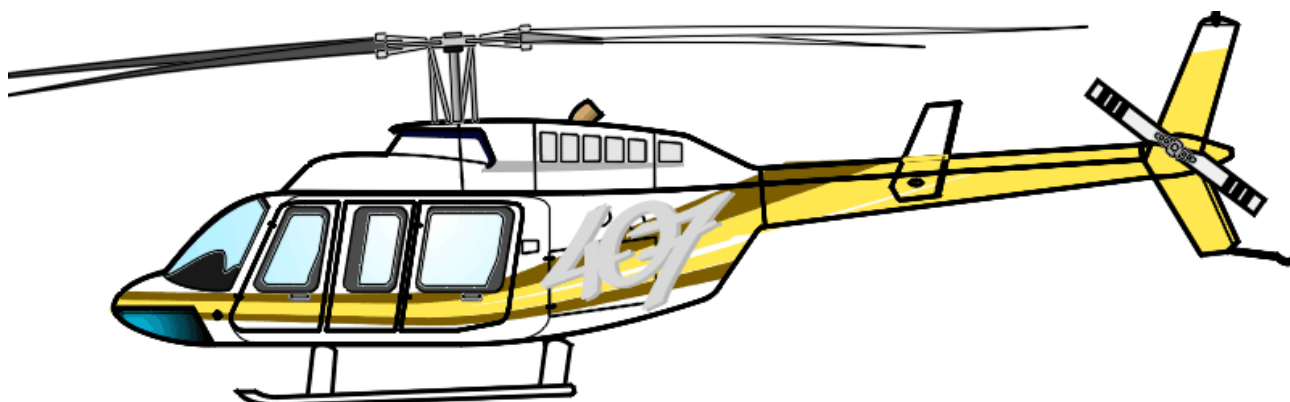


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# **INSTRUCTIONS FOR CONTINUED AIRWORTHINESS BELL HELICOPTER 407 CABIN HEATER SYSTEM**



**Record of Revisions**

| <b>REVISION<br/>NUMBER</b> | <b>ISSUE<br/>DATE</b> | <b>DATE<br/>INSERTED</b> | <b>BY</b> | <b>REVISION<br/>NUMBER</b> | <b>ISSUE<br/>DATE</b> | <b>DATE<br/>INSERTED</b> | <b>BY</b> |
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| B                          | 06/17/96              | N/A                      | NS        |                            |                       |                          |           |
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**LIST OF REVISIONS**

| <b>Rev</b> | <b>Description</b>   | <b>Date</b> |
|------------|--|-------------|
| A          | Revised page I-1 407H-516 was -510, 407H-514 was -512  | 05/09/96    |
| B          | Revised pages 12 & 13 of service instructions to reflect revised Electrical installation   | 11/19/92    |
| C          | Re-formatted entire document to meet 8110.54A and added options for glass cockpit version of 407 (407GX)   | 10/28/11    |
| D          | Clarified parts nomenclatures to match up in various references. Added Chin Bubble Defroster references. Expanded installation procedures and added figures accordingly to Chapters 3 and 6. | 12/29/11    |

**LIST OF EFFECTIVE PAGES**

| <b>Title</b>                               | <b>Page(s)</b> | <b>Revision No.</b> |
|--|----------------|---------------------|
| Record of Revisions                        | i              | D                   |
| List of Revisions                          | ii             | D                   |
| List of Effective Pages                    | ii             | D                   |
| Table of Contents                          | iii-iv         | D                   |
| Chapter 0 Introduction                     | 0-1 to 0-3     | D                   |
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| Chapter 4 Placards and Markings            | 4-1            | D                   |
| Chapter 5 Servicing                        | 5-1            | C                   |
| Chapter 6 Standard Practices               | 6-1 to 6-10    | D                   |
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## 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 cabin heater system installed in the Bell 407 series helicopter.

### 2. PURPOSE

The purpose of this manual is to provide the aircraft mechanic in the field with the necessary information to maintain the cabin 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 Bell Helicopter 407 models that are equipped with the Air Comm Corporation kit number 407H-200, -201, -202 and -203 cabin heater systems.

### 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.

**Outside Ambient Air Temperature (OAT):** The temperature of the air surrounding a person or object outside the helicopter.

**Inside Ambient Air Temperature (IAT):** The temperature of the air as measured at the inlets of the heater system.

### 6. ABBREVIATIONS

|      |             |
|------|-------------|
| cm:  | Centimeters |
| Lbs: | Pounds      |
| LH:  | Left hand   |
| RH:  | Right hand  |

### 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.

## 9. INFORMATION ESSENTIAL TO THE CONTINUED AIRWORTHINESS OF THE CABIN HEATER SYSTEM.

This manual provides information which is required for operation and maintenance of the Air Comm air cabin heater system installed in the Bell model 407 series helicopter. After completion of the cabin heater 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 **SR00221DE**.

## 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 may be acquired by contacting:

Air Comm Corporation Service Department  
3330 Airport Road  
Boulder, CO.80301  
Phone No. 303-440-4075 Fax No. 303-440-6355  
[Service@aircommcorp.com](mailto:Service@aircommcorp.com)

## 12. CHANGES TO INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

Changes made to a line or paragraph of this document will be indicated by a vertical bar in the right hand margin, 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. SYSTEM DESCRIPTION AND OPERATION

The cabin heating system is a bleed air type system which consists of bleed air components (plumbing), an electrically actuated shutoff valve, a heater control valve, and four heater ejector assemblies.

When the switch is in the "HEATER" position and the heater control valve is opened, bleed air flows from the engine compressor through the bleed lines to the heater ejectors/assemblies, where it is mixed with cabin air and exhausted to both the front and rear passengers. The forward heater ejectors are located under the front seats and the aft

heater ejectors are located on the sides of the rear aft-facing seats in the cabin. The warm air in the cockpit is ducted forward through ejector outlets which are located in the forward seat box structure. The warm air for the cabin is exhausted through the heater ejectors located on each side of the aft-facing cabin seats. Outlet flow can be individually adjusted by rotation of flow control ejector outlets in the front, or by rotating the flow control knob on the aft heater ejectors.

The heater control valve assembly is mounted under the pilot's seat and the heater control handle is located on the front of the seat box. It controls heater bleed air to the forward and aft heater ejectors.

A shutoff valve in the engine compartment, mounted just FWD of the firewall, is electrically actuated by the heater power switch mounted in the overhead console. The shutoff valve closes if a heater over-temperature condition is sensed.

Temperature sensors are installed throughout the aircraft as part of the heater system. If a sensor detects an over temperature condition, the heater overtemp annunciator (STD) or indicator (GX) will illuminate. This will also automatically close the shutoff valve. The heater power switch must be cycled to the OFF position in order to reset the shutoff valve and the heater overtemp annunciator/indicator.

The system includes a windshield defroster system. The defroster system contains a defroster control valve, located in the center console and defroster ejectors, located in each defroster eyebrow. The ejectors pump warm air across the windshield. The original defroster blowers supplied with the aircraft are not required but may remain installed at the discretion of the operator. The defroster and heater may be used simultaneously.

An optional chin bubble defroster is available. It includes two additional defroster ejectors located adjacent to each chin bubble. Warm air is controlled by the windshield defroster control valve.

A drain valve (engine bleed air components) is incorporated as a part of the heater system. This valve is used to drain cleaning solution overboard when washing the internal parts of the engine. The drain valve is located inside the RH engine access door and incorporates a spring loaded ball valve that is normally open when the engine is off. The drain valve is closed when the heater lines are pressurized during normal engine operation.



**Chapter 1**  
**AIRWORTHINESS LIMITATION SECTION**

The Airworthiness Limitations section is FAA approved and specifies maintenance required under paragraph 43.16 and 91.403 of the Federal Aviation Regulations unless an alternate program has been FAA approved.

1. Airworthiness Limitations

**No airworthiness limitations associated with this design change**

## Chapter 2 INSPECTIONS

### 1. Inspection Requirements

| Item  | Annually<br>Prior to Heating<br>Season | Special Inspection Information   | Ref.<br>Figure        |
|---|--|--|-----------------------|
| Heater Control Valve Assembly & Windshield Defroster Control Valves | X                                      | Check valve for ease of mechanical operation and security.   | 3.1, 3.6,<br>3.7      |
| Engine Bleed Air Components (Plumbing)                              | X                                      | Check for security and evidence of air leaks around fittings. Check insulation, hose and tube assemblies for damage or deterioration.  | 3.1                   |
| Heater Ejectors/ Assemblies   | X                                      | Visually inspect heater ejector nozzles for evidence of blockage, corrosion, deterioration or deformation through the heater air outlet. No blockage of the heater ejector nozzles is allowable. Check ejector flow control valve for freedom of operation.  | 3.1 - 3.5             |
| Placards & Markings   | X                                      | Check for security and legibility.   | 4.1                   |
| Drain Valve (Engine Bleed Air Components)                           | X                                      | <ol style="list-style-type: none"> <li>1. Remove valve and disassemble.</li> <li>2. Clean as required.</li> <li>3. Check for O-ring damage.</li> <li>4. Reassemble valve and reinstall.</li> </ol> <p style="text-align: center;"><b>NOTE</b><br/>Slight leakage is acceptable</p> <ol style="list-style-type: none"> <li>5. With engines operating ensure valve assembly is closed.</li> </ol>  | 3.9                   |
| Heater Overtemp Annunciator / Indicator                             | X                                      | <p>Verify operation of the heater overtemp warning light.</p> <p>Temp Sensor specifications:</p> <ol style="list-style-type: none"> <li>a. Normally open</li> <li>b. Closes at 160°F. This results in illumination of the overtemp light and closure of the firewall shutoff valve.</li> <li>c. When temp sensor cools to 140±5°F, it will reopen and overtemp annunciator / indicator will extinguish.</li> </ol>   | 3.11,<br>3.12         |
| Shutoff Valve   | X                                      | <p>Check shutoff valve for security and operation. Conduct functional check during ground operation.</p> <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">Air pressure must exist at the inlet side of the valve to ensure correct valve operation</p> <p><u>Functional Check</u></p> <ol style="list-style-type: none"> <li>1. Ensure heater switch is in the OFF position.</li> <li>2. With aircraft engines running ensure there is no airflow to the heater ejectors.</li> <li>3. Place the heater switch to the HEATER position.</li> <li>4. Check for warm air at each of the air ejectors.</li> <li>5. Return switch to the OFF position.</li> </ol> | 3.8,<br>3.14,<br>3.15 |

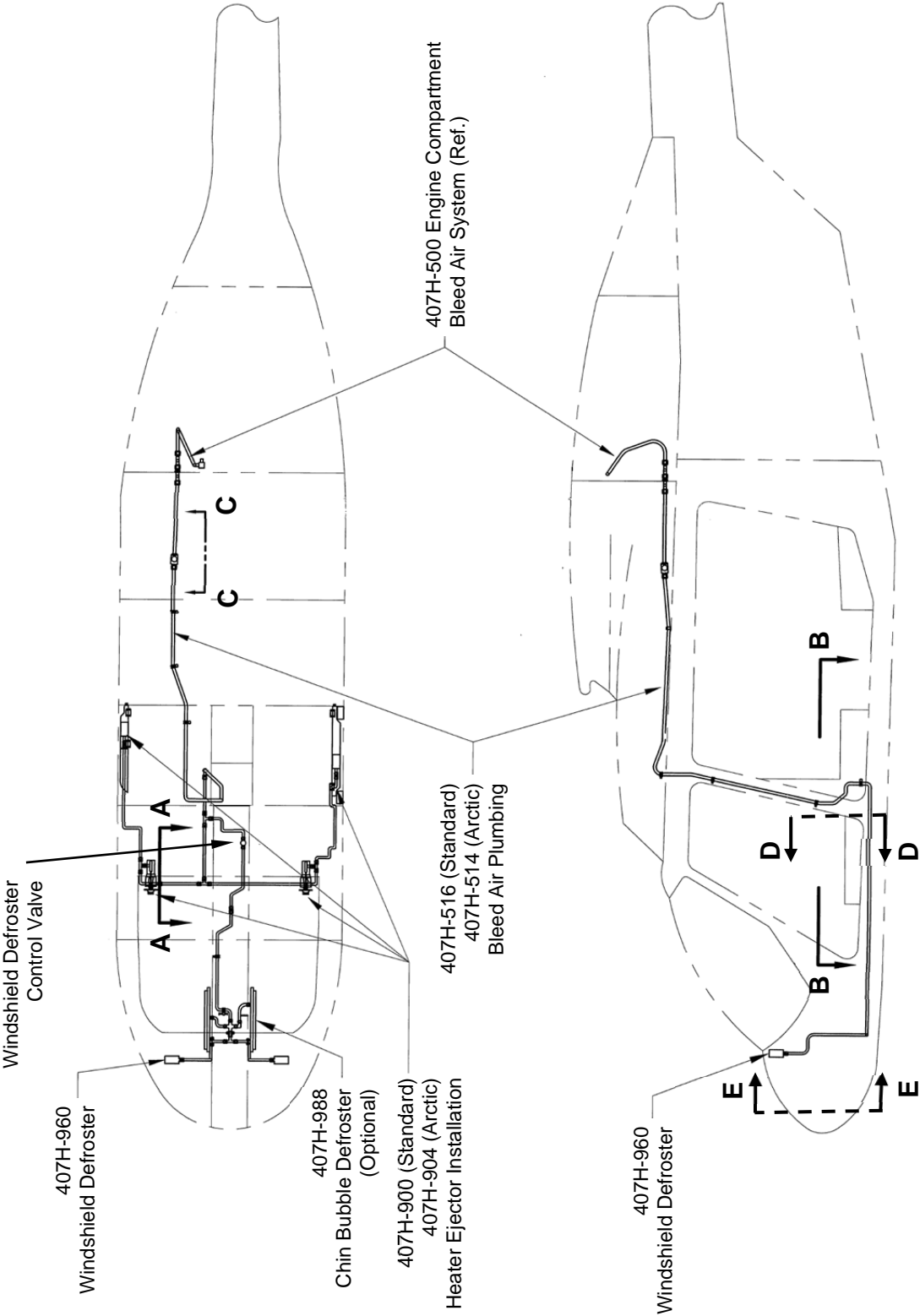
## Chapter 3

### LOCATION AND ACCESS

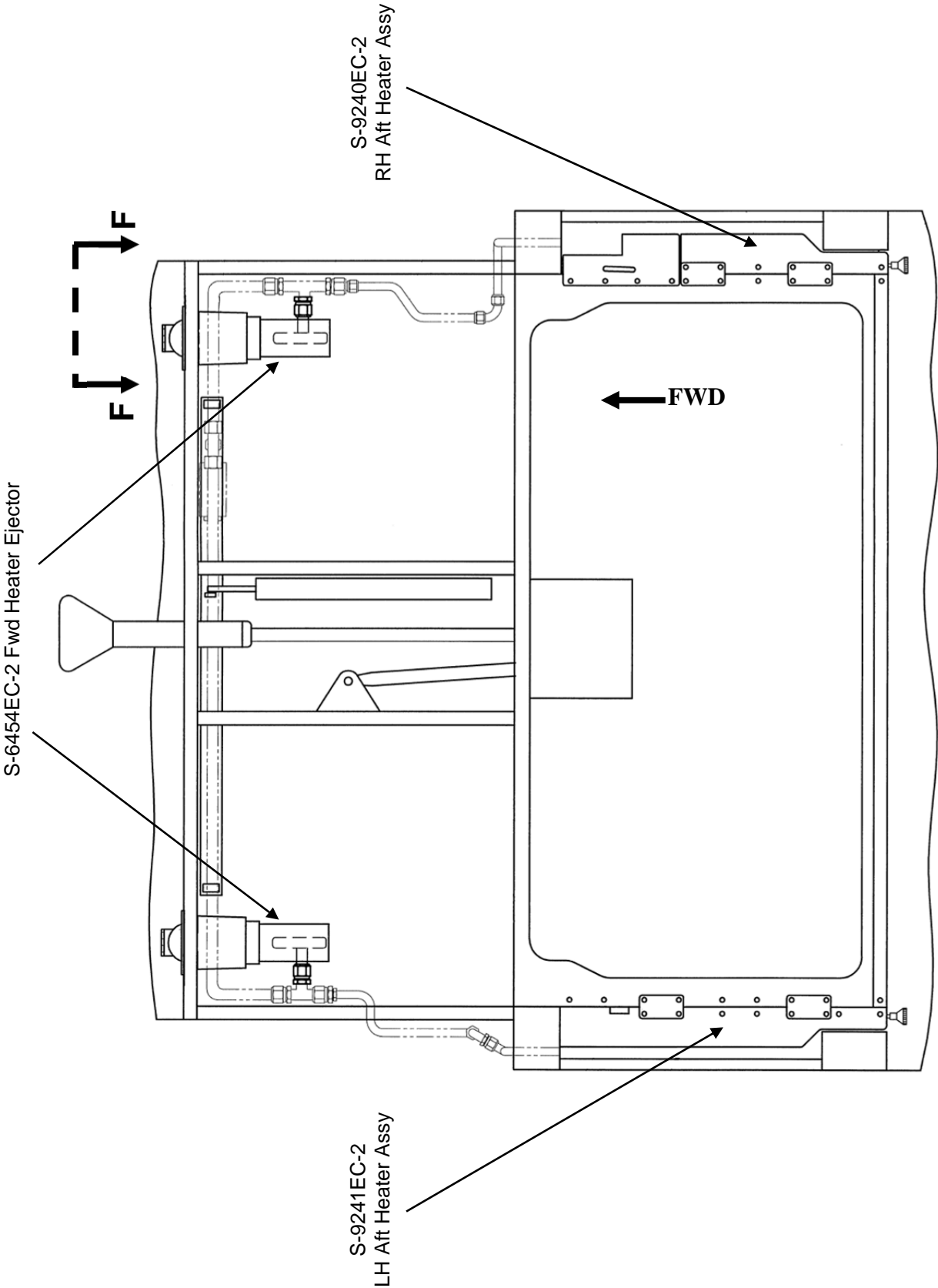
#### 1. Location of Cabin Heater Features

| Nomenclature                                | Figure | Description of Location              |
|---|--------|--------------------------------------|
| Heater System Major Components              | 3.1    | Throughout Heater System             |
| Forward and Aft Heater Ejectors/Assemblies  | 3.2    | Forward and Aft Seat Box             |
| Forward Flow Control Heater Ejector Outlet  | 3.3    | Installed on Forward Heater Ejectors |
| Forward Flow Control Heater Ejector Detail  | 3.4    | Forward Seat Box                     |
| Windshield & Chin Bubble Defroster Ejectors | 3.5    | Forward Cockpit                      |
| Heater Control Valve Assembly               | 3.6    | Forward Seat Box                     |
| Windshield Defroster Control Valve          | 3.7    | Center Console                       |
| Shutoff Valve                               | 3.8    | Engine Compartment                   |
| Engine Bleed Air Components – Drain Valve   | 3.9    | Engine Compartment                   |
| Heater System Temp Sensors                  | 3.10   | Heater System – Throughout Aircraft  |
| Heater Overtemp Indicator (GX)              | 3.11   | Instrument Panel                     |
| Existing Overtemp Annunciator (STD)         | 3.12   | Instrument Panel                     |
| Heater Power Switch                         | 3.13   | Overhead Console                     |
| Heater System Electrical Schematic (STD)    | 3.14   | Electrical System                    |
| Heater System Electrical Schematic (GX)     | 3.15   | Electrical System                    |

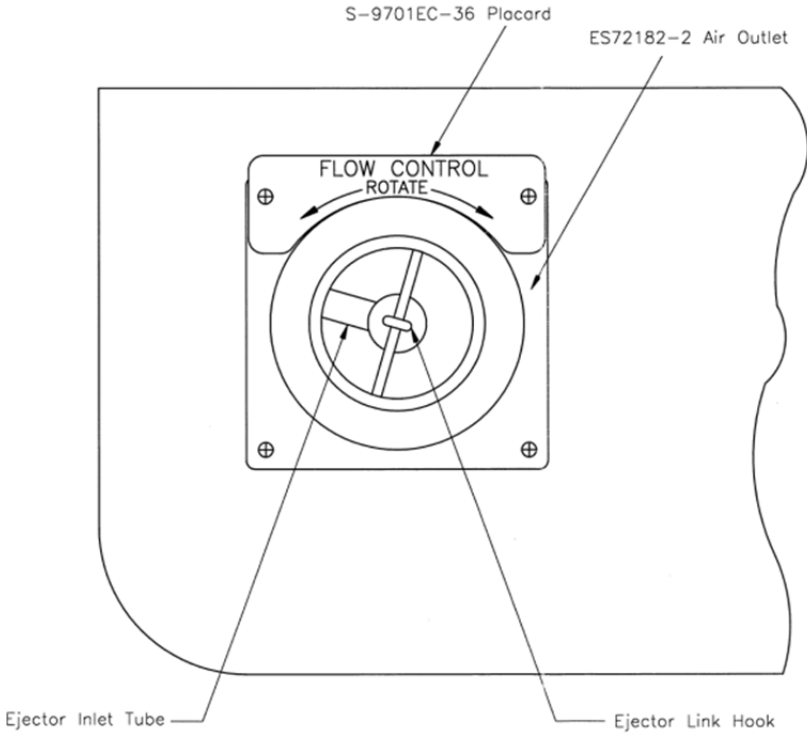
### Chapter 3 LOCATION AND ACCESS



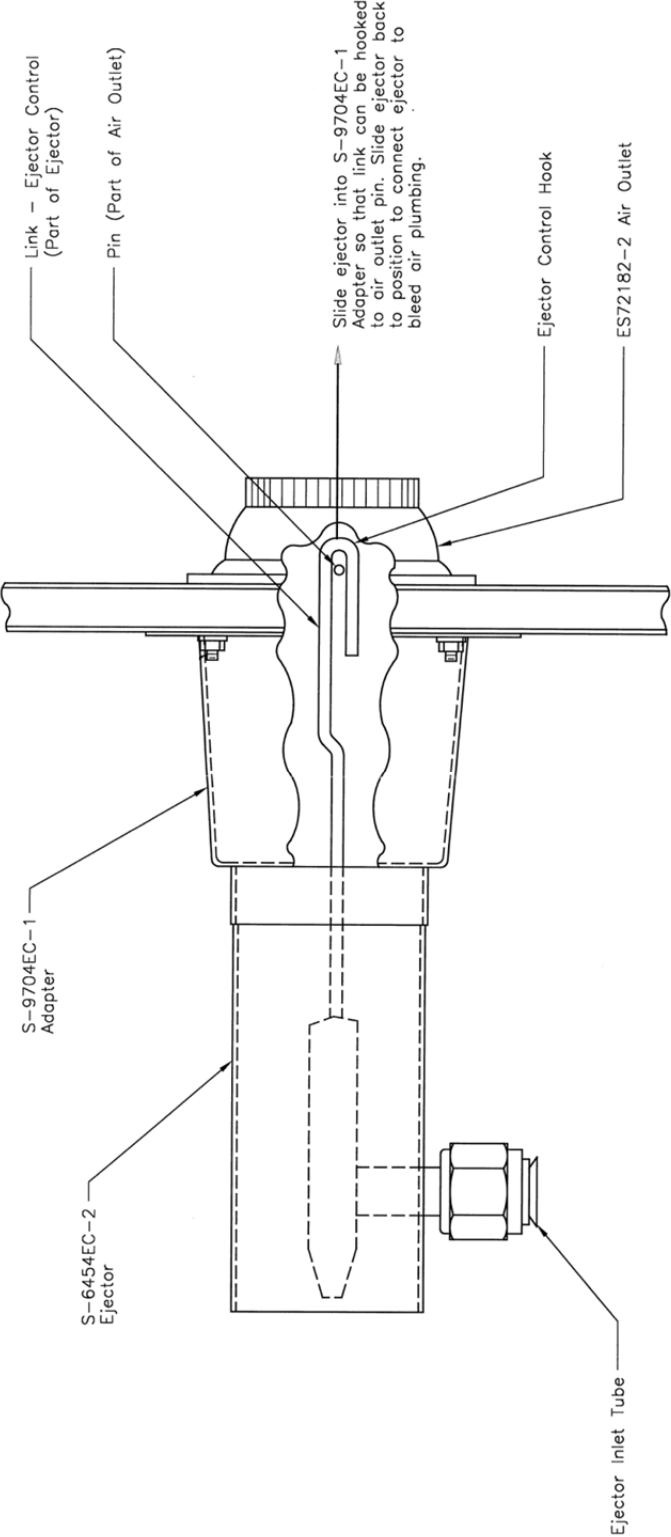
**Figure 3.1 Heater System Major Components**



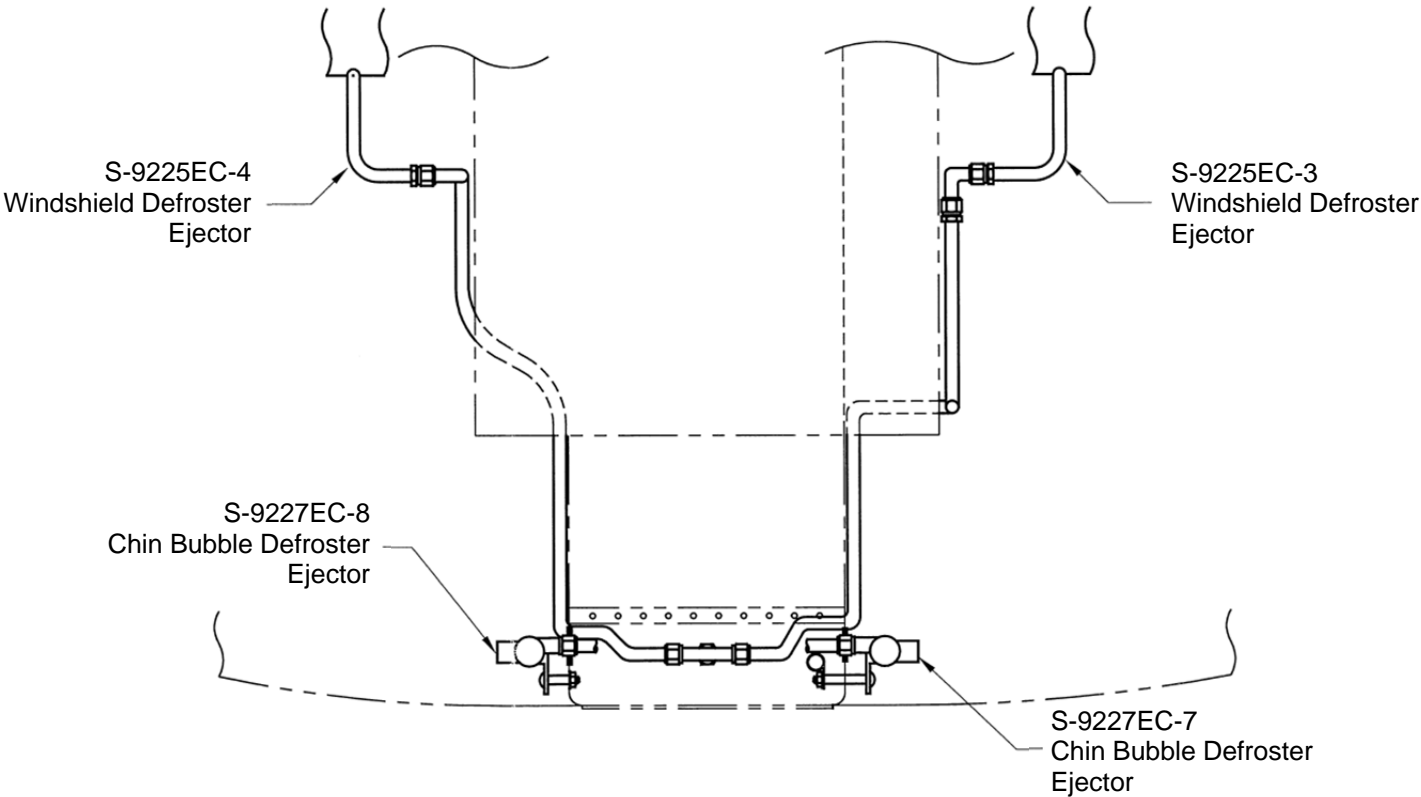
**View B – B (pg 3-2)**  
**Figure 3.2 Heater System Forward and Aft Ejectors/Assemblies**  
**(Looking Down)**



**View F – F (pg 3-3)**  
**Figure 3.3 Forward Flow Control Heater Ejector Outlet**  
**(Looking Aft)**

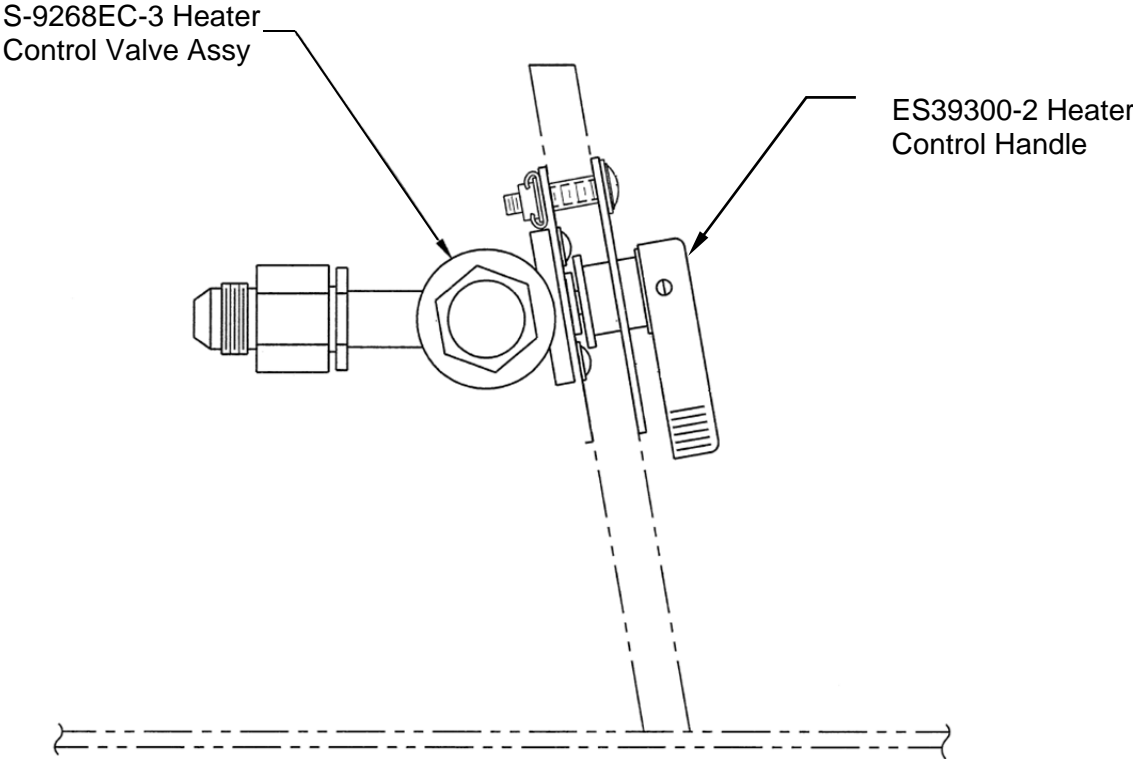


**View B - B (pg 3-2)**  
**Figure 3.4 Forward Flow Control Heater Ejector Detail**  
**(Looking Down)**

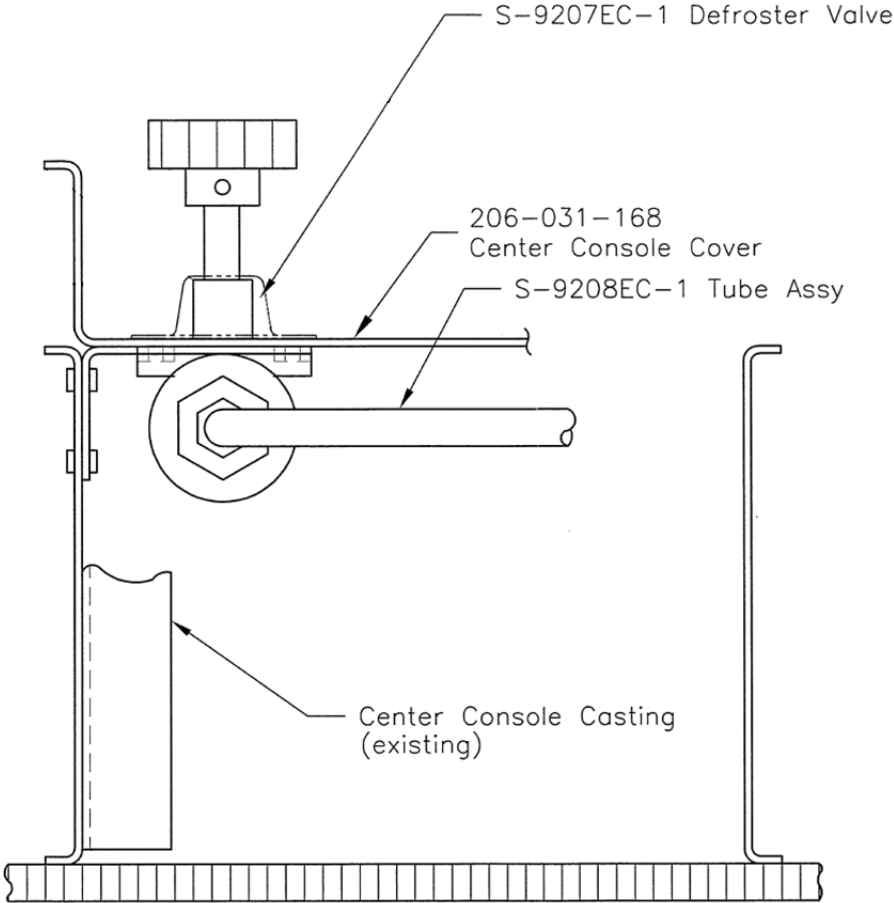


**View E – E (pg 3-2)**  
**Figure 3.5 Windshield & Chin Bubble Defroster Ejectors**  
**(Looking Aft)**

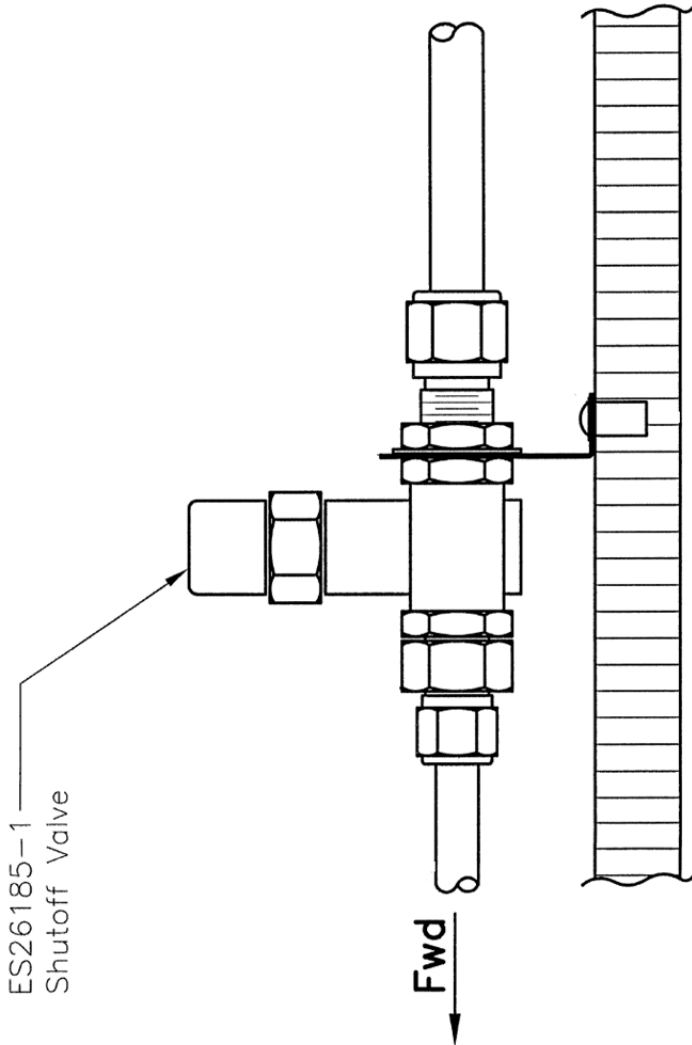




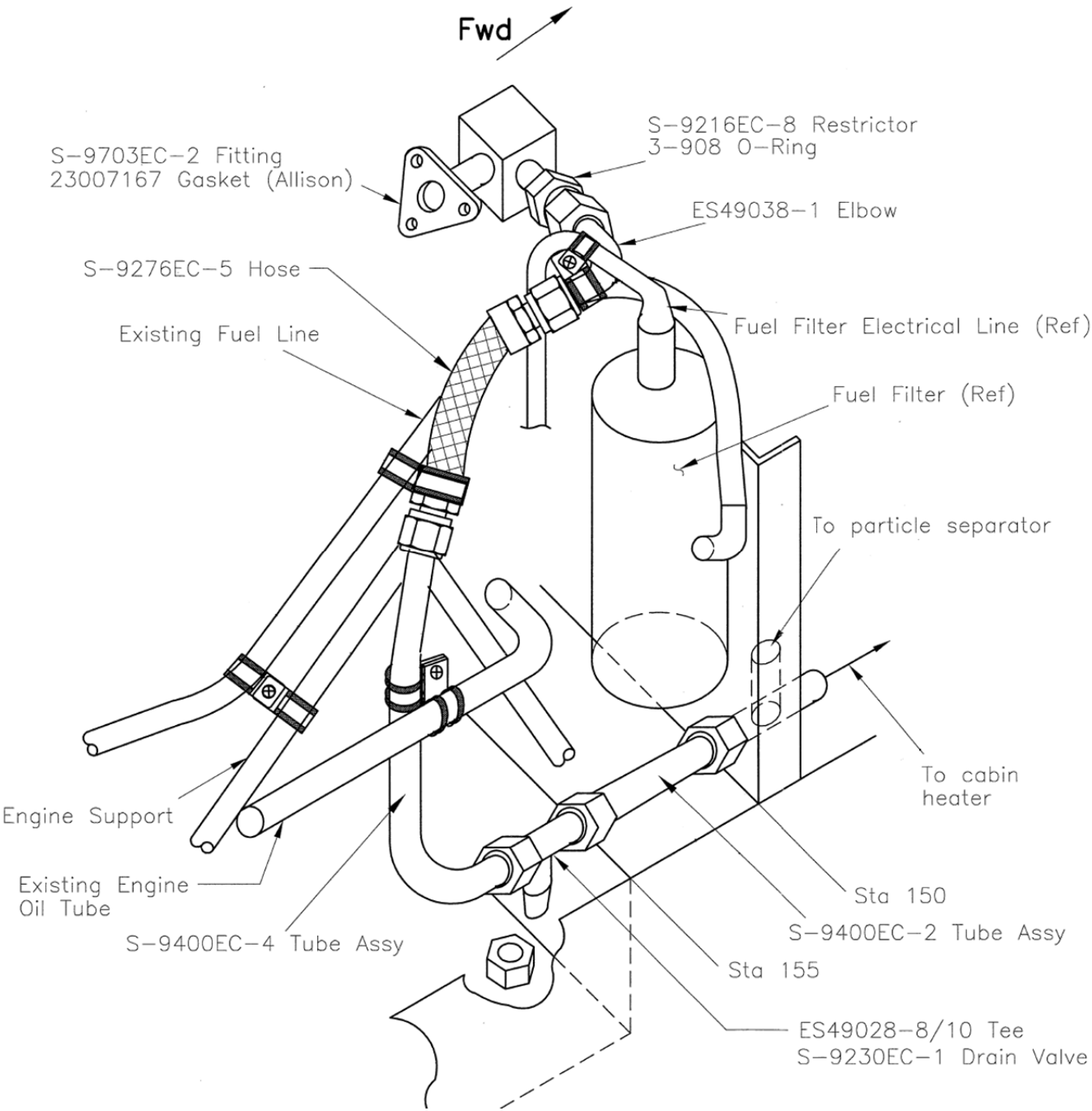
**View A- A (pg 3-2)**  
**Figure 3.6 Heater Control Valve Assembly**  
**(Looking Inboard)**



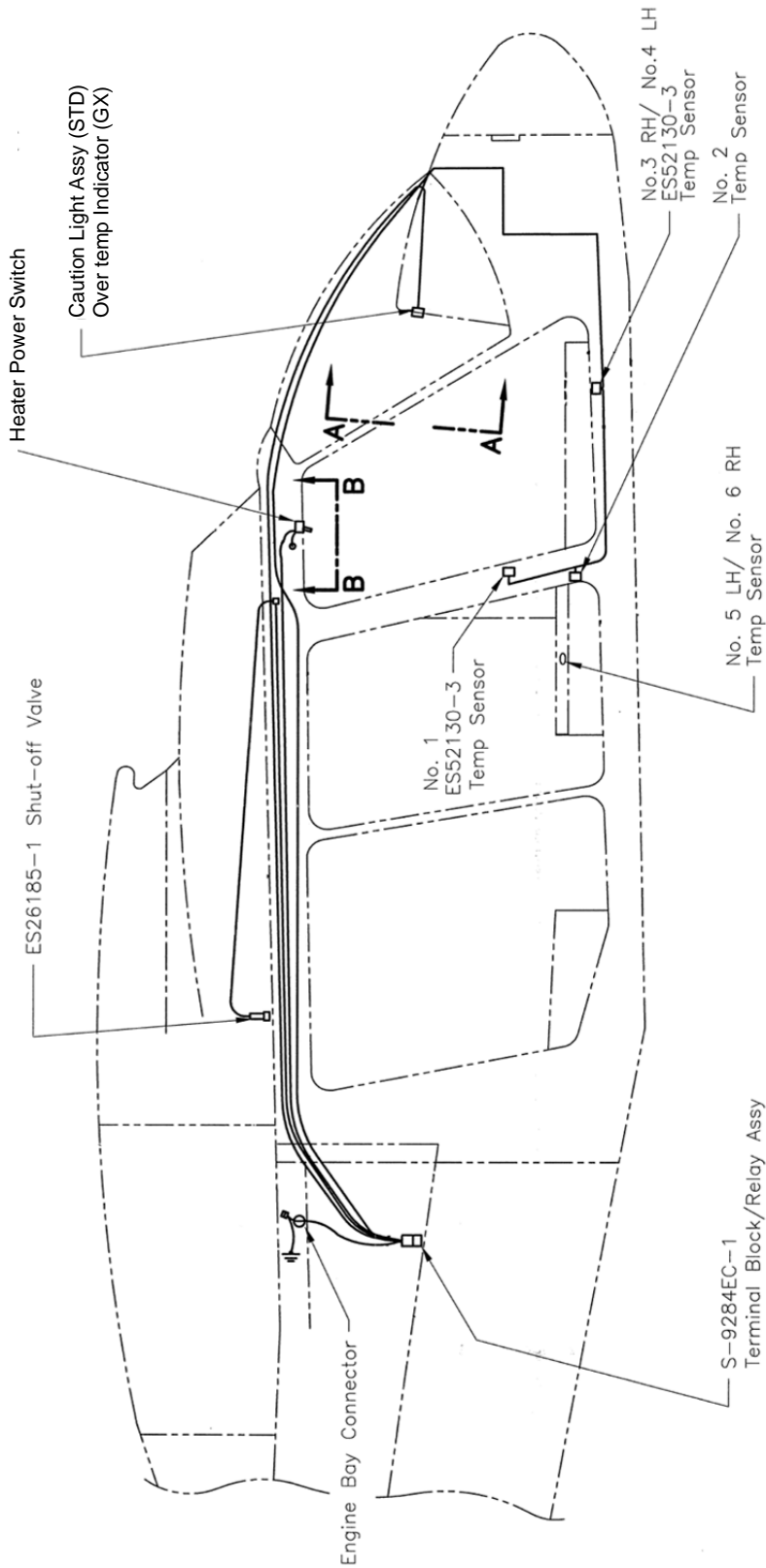
**View D- D (pg 3-2)**  
**Figure 3.7 Window Defroster Control Valve Assembly**  
**(Looking Forward)**



View C - C (pg 3-2)  
Figure 3.8 Heater Shutoff Valve  
(Looking Outboard)



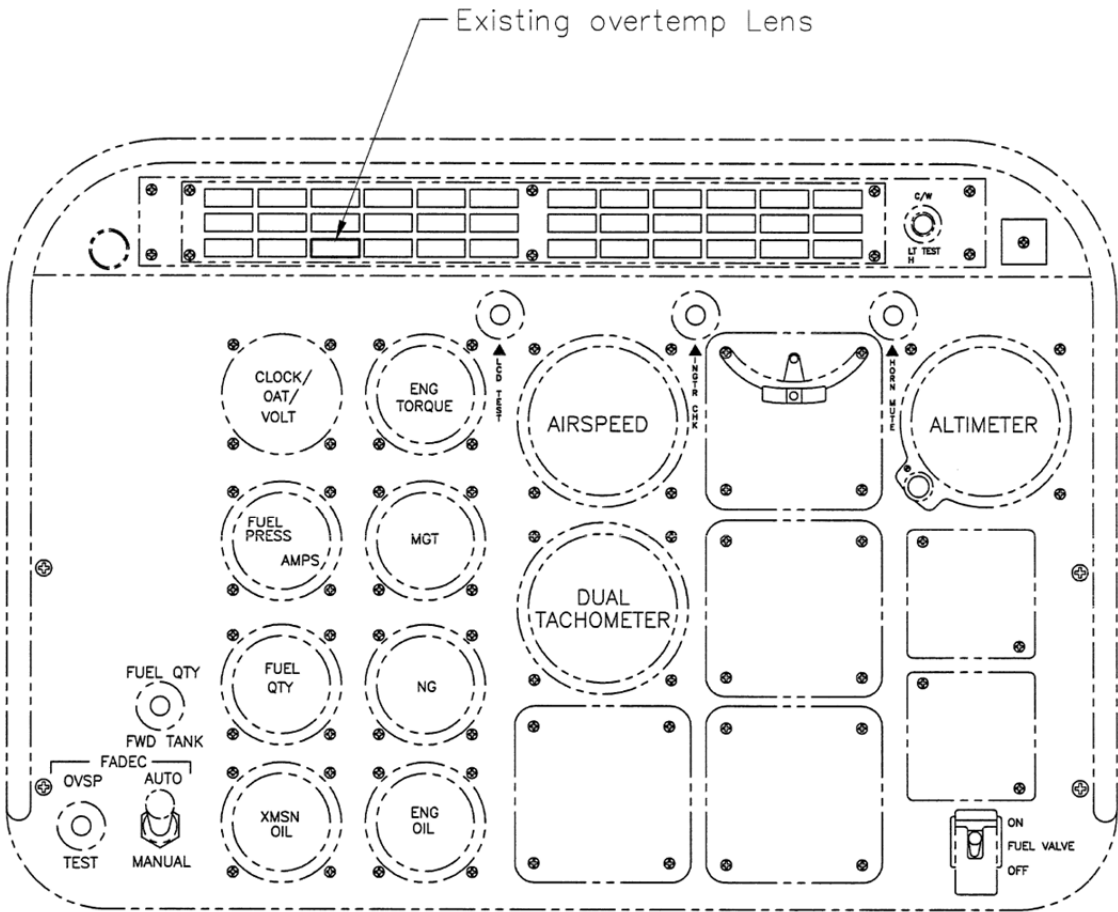
**Figure 3.9 Engine Bleed Air Components with Drain Valve  
(Looking Inboard RH Side)**



**Figure 3.10 Heater System Temp Sensors**

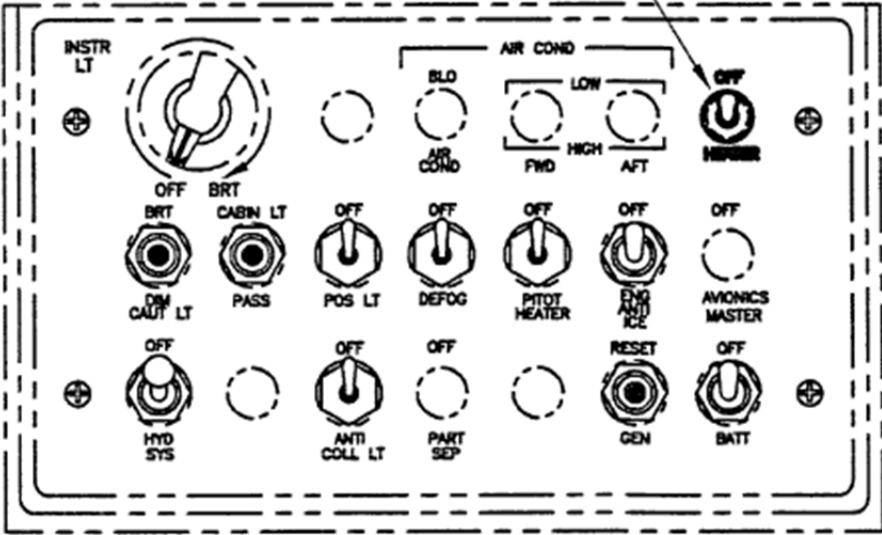


**View A – A (pg 3-10)**  
**Figure 3.11 Heater Overtemp Indicator (GX)**

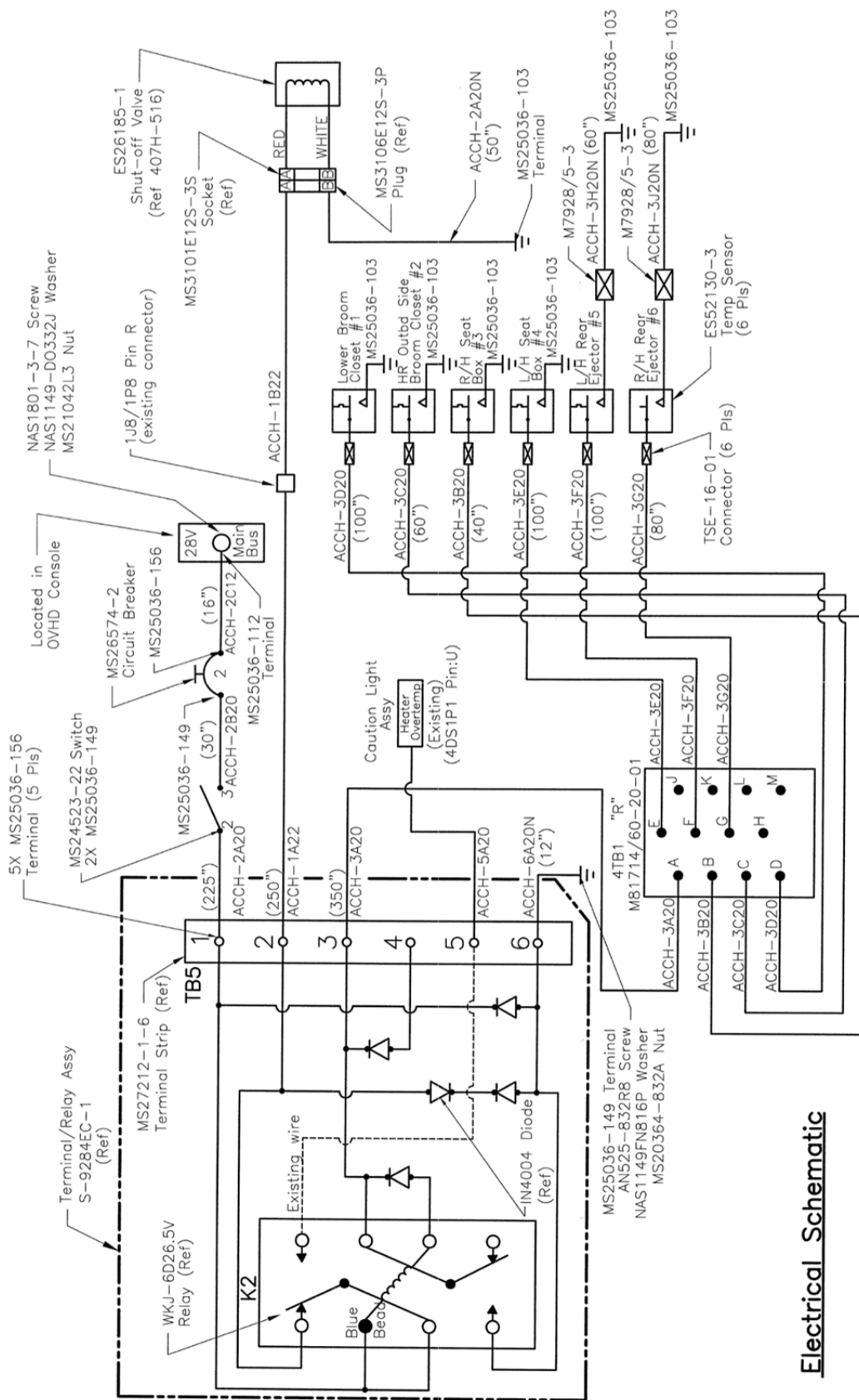


**View A – A (pg 3-9)**  
**Figure 3.12 Existing Overtemp Annunciator (STD)**

Heater Power Switch



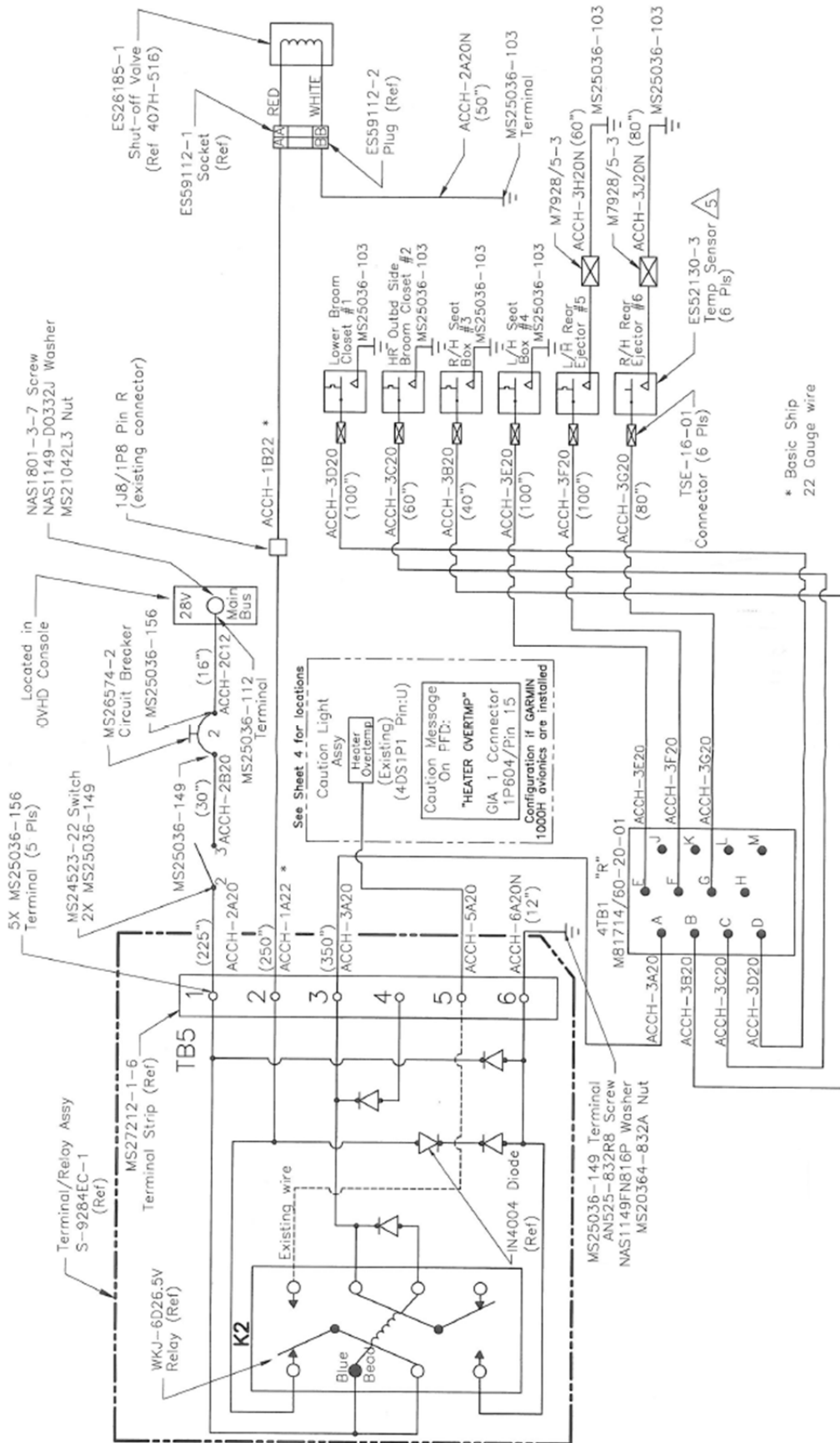
**View B – B (pg 3-9)**  
**Figure 3.13 Heater Power Switch**



**Electrical Schematic**

**Figure 3.14 Heater System Electrical Schematic (STD)**



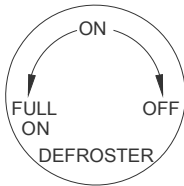
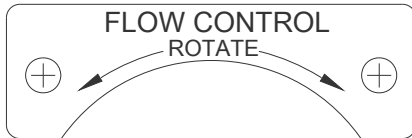


**Figure 3.15 Heater System Electrical Schematic (GX)**

## Chapter 4 PLACARDS AND MARKINGS

### 1. Heater System Placards and Markings

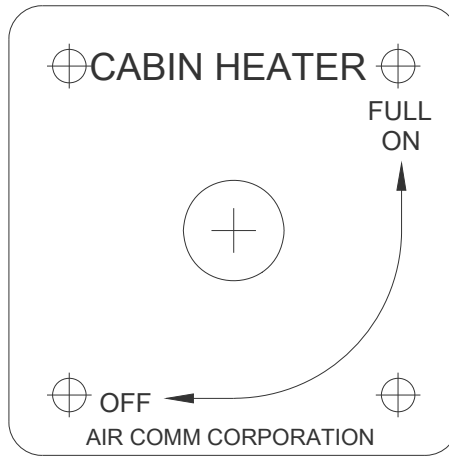
Fwd Flow Control  
Heater Ejector  
Outlets



Defroster Control  
Valve Knob



Aft Heater  
Assembly Flow  
Control Knob



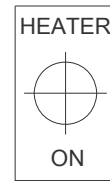
Heater Control  
Valve



Optional  
Light



Overtemp  
Lens



Heater  
Circuit  
Breaker

**Figure 4.1 Placards and Markings**

**Chapter 5**  
**SERVICING**

1. Servicing Requirements

**No servicing is required for the cabin heating system.**

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## Chapter 6

### STANDARD PRACTICES

#### 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 length.
  - b. Thread through safety wire hole in B-nut (or fitting).
  - c. Pull ends even. Twist safety wire to ensure a tight fit against the safety wire hole on the 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 the next B-nut (or fitting). Ensure safety wire routing prevents loosening of B-nuts.
  - f. Twist wire again to achieve 8 to 12 twists per inch (2.5 cm). Cut to form a “pigtail” with a minimum of 4 twists.

#### 2. REMOVAL, INSTALLATION / REPLACEMENT OF FWD HEATER EJECTOR ASSEMBLY (Figure 6.1 - 6.3)

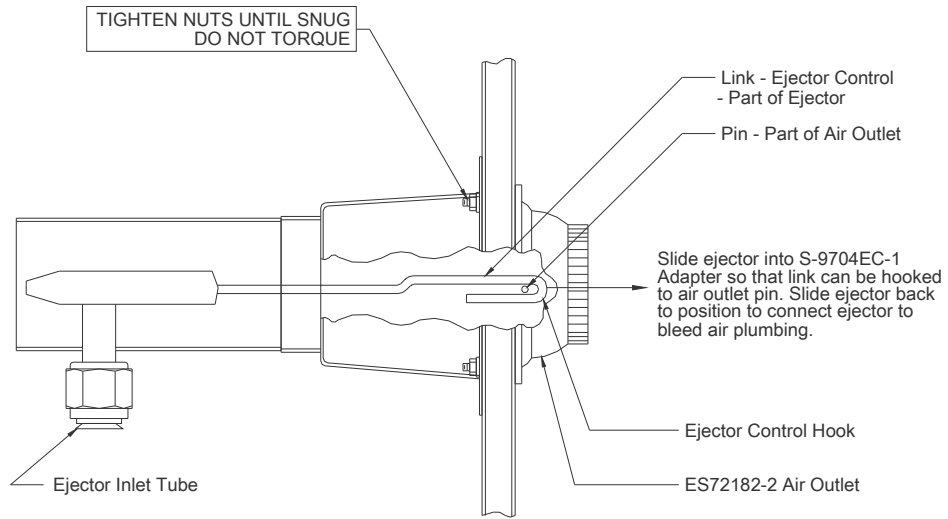
##### REMOVAL

- A. Disconnect ejector inlet tube B-Nut from bleed air plumbing.
- B. Slide ejector into adapter to unhook ejector link from air outlet pin. Slide ejector away from adapter for removal.

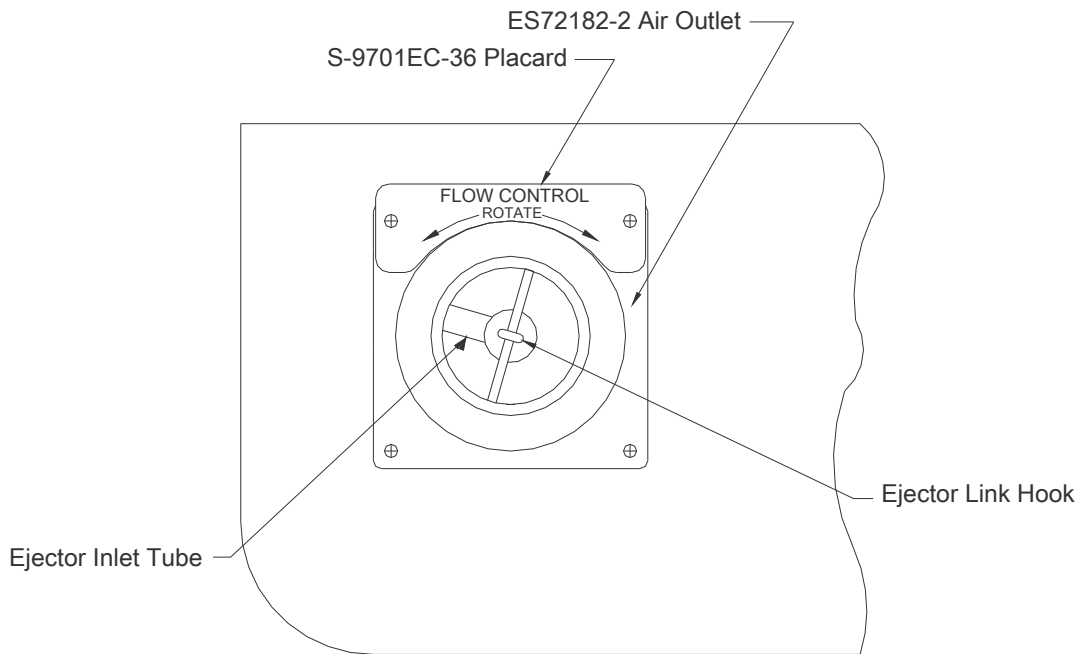
##### INSTALLATION / REPLACEMENT

- A. Slide ejector into adapter to hook ejector link to air outlet pin. Slide ejector back from adapter enough to position it for connection to bleed air plumbing.
- B. Connect ejector inlet tube B-Nut to bleed air plumbing.
- C. To ensure proper torque, align connection and thread B-Nut until metal on metal contact is felt. Continue to tighten an additional 60 degrees of rotation and safety wire per paragraph 1.

**Chapter 6**  
**STANDARD PRACTICES (Continued)**



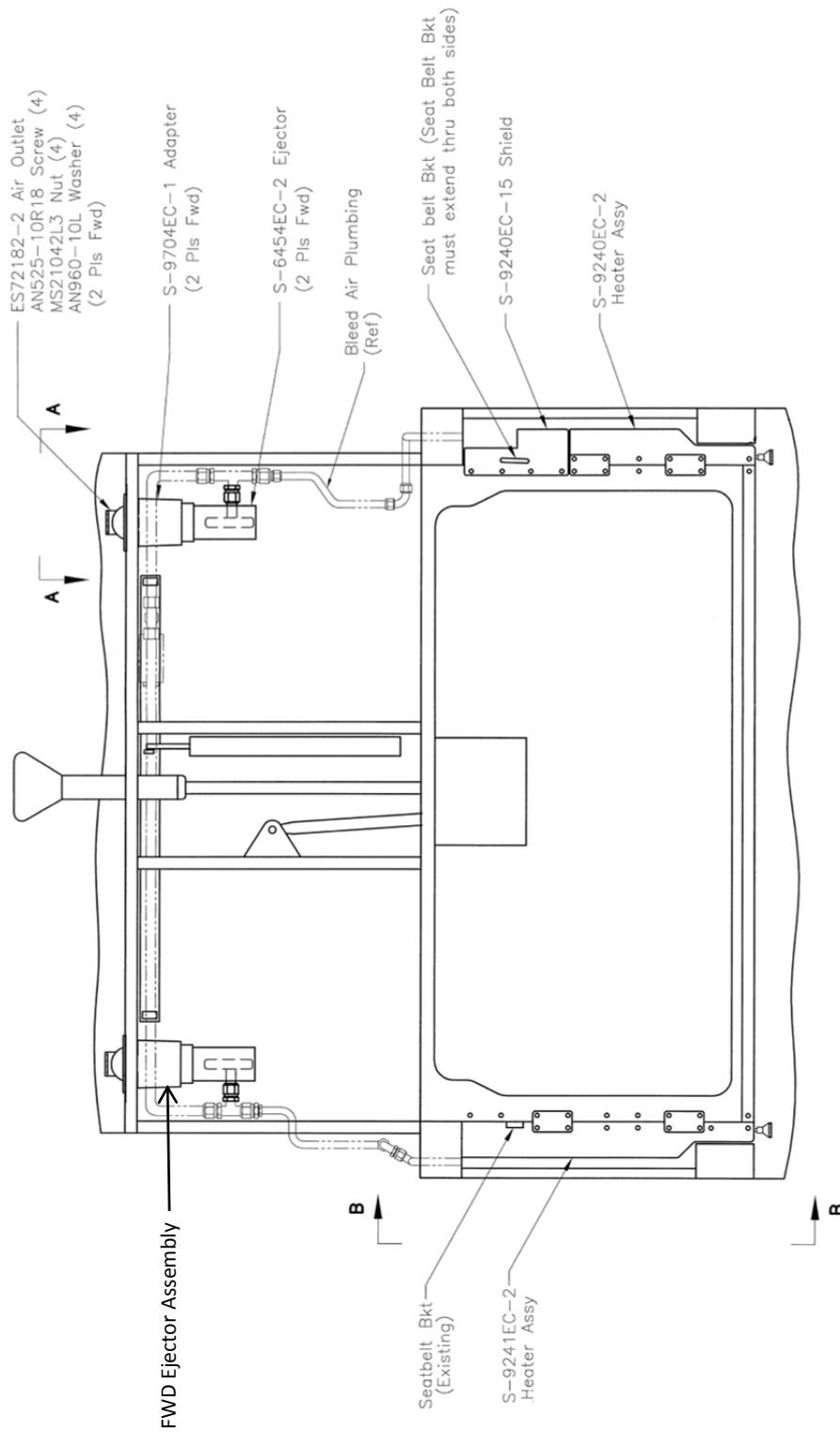
**Figure 6.1 Forward Flow Control Heater Ejector Outlet Detail (Looking Down)**



**View A – A (pg 6-3)**

**Figure 6.2 Forward Flow Control Heater Ejector Outlet (Looking Aft)**

**Chapter 6**  
**STANDARD PRACTICES (Continued)**



**Figure 6.3 Heater System Forward and Aft Ejectors  
(Looking Down)**

**Chapter 6**  
**STANDARD PRACTICES (Continued)**

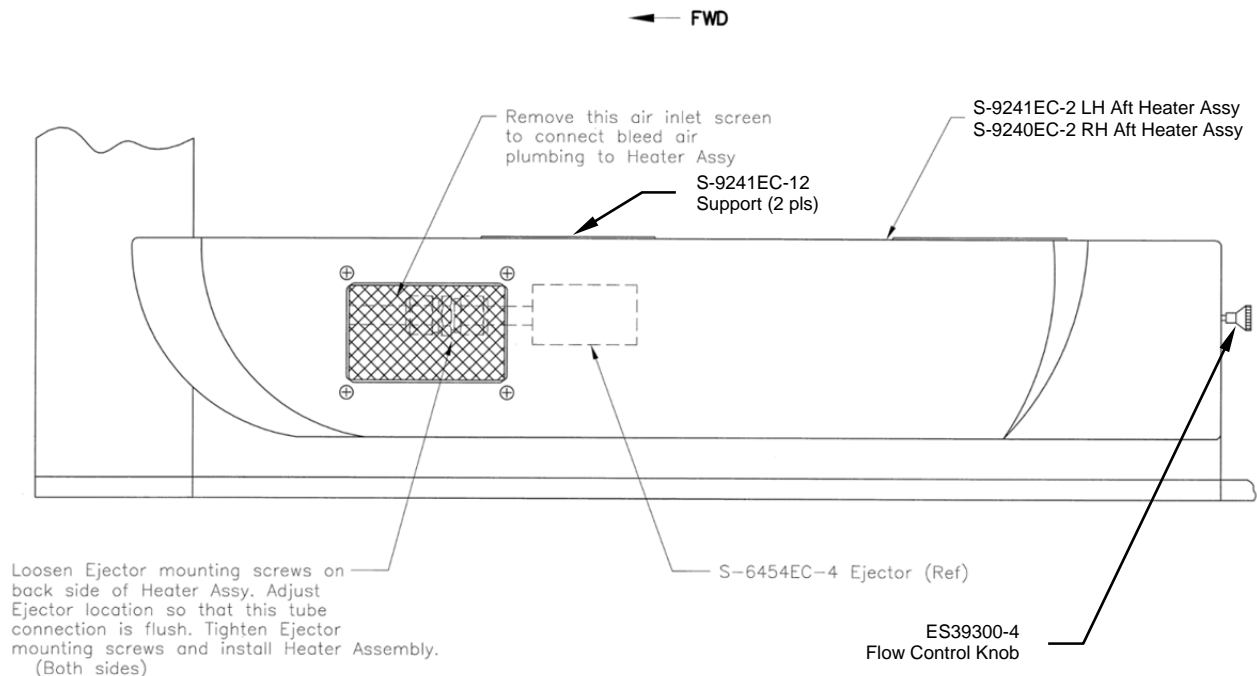
**3. REMOVAL, INSTALLATION / REPLACEMENT OF CABIN AFT HEATER EJECTOR ASSEMBLY (Figure 6.3 & 6.4)**

REMOVAL

- A. Remove inboard seat pan fasteners from S-9241EC-12 aft heater assembly supports.
- B. Remove S-9240EC-15 shield for RH side heater assembly removal.
- C. Position heater assembly to disconnect ejector tube B-Nut from bleed air plumbing for removal.

INSTALLATION / REPLACEMENT

- A. Loosen ejector mounting screws on back side of heater assembly. Adjust ejector location so tube connection is flush. It may be necessary to remove the air inlet screen for access to bleed air plumbing.
- B. Connect bleed tube to ejector B-Nut. To ensure proper torque, align connection and thread B-Nut until metal on metal contact is felt. Continue to tighten an additional 60 degrees of rotation and safety wire per paragraph 1.
- C. Tighten ejector mounting screws and install heater assembly by installing seat pan fasteners to heater assembly supports. Install S-9240EC-15 shield for RH side heater assembly.



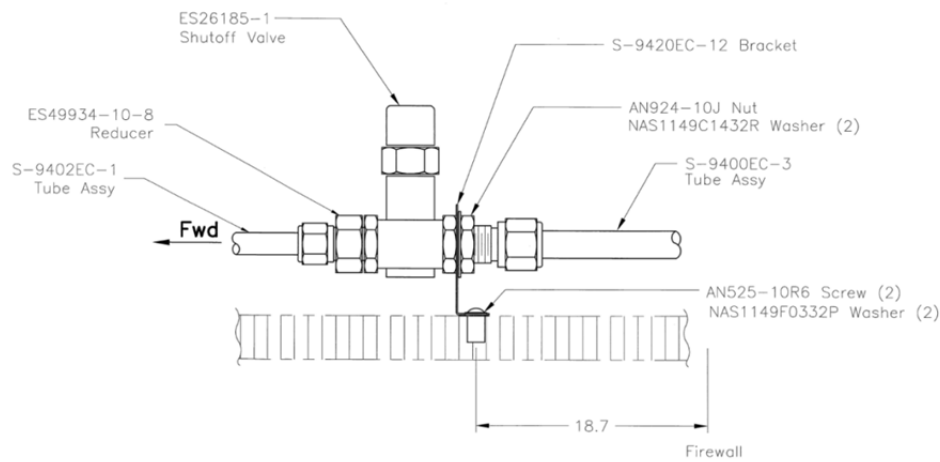
**View B – B (pg 6-3)**  
**Figure 6.4 Aft Flow Control Heater Assembly**  
**(Looking Inboard LH Side)**

**Chapter 6**  
**STANDARD PRACTICES (Continued)**

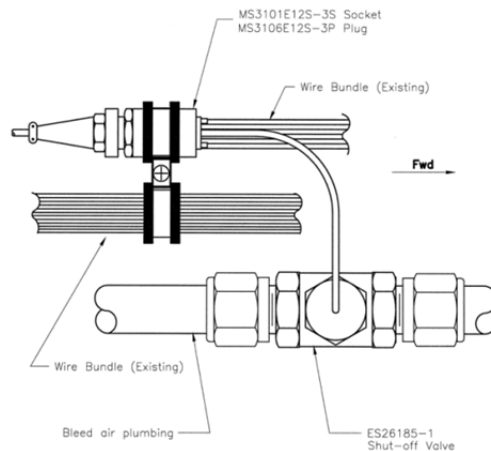
4. REMOVAL, INSTALLATION / REPLACEMENT OF HEATER SHUTOFF VALVE (Figure 6.5 & 6.6)

REMOVAL

- A. Disconnect bleed air plumbing from shutoff valve.
- B. Loosen socket/plug clamp and disconnect electrical connection.
- C. Remove bracket mounting screws from engine deck and remove shutoff valve. Retain S-9420EC-12 bracket for replacement shutoff valve.



**Figure 6.5 Shutoff Valve**  
**(Looking Outboard)**



**Figure 6.6 Shutoff Valve Electrical Connection**  
**(Looking Down)**



**Chapter 6**  
**STANDARD PRACTICES (Continued)**

INSTALLATION/REPLACEMENT

- A. Install S-9420EC-12 bracket on replacement shutoff valve and secure bracket to engine deck with mounting screws.
- B. Connect electrical connection and tighten socket/plug clamp.
- C. Connect bleed air plumbing to shutoff valve.
- D. To ensure proper torque, align connection and thread until metal on metal contact is felt. Continue to tighten an additional 60 degrees of rotation and safety wire per step 1.

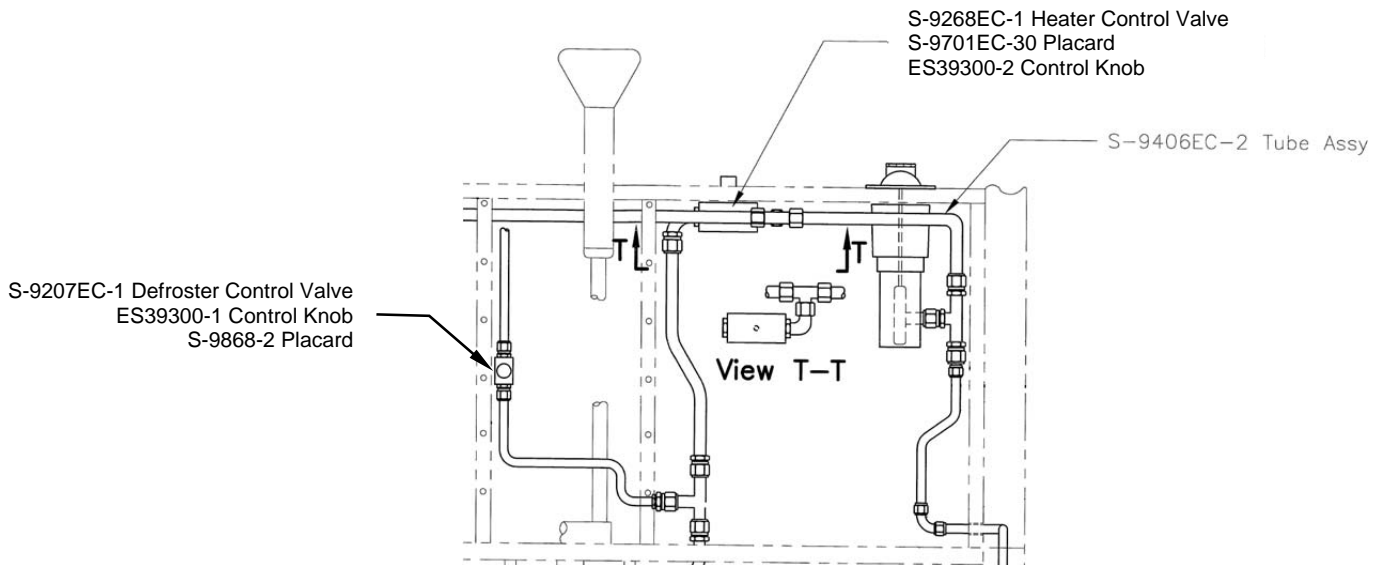
5. REMOVAL, INSTALLATION / REPLACEMENT OF HEATER CONTROL VALVE. (Figure 6.7)

REMOVAL

- A. Remove the panel located under the Pilots and Co-pilots seats to gain access to the heater control valve.
- B. Disconnect bleed air plumbing from heater control valve.
- C. Remove heater control valve knob and placard.
- D. Remove two mounting screws and remove heater control valve.

INSTALLATION / REPLACEMENT

- A. Position heater control valve and connect bleed air plumbing.
- B. Install two mounting screws, control valve knob and placard.
- C. To ensure proper torque, align connection and thread B-Nut until metal on metal contact is felt. Continue to tighten an additional 60 degrees of rotation and safety wire per step 1.



**Figure 6.7 Heater Control Valve  
(Looking Down)**

**Chapter 6**  
**STANDARD PRACTICES** (Continued)

6. REMOVAL, INSTALLATION / REPLACEMENT OF WINDSHIELD DEFROSTER CONTROL VALVE. (Figure 6.7)

REMOVAL

- A. Remove defroster control valve knob and center console cover.
- B. Disconnect bleed air plumbing from heater control valve.
- C. Remove two mounting screws and remove defroster control valve.

INSTALLATION / REPLACEMENT

- A. Position defroster control valve and connect bleed air plumbing.
- B. Install two mounting screws.
- C. To ensure proper torque, align connection and thread B-Nut until metal on metal contact is felt. Continue to tighten an additional 60 degrees of rotation and safety wire per step 1.
- D. Install center console cover and defroster control valve knob.

7. REMOVAL, INSTALLATION / REPLACEMENT OF HEATER TEMP SENSOR (Figure 3.8 & 6.8)

REMOVAL

- A. Remove mounting hardware and wiring clamp if applicable. Retain for installation.
- B. Remove heater temp sensor wiring TSE connector and remove temp sensor.
- C. Temp sensors 5 & 6 are part of the aft heater assembly and will necessitate removal of the heater assembly.

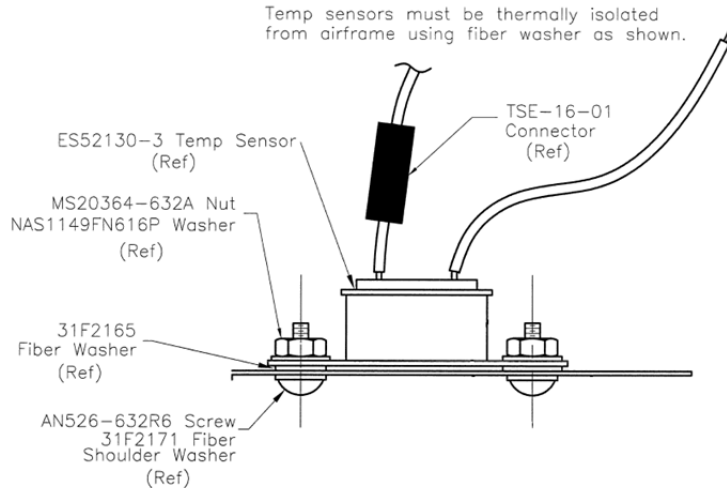
INSTALLATION / REPLACEMENT

**NOTE**

Maintain a minimum clearance of 0.8 inches between temp sensors and bleed air plumbing. Use fiber washers to isolate sensors.

- A. Install temp sensor with mounting hardware and connect wiring with TSE connector.
- B. Secure wiring in clamps as necessary.

## Chapter 6 STANDARD PRACTICES (Continued)



**Figure 6.8 ES52130-3 Temp Sensor**  
**(Typical)**

### 8. REMOVAL, CLEANING, INSTALLATION / REPLACEMENT OF DRAIN VALVE (Figure 3.7 & 6.9)

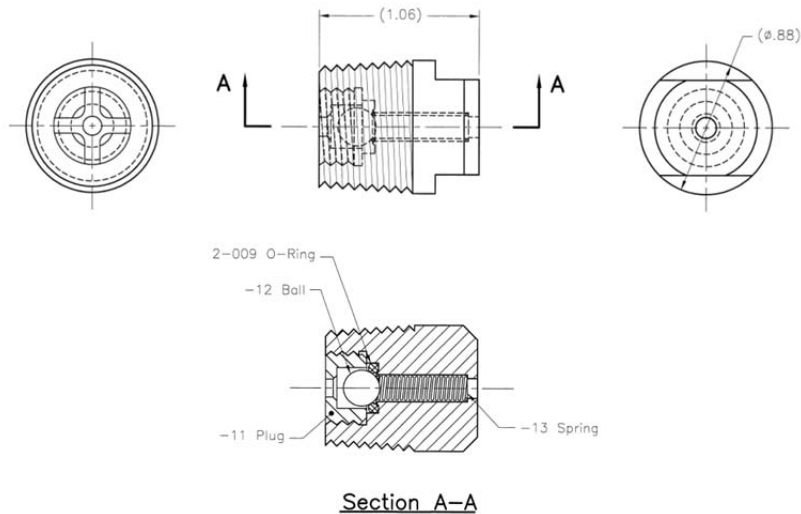
#### REMOVAL

- A. Remove drain valve from ES49028-8/10 tee fitting.
- B. Remove S-9230EC-11 plug, 2-009 O-ring, S-9230EC-12 ball, and S-9230EC-13 spring from drain valve body.
- C. Inspect O-ring for damage and ball and spring for corrosion. Clean parts with non-corrosive cleaning solution. Replace as needed.

#### INSTALLATION / REPLACEMENT

- A. Assemble spring, ball, and O-ring into drain valve body.
- B. Apply Loctite 567 (white) to internal threads of S-9230EC-11 plug. Install plug and torque to 75 – 80 in/lb.
- C. Apply Anti-Seize Ease Off 990 (MB1215), or equivalent to drain valve threads. Install drain valve into ES49028-8/10 tee fitting.

**Chapter 6**  
**STANDARD PRACTICES (Continued)**



**Figure 6.9 S-9230EC-1 Drain Valve**

9. REMOVAL, INSTALLATION / REPLACEMENT OF THE BLEED AIR PLUMBING (Figure 3.1)

REMOVAL

A. Cut attaching safety wire from B-Nuts at each end of bleed air plumbing to be removed.

**NOTE**

Always use a back-up wrench to hold the union, bulkhead fitting, or component that the bleed air plumbing is being removed from.

- B. Loosen the B-Nut at each end of bleed air plumbing.
- C. Remove any clamps securing bleed air plumbing to the aircraft.
- D. Remove bleed air plumbing. Apply protective caps as needed.

**Chapter 6**  
**STANDARD PRACTICES (Continued)**

INSTALLATION / REPLACEMENT

- A. Install bleed air plumbing, secure clamps, and connect B-nuts.

**NOTE**

Always use a back-up wrench to hold the union, bulkhead fitting, or component that bleed air plumbing is being connected to.

- B. Apply Anti-Seize Ease Off 990 (MB1215), or equivalent to all fittings prior to assembly.
- C. To ensure proper torque, align connection and thread B-Nut until metal on metal contact is felt. Continue to tighten an additional 60 degrees of rotation and safety wire per step 1.
- D. After completion of bleed air plumbing installation, check all joints for audible signs of leakage during operational run up of system.

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## Chapter 7 TROUBLESHOOTING

### 1. SYSTEM TROUBLESHOOTING CHART

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  | Shutoff valve not open   | Operate heater power switch to HEATER position              |
| No Heat  | Heater control valve in the off position                           | Operate heater control valve to the HEATER position         |
| No Heat  | Shutoff valve failure  | Replace shutoff valve                                       |
| No Heat  | Heater circuit breaker tripped                                     | Reset breaker   |
| No Heat. Heater OVER TEMP annunciator/indicator illuminated  | Malfunction of temp sensor   | Check temp sensor – all sensors should be electrically open |
| No Heat / Heater OVER TEMP annunciator/indicator illuminated | Air blockage of heater inlet or outlets                            | Remove blockage   |
| No Heat / Heater OVER TEMP annunciator/indicator illuminated | Bleed air line fitting loose causing an over-temperature condition | Check all lines and fittings for security                   |