AIR COMM CORPORATION
3300 AIRPORT ROAD
BOULDER, CO. 80301

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
AGUSTA A109
HEATER SYSTEM

Revision 0

15 March, 1997

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).....March. 15, 1997

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 0-4	0
Chapter 1 Airworthiness Limitation Section	1-1	0
Chapter 2 Inspections	2-1	0
Chapter 3 Location and Access	3-1 to 3-3	0
Chapter 4 Placards and Markings	4-1	0
Chapter 5 Suggested Spares List	5-1	0
Chapter 6 Standard Practices	6-1 to 6-6	0
Chapter 7 Troubleshooting	7-1 to 7-3	0
Appendix A Weight and Balance	A-1	0

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 heater system installed in the Agusta A109 series helicopter.

2. PURPOSE

The purpose of this manual is to provide the aircraft mechanic in the field the necessary information to maintain the heater 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 Agusta Helicopter models A109 that are equipped with the Air Comm Corporation kit number A109H-200 heater 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.

6. ABBREVIATIONS

Lbs:	Pounds
cm:	Centimeters

7. PRECAUTIONS

The following precautions may be 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 HEATER SYSTEM.

This manual provides information which is required for operation and maintenance of the Air Comm heater system installed in the Agusta model A109 series helicopter. After completion of the heater installation this document must be placed with the appropriate existing aircraft documents.

10. REFERENCE DOCUMENT

The approval basis of the system covered by this ICA is Supplemental Type Certificate SR00291DE

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

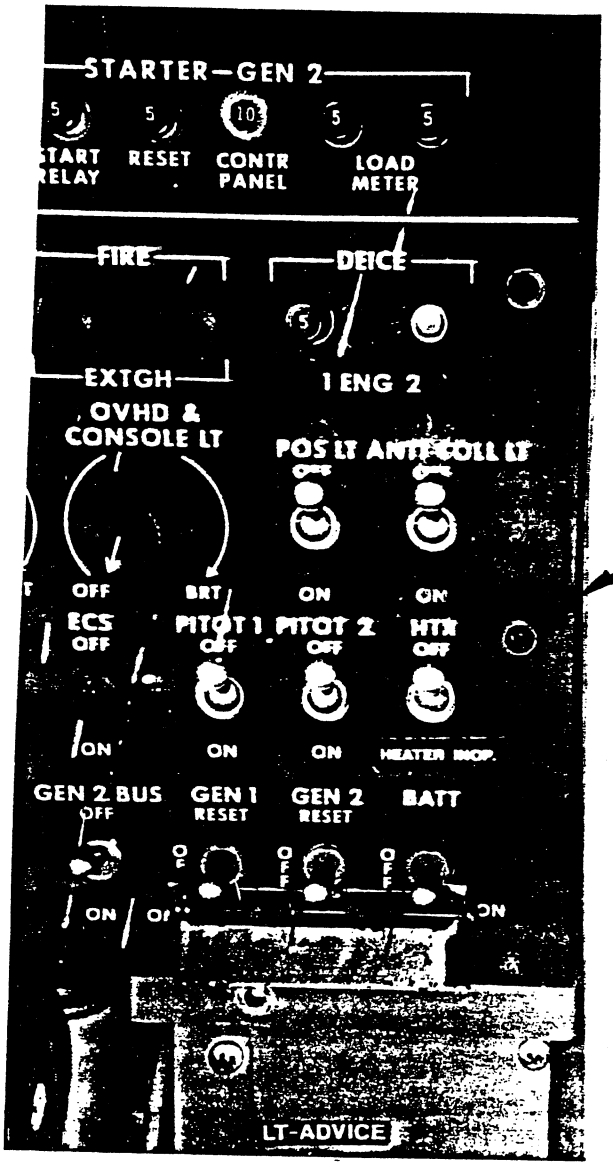
Changes made to a line or paragraph of this document will be indicated by a vertical bar in the right hand margin, while a complete page change will be indicated by a vertical bar next to the page number.

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

13. HEATING SYSTEM FEATURES

The bleed air heating system features four heater ejectors installed below the seat box area, and two defroster ejectors located in the existing aircraft ducting forward to the instrument panel. The system is turned on & off via a switch in the overhead cockpit console, and the use of a manual control valve located on the forward side of the pilots seat box. The temperature is controlled manually by this mechanically operated valve.

This area intentionally left blank



Heater Circuit Breaker (Existing)

Heater Switch (On / Off) (Existing)

OVERHEAD CONSOLE Fig 0-1

Chapter 0
Introduction (continued)

14. DESCRIPTION OF THE HEATER AND ITS INSTALLATION

The cabin heater system is shown schematically by figure 3-2.

The ACC heater system consists of bleed air plumbing, heater control valve, four heater ejectors, two defroster ejectors, and a firewall shutoff valve.

The ACC bleed air plumbing connects to the compressor scroll section of both of the engines, and runs forward to the heater and defroster control valve assemblies.

From the control valve the bleed air is piped to the four ejectors which are installed in the seat box area of the cabin

The heater is operated by activating the heater ON/OFF switch, which opens the firewall shutoff valves, and then by moving the heater control to the desired position. This allows engine bleed air to flow into the ejectors.

The pumping action of the ejectors is provided by the bleed air pressure. Cabin "return air" is pulled through cabin mounted inlets, mixed with the bleed air and exhausted to the cabin through the ejector outlets.

THIS AREA INTENTIONALLY LEFT BLANK

CHAPTER 1
AIRWORTHINESS LIMITATION

1. AIRWORTHINESS LIMITATIONS

"The bleed air heater shall be OFF during takeoff and landing, in flight below 200 ft height, during single engine operation, and other flight conditions requiring maximum engine power available."

NOTE

If necessary, the bleed air heater may be used in hovering in ground effect above 3 ft. wheel height and in hovering out of ground effect above 200 ft. height.

THIS AREA INTENTIONALLY LEFT BLANK

CHAPTER 2
INSPECTIONS

1. INSPECTION REQUIREMENTS

PERIODIC INSPECTIONS

Item	Annually Prior to Heating Season	Special Inspection Information
Heater Control Valve & Linkage	X	Check for operation and security.
*Bleed Air Plumbing	X	Check for security, and evidence of air leaks around fittings.
Heater Ejectors	X	Check for evidence of air leaks and corrosion around bleed air connection, and security. Check for evidence of deterioration and security of heater ejector acoustical felt inside heater ejectors.
Placards & Markings	X	Check for security and legibility.

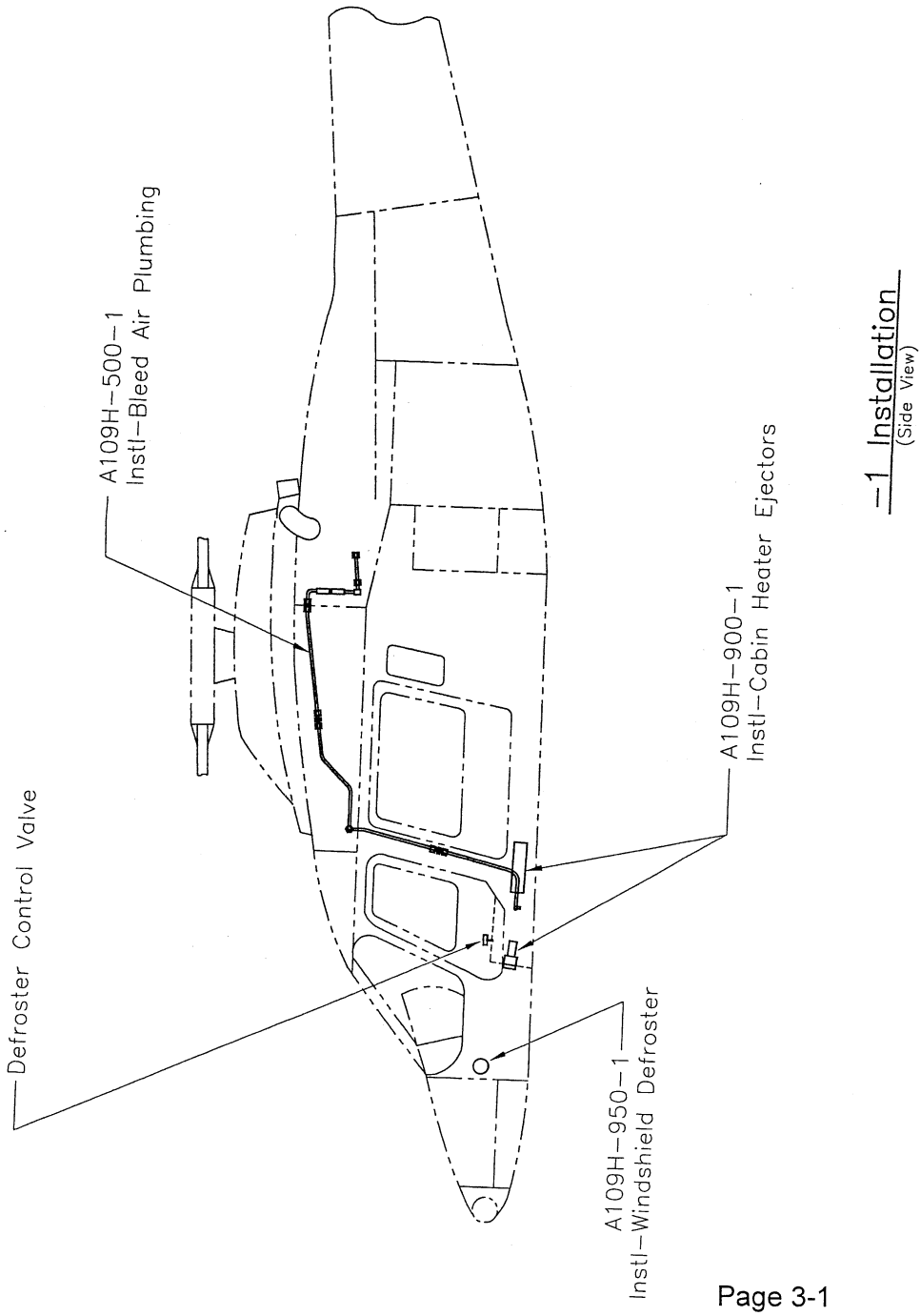
* Bleed Air Plumbing, refers to the portion of the heater system through which bleed air passes from the engine bleed air connections to the ACC heater ejector assemblies.

THIS AREA INTENTIONALLY LEFT BLANK

CHAPTER 3
LOCATION AND ACCESS

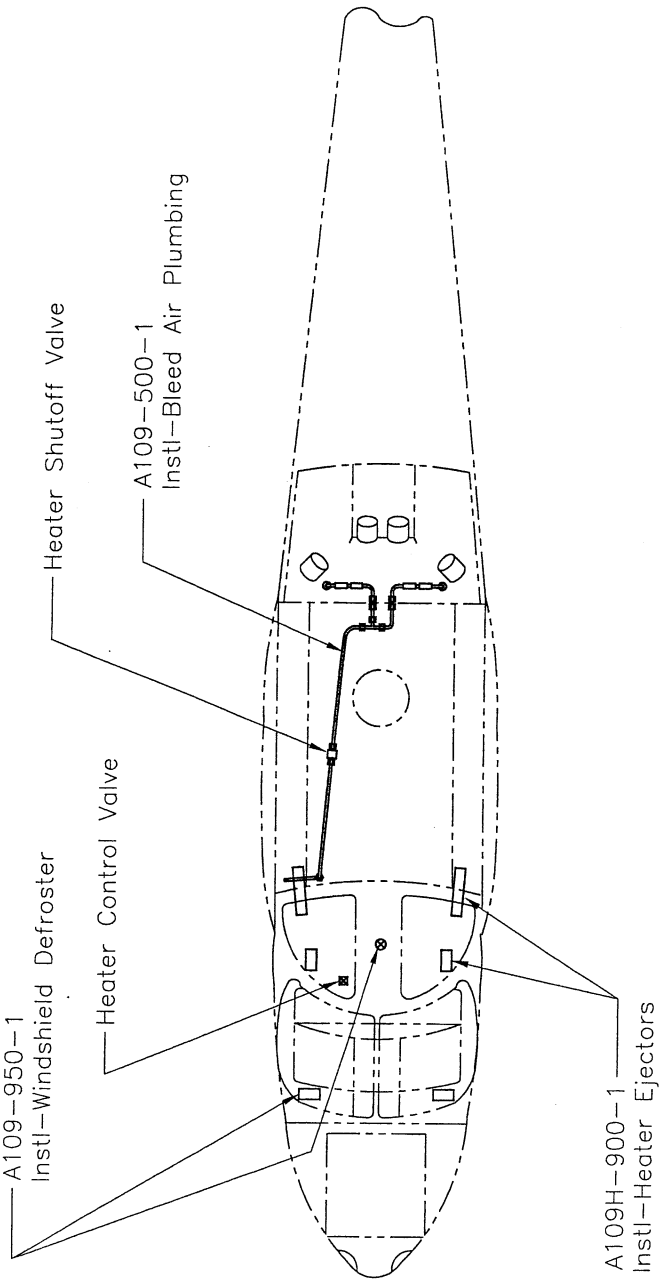
1. LOCATION OF HEATER FEATURES

Nomenclature	Description of Location
Heater Control Handle	Is located below the forward facing side of the pilots side seat box area.
Heater Ejectors	Are located below the pilots seats
Heater Shutoff Valve	The heater shut off valve is located on the main cabin roof just aft of the main transmission aircraft left.
Bleed Air Plumbing	The bleed air plumbing runs from the engine compartment forward to the pilots seat box area.



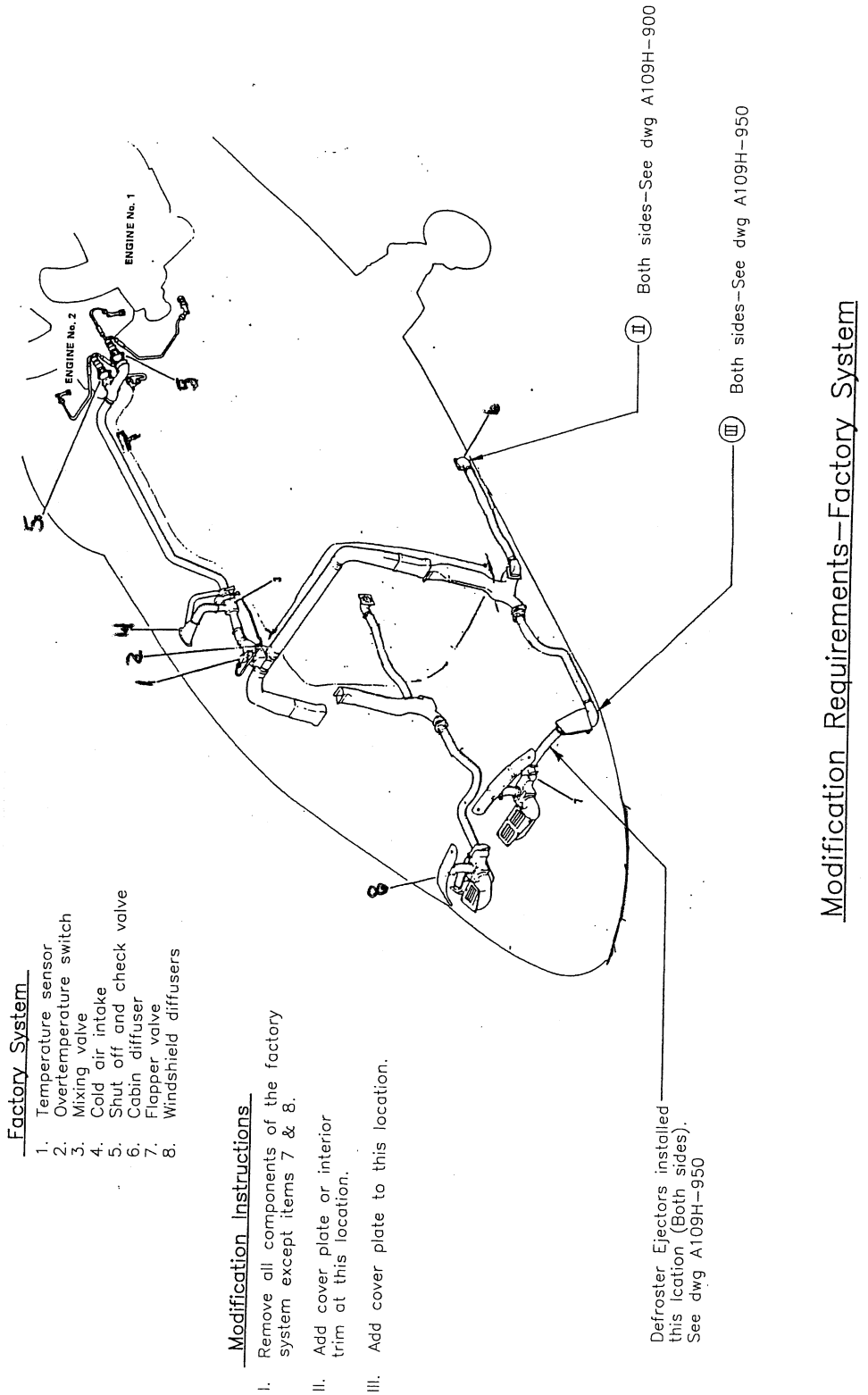
-1 Installation
(Side View)

2. General Layout of Agusta Heating System Fig. 3-2



-1 Installation
(Top View)

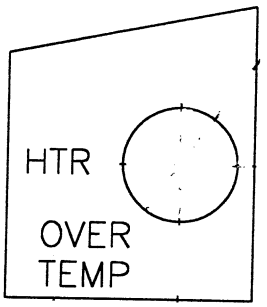
3. General Layout of Agusta A109 Heating System Fig. 3-2 (continued)



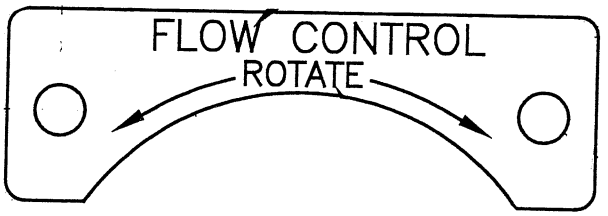
CHAPTER 4
PLACARDS AND MARKINGS

1. PLACARD AND MARKING INFORMATION

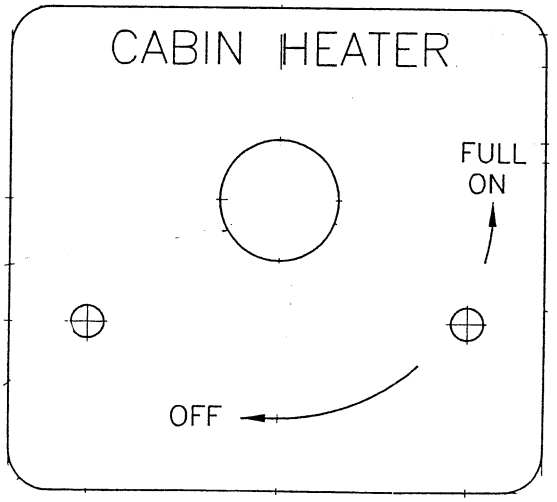
A109H-2500-1 Placard



S-9278EC-1 Placard



S-9701EC-36 Placard



S-9701EC-42 Placard

CHAPTER 5
SUGGESTED SPARES LIST

1. SUGGESTED SPARES LIST

Item	Part Number
Defroster Valve Assy.	S-9209EC-3
Heater Valve Assy.	S-9209EC-5
Shutoff Valve Assy.	ES26185-1
Check Valve Assy.	S-9740EC-1
Temperature Sensor	ES52130-3

THIS AREA INTENTIONALLY LEFT BLANK

CHAPTER 6
STANDARD PRACTICES INFORMATION

1. B-NUT / FITTING SAFETY WIRE PROCEDURE

   A. Use MS20995C-32 per QQ-W-423B Cond A Safety wire (or Equivalent) to secure all B-nut / Fittings in the heater bleed air system.

   a. Cut safety wire with excess in mind.
   b. Thread through safety wire hole in B-nut (or fitting).
   c. Pull ends even. Twist tight to B-nut (or fitting).
   d. Twist wire to achieve 8 to 12 twist per inch (2.5 cm)
   e. Thread through safety wire hole in B-nut (or fitting).
   f. Twist wire again to achieve 8 to 12 twist per inch (2.5 cm), and cut to form "pigtail" of a minimum of 4 twist. Cut away excess.

2. REMOVAL, INSTALLATION / REPLACEMENT OF HEATER EJECTOR ASSEMBLY

   REMOVAL

   A. Remove top to pilots seat box for access to heater ejector assemblies.

   B. Cut safety wire from B-nut to the ejector body.

   C. Slide the ejector adapters away form the ejector body, and remove ejector.

   INSTALLATION / REPLACEMENT

   A. Install the heater ejector in the reverse order of its removal, Safety per the instructions given on Page 6-1, a through f.

3. REMOVAL, INSTALLATION / REPLACEMENT OF HEATER VALVE ASSEMBLY

   REMOVAL

   A. Remove top to pilots seat box for access to heater valve assembly.

   B. Cut the safety wire from the three (3) B-nuts that attach to the bleed air plumbing to the valve assembly.

   C. Remove the four (4) mounting Screws from the valve support bracket, and remove valve assembly from the aircraft.

   INSTALLATION / REPLACEMENT

   A. Install the heater valve assembly in the reverse order of its removal.
   B. Safety wire per instructions given on page 6-1, a through f.

Chapter 6
Standard Practices Information (continued)

5. REMOVAL, INSTALLATION / REPLACEMENT OF HEATER BLEED AIR PLUMBING

REMOVAL

A. Remove necessary center belly panel(s) to gain access to the required section(s) of heater bleed air plumbing to be removed.

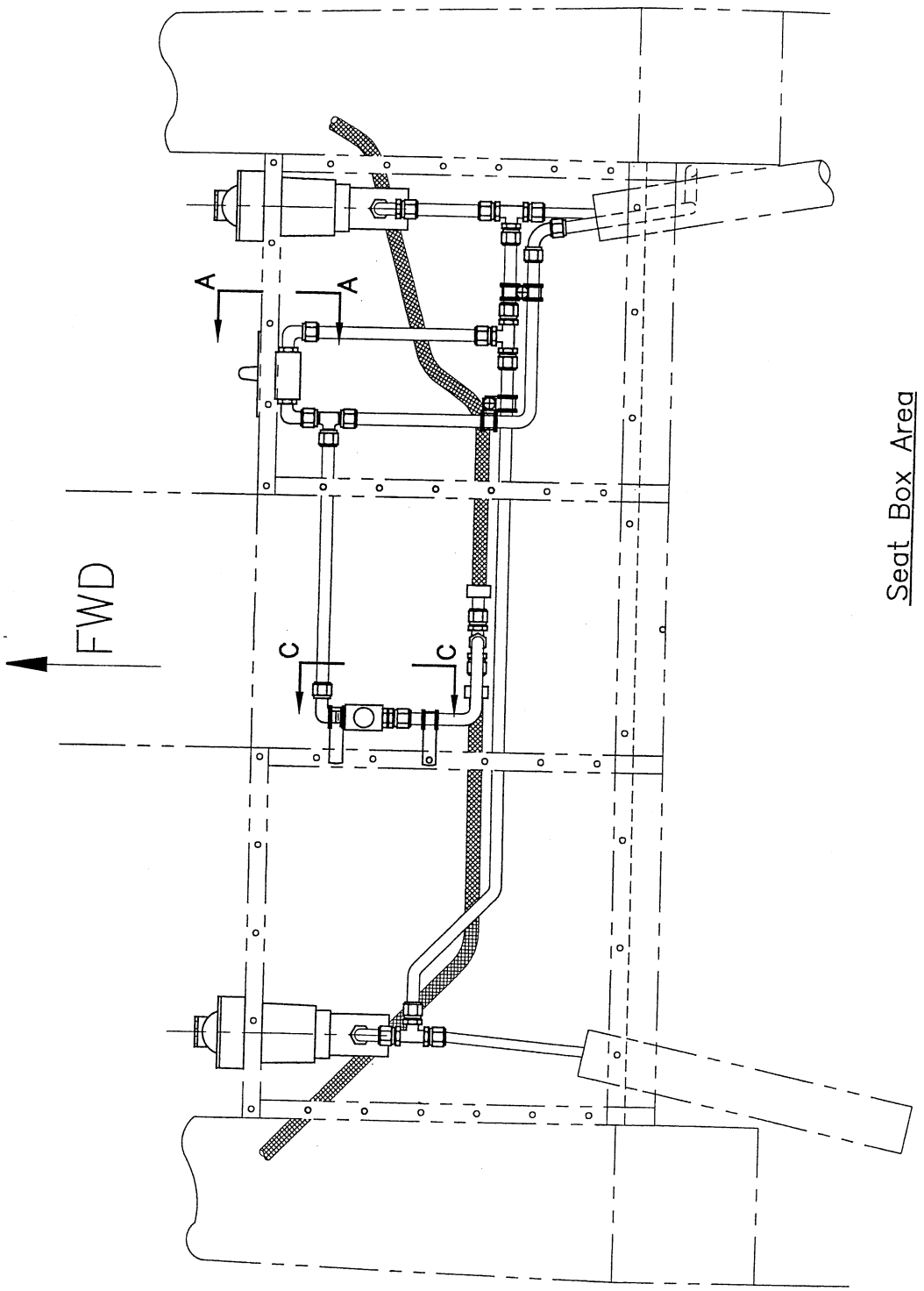
B. Cut safety wire from B-nut, and remove desired heater bleed line.

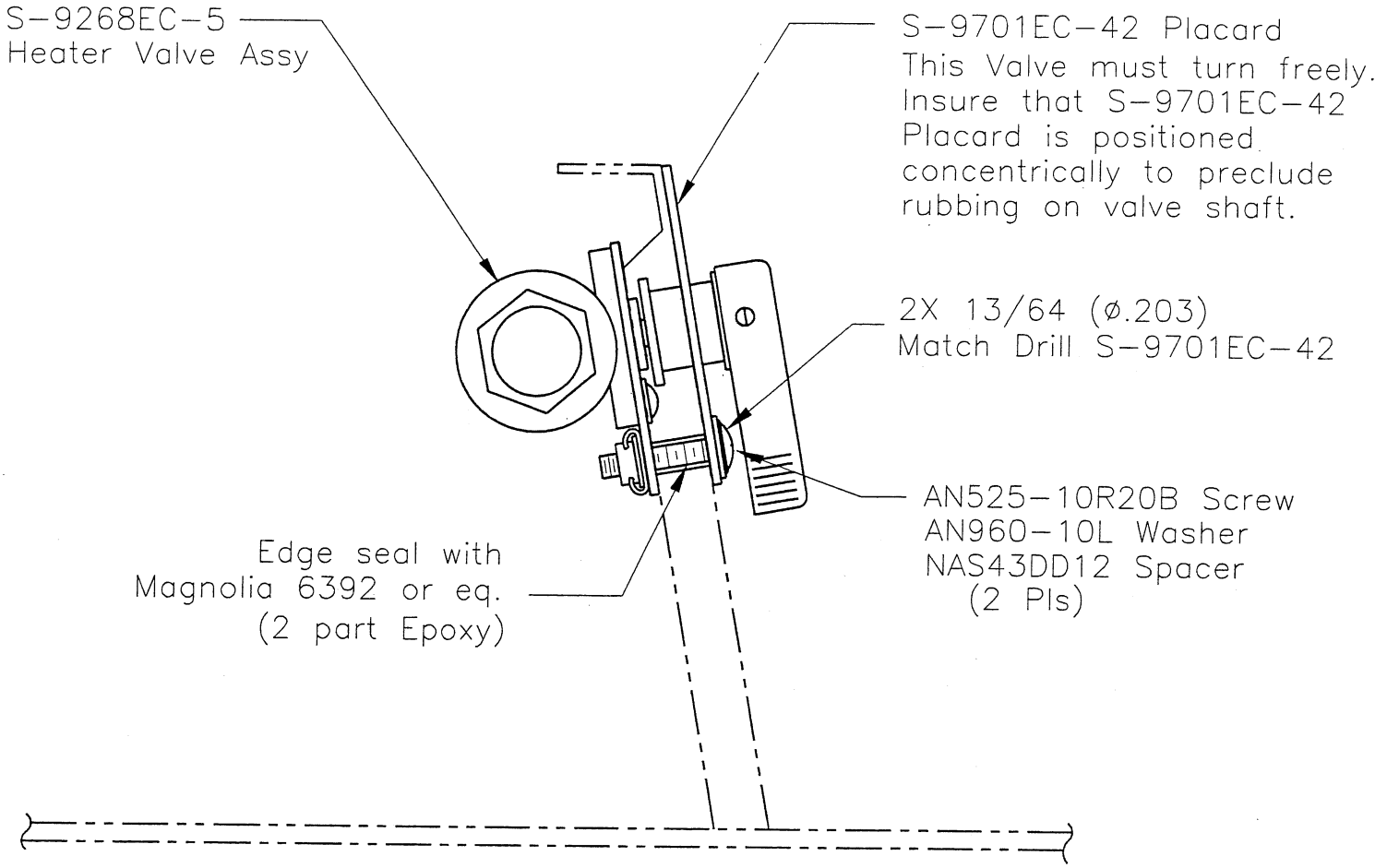
INSTALLATION / REPLACEMENT

A. Install the affected bleed heater line(s) in the reverse order of its removal.

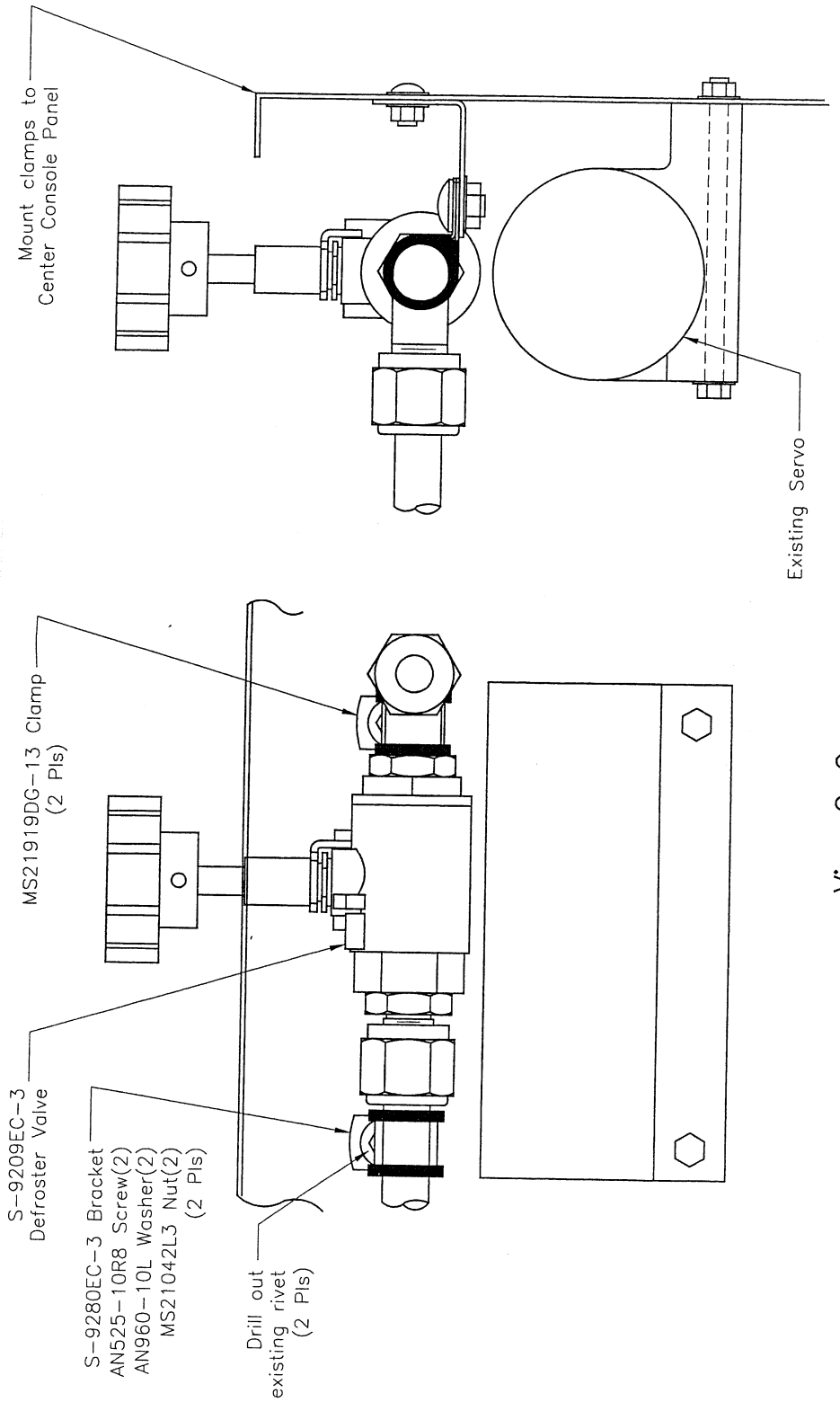
B. Apply a thin coat of Loctite® 567 Thread Sealant, or equivalent to all joints.

C. Safety wire per instructions given on page 6-1, a through f.


A
A
C
C
FWD
Seat Box Area


S-9268EC-5
Heater Valve Assy
S-9701EC-42 Placard
This Valve must turn freely.
Insure that S-9701EC-42
Placard is positioned
concentrically to preclude
rubbing on valve shaft.
2X 13/64 (ø.203)
Match Drill S-9701EC-42
AN525-10R20B Screw
AN960-10L Washer
NAS43DD12 Spacer
(2 Pls)
Edge seal with
Magnolia 6392 or eq.
(2 part Epoxy)

View A-A


Mount clamps to Center Console Panel
Existing Servo
MS21919DG-13 Clamp (2 Pls)
S-9209EC-3 Defroster Valve
S-9280EC-3 Bracket
AN525-10R8 Screw(2)
AN960-10L Washer(2)
MS21042L3 Nut(2)
(2 Pls)
Drill out existing rivet (2 Pls)
View C-C
(Looking Outbd from RH Side)

CHAPTER 7
TROUBLESHOOTING

1. SYSTEM TROUBLESHOOTING

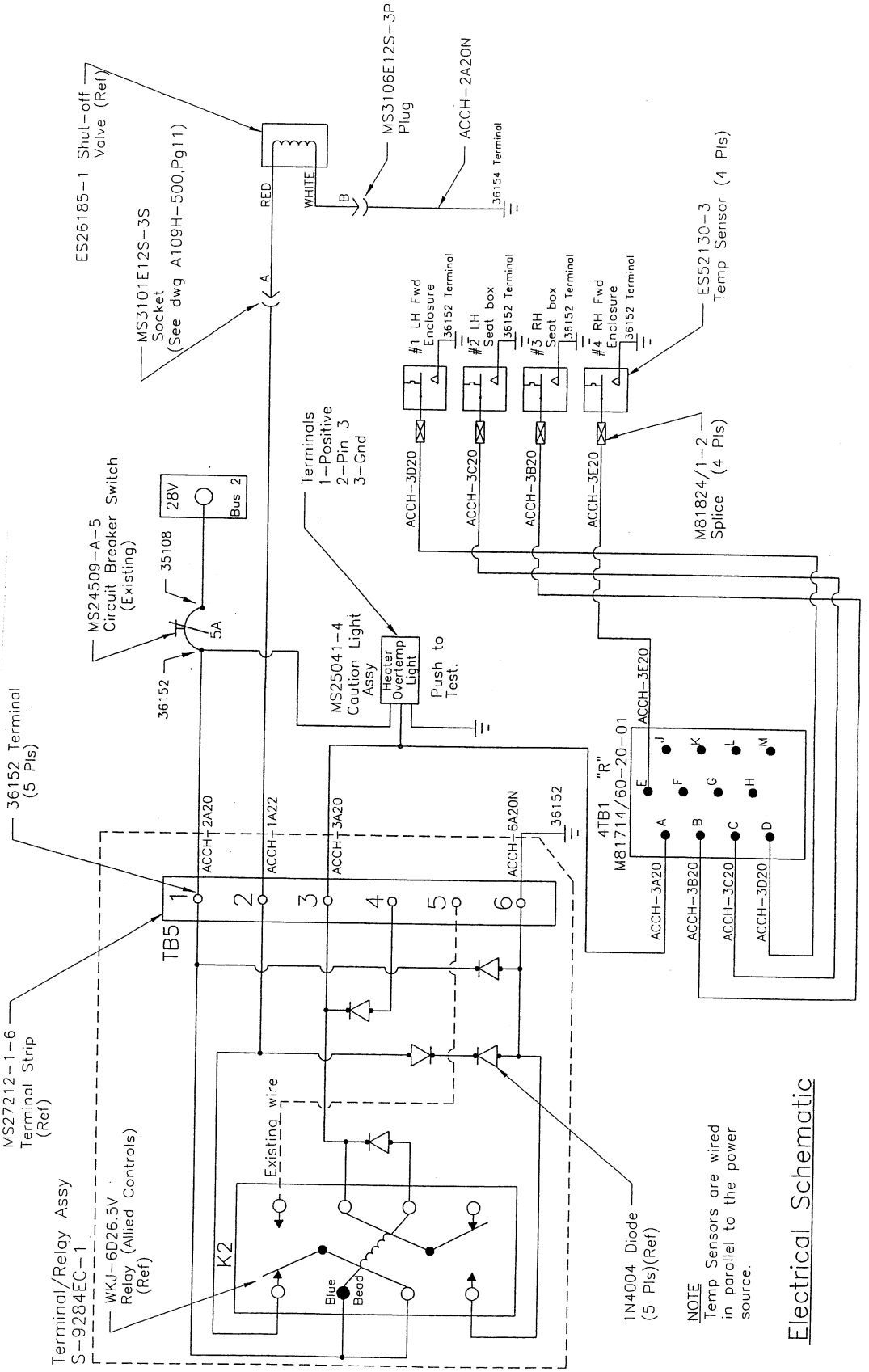
Prior to troubleshooting a defective system, it is advisable to conduct a visual inspection for general condition, and obvious signs of damage or failure.

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

Problem	Probable Cause	Solution
No Heat	Bleed air shutoff valve(s) not open	Push heater switch to on position
No Heat	Manual heater valve in the off position	Push the heater valve to the on position
No Heat	Bleed air shutoff valve has failed	Replace bleed air shutoff valve
No Heat	HTR Circuit breaker tripped	Reset breaker
Poor Performance	Leak in bleed air plumbing system	Tighten fittings that are suspected to be leaking
Poor Performance	Automatic drain valve stuck in the open position	Replace drain valve

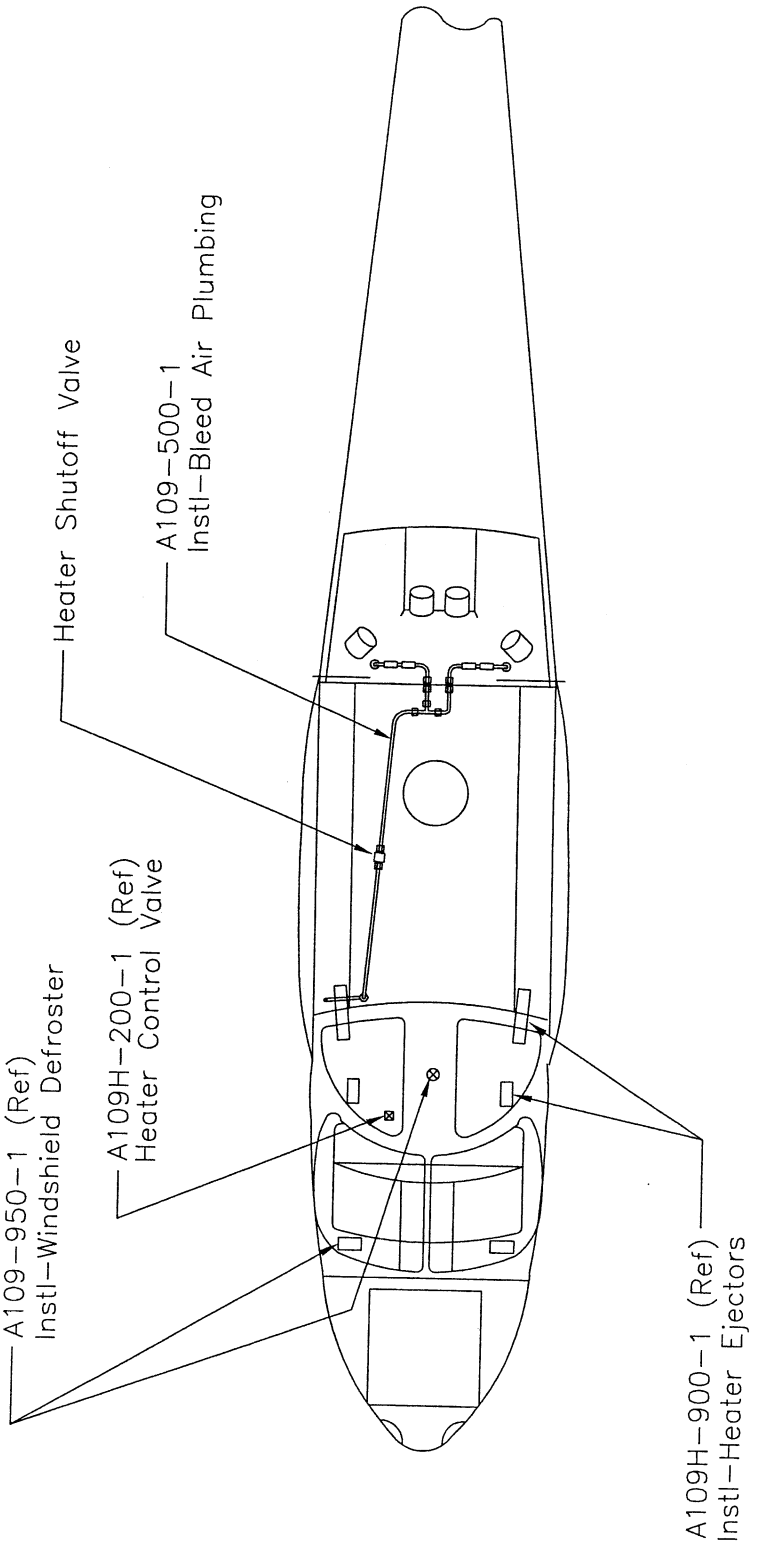
THIS AREA INTENTIONALLY LEFT BLANK

2. Fig 7-1 ELECTRICAL SCHEMATIC



Chapter 7
Troubleshooting (continued)

3. PLUMBING SCHMATIC



-1 Installation
(Top View)

Appendix A

Weight and Balance Information

Weight breakdown – Agusta A109 heater System:
Ref. Dwg. A109-200

Item	Wt. (lbs)	Arm (in)	M (in-lb.)
Total A109-200 Heater	22.6	82.3	1,860

THIS AREA INTENTIONALLY LEFT BLANK