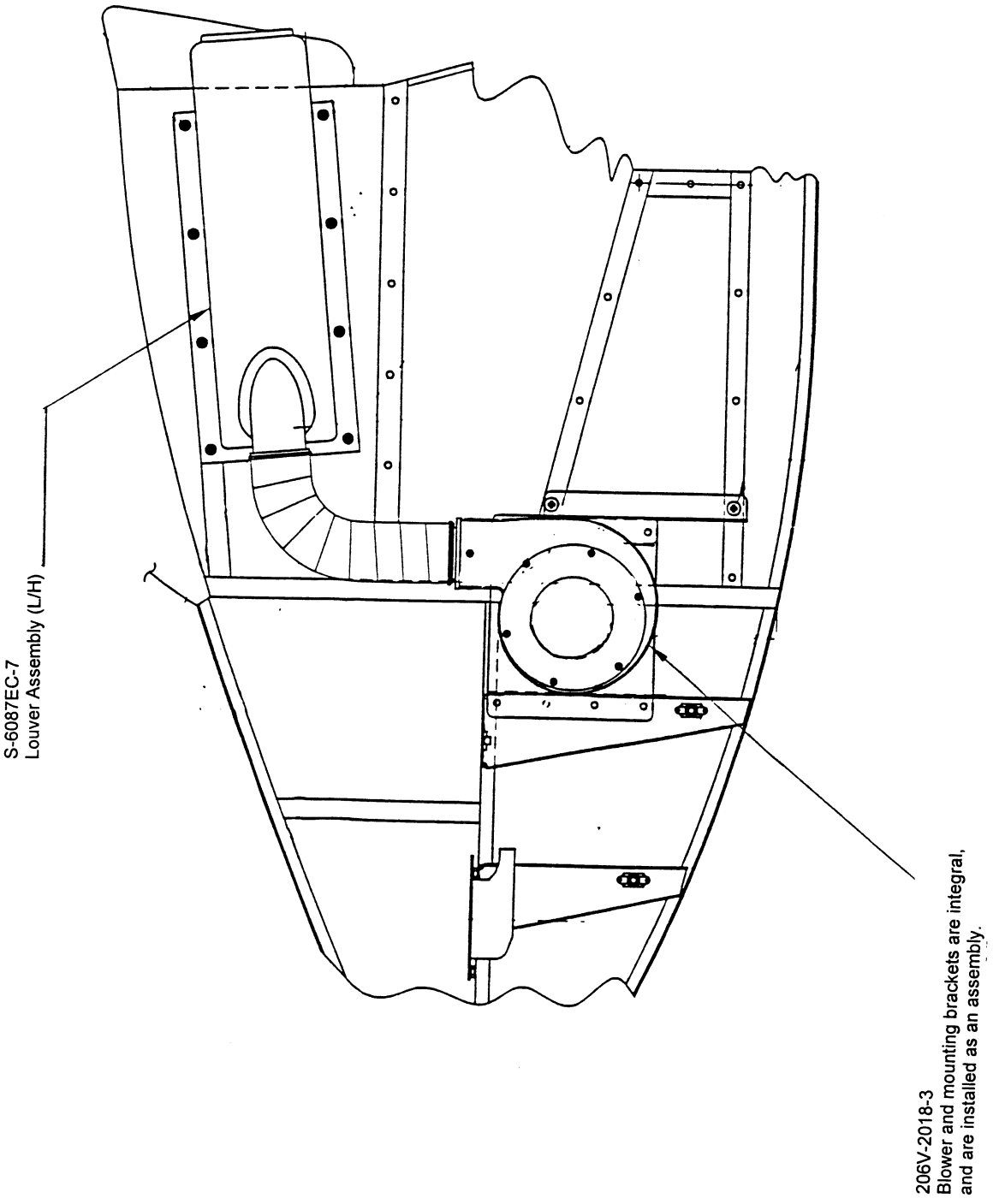


Figure 3-4 Left Hand Cockpit Blower Installation

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

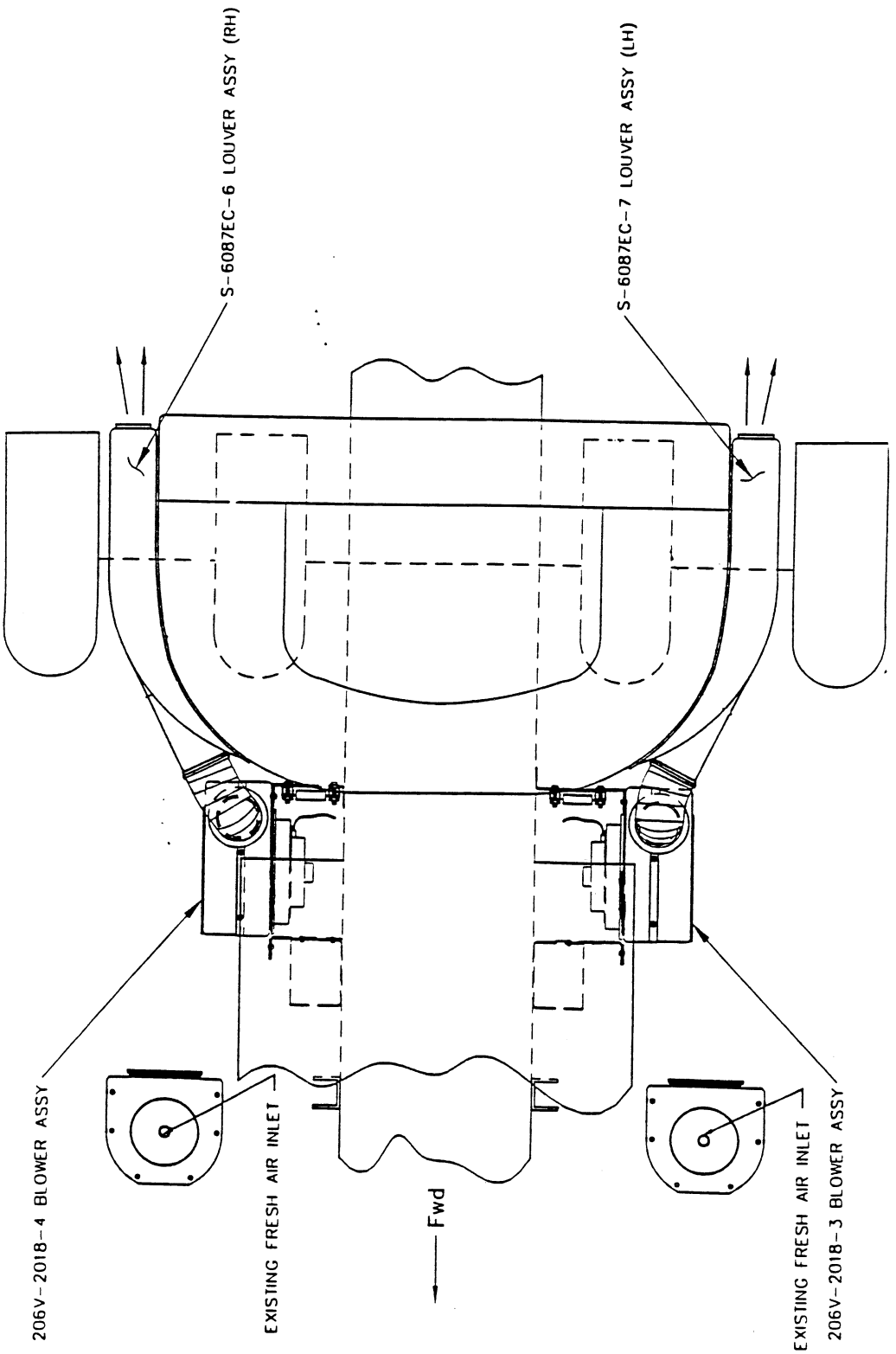


Figure 3-5 View Looking Down – Cockpit Blowers

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

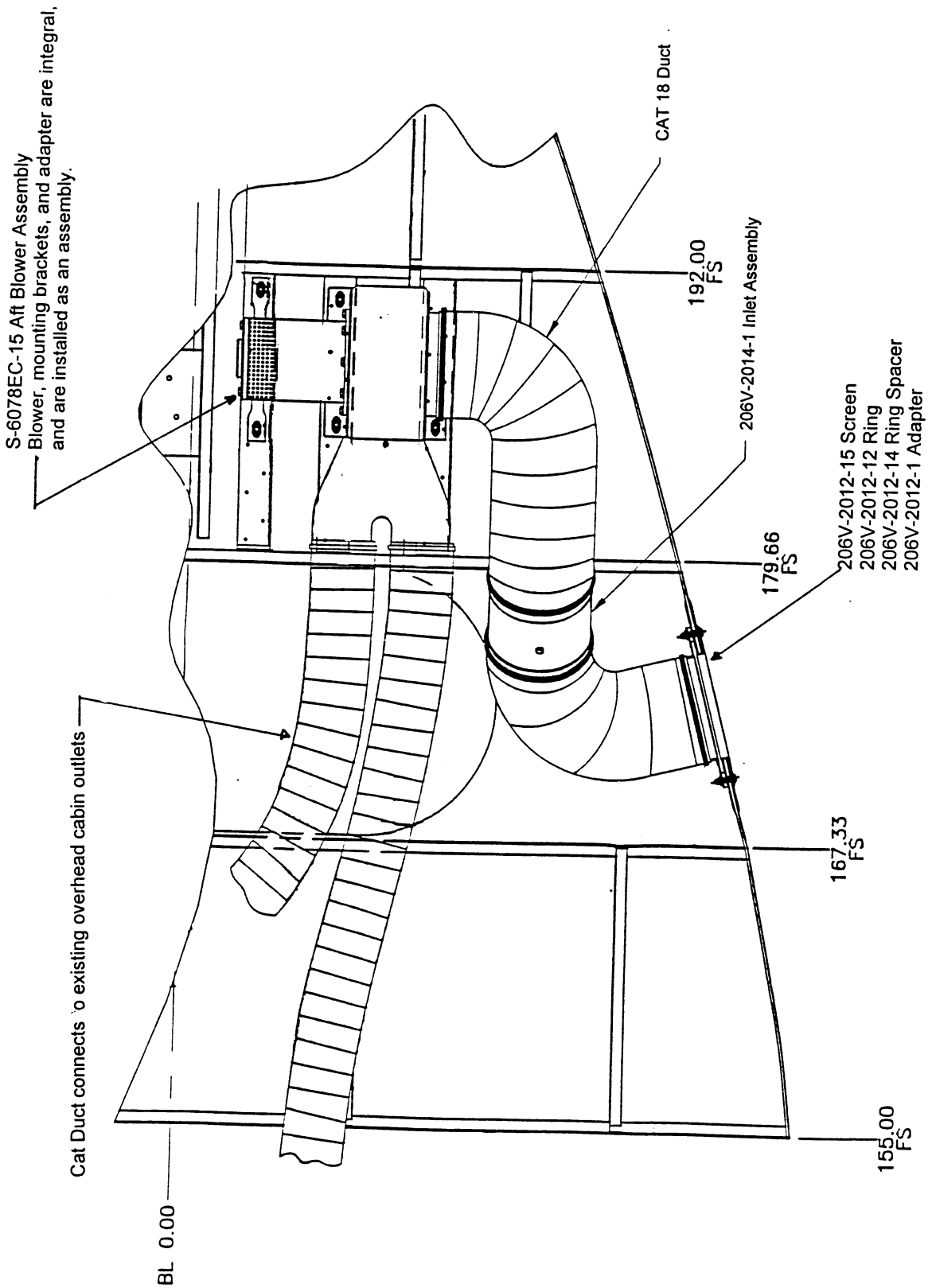


Figure 3-6 Cabin Blower Installation (Looking Down)

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

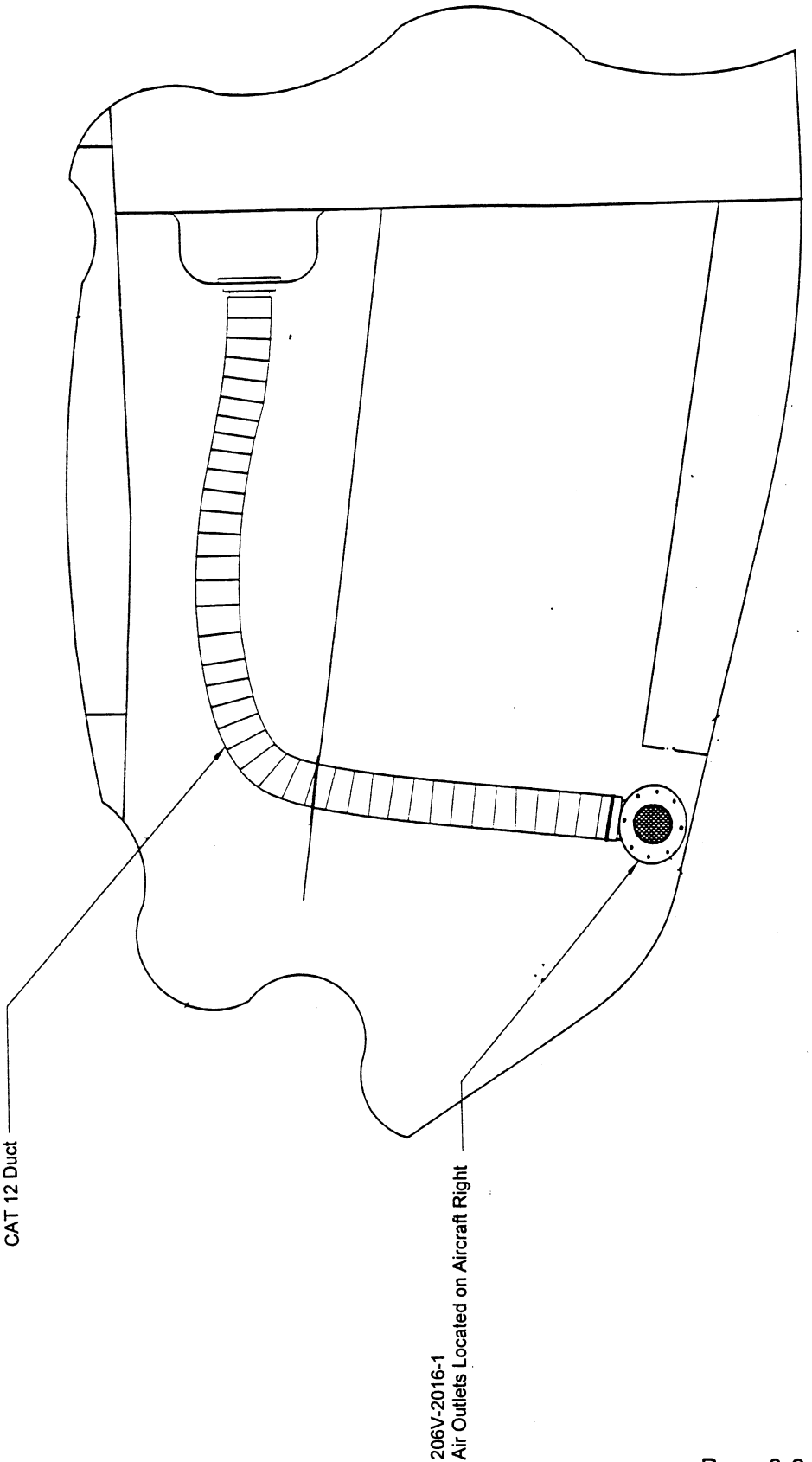


Figure 3-7 Cabin Exhaust Ventilation Duct

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

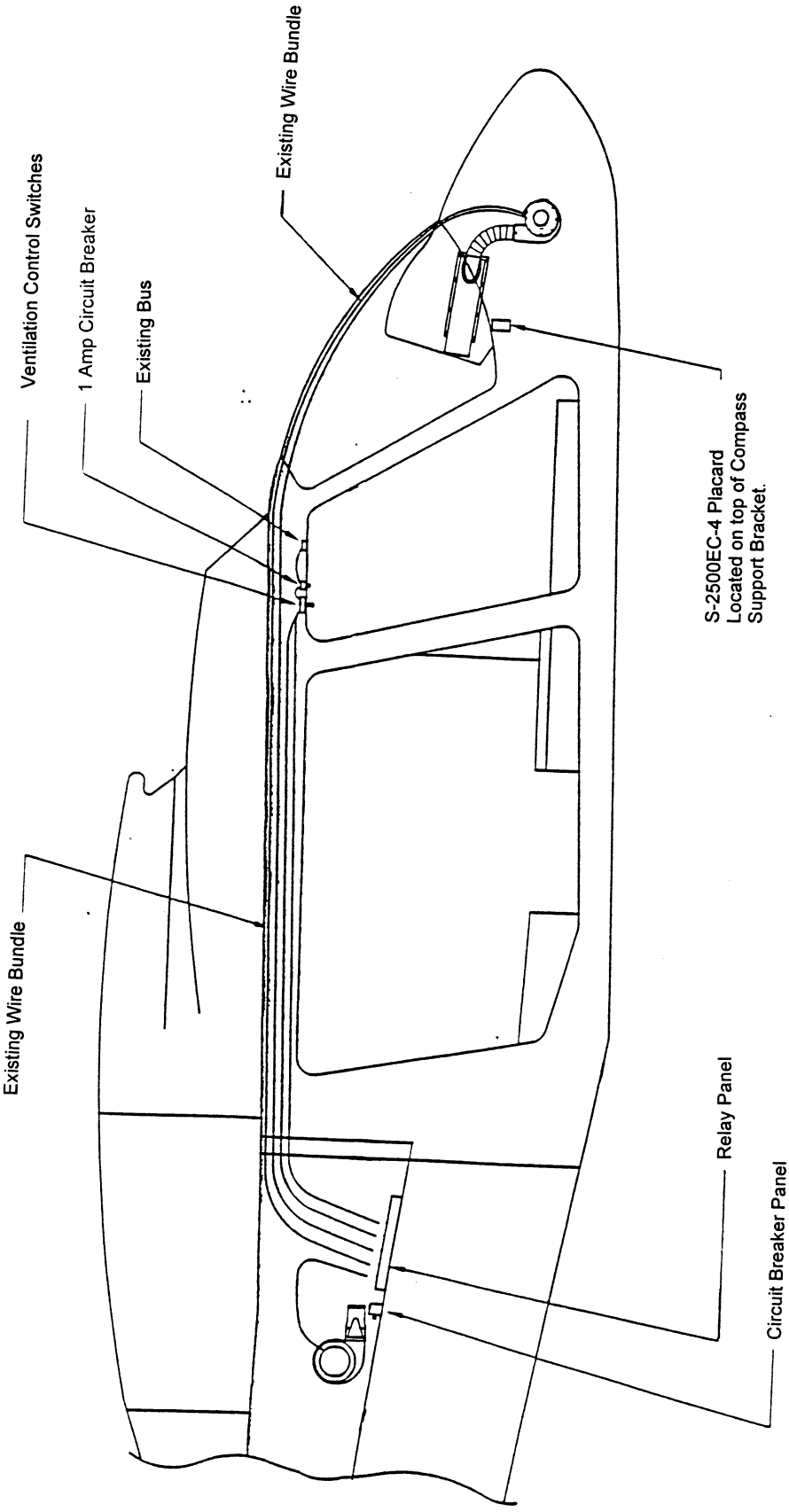


Figure 3-8 General Arrangement – Ventilation Blower Electrical Components

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

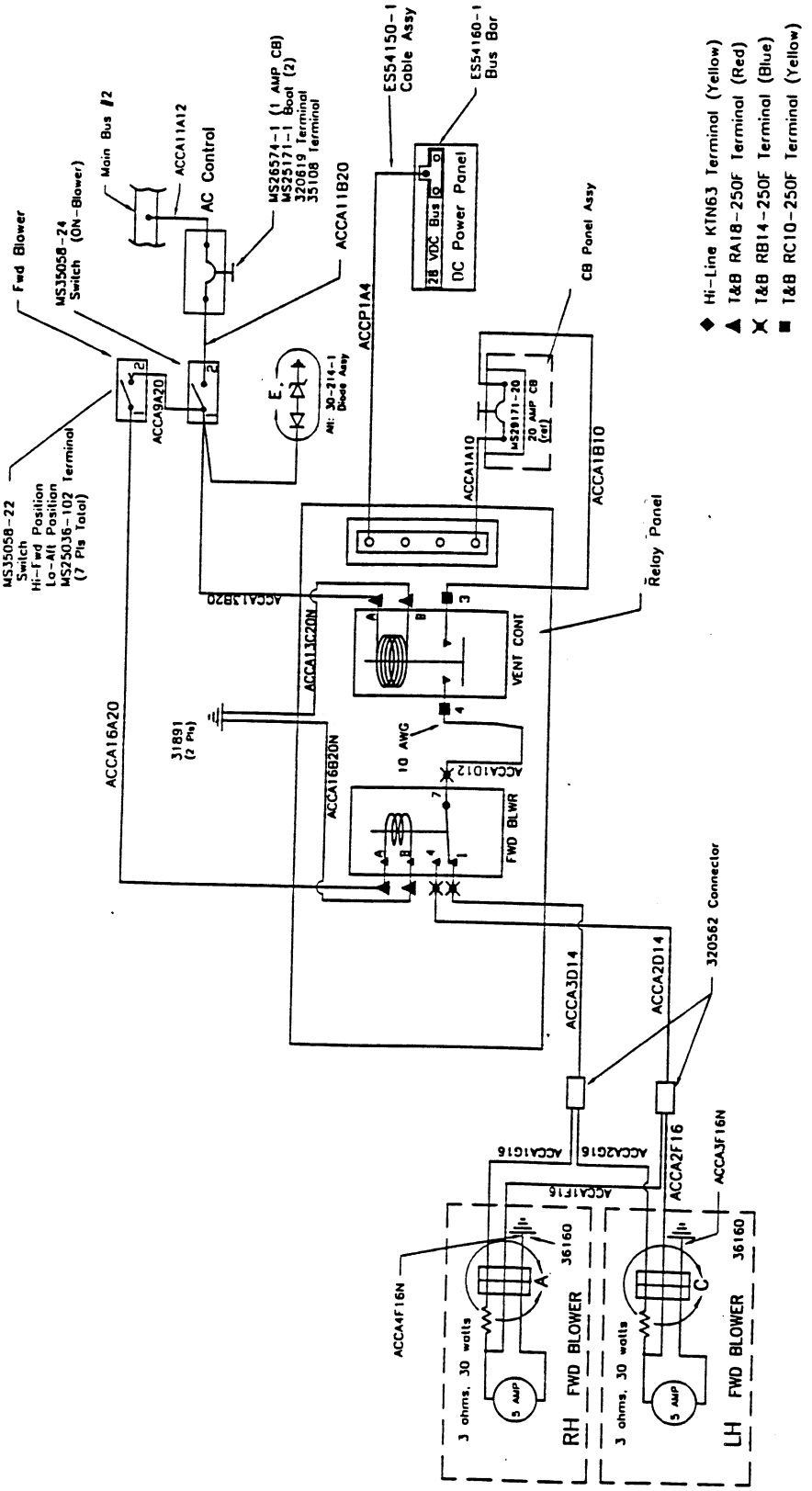


Figure 3-9 Electrical Schematic – Cockpit Blowers (only)

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

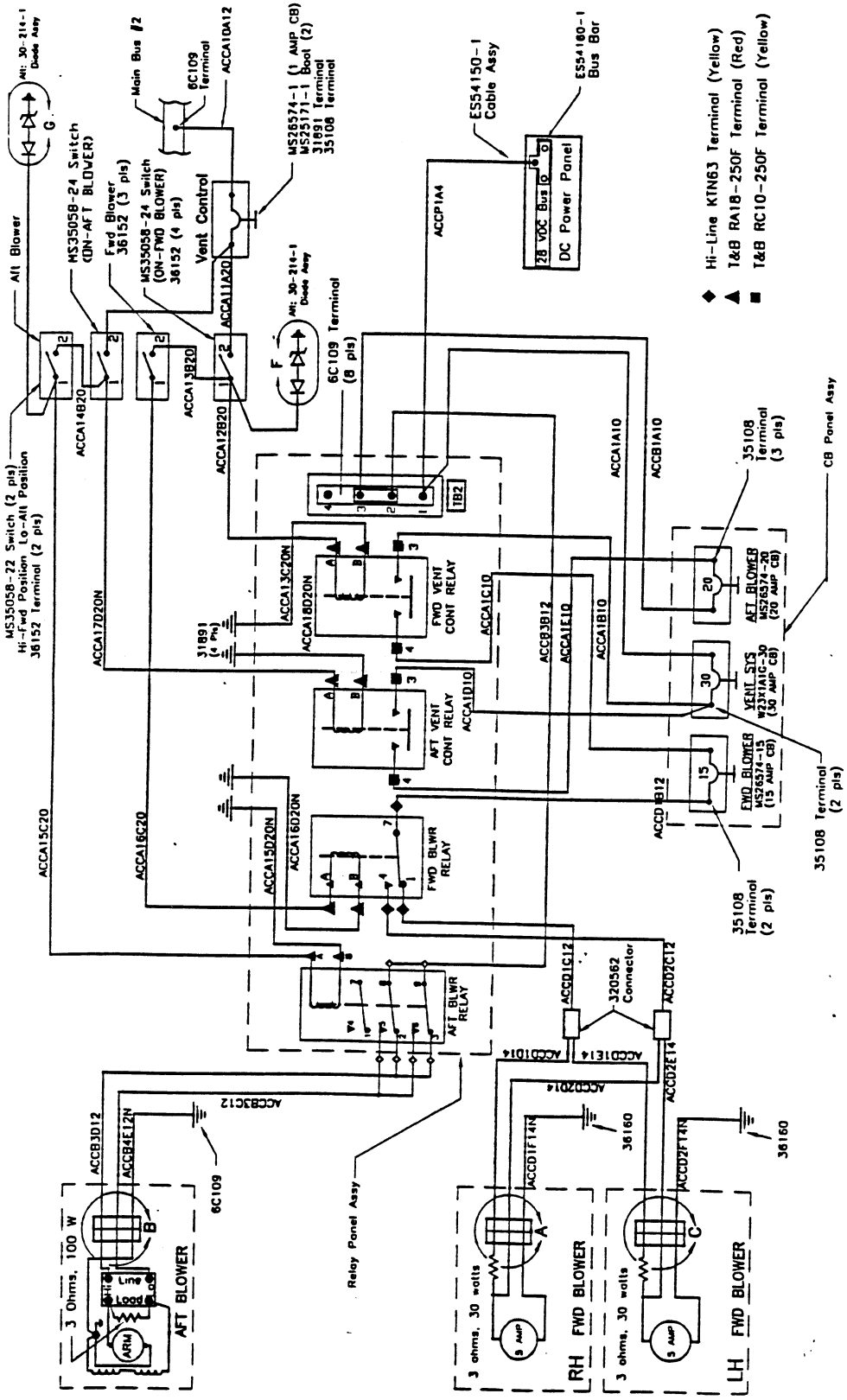


Figure 3-10 Electrical Schematic – Cockpit & Cabin Ventilation Blowers

1. LOCATION OF VENTILATION SYSTEM FEATURES (continued).

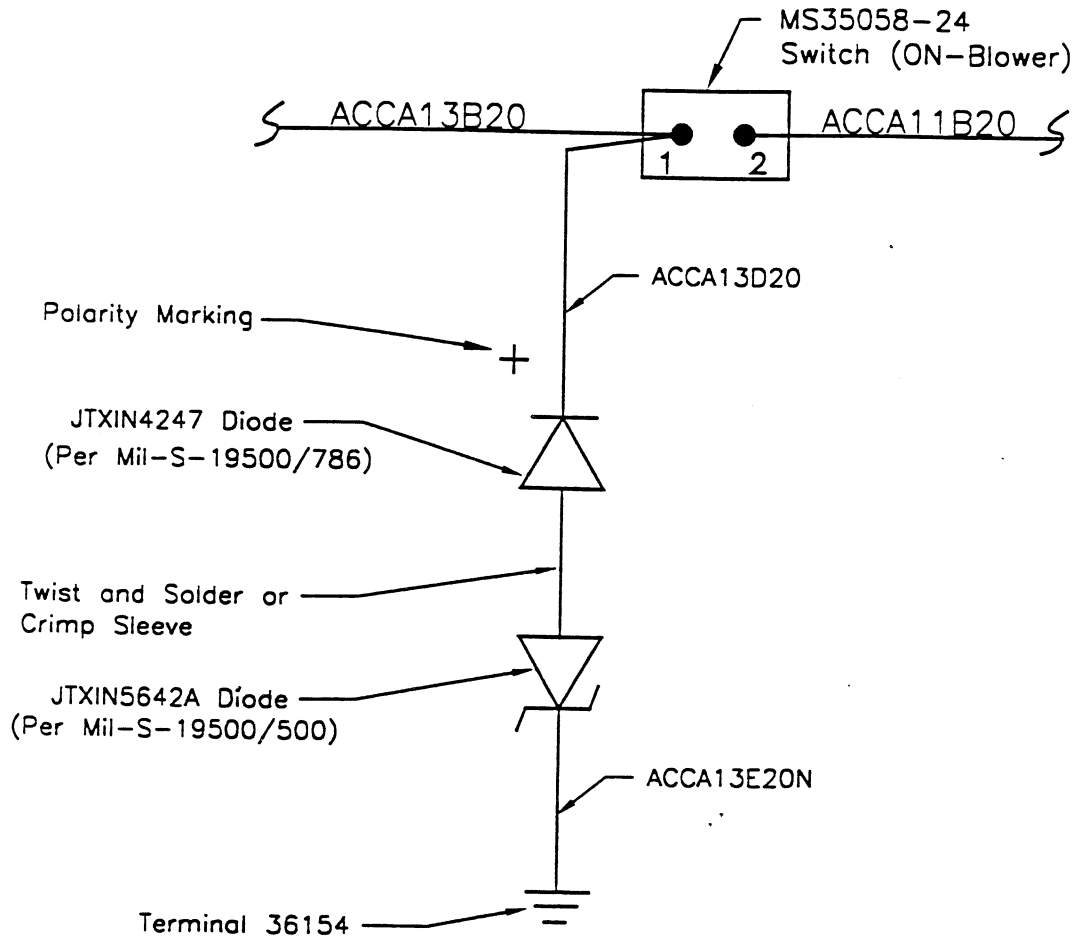
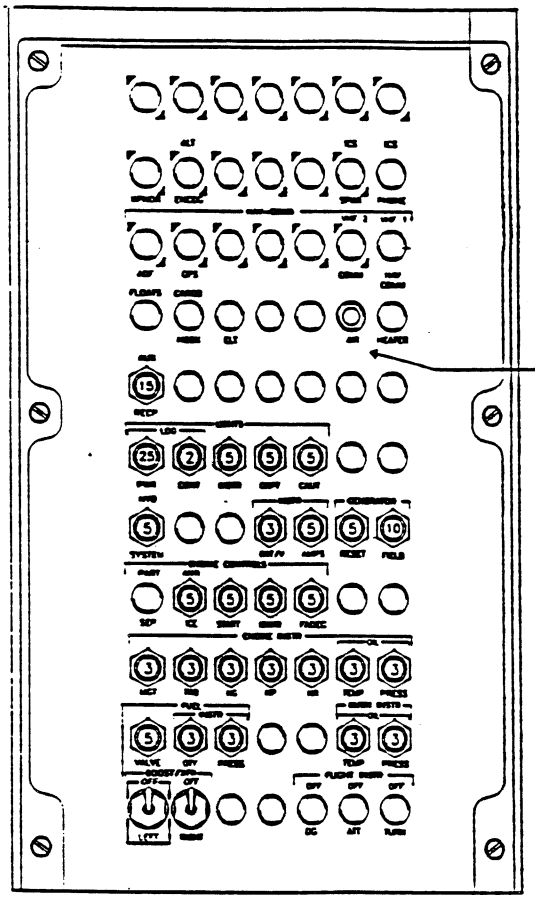


Figure 3-11 Transient Suppression Circuitry

CHAPTER 4
PLACARDS AND MARKINGS

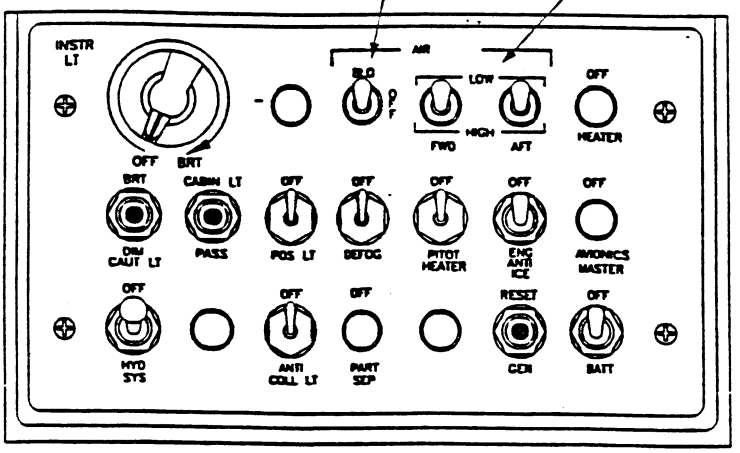
1. PLACARD AND MARKING INFORMATION



Cabin Ventilation System control circuit breaker. Located in overhead console.

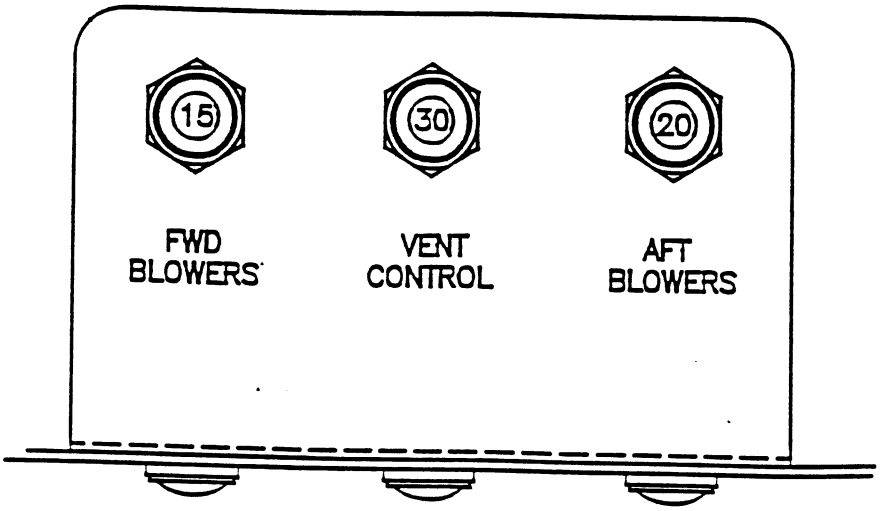
Blower Speed control switches

Fresh Air Ventilation On (BLO) / OFF Switch



Continued

1. PLACARD AND MARKING INFORMATION (continued)



Circuit Breakers for Ventilation Control, Forward and Aft Blowers. Circuit Breaker panel located above baggage compartment.

MAG COMPASS DEVIATION MAY BE EXCESSIVE WITH AIR COND OR BLOWER ON

S-2500EC-4 Placard
Located on top of Compass Support Bracket

EXHAUST VENT
PUSH OPEN – CLOSE

OPEN WHEN VENT BLOWER IS ON FOR MAXIMUM VENTILATION
CLOSE WHEN DESIRED TO ACHIEVE MAX CABIN HTR. EFFECTIVENESS

Locate in hat rack below exhaust air vent

CHAPTER 5
SERVICING

1. SERVICING INFORMATION

NOTE

There is no scheduled servicing, or lubrication requirements associated with this installation.

Reference Chapter 2 Inspections, for Periodic Inspections and Overhaul Schedule.

THIS AREA INTENTIONALLY LEFT BLANK

CHAPTER 6
STANDARD PRACTICES INFORMATION

1. REMOVAL & REPLACEMENT OF FORWARD VENTILATION BLOWER ASSEMBLY

The forward ventilation blower assemblies 206V-2018-3 & -4 are located (one) on each side of the center pedestal, below the instrument panel, and just forward of the tail rotor control pedals.

REMOVAL

WARNING

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

A. Disconnect the electrical connectors from the 206V-2018 –3 L/H, and or –4 R/H Blower Assembly.

B. Remove the Tywrap that secures the Cat ducting to the air inlet and outlet of the blower housing.

C. Remove the four (4) AN525-10R8 screws that attach the blower assembly to the center pedestal and remove the blower assembly from the aircraft.

INSTALLATION / REPLACEMENT

A. Reinstall blower assembly in aircraft and install four (4) AN525-10R8 screws that attach the blower assembly to the center pedestal.

B. Install a CT11B Tywrap on the inlet and outlet of the blower housing to secure the Cat ducting.

C. Reconnect the motor wiring to connector located adjacent to the 206V-2018-3, and or –4 blower assembly.

2. REMOVAL & REPLACEMENT OF FORWARD VENTILATION BLOWER MOTOR / BLOWER WHEEL FROM BLOWER ASSEMBLY

REMOVAL

WARNING

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

A. Remove Forward Ventilation Blower Assembly (Chapter 6, Item 1)

B. Remove the four (4) AN525-10R8 screws that attach the blower motor (ES61060-2) to the blower housing.

CAUTION

Care should be taken not to handle or damage the blower wheel when removing the blower motor from the blower housing, as this may cause the blower wheel to become "unbalanced".

(Continued)

C. Remove the blower motor and blower wheel assembly from the blower housing.

D. Remove the blower wheel from the blower motor using a 1/8th inch Allen wrench to remove the set screw.

INSTALLATION / REPLACEMENT

A. Install the blower wheel to the forward ventilation blower motor using a 1/8th inch Allen wrench to install the set screw.

B. Reinstall the four (4) AN525-10R8 mounting screws that secure the blower motor to the blower housing.

C. Install the Forward Ventilation Blower (Chapter 6, Item 1)

NOTE

Insure that the blower wheel does not contact the motor housing or the Venturi ring on the blower housing prior to installing the blower assembly in the aircraft.

D. Reapply power and run blowers on Hi and Lo settings to insure proper function.

NOTE

Check to insure you have proper blower wheel rotation should you note Low or Poor blower performance. This can be caused by having the electrical leads to the blower motor reversed.

3. REMOVAL AND REPLACEMENT OF AFT VENTILATION BLOWER ASSEMBLY.

The S-6078EC-15 Blower Assembly is located on the avionics shelf above the cargo compartment behind the "hat shelf" area.

REMOVAL

WARNING

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

A. Disconnect the electrical connector from the S-6078EC-15 Blower assembly.

B. Remove the Tywraps that secure the Cat ducting to the air inlet and outlets of the blower housing.

C. Remove the four (4) AN525-10R6 screws that attach the blower assembly to the avionics shelf.

Continued

D. Remove the Two (2) AN525-10R6 screws that attach the blower motor support to the avionics shelf, and remove the S-6078EC-15 Blower assembly from the aircraft.

INSTALLATION / REPLACEMENT

A. Install the S-6078EC-15 blower in the aircraft using six (6) AN525-10R6 screws that attach blower motor support and assembly to the avionics shelf.

B. Install CT21B Tywraps to the inlet and outlets of the S-6078EC-15 Blower Assembly, reconnecting the Cat ducting to the blower housing.

C. Connect the electrical connector to the S-6078EC-15 Blower Assembly.

4. REMOVAL AND REPLACEMENT OF AFT VENTILATION BLOWER MOTOR / BLOWER WHEEL FROM BLOWER ASSEMBLY.

A. Remove Aft Ventilation Blower Assembly (Chapter 6, Item 3)

CAUTION

Care should be taken not to handle or damage the blower wheel when removing the blower motor from the blower housing, as this may cause the blower wheel to become "unbalanced".

B. Remove the eight (8) AN3-4 bolts that attach the blower motor to the blower housing, and remove the motor & wheel assembly from the housing.

C. Remove the blower wheel from the blower motor using a $1/8^{th}$ inch Allen wrench to remove the set screw.

INSTALLATION / REPLACEMENT

A. Install, and Torque the eight (8) AN3-4 bolts to 50 to 70 inch lbs (5.7 – 8.0 Nm) that attach the blower motor to the blower housing.

NOTE

Insure that the blower wheel does not contact the motor housing or the Venturi ring on the blower housing prior to installing the blower assembly in the aircraft.

B. Reapply power and run blowers on Hi and Lo settings to insure proper function.

Continued

CHAPTER 6
STANDARD PRACTICES INFORMATION (continued)

NOTE

Check to insure you have proper wheel rotation should you note low or poor blower performance. This can be caused by having the electrical leads to the blower motor reversed.

C. Install the Aft Ventilation Blower Assembly (Chapter 6, Item 3)

THIS AREA INTENTIONALLY LEFT BLANK

CHAPTER 7
TROUBLESHOOTING

1. SYSTEM TROUBLESHOOTING

Problem	Probable Cause	Solution
Forward Ventilation Blower not operating	Ventilation Forward Blower Circuit Breaker tripped.	a. Reset Circuit Breaker.
	Short in circuit.	b. If breaker will not reset, check for short in circuit.
	Motor inoperative	c. Replace blower motor
	Relay inoperative	d. Replace relay
Aft Ventilation Blower not operating	Ventilation Aft Blower Circuit Breaker Tripped.	a. Reset Circuit Breaker
	Short in circuit.	b. If breaker will not reset, check for short in circuit.
	Motor inoperative	c. Replace blower motor
	Relay inoperative	d. Replace relay

THIS AREA INTENTIONALLY LEFT BLANK

APPENDIX A

Suggested Spares List

The items listed below are field replaceable parts for the Bell Model 407 Cabin Ventilation System.

Item	Description	Part No.
1	Aft Cabin Blower Assembly	S-6078EC-15
2	Cockpit Blower Assembly (L/H)	206V-2018-3
3	Cockpit Blower Assembly (R/H)	206V-2018-4
4	W389DCX-3 (Vent Control Relay)	W389DCX-3
5	W389CX-13 (Aft Blower Relay)	W389CX-13
6	W389CX-8 (Fwd Blower Relay)	W389CX-8
7	1 Amp Circuit Breaker (Vent Control)	MS26574-1
8	15 Amp Circuit Breaker (Fwd Blower)	MS26574-15
9	20 Amp Circuit Breaker (Aft Blower)	MS26574-20
10	30 Amp Circuit Breaker (Vent Control)	W23X1A1G-30
11	3 ohm / 100 Watt Resistor (Cabin Blower)	D100K3RO
12	3 ohm / 30 Watt Resistor (Cockpit Blower)	F30J3RO
13	206V-2018-3 / -4 Replacement Blower Motor	ES61060-2
14	S-6078EC-15 Replacement Blower Motor	ES61132-2
15	Louver Assembly (RH)	S-6087EC-6
16	Louver Assembly (LH)	S-6087EC-7

Source: Air Comm Corporation
3300 Airport Road
Boulder, CO. 80301

Phone: (303) 440-4075
Fax: (303) 440-6355

APPENDIX B

Weight and Balance Information

Weight breakdown – Bell 407 cabin ventilation system:
Dwg. 407V-102-1 / -2

Item	Wt. (lbs)	Arm (in)	M (in-lb.)
Total (407V-102-1 Installation) Forward Ventilation Blowers	12.00	21.5	258
Total (407V-102-2 Installation) Forward & Aft Ventilation Blowers	28.40	115.1	3269

THIS AREA INTENTIONALLY LEFT BLANK