



**Keith Products, L.P.**

**Air Conditioning System for Learjet 55**

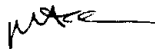
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**Maintenance Manual  
with  
Illustrated Parts Catalog**

**Document No. CR-56-100-1M  
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**LIST OF REVISIONS**

<u>REV.</u>	<u>DATE</u>	<u>DESCRIPTION</u>	<u>BY</u>	<u>APPVD</u>
NC	6-5-98	INITIAL RELEASE	MAK	MJR
A	7-24-01	MODIFIED SECT. 21-51-20 FIG. 20 PG 5 I/N 28 WAS 35-1560-8 SUPPORT, NOW 35-1560-12	JMS	

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## INTRODUCTION

### 1. PURPOSE

The purpose of this Maintenance Manual is to provide detailed instructions for the troubleshooting, checking and maintenance of the Keith Products, Inc., air conditioning system for the Learjet Model 55 aircraft.

### 2. SCOPE

The scope of the service and maintenance manual provides the maintenance technician with detailed information covering:

- Overall system level description and theory of operation.
- Component level description and theory of operation.
- Component checking and troubleshooting procedures.
- Maintenance practices to keep the environmental control system operating at its maximum efficiency.
- The identification of special equipment to accomplish the specific tasks.
- An Illustrated Parts Catalog (IPC) covering the breakdown of each major component of the air conditioning system is included in this manual.

### 3. ARRANGEMENT

This Maintenance Manual is arranged in accordance with Air Transport Association (ATA) Specification 100 and includes an Illustrated Parts Catalog.

### 4. GLOSSARY

Nonstandard abbreviations and symbols used in the Maintenance Manual are described below.

#### **Abbreviations:**

A/C	- Air Conditioning
A/R	- As Required
Assy	- Assembly
Comm. Avail.	- Commercially Available
Evap	- Evaporator
FWD	- Forward
Gnd	- Ground
GPU	- Ground Power Unit
IPC	- Illustrated Parts Catalog
STC	- Supplemental Type Certificate
SW	- Switch
VDC	- Volts Direct Current

## **AIR CONDITIONING SYSTEM - SYSTEM DESCRIPTION**

### **1. GENERAL**

The air conditioning system for the Learjet Model 55 aircraft consists of a refrigerant R134a vapor cycle cooling system. This system allows the pilot to control cooling for a comfortable aircraft cabin on the ground and in flight. Figure 1 shows a general arrangement of the air conditioning system.

The switch panel located on the co-pilot's lighting switch panel above the right armrest contains the cooling system ON/OFF/FAN switch, the Crew fan speed switch, and the cabin fan speed switch.

### **2. REFRIGERATION SYSTEM**

The refrigeration or air conditioning system, as designed and manufactured by Keith Products for the Learjet Model 55 aircraft, is a vapor cycle type cooling system using refrigerant R134a. The system is electrically operated using the aircraft 28 VDC electrical system and is operable in all normal flight modes. Air conditioning may be operated with ground external power or the aircraft electrical system with both generators providing 28 VDC.

The major components of the system are the compressor and condenser assembly with a common blower/motor, and two evaporator/blower units. Refrigerant plumbing and electrical systems connect the major components to provide a closed loop system.

The compressor and condenser assemblies are mounted in the tailcone. The compressor drive motor also has a fan that provides airflow for the condenser. The motor and compressor are mounted on a beam. The motor turns at approximately 7,500 RPM. The compressor is belt driven from the motor shaft. The compressor takes low pressure refrigerant gas and compresses it to a higher pressure and temperature. Condenser cooling air passes over the compressor and drive motor to provide cooling airflow for those components prior to passing through the condenser coil to remove heat from the refrigerant system. After passing through the condenser coil, the air is exhausted to the outside through an exhaust plenum and out an exhaust outlet on the right side. If the drag chute option is not installed, then from the exhaust plenum, the air will travel to outlets on the bottom of the aircraft.

An evaporator unit is located below the co-pilot floor. It provides cooling airflow for the cockpit and the cabin overhead Wemac outlets. It is of a design wherein the cabin air is drawn into the blower, located beneath the pilot's seat, which sends air across the evaporator coil and delivers the conditioned air to an overhead outlet duct. This recirculating system continues to dry and cool the air each time it passes through the evaporator. Moisture removed from the air by the cold coil (condensate) is collected within the evaporator housing and is forced overboard. The evaporator is equipped with

a thermal expansion valve which regulates the amount of refrigerant entering the coil to provide the optimum cooling effect. The evaporator blower can be operated in the "FAN" position to recirculate cabin air without cooling. The blower is operated from an independent and variable fan speed control potentiometer mounted on the A/C switch panel.

An additional evaporator/blower unit is installed just forward of the AFT pressure bulkhead. It contains an evaporator and blower. The blower provides flood duct cooling to the cabin. This recirculating system continues to dry and cool the air each time it passes through the evaporator. Moisture removed from the air by the cold coil (condensate) is collected within the evaporator housing and is drained overboard. The evaporator is equipped with a thermal expansion valve which regulates the amount of refrigerant entering the coil to provide the optimum cooling effect. The evaporator blower can be operated in the "FAN" position to recirculate cabin air without cooling. The blower is operated from an independent and variable fan speed control potentiometer mounted on the switch panel.

The plumbing which connects the compressor, condenser and the evaporators, consists of rubber based hoses with a nylon barrier. The fittings are permanently swaged onto the hoses. All fittings are "O-ring" type connections with sealant on the fitting mating surfaces to prevent refrigerant leaks. Two R134a service valves are located near the compressor in the tailcone. They are sized differently to avoid incorrect cross-connecting when gaining access to the plumbing for system recharging.

The entire air conditioning refrigerant loop is protected against over pressure conditions by two separate safety devices. The first device is a binary high/low pressure switch, located on the compressor discharge port, that activates in the event of an overpressure. This switch will open at approximately 350 PSIG and will interrupt power to the compressor control circuit. This in turn will de-energize the compressor motor relay and remove power to the compressor motor. The refrigerant system pressure will then drop. The switch will also interrupt power to the compressor control circuit under low pressure conditions. The second overpressure safety device is a fuse plug which will vent the system refrigerant safely overboard in the event of a system pressure in excess of 425 PSIG. It is located on the receiver/drier.

The electrical system allows operation of the air conditioning system from either aircraft power with both generators on line or from an active GPU prior to engine start. System safety features include electrical interlocking and load shedding. In flight or on ground, the air conditioning system can be operated from the aircraft electrical system only with both generators on line. Loss of either generator will automatically shed the air conditioning system electrical loads except for the minimal loads of the evaporator fans. Also, the air conditioning system is inhibited when either START-OFF-GEN switch is selected to START.

**INSPECTION/CHECK**

## 1. GENERAL

Listed below are the recommended inspection intervals for maintenance critical items associated with the air conditioning system. Proper and timely inspections will keep the air conditioning system operating at its peak efficiency.

## 2. INSPECTION INTERVALS

<b>ITEM</b>	<b>INSPECT FOR</b>	<b>INTERVAL</b>	<b>ACTION</b>
Air Conditioning System Components	Dirt, Damage	On condition or every 600 hours	Clean or replace component as necessary
Compressor Belt	Tension, Wear	Within five (5) hours of installing new belt, then every 300 hours or six (6) months	Tension or replace as necessary. See 21-50-03, Page 201.
Sight Glass	Proper refrigerant level	When problem is suspected	Discharge/charge as necessary per TR-134
Evaporator and condenser coils	Dirt	At 600 Hour Inspection	Clean as necessary
Refrigerant hoses	Chafing, wear	At 600 Hour Inspection	Repair as necessary per 21-50-02, Page 201
Compressor drive motor	Brush wear	At 1200 Hour Inspection	Inspect/Replace per 21-50-03, Page 201
FWD Evaporator Drain	Cracks in skin	At 500 landings (after kit installation), every 100 flights thereafter.	Inspect/Repair as necessary.



**ELECTRICAL**

**DESCRIPTION AND OPERATION**

1. GENERAL

The air conditioning system consists of one high energy compressor drive/condenser fan motor and two (2) evaporator blowers, (1 FWD), and (1 AFT). The air conditioning system is operated by a mode switch with “COOL-OFF-FAN” positions. Airflow for the evaporators is controlled by a variable potentiometer for fan speed. The system incorporates a binary pressure switch to sense an over pressure or under pressure condition in the system.

The air conditioning system is controlled by an Interface Control Box which monitors generator and GPU inputs to ensure operation or shedding of the system if a fault exists.

This section of the maintenance manual describes the electrical system and presents electrical troubleshooting procedures.

2. LOAD/SHED DESCRIPTION

The system incorporates a logic interface control box that enables the system to operate or be shed under various conditions. The table below shows operation under various conditions.

<b>CONDITIONS</b>	<b>EVAP FANS</b>	<b>COMP DRIVE</b>
Gnd Power Cart/On	On	On
Gnd Power Cart Connected/Off	On	Off
Battery Only	On	Off
One Generator on Ground	On	Off
Both Generators on Ground	On	On
Refrigerant Over/Under Pressure	On	Off
One Generator in Flight	On	Off
Both Generators in Flight	On	Off
Either START-OFF-GEN switch in START position	Off	Off

**A/C SYSTEM OPERATIVE CONFIGURATIONS**

**TABLE 1**

## TROUBLESHOOTING

### 1. GENERAL

The following procedures are used for troubleshooting the electrical system and the electrical interfaces with the other assemblies of the air conditioning system.

### 2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
Service Pressure Gauge	Comm. Avail.	1	None
Multi-meter	Comm. Avail.	1	None
28 VDC Source	N/A	A/R	None

### 3. ELECTRICAL TROUBLESHOOTING PROCEDURES

**NOTE:** Always attach a service gauge set to system prior to beginning trouble shooting to ensure proper refrigerant charge is present.

**CAUTION:** Do not operate air conditioning system with condenser air inlet or outlet blocked.

#### A. Air Condition Selected, Compressor Drive/Condenser Fan Motor Does Not Turn.

1. Connect service pressure gauge to service ports located near compressor/drive motor enclosure assembly.
2. Connect and activate ground power to aircraft.
3. Select air conditioning system to "COOL".
4. Check that load shed start conditions in the Description and Operation paragraph are met. Reference 21-50-01, Page 1.
5. Check the 175A current limiter located in the existing Power Distribution panel in the AFT Equipment Bay. Replace if necessary.
6. Check for power at input and output of the compressor relay. If power is present at input and output, proceed to Step 8. If power is present only at input, proceed to Step 7.
7. Check for power at the leads of the pressure switch. If power is present at the input of the switch and not the output, disconnect leads to the switch and check continuity of pressure switch. If no continuity and gauge set reads adequate pressure, replace pressure switch. Switch can be removed without discharge of refrigerant. Back switch off in a counter clockwise direction. Re-install in reverse order. Lubricate O-ring in switch per 21-50-02 Page 202.
8. Check for power at motor. If power is present, proceed to Step 9. If power is not present and load/shed conditions of Step 4 are met, check

power on the interface control box at connector Pin 4. If power is present, system problem exists in load shed system start unit. If power is not present, check 5 amp CB and mode switch.

9. Fault is isolated to compressor drive/condenser fan motor. Unit should be replaced.
10. Select air conditioning OFF, remove electrical power, disconnect service gauge when troubleshooting is complete.

**Evaporator Blowers**

1. GENERAL

The following procedures are used for troubleshooting the blowers.

**CAUTION:** Do not operate air conditioning system with condenser air inlet or outlet blocked.

2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
Multi-meter	Comm. Avail.	1	None
28 VDC Source	N/A	A/R	None

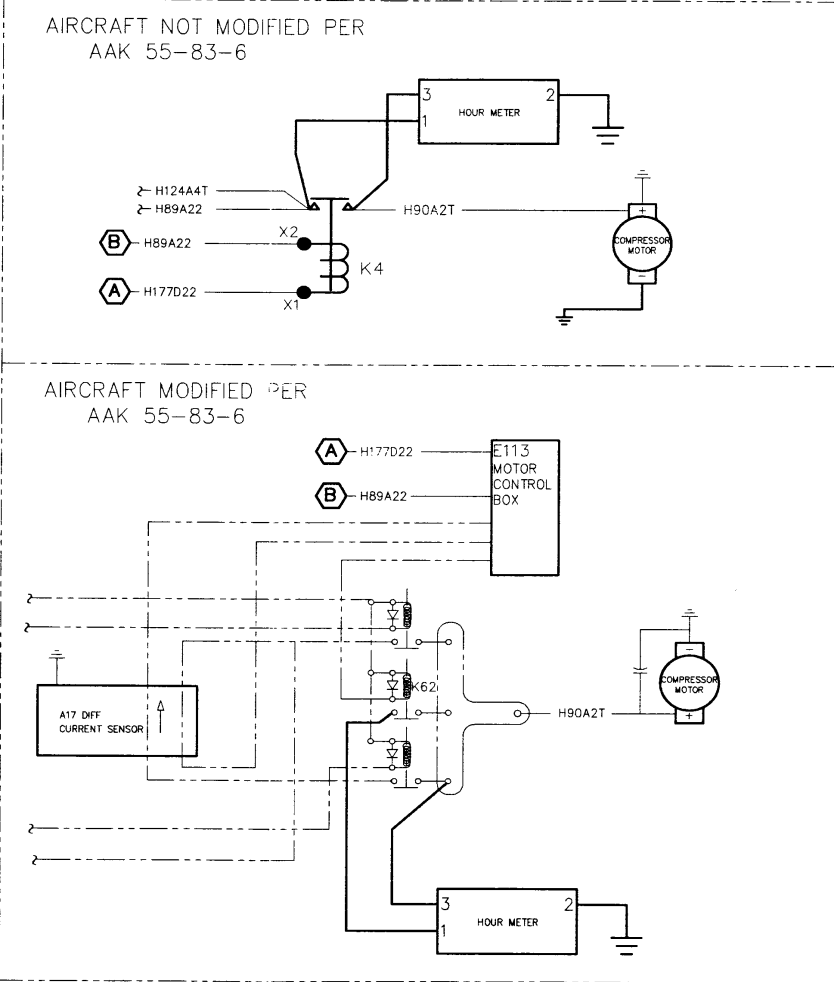
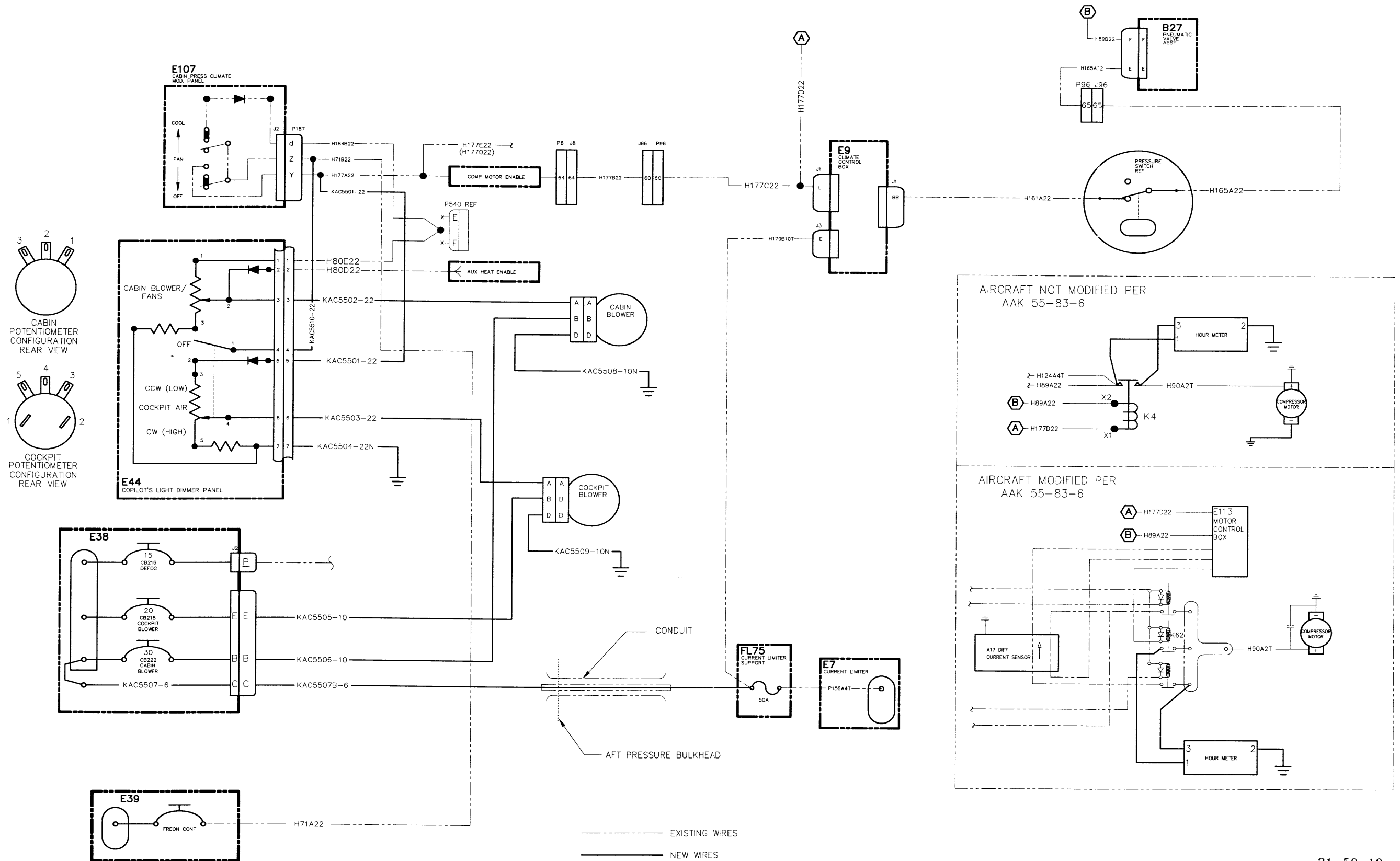
3. BLOWER TROUBLESHOOTING PROCEDURES

With the air conditioning system operating, observe if any of the following conditions occur as described in Table 1:

**NOTE:** Always attach a service gauge set to system prior to beginning trouble shooting to ensure proper refrigerant charge is present.

Trouble	Probable Cause	Correction
1. Blower will not run.	Loss of power to blower motor	Check for 28vdc at Pin B
2. Blower will not run.	Defective potentiometer or signal wire	Check for variable voltage at Pin A
3. Power at connector but blower still doesn't run.	Defective blower motor	Replace blower assy

Comp/Cond Troubleshooting  
Table 1



## **PLUMBING**

### **DESCRIPTION AND OPERATION**

#### **1. GENERAL**

The plumbing system consists of a flexible nylon lined refrigerant hose with permanent swaged on fittings. All connections are tube O-ring type with sealant on the fitting mating surfaces to ensure leak free operation. Hose, O-ring material, and sealant are specially designed to work with refrigerant R134a and polyolester oils. Two service valves are located near the compressor/drive motor enclosure assembly. They are sized differently to avoid incorrect cross-connection when servicing the system. A receiver/drier is located downstream of the condenser and is installed on the condenser flange to remove moisture from the liquid refrigerant. A binary pressure switch monitors the refrigerant gas pressure. This switch will open at a compressor discharge over pressure of 350 psi and under pressured conditions of 30 psi. This will interrupt the power to the compressor drive motor control circuit and stop the compressor.

This section of the maintenance manual discusses checks and maintenance practices used for the plumbing portion of the air conditioning system.

**MAINTENANCE PRACTICES**

1. GENERAL

The following procedures are used to perform typical maintenance on the air conditioning system plumbing.

**CAUTION:** Do not operate air conditioning system with condenser air inlet or outlet blocked.

2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
R134a Compatible Hose Swaging Kit	Available from Keith Products	1	None
Sharp Knife	Comm. Avail.	1	None
Impact Wrench	Comm. Avail.	1	None
Polyolester Oil	Comm. Avail.	A/R	Viscosity ISO 68
Sealant	ES49000-3 Available from Keith Products	A/R	None

3. PLUMBING MAINTENANCE PROCEDURES

A. Hose or Fitting Replacement

**NOTE:** If it is found that a hose or fitting has a leak, it will be necessary to replace the entire hose assembly. Follow the Hose Swaging Instructions below.

1. Hose should only be cut with a sharp knife. (**Note:** Use of serrated blades or saws to cut hose will leave particles that can contaminate system).
2. Insert the proper size die in the swaging tool. (See crimp tool instructions)
3. Insert fitting in swaging tool so that it is centered in the die and hand tighten.
4. Insert hose in fitting until it bottoms (**Note:** Indicating hole is in base of fitting).
5. Using impact wrench, tighten nut until die housings contact. (**Note:** It is important to keep hose pushed into fitting while swaging).
6. Reverse impact and back off nut until housing contacts rubber stops.

B. Connection to Components - O-Ring Replacement

1. Place the appropriate O-ring (Ref. IPC Fig. 1) over the tube "O" end of the fitting.
2. Lubricate O-ring with polyolester oil or sealant prior to assembly.
3. Apply sealant to all fitting mating surfaces prior to assembly.

C. Receiver/Drier Replacement

1. Replace receiver/drier whenever the compressor is replaced or when the air conditioning system plumbing is left open to the atmosphere for a period of time greater than one (1) hour.

## INSPECTION/CHECK

## 1. GENERAL

The following procedures are used for checking and inspecting the air conditioning system plumbing.

## 2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
Electronic R134a Refrigerant Leak Detector	Comm. Avail.	1	None

## 3. PLUMBING CHECK PROCEDURES

## A. Plumbing Installation Preventive Maintenance Check

**CAUTION:** Do not operate air conditioning system with condenser air inlet or outlet blocked.

**NOTE:** All O-rings should be lubricated with polyolester oil or sealant applied to all fittings mating surfaces before assembly.

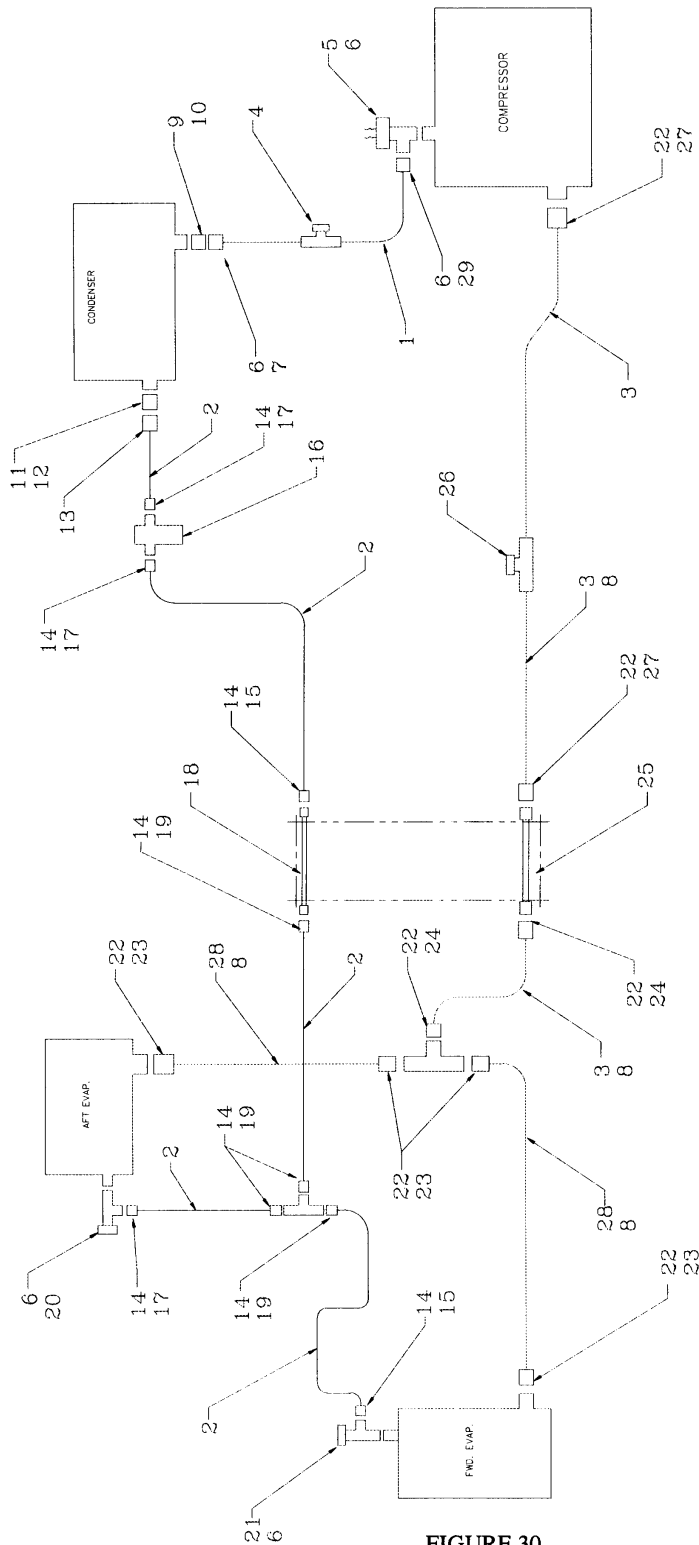
1. Check that all hoses are properly supported and do not chafe. Check that all clamps remain secure and that the hose and fitting are well supported at connections with fixed units such as evaporator, condenser, etc., to prevent fatigue cracking in tubing headers or fittings.

## B. Plumbing System Refrigerant Leak Check

1. Connect service pressure gauge set to service ports, located near the compressor.
2. Check that the gauges are reading the proper static pressure. Both gauges should read approximately 55 psig @ standard temperature (59°F) with a properly charged system when the system is not operating.
3. Using leak detector, check entire plumbing system including hose fittings and coil assemblies for leaks. There shall be no leaks. Repair or replace leaking component per the appropriate maintenance manual section and its IPC.



**MODEL 55  
ILLUSTRATED PARTS CATALOG**



**FIGURE 30  
PLUMBING INSTL- CABIN  
COOLING REFRIGERANT  
SHEET 1 OF 2**

MODEL 55  
ILLUSTRATED PARTS CATALOG

FIG	ITEM	PART NUMBER	NOMENCLATURE	EFF CODE	UNITS PER ASSY
30		56-0800-1	Plumbing Instl		
		.. 56-0250-1	.. Fwd Evaporator Assy		(Fig 15)
		.. 66-0260-2	.. Aft Evaporator Assy		(Fig 15)
		.. JBS222-1	.. Compressor Assy		(Fig 20)
	1	.. ES48149-2	.. Hose (In)		168
	2	.. ES48149-1	.. Hose (In)		1020
	3	.. ES48149-4	.. Hose (In)		600
	4	.. ES40158-2	.. Splicer, w/R134a SV		1
	5	.. JBS2020-5	.. Pressure Switch		(Fig 20)
	6	.. ES49011-2	.. O-Ring		3
	7	.. ES40150-2	.. Fitting		1
	8	.. ES02162-3	.. Tubing Insulation		(Ref)
	9	.. JBS6009-2	.. Fitting		1
	10	.. MS28775-114	.. Fitting		1
	11	.. AN919-12D	.. Fitting		1
	12	.. MS28775-111	.. O-Ring		1
	13	.. ES40148-8	.. Fitting, 90°		1
	14	.. ES49011-1	.. O-Ring		9
	15	.. ES40150-1	.. Fitting, 45°		2
	16	.. ES43030-2	.. Receiver/Drier		1
	17	.. ES40151-1	.. Fitting, 90°		3
	18	.. 56-0850-1	.. Tube Assy, Discharge		1
	19	.. ES40149-1	.. Fitting, Str		4
	20	.. ES26105-1	.. Expansion Valve		1
	21	.. ES26104-1	.. Expansion Valve		1
	22	.. ES49011-3	.. O-Ring		7
	23	.. ES40149-3	.. Fitting, Str		4
	24	.. ES40149-7	.. Fitting, Str		2
	25	.. 56-0850-2	.. Tube Assy, Suction		1
26	.. ES40158-4	.. Splicer, w/R134a SV		1	
27	.. ES40150-7	.. Fitting, 45°		2	
28	.. ES48149-3	.. Hose (In)		540	
29	.. ES40151-2	.. Fitting, 90°		1	

- ITEM NOT ILLUSTRATED

A - ATTACHING PARTS

**COMPRESSOR/DRIVE MOTOR ASSEMBLY****DESCRIPTION AND OPERATION****1. GENERAL**

The compressor and condenser assembly is located in the tailcone. The compressor is mounted on a beam assembly which also includes the compressor drive motor. The drive motor via a multi V flat belt, turns the compressor which compresses the refrigerant gas for condensing at ambient temperatures. A binary pressure switch mounted on the compressor monitors the refrigerant gas pressure. This switch will open at a compressor discharge over-pressure of 350 psi and under-pressure conditions of 30 psi. This will interrupt the signal to the interface control box and stop the compressor drive motor.

This section of the maintenance manual discusses troubleshooting and maintenance practices used for the compressor assembly portion of the air conditioning system. An Illustrated parts Catalog is included in Figure 1.

**TROUBLESHOOTING**

1. GENERAL

The following procedures are used for troubleshooting the compressor assembly.

**CAUTION:** Do not operate air conditioning system with condenser air inlet or outlet blocked.

2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
Service Pressure Gauge	Comm. Avail.	1	None
28 VDC Source	N/A	A/R	None

3. COMP/COND TROUBLESHOOTING PROCEDURES

With the air conditioning system operating, observe if any of the following conditions occur as described in Table 1:

**NOTE:** Always attach a service gauge set to system prior to beginning trouble shooting to ensure proper refrigerant charge is present.

Trouble	Probable Cause	Correction
1. Unusually high suction pressure with low discharge pressure.	a) Internal problem with compressor body. b) Faulty expansion valve	a) Replace compressor b) Replace expansion valve
2. Unusually low suction and discharge pressure.	a) System or compressor leak. b) Faulty expansion valve	a) Repair leak or replace compressor. b) check bulb location and/or replace valve as necessary
3. High compressor discharge pressure.	a) Condenser air exhaust restricted. b) Refrigerant overcharge c) Excessive amount of compressor oil d) Receiver/Dryer clogged e) Condenser fan damaged	a) Inspect exhaust flow path. b) Discharge refrigerant until only occasional bubbles are present in sigh glass. c) Drain until correct d) Replace as necessary e) Replace as necessary
4. Rough running.	a) Damaged Belt b) Damaged fan c) Loose beam on mounts d) Internal compressor problem.	a) Replace as necessary b) Replace as necessary c) Tighten bolts d) Replace compressor

Comp/Cond Troubleshooting  
Table 1

## MAINTENANCE PRACTICES

### 1. GENERAL

The following procedures are used to perform typical maintenance on the compressor assembly.

### 2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
Feeler Gage	Comm. Avail.	1	None
Oil Dipstick	Make from metal wire.	1	See Fig. 201
Coil Cleaner	Comm. Avail.	A/R	Non Acid Based
Polyol Ester Oil	Comm. Avail.	A/R	Viscosity ISO 68

### 3. COMPRESSOR ASSEMBLY MAINTENANCE PROCEDURES

#### A. Compressor Drive Belt Adjustment

1. Adjust belt for moderate tension and then rotate large pulley through two (2) revolutions.
2. Tension belt to deflect 0.16 inch with a 2 -3 lb. force applied at midspan location.
3. Rotate belt two (2) revolutions, retention as required.

#### B. Compressor Drive Motor Brush Inspection

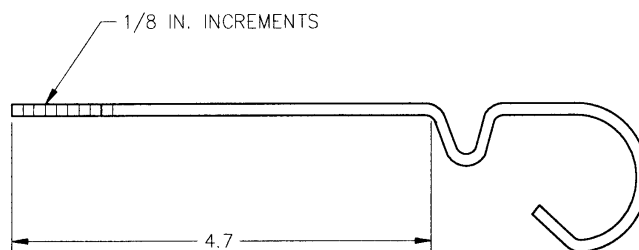
1. Remove anti-drive end bell from motor.
2. Inspect brushes for wear. Measure brush length along the longest side of angled face.
3. Replace brushes per Overhaul Manual TR-712 if brushes are shorter than 1.00 in. New brush length is 1.250 in. Shortest useable length is 0.880 in.

#### C. Compressor Oil Level Check

**NOTE:** It is not necessary to check the compressor oil level during routine maintenance. It only needs to be checked when a system component is replaced or when incorrect oil level is suspected. Use only polyolester oil viscosity grade ISO 68.

1. Operate air conditioning system for 10 minutes. This will collect as much oil as possible in the compressor.
2. Evacuate air conditioning system of refrigerant and remove compressor from aircraft.

3. Place compressor on table such that the oil fill plug is up.
4. Remove oil fill plug.
5. Insert dipstick into oil fill port. It may be necessary to insert the dipstick into the compressor at a slight angle. Ensure that the dipstick is not inserted into the compressor more than 4.7 inches as shown below.
6. Check that the oil level is eight (8) fluid ounces (at the 8th increment). Add or subtract oil in one (1) fluid ounce increments until eight (8) fluid ounces is obtained.
7. Clean oil fill port area and install oil fill plug. Torque plug to 6 -9 ft-lbs.



**Fabricated Dipstick**

**MODEL 55**  
ILLUSTRATED PARTS CATALOG

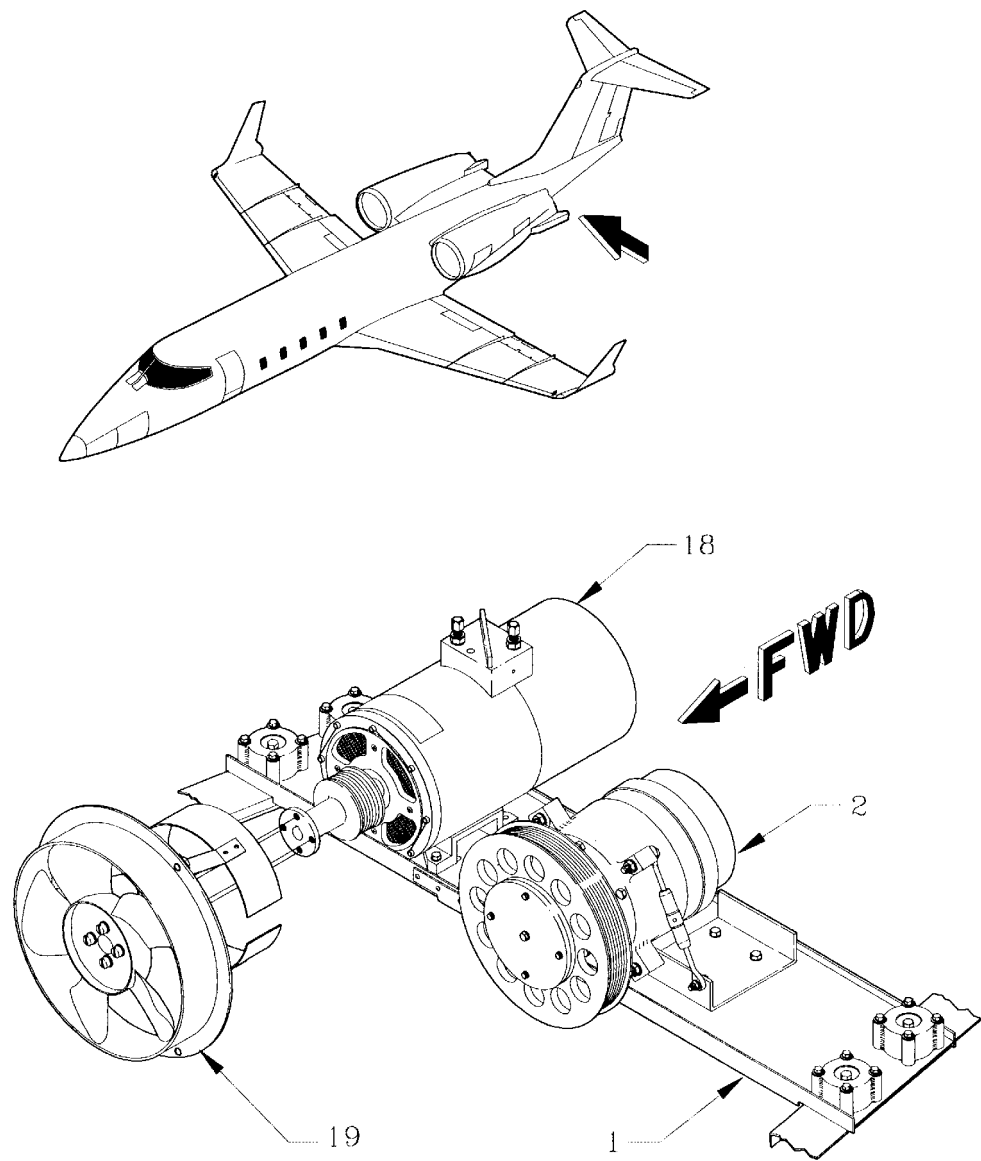


FIGURE 20  
COMPRESSOR AND MOTOR INSTL - CABIN  
COOLING REFRIGERATION  
SHEET 1 OF 5

FIG  
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MODEL 55  
ILLUSTRATED PARTS CATALOG

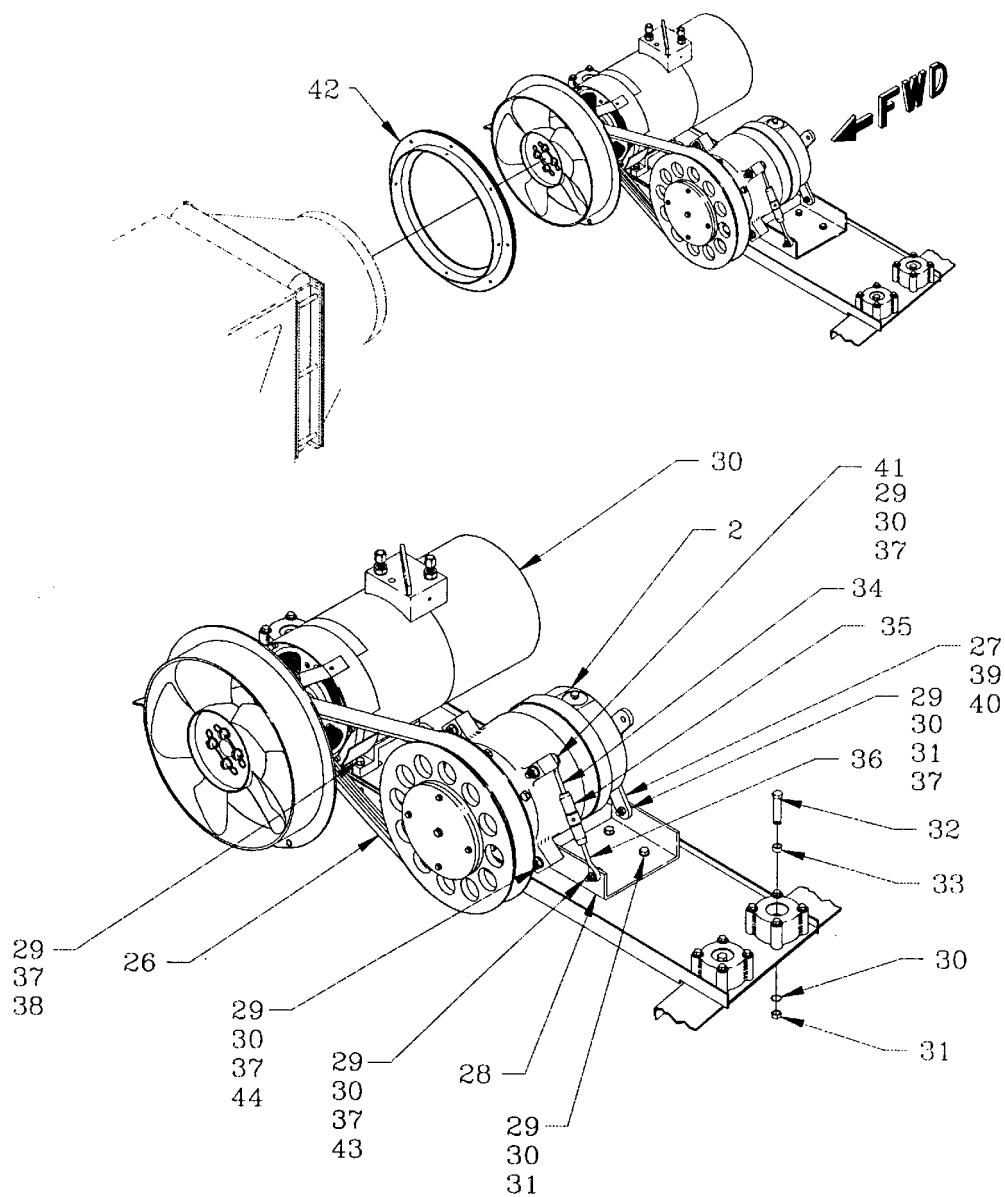


FIGURE 20  
COMPRESSOR AND MOTOR INSTL - CABIN  
COOLING REFRIGERATION  
SHEET 2 OF 5



MODEL 55  
ILLUSTRATED PARTS CATALOG

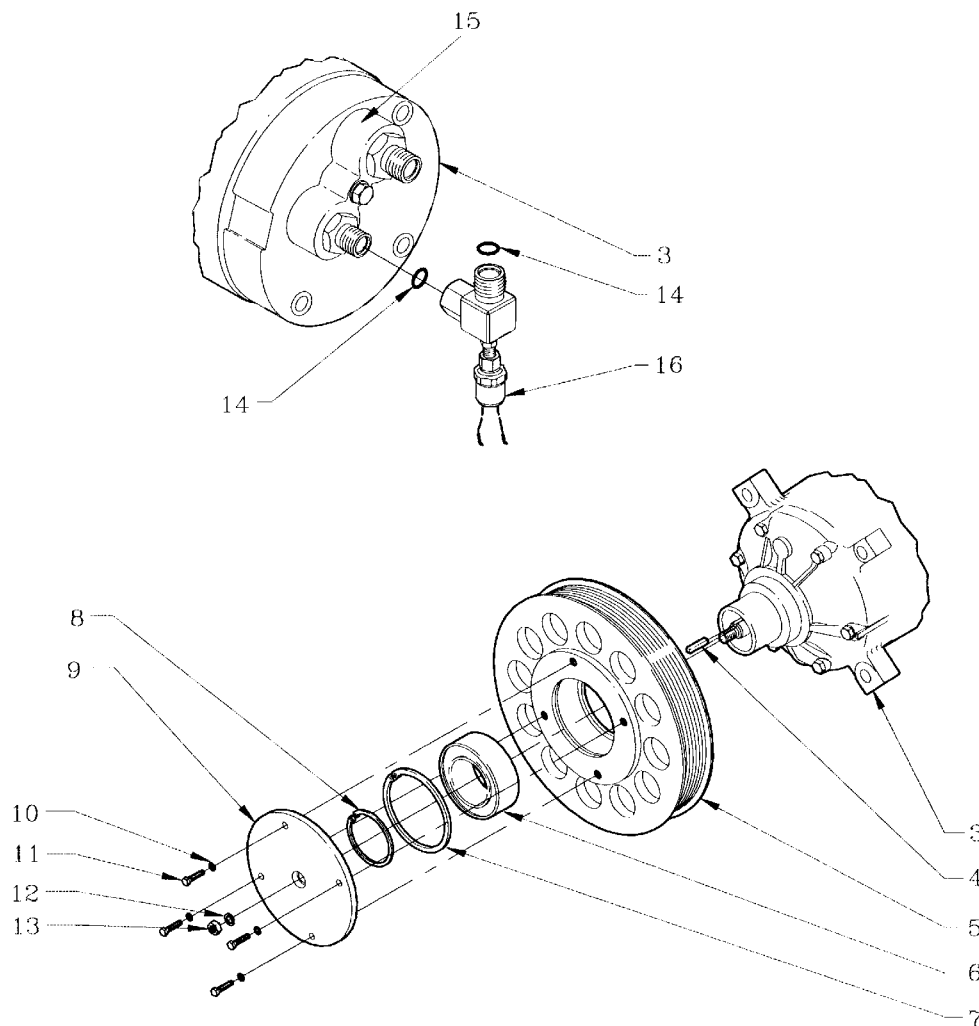
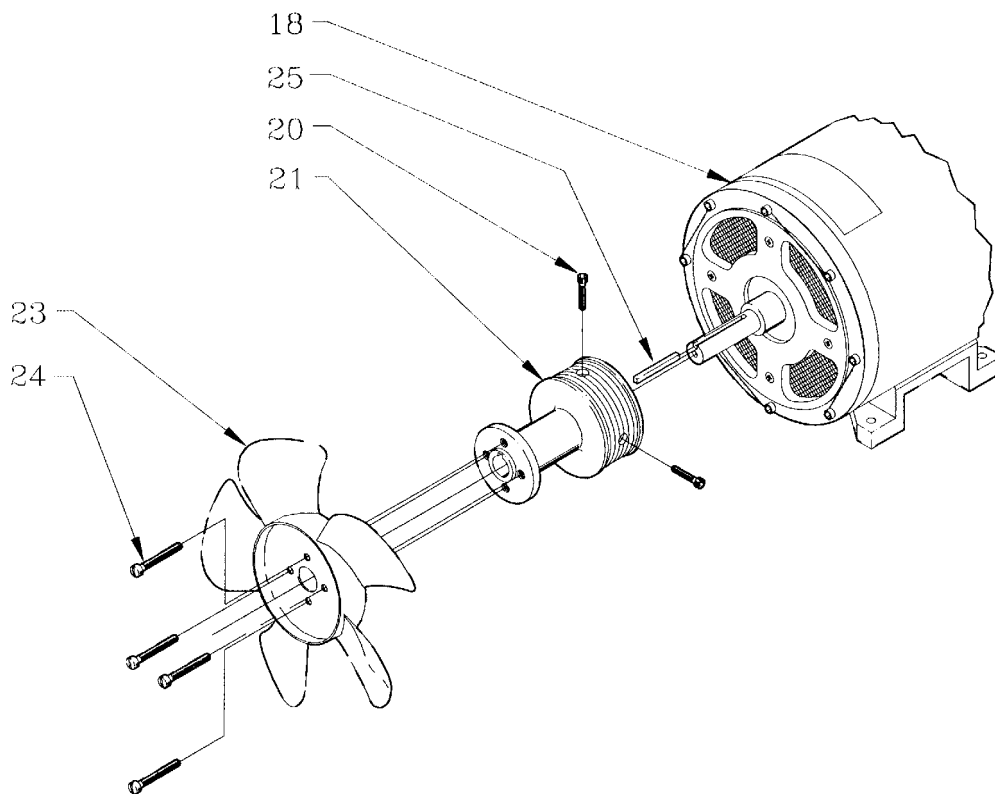


FIGURE 20  
COMPRESSOR AND MOTOR INSTL - CABIN  
COOLING REFRIGERATION  
SHEET 3 OF 5

**MODEL 55**  
**ILLUSTRATED PARTS CATALOG**



**FIGURE 20**  
**COMPRESSOR AND MOTOR INSTL - CABIN**  
**COOLING REFRIGERATION**  
**SHEET 4 OF 5**

**MODEL 55**  
**ILLUSTRATED PARTS CATALOG**

FIG	ITEM	PART NUMBER	NOMENCLATURE	EFF CODE	UNITS PER ASSY
20		56-0500-1	Pallet Beam Assy & Compressor Instl		
	1	· · 66-0550-1	· · Pallet Beam Assy		1
	2	· · JBS222-1	· · Compressor Drive		1
	3	· · JBS223-1	· · Compressor		1
	4	· · ES20091-1	· · Key		1
	5	· · JBS14001-10	· · Pulley		1
	6	· · ES20146-4	· · Bearing		1
	7	· · ES10501-9	· · Retaining Ring		1
	8	· · ES10306-3	· · Retaining Ring		1
	9	· · JBS14001-8	· · Pulley End Plate		1
	10	· · AN960-10L	· · Washer		4
	11	· · AN3H-4A	· · Bolt		4
	12	· · AN960-616	· · Washer		1
	13	· · ES34126-1	· · Shaft Nut		1
	14	· · ES49011-2	· · O-Ring		2
	15	· · ES49024-1	· · Manifold Fitting		1
	16	· · JBS2020-5	· · Pressure Switch		1
	17	· · RESERVED	· ·		
	18	· · ES61134-2	· · Motor Compressor Drive		1
	19	· · · · 35-0560-3	· · · · Fan Shroud Assy		1
	20	· · · · AN503-8-8	· · · · Screw		2
	21	· · · · JBS15015-2	· · · · Pulley		1
	22	· · RESERVED	· · · ·		
	23	· · · · ES73068-1	· · · · Fan		1
	24	· · · · AN502-10R18	· · · · Screw		4
	25	· · · · JBS80-1	· · · · Key		1
	26	· · · · ES20040-6	· · · · Belt		1
	27	· · · · 35-1560-9	· · · · Bracket		1
	28	· · · · 35-1560-12	· · · · Support		1
	29	· · · · MS21042-4	· · · · Nut		16
	30	· · · · AN960-416	· · · · Washer		19
	31	· · · · AN4-5A	· · · · Bolt		5
	32	· · · · AN4-16A	· · · · Bolt		4
	33	· · · · NAS43HT4-14	· · · · Spacer		4
	34	· · · · MS21254-5LS	· · · · Eye End, LH Thread		1
	35	· · · · MS21251-A5S	· · · · Turnbuckle		1
	36	· · · · MS21254-5RS	· · · · Eye End, RH Thread		1
	37	· · · · AN960-416L	· · · · Washer		13
	38	· · · · AN4-7A	· · · · Bolt		4
	39	· · · · ES39112-4	· · · · Bolt		1
	40	· · · · ES38128-4	· · · · Washer		1
	41	· · · · AN4-14A	· · · · Bolt		1
	42	· · · · 66-0350-1	· · · · Shroud Assy		1
	43	· · · · AN4-6A	· · · · Bolt		1
	44	· · · · AN4-13A	· · · · Bolt		1

- ITEM NOT ILLUSTRATED

A - ATTACHING PARTS

## **CONDENSER ASSEMBLY**

### **DESCRIPTION AND OPERATION**

#### **1. GENERAL**

The condenser assembly is located in the tailcone and is attached to the condenser exhaust plenum. It consists of a condenser coil unit, shroud, and receiver/drier. The condenser converts the refrigerant gas to a liquid. This liquid is collected by the receiver/drier where moisture is removed. The compressor drive motor includes a fan which draws in cool (ambient) air from the tailcone and supplies air to the condenser coil where the refrigerant gas can be condensed to a liquid. After passing through the condenser coil, the air is exhausted to the outside through an exhaust plenum and out an exhaust outlet on the right side. If the drag chute option is not installed, then from the exhaust plenum, the air will travel to outlets on the bottom of the aircraft.

This section of the maintenance manual discusses troubleshooting and maintenance practices used for the condenser assembly portion of the air conditioning system.

**TROUBLESHOOTING**

1. GENERAL

The following procedures are used for troubleshooting the condenser assembly portion of the air conditioning system.

2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
Service Pressure Gauge	Comm. Avail.	1	None
28 VDC Source	N/A	A/R	None

3. CONDENSER TROUBLESHOOTING PROCEDURES

**CAUTION:** Do not operate air conditioning system with condenser air inlet or outlet blocked.

**NOTE:** Always attach a service gauge set to system prior to beginning trouble shooting to ensure proper refrigerant charge is present.

Trouble	Probable Cause	Correction
Low air flow across condenser coil.	Dirty condenser coil. Missing Fan Blades Bent fins.	Clean condenser coil. Replace Straighten fins.

Condenser Troubleshooting

Table 1

**MAINTENANCE PRACTICES**

## 1. GENERAL

The following procedures are used to perform typical maintenance on the condenser assembly.

## 2. TOOLS AND EQUIPMENT

<b>Designation</b>	<b>Ref. No.</b>	<b>Qty</b>	<b>Remarks</b>
Polyolester Oil	Comm. Avail.	A/R	Viscosity ISO 68
Vacuum Cleaner	Comm. Avail.	1	None
Coil Cleaner	Comm. Avail.	A/R	Non-acid based
Fin Tool	Comm. Avail.	1	None

## 3. CONDENSER ASSEMBLY MAINTENANCE PROCEDURES

## A. Condenser Coil Cleaning Procedure

1. Use vacuum cleaner to remove large debris from upstream and downstream coil faces.
2. Spray coil cleaner on both coil faces. Wash off with water.
3. Allow coil to dry thoroughly prior to additional maintenance.

## B. Straighten Bent Cooling Fins

1. Carefully comb fins with fin comb tool until straight.

**FWD EVAPORATOR ASSEMBLY****DESCRIPTION AND OPERATION**

## 1. GENERAL

The FWD evaporator assembly for the Learjet 55 is located under the co-pilot's floor and provides cooling airflow to the flight crew through an overhead duct. The evaporator assembly includes an evaporator coil, expansion valve and air outlet ducting.

This section of the maintenance manual discusses troubleshooting and maintenance practices used for the FWD evaporator assembly portion of the air conditioning system.

## TROUBLESHOOTING

### 1. GENERAL

The following procedures are used for troubleshooting the FWD evaporator assembly portion of the air conditioning system.

### 2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
Service Pressure Gauge	Comm. Avail.	1	None
28 VDC Source	N/A	A/R	None

### 3. EVAPORATOR TROUBLESHOOTING PROCEDURES

**CAUTION:** Do not operate air conditioning system with condenser air inlet or outlet blocked.

**NOTE:** Always attach a service gauge set to system prior to beginning trouble shooting to ensure proper refrigerant charge is present.

#### A. Water is Being Blown from Air Outlets

1. Operate GPU and apply 28 VDC electrical power.
2. Select air conditioning system to ON.
3. Check evaporator drain for condensate runoff.
4. If no runoff, clear drain of blockage or verify that routing is in a down hill orientation.
5. Check the evaporator coil for bent fins. Straighten with a fin comb if necessary.
6. Select air conditioning OFF, remove electrical power.

#### B. No Cooling at Evaporator

1. Connect service pressure gauge to service ports located near compressor close out assembly.
2. Operate GPU and apply 28 VDC electrical power.
3. Select air conditioning system to ON.
4. Check evaporator for proper cooling. If cooling not sufficient, check refrigerant level to ensure that system is correctly charged, this can be confirmed by a clear sight glass (no bubbles) on the top of the receiver dryer. If bubbles are present, add refrigerant until sight glass just clears.
5. Check expansion valve bulb connection and proper orientation.
6. If system is correctly charged, replace expansion valve per Maintenance Practices procedure.



**MAINTENANCE PRACTICES**

## 1. GENERAL

The following procedures are used to perform typical maintenance on the evaporator assembly.

## 2. TOOLS AND EQUIPMENT

<b>Designation</b>	<b>Ref. No.</b>	<b>Qty</b>	<b>Remarks</b>
Sealant	ES49000-3	A/R	None
Polyolester Oil	Comm. Avail.	A/R	Viscosity ISO 68
Vacuum Cleaner	Comm. Avail.	1	None
Coil Cleaner	Comm. Avail.	A/R	Non-acid based

## 3. EVAPORATOR MAINTENANCE PROCEDURES

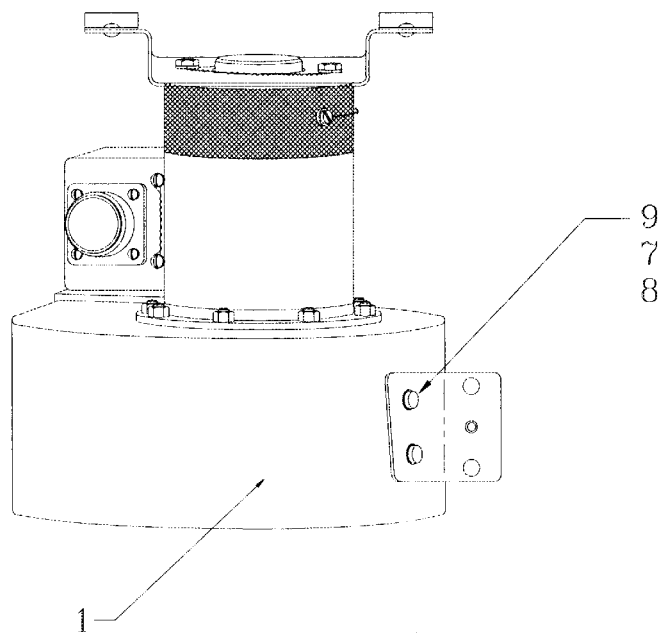
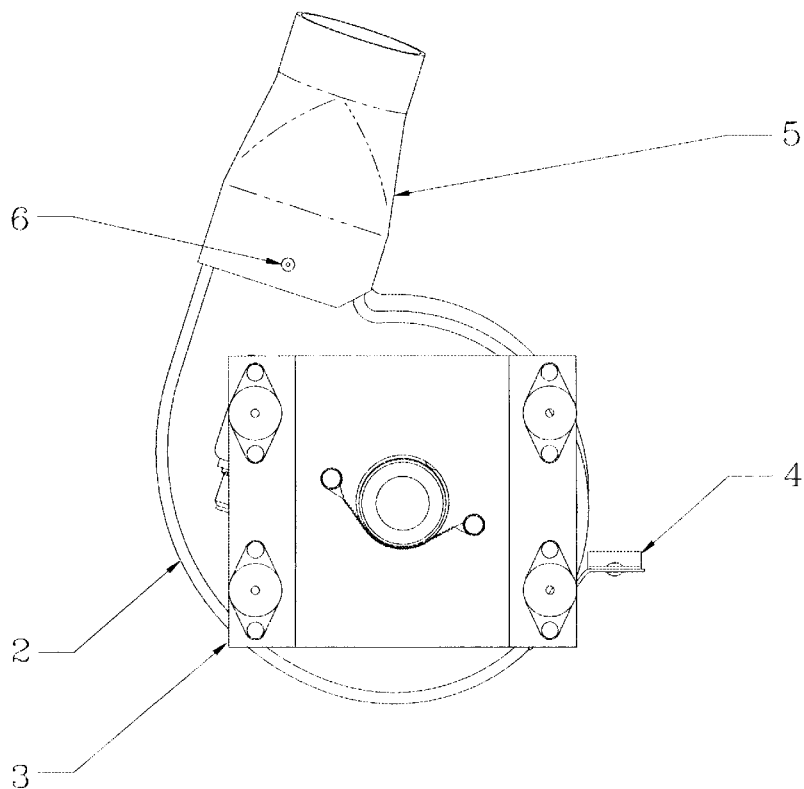
## A. Expansion Valve Replacement

1. Discharge system in accordance with recovery equipment's instructions.
2. Disconnect liquid line from inlet of expansion valve, and cap. Remove the thermal sense bulb from its clamp located on the suction tube of the evaporator and carefully remove insulation covering bulb.
3. Disconnect the fitting that connects the valve to the coil and plug coil fitting.
4. Install new expansion valve and O-ring in the reverse order.
5. Lubricate O-ring with polyolester oil or apply sealant to fitting mating surfaces prior to assembly.
6. Install the thermal sense bulb such that it makes contact with the suction tube along its entire length, and locate it at the 3 or 9 o'clock position on the tube. Insulate the bulb thoroughly with insulation.

## B. Evaporator Coil Cleaning Procedure

1. Use vacuum cleaner to remove large debris from the coil face.
2. Spray coil cleaner on coil face. Wash off with water.

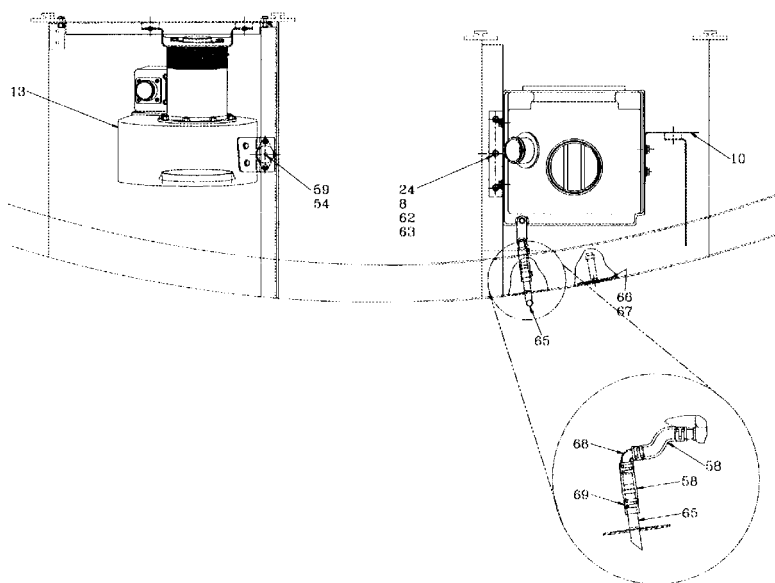
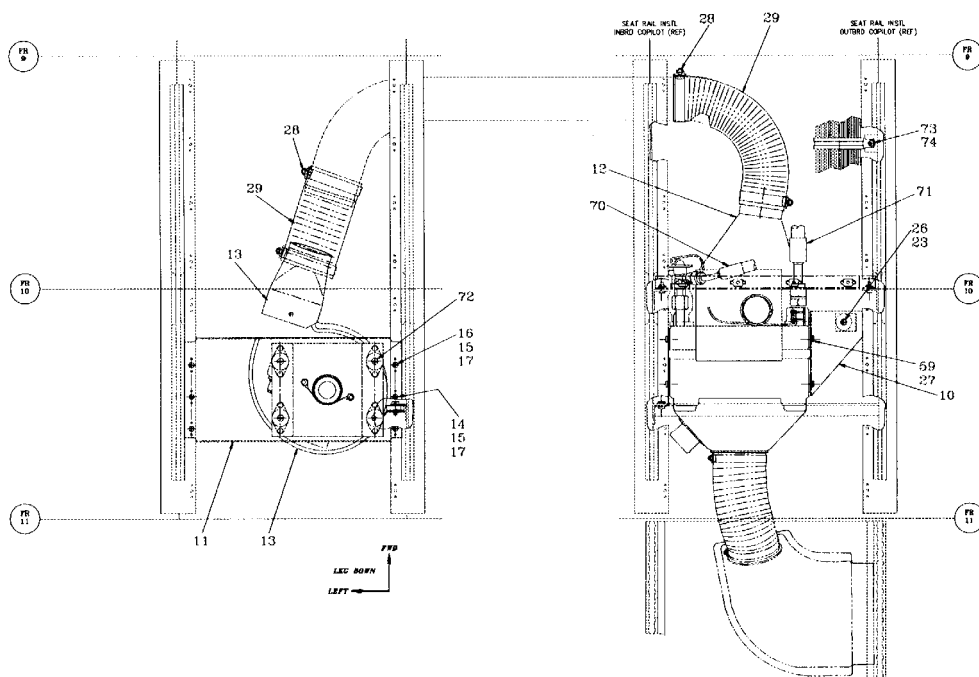
**MODEL 55  
ILLUSTRATED PARTS CATALOG**



**FIGURE 15  
COOLING SYSTEM INSTL - CABIN  
REFRIGERATION  
SHEET 1 OF 9**

**FIG  
21-50-15  
June 1998  
Page 1**

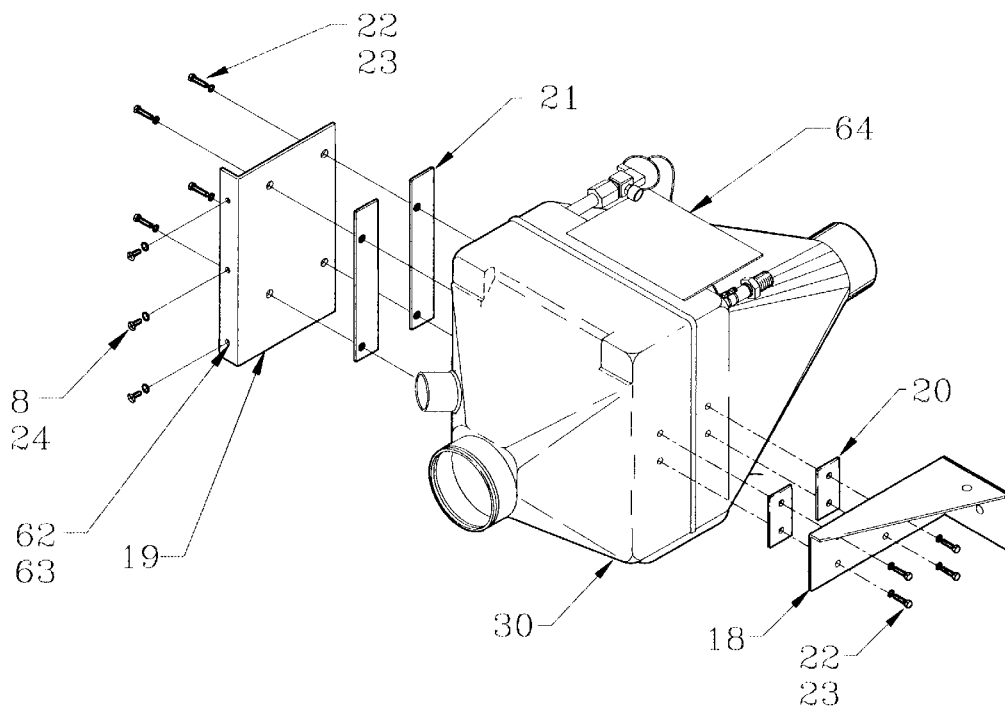
**MODEL 55  
ILLUSTRATED PARTS CATALOG**



**FIGURE 15  
COOLING SYSTEM INSTL - CABIN  
REFRIGERATION  
SHEET 2 OF 9**

**FIG  
21-50-15  
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Page 2**

**MODEL 55  
ILLUSTRATED PARTS CATALOG**



**FIGURE 15  
COOLING SYSTEM INSTL - CABIN  
REFRIGERATION  
SHEET 3 OF 9**

**MODEL 55**  
ILLUSTRATED PARTS CATALOG

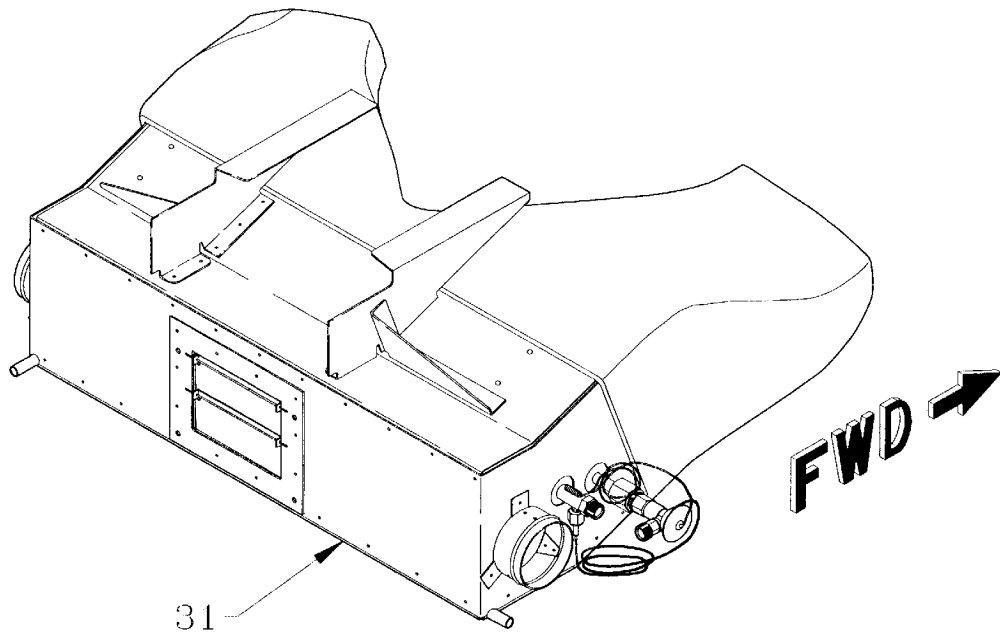
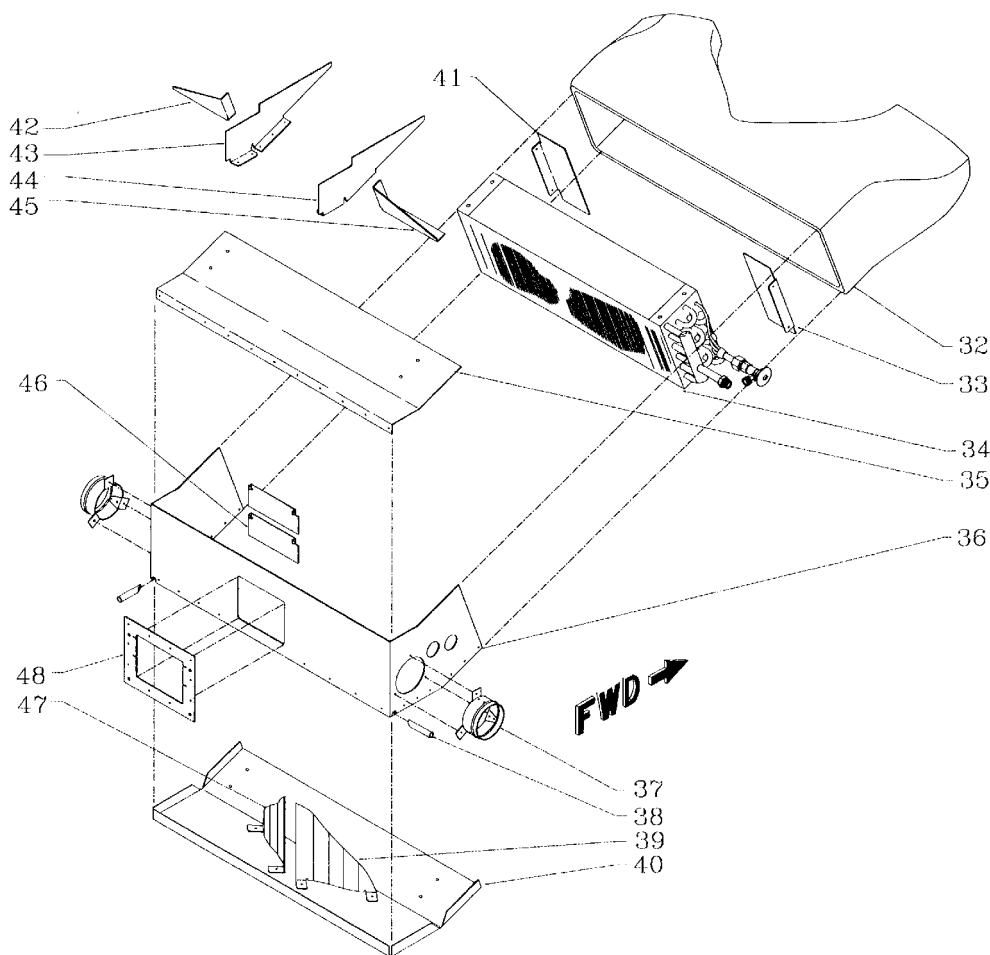


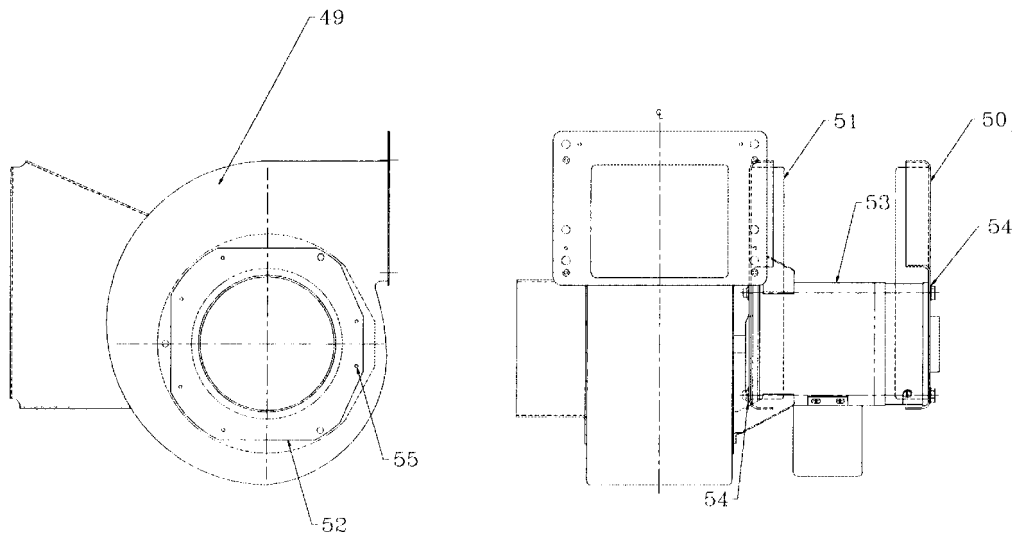
FIGURE 15  
COOLING SYSTEM INSTL - CABIN  
REFRIGERATION  
SHEET 4 OF 9

**MODEL 55  
ILLUSTRATED PARTS CATALOG**



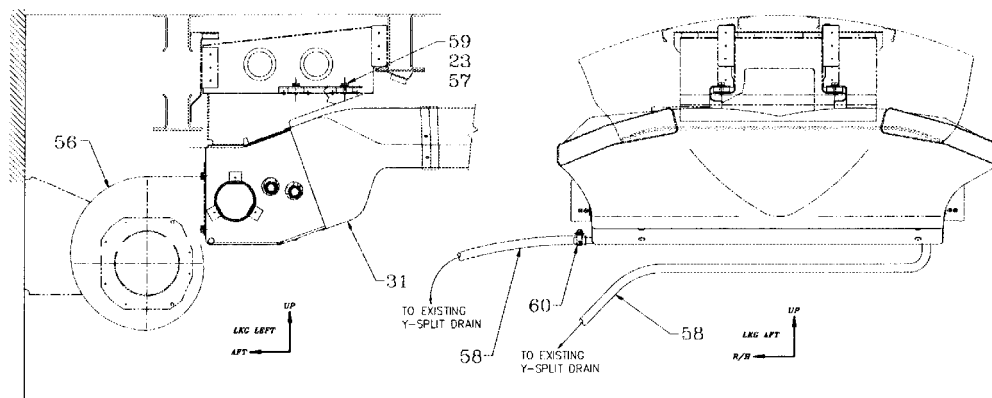
**FIGURE 15  
COOLING SYSTEM INSTL - CABIN  
REFRIGERATION  
SHEET 5 OF 9**

**MODEL 55**  
ILLUSTRATED PARTS CATALOG



**FIGURE 15**  
COOLING SYSTEM INSTL - CABIN  
REFRIGERATION  
SHEET 6 OF 9

**MODEL 55**  
ILLUSTRATED PARTS CATALOG



**FIGURE 15**  
COOLING SYSTEM INSTL - CABIN  
REFRIGERATION  
SHEET 7 OF 9



MODEL 55  
ILLUSTRATED PARTS CATALOG

FIG	ITEM	PART NUMBER	NOMENCLATURE	EFF CODE	UNITS PER ASSY
15		56-0200	Fwd Evaporator/Blower Instl		
	1	.. 66-0251-1	.. Fwd Blower Assy		1
	2	.... ES73175-2	.... Blower Assy		1
	3	.... 66-0251-3	.... Bracket Assy		1
	4	.... 66-0251-2	.... Clip Assy		1
	5	.... 66-1251-2	.... Adapter		1
	6	.... ES31100-2	.... Rivet		2
	7	.... MS27039-0808	.... Screw		2
	8	.... AN960-8	.... Washer		5
	9	.... MS20365-832	.... Nut		2
	10	.. 56-1200-1	.. Bracket		1
	11	.. 66-1200-3	.. Bracket		1
	12	.. 56-0250-1	.. Fwd Evap Assy		1
	13	Reserved			
	14	.. MS24694-S5	.. Screw		2
	15	.. MS21069L08	.. Nutplate		6
	16	.. MS27039-0810	.. Screw		4
	17	.. MS20426AD3-3.5	.. Rivet		12
	18	.. 56-1200-1	.. Bracket		1
	19	.. 56-1250-9	.. Bracket		1
	20	.. 56-1250-2	.. Support		2
	21	.. 56-1250-3	.. Support		2
	22	.. AN3-4A	.. Bolt		8
	23	.. AN960-10	.. Washer		12
	24	.. MS27039-0807	.. Screw		5
	25	Reserved			
	26	.. MS27039-1-07	.. Screw		1
	27	.. AN970-3	.. Washer		4
	28	.. ES30042-3	.. Clamp		2
	29	.. ES70009-1	.. Flexduct		2
	30	Reserved			
		56-0210	Aft Evaporator/Blower Instl		
	31	.. 66-0260-2	.. Aft Evaporator Assy		1
	32	.... ES76001-1	.... Distributor		1
	33	.... 66-1260-4	.... Side Closeout		1
	34	.... JBS2050-4	.... Evaporator Coil		1
	35	.... 66-1260-12	.... Top Plate		1
	36	.... 66-1260-14	.... Closeout		1
	37	.... 66-0260-10	.... Collar Assy		2
	38	.... 66-1260-24	.... Drain Tube		2
	39	.... 66-1260-7	.... Baffle		1
	40	.... 66-1260-13	.... Bottom Plate		1
	41	.... 66-1260-5	.... Side Closeout		1
	42	.... 66-1260-27	.... Bracket		1
	43	.... 66-1260-11	.... Rail, LH		1
	44	.... 66-1260-10	.... Rail, RH		1
	45	.... 66-1260-26	.... Bracket		1
	46	.... 66-1260-19	.... Door		2
	47	.... 66-1260-6	.... Baffle		1
	48	.... 66-1260-20	.... Spacer		1
	49	.. 56-0261	.. Aft Evaporator/Blower Assy		1

- ITEM NOT ILLUSTRATED

A - ATTACHING PARTS

MODEL 55  
ILLUSTRATED PARTS CATALOG

FIG	ITEM	PART NUMBER	NOMENCLATURE	EFF CODE	UNITS PER ASSY
	50	.... 56-1261-1	.... Mount		1
	51	.... 56-1261-2	.... Mount		1
	52	.... 56-1261-3	.... Flanged Inlet		1
	53	.... ES73176-1	.... Blower		1
	54	.... AN960-10L	.... Washer		5
	55	.... ES31101DS4-3	.... Rivet		6
	56	.. 56-0210-2	.. Aft Blower Instl		
	57	.. ES36007-1	.. Mount		1
	58	.. ES48012-2	.. Drain Tube		3
	59	.. AN3-4A	.. Bolt		4
	60	.. ES30043-2	.. Clamp		2
	61	Reserved			
	62	.. MS21059L08	.. Nutplate		3
	63	.. ES31102-4	.. Rivet		6
	64	.. ES06119-1	.. Foam Tape, Al Backed		1
	65	.. JBS558-1	.. Drain, Evap		1
	66	.. NAS1097AD3-3	.. Rivet		25
	67	.. 66-0220-1	.. Plug Assy		1
	68	.. ES41040-1	.. Elbow 90°		1
	69	.. ES30001-2	.. Clamp		4
	70	.. ES40150-1	.. Fitting 45°		1
	71	.. ES40149-3	.. Fitting, Str		1
	72	.. MS24694-S49	.. Screw		4
	73	.. AN525-832R8	.. Screw		1
	74	.. MS21919WDG45	.. Clamp		1

- ITEM NOT ILLUSTRATED

A - ATTACHING PARTS

**AFT EVAPORATOR ASSEMBLY****DESCRIPTION AND OPERATION**

## 1. GENERAL

This section of the maintenance manual discusses troubleshooting and maintenance practices used for the AFT evaporator assembly portion of the air conditioning system.

## TROUBLESHOOTING

## 1. GENERAL

The following procedures are used for troubleshooting the AFT evaporator assembly portion of the air conditioning system.

## 2. TOOLS AND EQUIPMENT

Designation	Ref. No.	Qty	Remarks
Service Pressure Gauge	Comm. Avail.	1	None
28 VDC Source	N/A	A/R	None

## 3. EVAPORATOR TROUBLESHOOTING PROCEDURES

**CAUTION:** Do not operate air conditioning system with condenser air inlet or outlet blocked.

**NOTE:** Always attach a service gauge set to system prior to beginning trouble shooting to ensure proper refrigerant charge is present.

## A. Water is Being Blown from Air Outlets

1. Operate GPU and apply 28 VDC electrical power.
2. Select air conditioning system to ON.
3. Check evaporator drain for condensate runoff.
4. If no runoff, clear drain of blockage or verify that routing is in a down hill orientation.
5. Select air conditioning OFF, remove electrical power.

## B. No Cooling at Evaporator

1. Connect service pressure gauge to service ports located near compressor close out assembly.
2. Operate GPU and apply 28 VDC electrical power.
3. Select air conditioning system to ON.
4. Check evaporator for proper cooling. If cooling not sufficient, check refrigerant level to ensure that system is correctly charged, this can be confirmed by a clear sight glass (no bubbles) on the top of the receiver drier. If bubbles are present, add refrigerant till sight glass just clears.
5. Check expansion valve bulb location and connection.
6. If system is correctly charged and bulb connection is correct, replace expansion valve per Maintenance Practices procedure. (21-50-06 pg 201)

**MAINTENANCE PRACTICES**

## 1. GENERAL

The following procedures are used to perform typical maintenance on the evaporator assembly.

## 2. TOOLS AND EQUIPMENT

<b>Designation</b>	<b>Ref. No.</b>	<b>Qty</b>	<b>Remarks</b>
Sealant	ES49000-3	A/R	None
Polyolester Oil	Comm. Avail.	A/R	Viscosity ISO 68
Vacuum Cleaner	Comm. Avail.	1	None
Coil Cleaner	Comm. Avail.	A/R	Non-acid based

## 3. EVAPORATOR MAINTENANCE PROCEDURES

## A. Expansion Valve Replacement

1. Discharge system in accordance with recovery equipment's instructions.
2. Disconnect liquid line from inlet of expansion valve, and cap. Remove the thermal sense bulb from its clamp located on the suction tube of the evaporator and carefully remove insulation covering bulb.
3. Disconnect expansion valve sense line from tube assembly.
4. Disconnect the fitting that connects the valve to the coil and plug coil fitting.
5. Install new expansion valve and O-rings in the reverse order..
6. Lubricate O-ring with polyolester oil or apply sealant to fitting mating surfaces prior to assembly.
7. Install the thermal sense bulb such that it makes contact with the suction tube along its entire length, and locate it at the 3 or 9 o'clock position on the tube. Insulate the bulb thoroughly with insulation.

## B. Evaporator Coil Cleaning Procedure

1. Use vacuum cleaner to remove large debris from the coil face.
2. Spray coil cleaner on coil face. Wash off with water.

## **HEATER ASSEMBLY**

### **DESCRIPTION AND OPERATION**

#### **1. GENERAL**

The auxiliary heater elements were originally located in the outlet nozzles of the air conditioning system's aft evaporator. With the relocation, the heater elements have been repackaged and moved to a location aft of the new evaporator, and mounted to the aft pressure bulkhead. Air is drawn across the elements by the evaporator blower, passed across the coil, and blown into the existing overhead conditioned air distribution ducting.

#### **2. AUX HEAT SYSTEM OPERATION:**

On the ground, auxiliary heat is provided to the cabin for pre-heating the inside of the aircraft by selecting either HIGH or LOW on the AUX HT switch located on the co-pilot's PRESSURIZATION CONTROL panel. The heater elements automatically shut off when the air conditioner is turned on, or when the aircraft's landing gear is retracted.

With LOW selected, one heater coil in each of the two elements is activated, and the aft evaporator blower automatically operates. When HIGH is selected, the two additional coils activate. The blower continues to run, providing airflow across the elements to be heated and delivered to the overhead conditioned air distribution ducting.

#### **3. SYSTEM SAFETY:**

Each existing heating element has a thermal switch (normally-closed) and a thermal fuse, all of which are wired in series through the Climate Control Box. The thermal switches open at 150°F ±10°F, and the fuses open at 400°F ±30°F to deactivate the elements in case of air flow failure or coil overtemp. Failure of the blower or activation of any one of the over temperature switches causes the system to remove power from the heating elements.

1. GENERAL

Because the heater elements are used from the existing Learjet 55 system, all connections through the control box and safety devices remain the same. The operation of the newly relocated elements remain unchanged. All trouble shooting should be done in accordance with the existing Learjet maintenance manual.

**MAINTENANCE PRACTICES**

## 1. GENERAL

The following procedures are used to perform typical maintenance on the heater assembly.

## 2. TOOLS AND EQUIPMENT

<b>Designation</b>	<b>Ref. No.</b>	<b>Qty</b>	<b>Remarks</b>
Screwdriver	Comm. Avail.	A/R	None
Vacuum Cleaner	Comm. Avail.	1	None

## 3. HEATER MAINTENANCE PROCEDURE

## A. Heater Box Cleaning Procedure

1. Remove heater box from aft bulkhead and blower assembly.
2. With screwdriver, gain access to heater elements by disassembly of heater box.
3. Use vacuum cleaner to remove debris and dust from elements and inner box.

## B. Element/Thermal Switch/Thermal Fuse Replacement

1. The heater elements, thermal switch, and thermal fuse are existing Learjet heating components. If part replacement is necessary, it should be conducted through an approved Learjet vendor.



**MODEL 55**  
ILLUSTRATED PARTS CATALOG

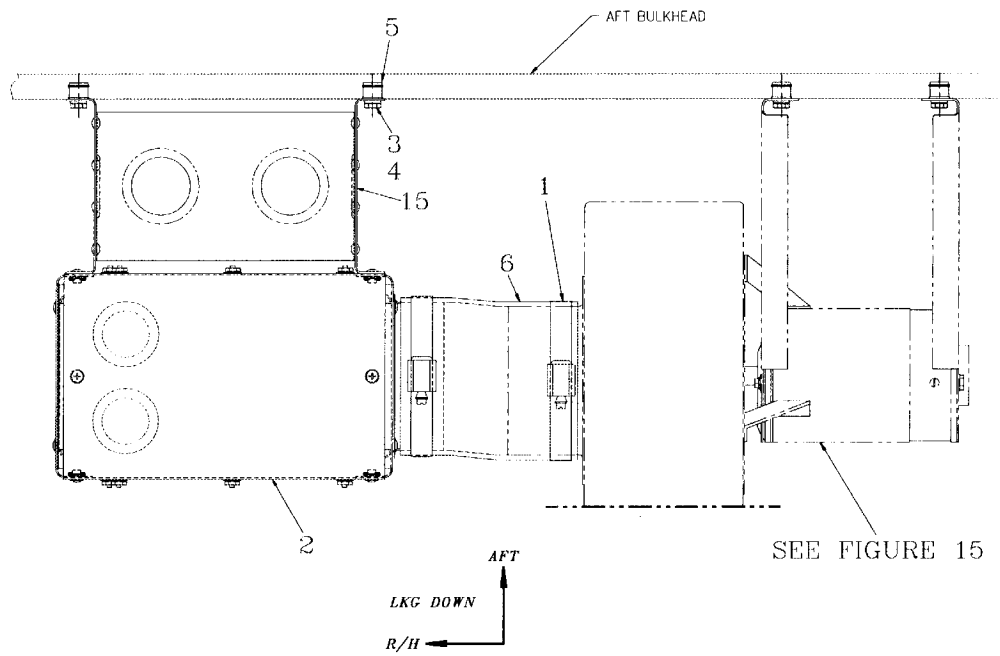
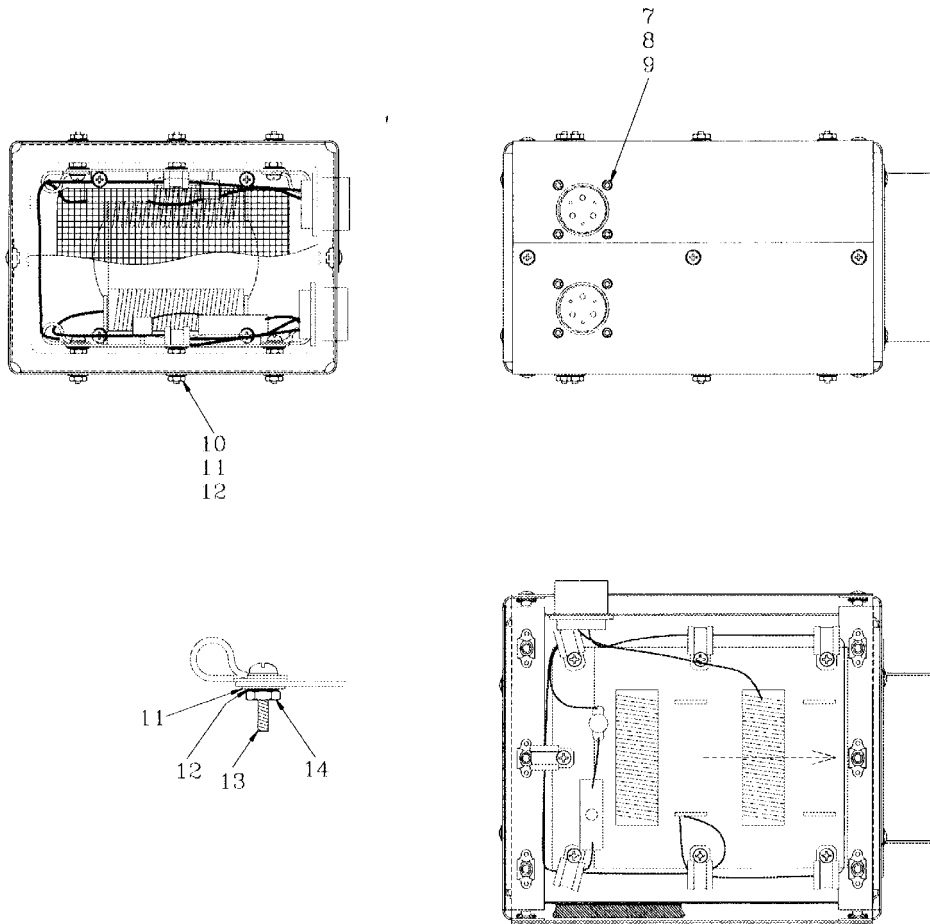


FIGURE 25  
HEATER ASSY  
SHEET 1 OF 3

**MODEL 55**  
ILLUSTRATED PARTS CATALOG



**FIGURE 25**  
**HEATER ASSY**  
SHEET 2 OF 3

MODEL 55  
ILLUSTRATED PARTS CATALOG

FIG	ITEM	PART NUMBER	NOMENCLATURE	EFF CODE	UNITS PER ASSY
25		56-0210-3	Heater Installation		(Fig 15)
		.. 56-0210-2	.. Aft Blower Installation		2
	1	.. ES30042-7	.. Clamp		1
	2	.. 56-0280-1	.. Heater Assy		4
	3	.. AN3-4A	.. Bolt		4
	4	.. AN960-10	.. Washer		4
	5	.. ES31080-2	.. Insert		1
	6	.. ES70010-2	.. Duct, Extreme Temp		8
	7	.. MS35206-216	.. Screw		8
	8	.. MS35338-155	.. Lock Washer		14
	9	.. MS21042-04	.. Nut		28
	10	.. AN341-6	.. Nut		28
	11	.. AN960PD6L	.. Washer		14
	12	.. MS35338-41	.. Lock Washer		14
	13	.. MS35206-231	.. Scew		14
	14	.. MS21042-06	.. Nut		1
	15	.. 56-0280-2	.. Bracket Assy		

- ITEM NOT ILLUSTRATED      A - ATTACHING PARTS

**MODEL 55**  
ILLUSTRATED PARTS CATALOG

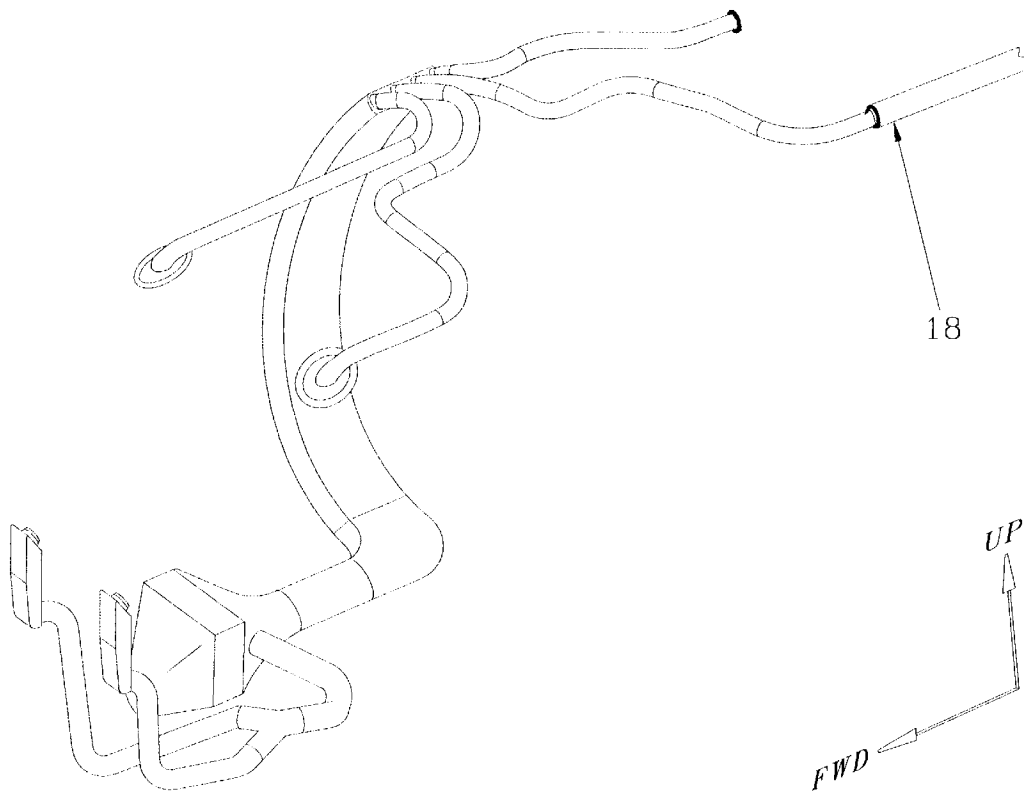
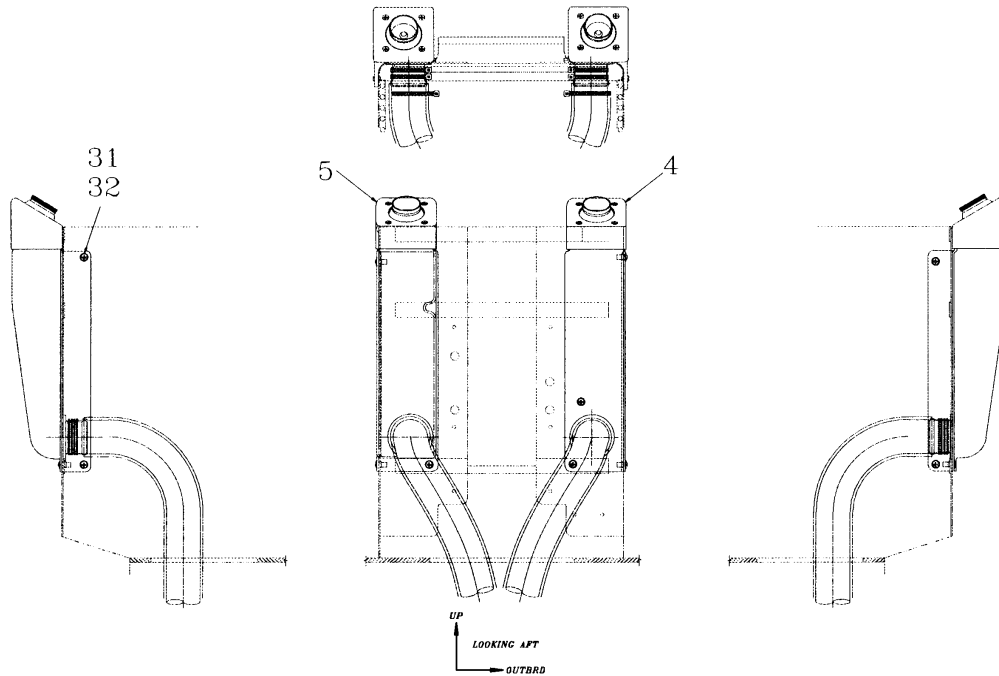


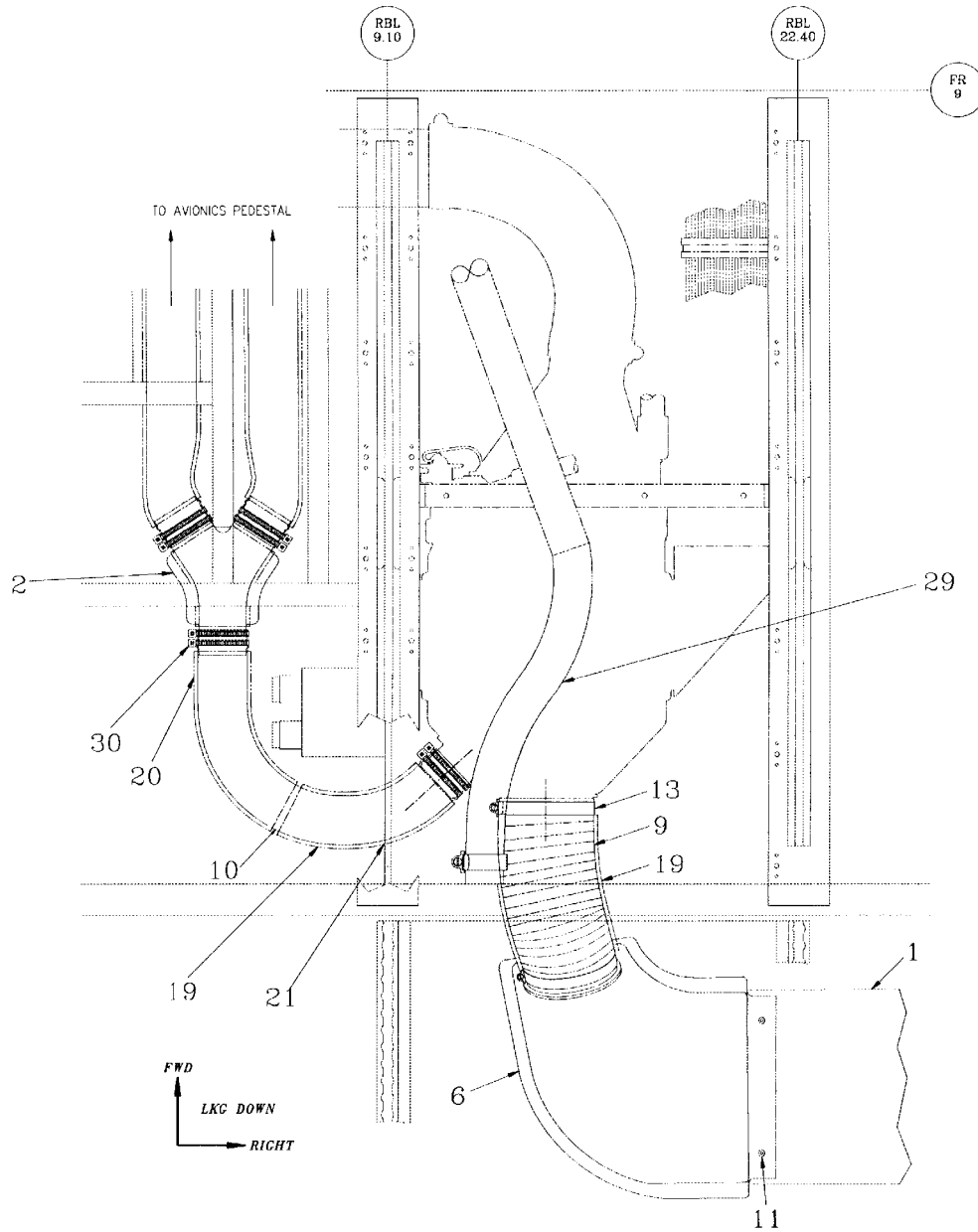
FIGURE 10  
COOLING SYSTEM INSTL - DISTRIBUTION  
SHEET 1 OF 6

**MODEL 55**  
**ILLUSTRATED PARTS CATALOG**



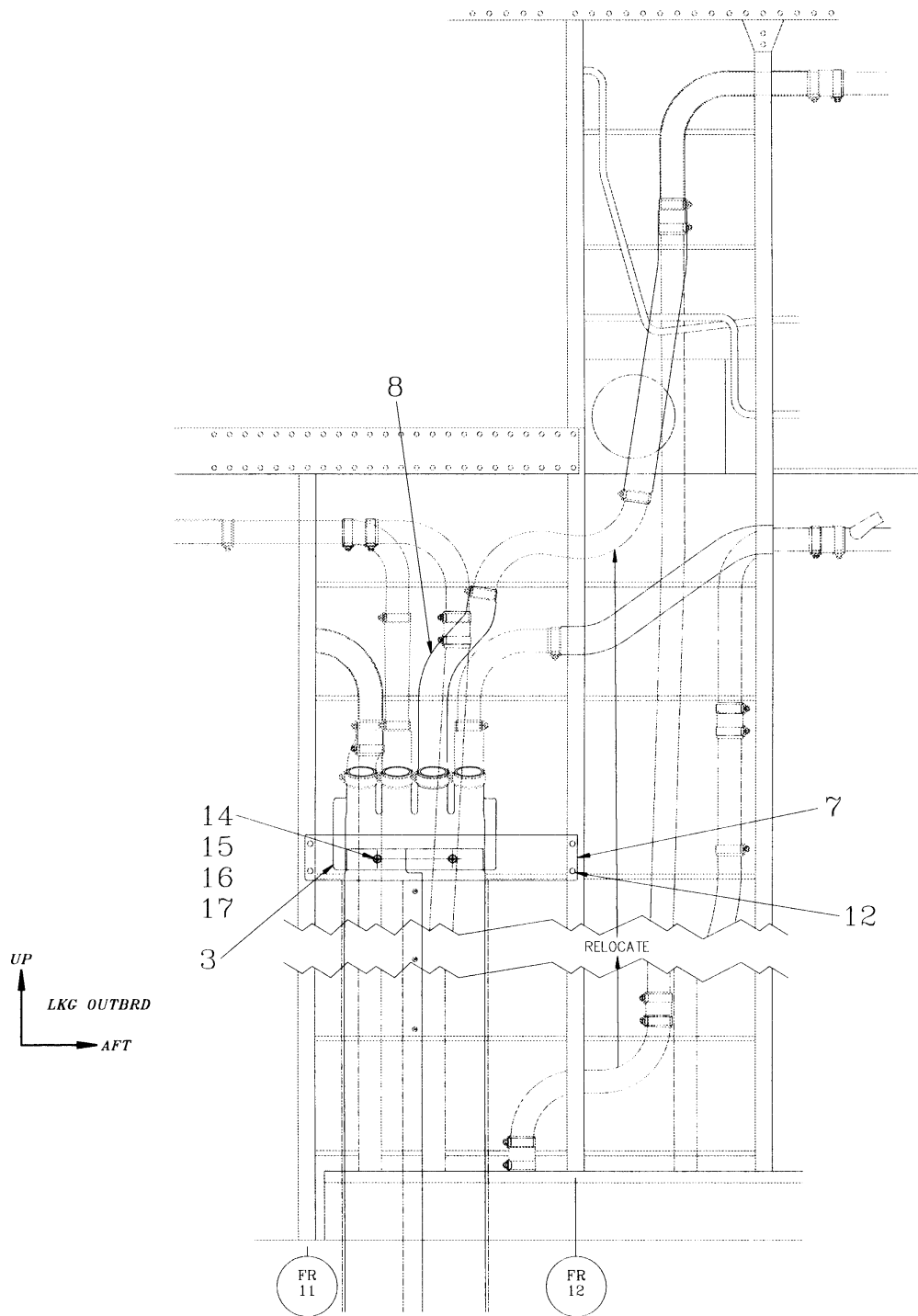
**FIGURE 10**  
**COOLING SYSTEM INSTL - DISTRIBUTION**  
**SHEET 2 OF 6**

**MODEL 55**  
**ILLUSTRATED PARTS CATALOG**



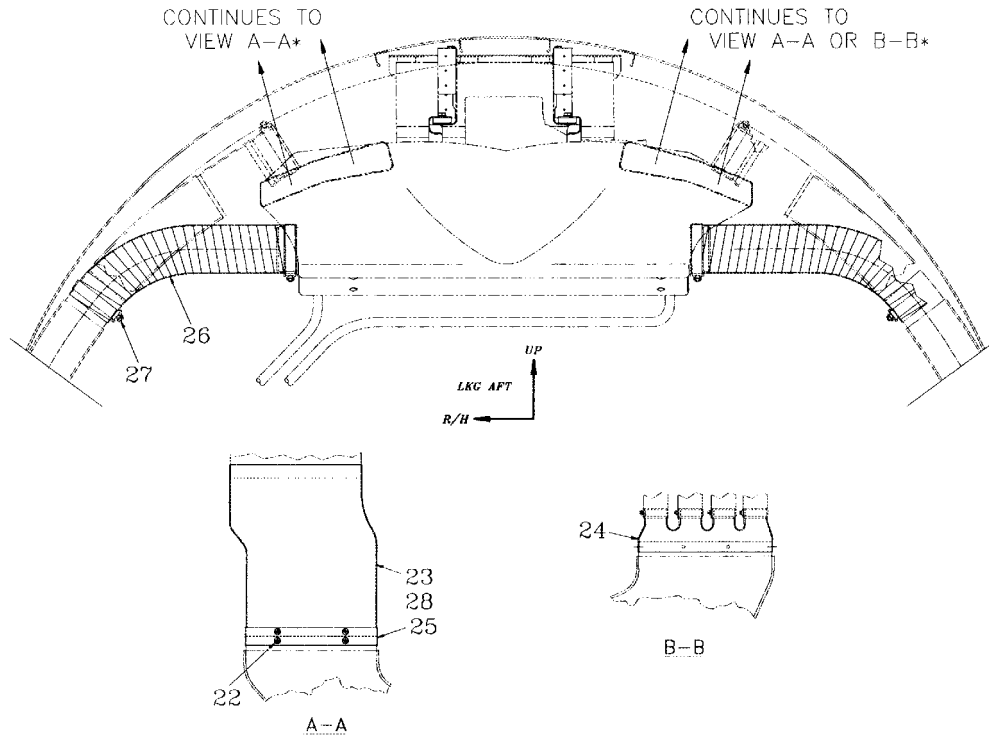
**FIGURE 10**  
**COOLING SYSTEM INSTL - DISTRIBUTION**  
**SHEET 3 OF 6**

**MODEL 55**  
**ILLUSTRATED PARTS CATALOG**



**FIGURE 10**  
**COOLING SYSTEM INSTL - DISTRIBUTION**  
**SHEET 4 OF 6**

**MODEL 55  
ILLUSTRATED PARTS CATALOG**



\* NOTE: ON AIRCRAFT EQUIPPED WITH RESTROOM, DUCT 23 SHALL BE INSTALLED ON R.H. SIDE AND DUCT 24 SHALL BE INSTALLED ON L.H. SIDE.

ON AIRCRAFT NOT EQUIPPED WITH RESTROOM, DUCT 23 SHALL BE INSTALLED ON R.H. SIDE AND DUCT 28 SHALL BE INSTALLED ON L.H. SIDE.

FIGURE 10  
COOLING SYSTEM INSTL - DISTRIBUTION  
SHEET 5 OF 6



MODEL 55  
ILLUSTRATED PARTS CATALOG

FIG	ITEM	PART NUMBER	NOMENCLATURE	EFF CODE	UNITS PER ASSY
10		56-0600-1	Ducting Installation		
	1	.. 66-0650-1	.. Duct Assy		3
	2	.. 66-0650-2	.. Y-Duct Assy		1
	3	.. 66-0650-3	.. Distributor Duct Assy		1
	4	.. 56-0650-1	.. Duct Assy		1
	5	.. 66-0650-5	.. Duct Assy		1
	6	.. 66-0650-6	.. Trans Duct Assy		1
	7	.. 66-1650-8	.. Strap		3
	8	.. ES70009-11	.. Flexduct (In.)		52
	9	.. ES70009-2	.. Flexduct (In.)		12
	10	.. ES70009-4	.. Flexduct (In.)		120
	11	.. ES31100-3	.. Rivet		6
	12	.. ES31101DS4-2	.. Rivet		12
	13	.. ES30042-5	.. Clamp		2
	14	.. MS35338-42	.. Lock Washer		2
	15	.. AN960-8L	.. Washer		2
	16	.. AN525-832R9	.. Screw		2
	17	.. MS27130-A14	.. Rivnut		2
	18	.. ES02162-6	.. Insulation Tubing (In.)		350
	19	.. ES06022-1	.. Tape, Insul. Foam (In.)		360
	20	.. ES02163-5	.. Insulation (Sq. In.)		2565
	21	.. MS21266-1N	.. Grommet, Strip (In.)		12
	22	.. AN525-832R6	.. Screw		15
	23	.. ES76003-2	.. Air Duct, R/H		1
	24	.. ES76003-3	.. Air Duct, L/H		1
	25	.. ES76003-4	.. Strap		2
	26	.. ES70010-1	.. Flexduct (In.)		23
	27	.. ES30042-3	.. Clamp		4
	28	.. ES76003-1	.. Air Duct, L/H		1
	29	.. ES70010-4	.. Duct, Extr. Temp. (In.)		18
	30	.. ES30015-2	.. Cable Tie		14
	31	.. AN525-832R7	.. Screw		6
	32	.. MS27130-A13	.. Rivnut		14
	33	.. ES31100-1	.. Rivet		4

- ITEM NOT ILLUSTRATED

A - ATTACHING PARTS