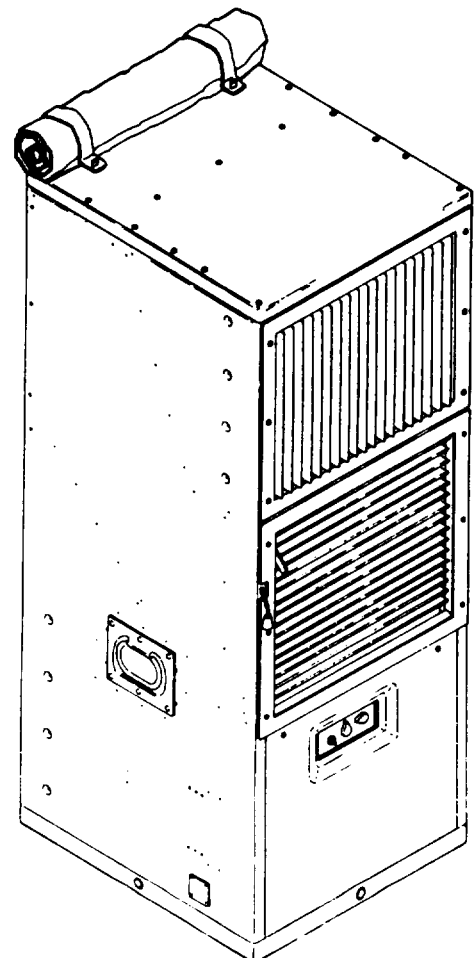
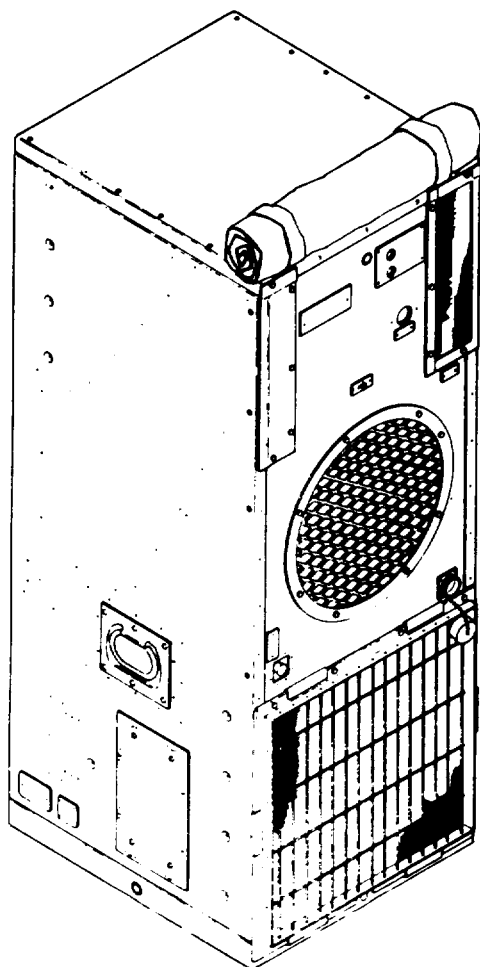


TM 5-4120-356-14
TO 35E9-263-1

TECHNICAL MANUAL

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL**

**AIR CONDITIONER, VERTICAL COMPACT
18,000 BTU/HR, 208 VOLT, 3-PHASE, 50/60 HZ
MODEL 18KV-208-3-60 NSN 4120-01-089-4053**



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Operator's, Organizational, Direct Support
and General Support Maintenance Manual

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18,000 BTU/HR, 208 VOLT, 3-PHASE, 50/60 HZ
MODEL 18KV-208-3-60 NSN 4120-01-089-4053**

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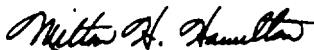
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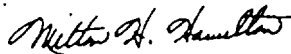
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AIR CONDITIONER, VERTICAL COMPACT
18,000 BTU/HR, 208 VOLT, 3-PHASE, 50/60 HZ
MODEL 18KV-208-3-60 NSN 4120-01-089-4053

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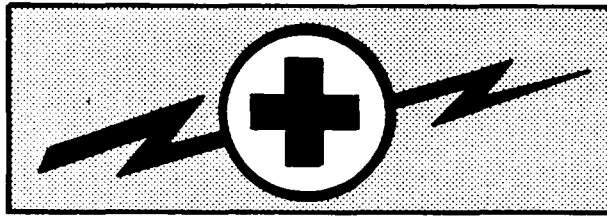
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WARNING



WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

or severe injury may result if you fail to observe safety precautions. Always disconnect the air conditioner from power source before working on it. Do not operate the air conditioner without louvers, top covers, and guards in place and tightly secured.

WARNING

REFRIGERANT UNDER PRESSURE

is used in the operation of this equipment.

DEATH

or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part that contains Refrigerant -- 22. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas.

WARNING

The burning of polyurethane foams is dangerous. Due to the chemical composition of a polyurethane foam, toxic fumes are released when it is burned or heated. If it is burned or heated indoors, such as during a welding operation nearby, you should take care to ventilate the area thoroughly. An exhaust system like that of a paint spray booth should be used. Air-supplied respirators, approved by the National Institute for Occupational Safety and Health or the US Bureau of Mines, should be used for all welding in confined spaces and in places where ventilation is inadequate. Persons who have chronic or recurrent respiratory conditions, including allergies and asthma, should not work in these areas.

WARNING

Clean parts in a well-ventilated area. Avoid inhalation of solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly. Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100F to 138F (38C to 59C). Wear eye protection when blowing solvent from parts. Air pressure should not exceed 30 psig (2.1Kg/cm²).

TECHNICAL MANUAL

NO. 5-4120-356-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington DC, 12 August 1981OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT AND
GENERAL SUPPORT MAINTENANCE MANUALAir Conditioner, Vertical Compact
18,000 BTU/HR, 208 volt, 3-phase, 50/60 HZ
Model 18KV-208-3-60

NSN 4120-01-089-4063

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of any way to improve procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: commander, U.S. Army Troop Support Command, ATTN: AMSTR-MMTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished to you.

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CHAPTER 1

INTRODUCTION

Section I. General

1-1. **SCOPE**

- a. Type of Manual: Operator's, Organizational, Direct Support and General Support Maintenance.
- b. Model Number and Equipment Name: TM18KV-208-3-60 Air Conditioner, Vertical Compact, 18,000 BTU/HR.
- c. Purpose of Equipment: The air conditioner can be used in temporary buildings, shelters, mobile van and trailers. The unit accomplishes three functions; cooling, heating and ventilation.

1-2. **MAINTENANCE FORMS AND RECORDS**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750; The Army Maintenance Management System (TAMMS).

1-3. **DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE**

Destruction of the air conditioner to prevent enemy use shall be in accordance with TM 750-244-3, Procedure for Destruction of Equipment.

1-4. **PREPARATION FOR STORAGE AND SHIPMENT**

Seal all openings in the air conditioner cabinet with barrier material and sealing tape. Cover the entire cabinet with a protective material

- a. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authority. During the storage period appropriate maintenance records will be kept.

- b. Before placing equipment in administrative storage, current maintenance services and equipment serviceable criteria (ESC) evaluations should be completed, shortcomings and deficiencies should be corrected and all modification work orders (MWO's) should be applied.

- c. Storage site selection. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans, conex containers and other containers maybe used.

1-5. **RADIO INTERFERENCE SUPPRESSION**

Essentially, suppression is attained by providing a low resistance path to ground for stray currents. The methods used include shielding the ignition and high frequency wires, grounding the frame with bonding straps, and using capacitors and resistors.

1-6. **REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)**

If your air conditioner needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at U.S. Army Troop Support Command, ATTN: AMSTR-MOF, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. We'll send you a reply.

1-7. **HAND RECEIPT**

Hand receipts for Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) items are published in a Hand Receipt manual, TM 5-4120-356-14-HR. This manual is published to aid in property accountability and is available through: Commander, U.S. Army Adjutant General Publications Center, 2800 Eastern Blvd., Baltimore, MD 21220.

Section II. Equipment Description

1-8. EQUIPMENT PURPOSE

The 18,000 BTU/HR Air Conditioner is used primarily in van type enclosures. The unit accomplishes three functions; ventilating, cooling and heating.

1-9. CAPABILITIES AND FEATURES

The air conditioner is semi-portable and has a capacity of 18,000 BTU/HR. The unit operates on 208 volts, 3-phase, 50/60 Hz power. Intake air for cooling and heating enters the unit in either of two modes: 100 percent recirculated air, or partially recirculated air and partially fresh outside air. Air may be drawn directly from the outside, or may be filtered if the unit is provided with a chemical, biological, radiological (CBR) filter unit. The unit is equipped with an air conditioner cover which is used for protection of the condenser coil and fan when the air conditioner is not in operation.

1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

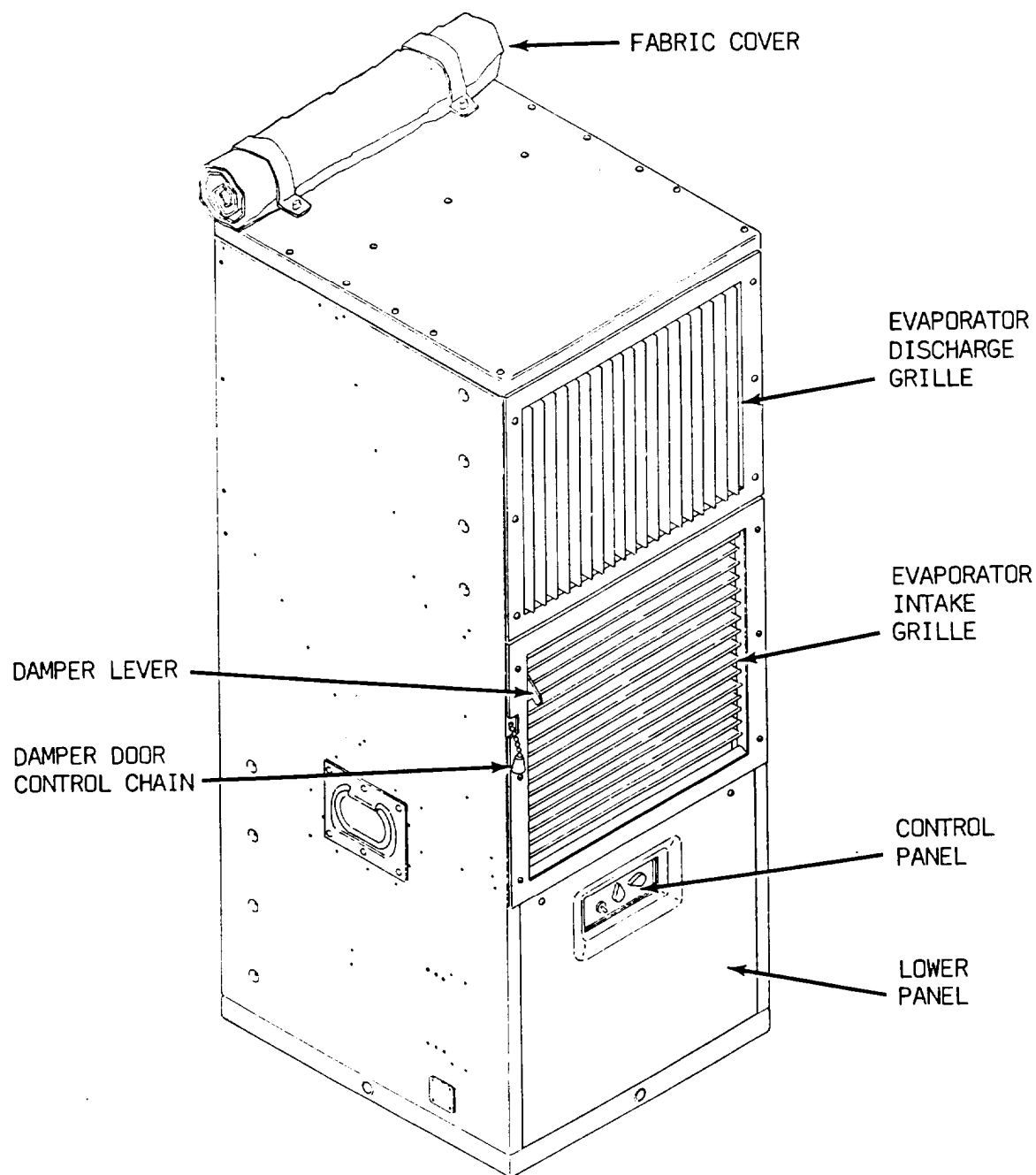
Figures 1-1 through 1-4 show the location of and describes the major component of the air conditioner.

1-11. DIFFERENCES BETWEEN MODELS

This manual was prepared for the Tiernay Manufacturing Model TM18KV-208-3-60.

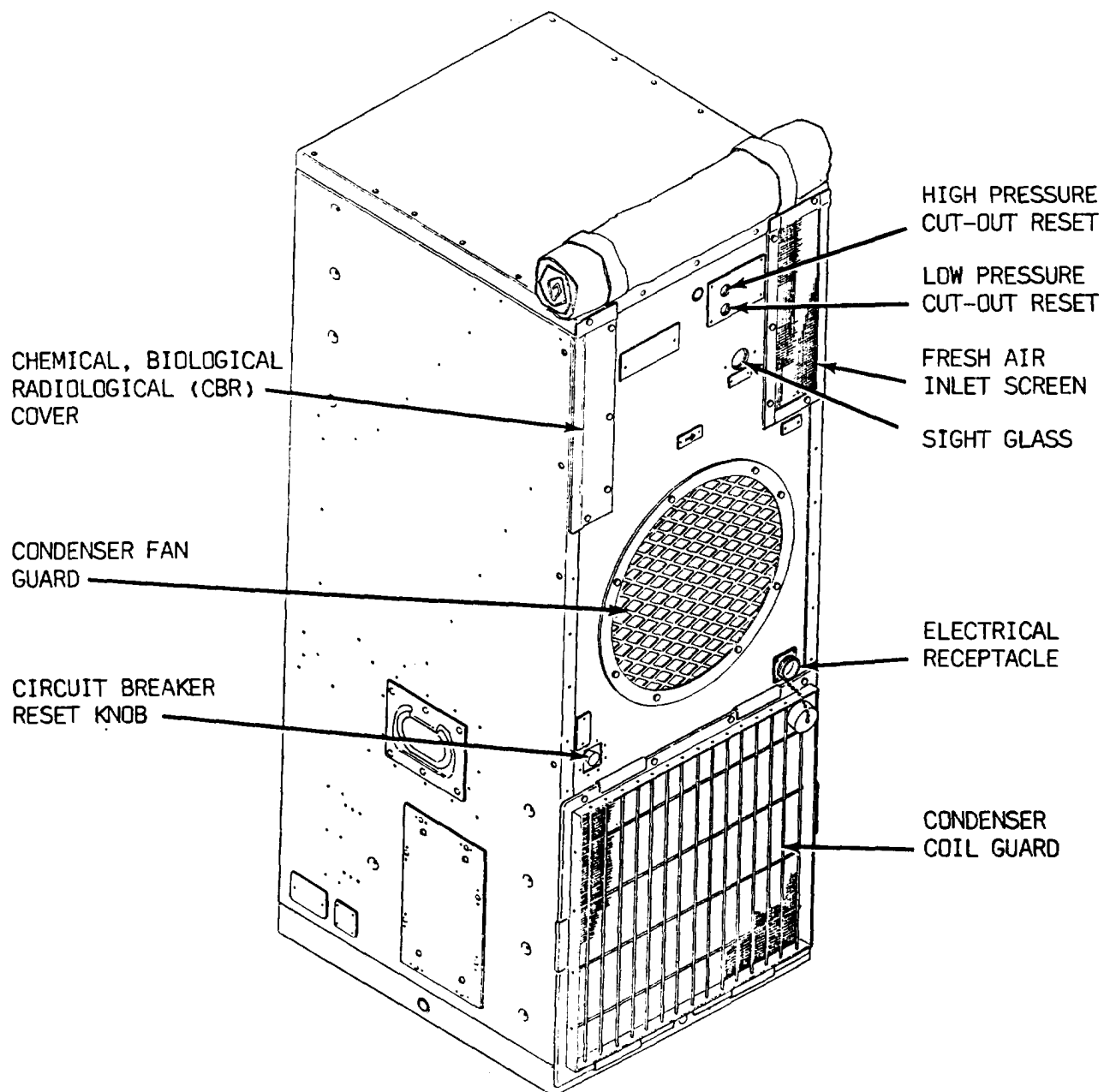
1-12. PERFORMANCE DATA

Electrical Requirements:	208 volts, 50/60 Hz, 3-Phase
Capacity:	18,000 BTU/HR
Refrigerant Capacity:	4 pounds (1.7kg) of refrigerant Specification BB-F-1421, Type 22
Cabinet Dimensions: Length:	17 inches (42cm)
Width:	17 inches (42cm)
Height:	46 inches (115cm)
weight:	258 pounds (71.667 kg)



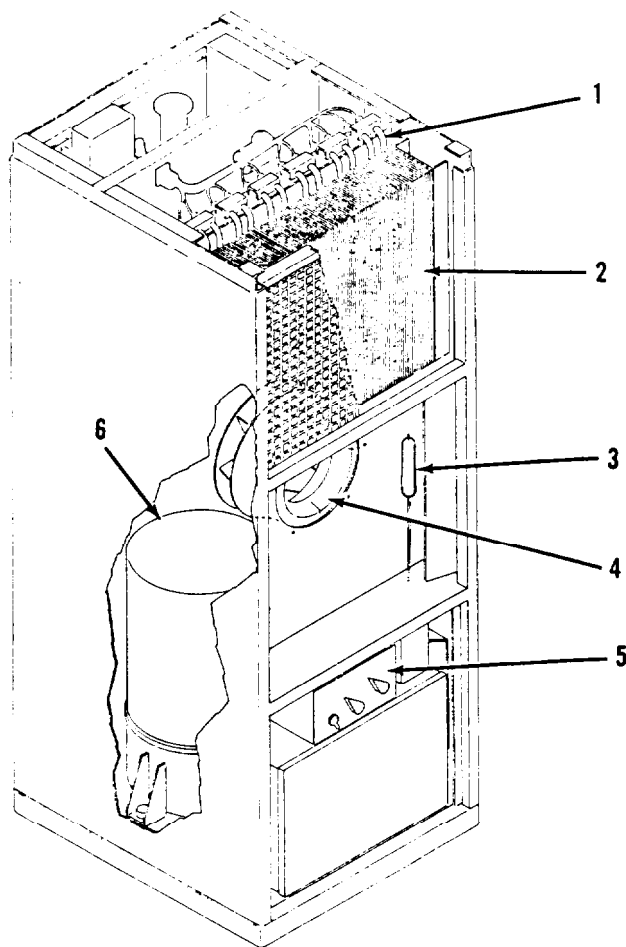
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Figure 1-1. Right front three-quarter view of air conditioner



TS5-4120-356-14/1-2

Figure 1-2. Left rear three-quarter view of air conditioner



HEATER ELEMENTS (1). Consists of six electrical resistance heaters mounted directly behind the evaporator coil. The heater elements provide two ranges of heating.

EVAPORATOR COIL (2). Heat is absorbed from the air passing over the evaporator coil by the refrigerant passing through it. This action serves to cool the air as it flows through the evaporator coil.

TEMPERATURE BULB (3). Senses air temperature over the evaporator coil to maintain an even temperature of cooling air into the conditioned area.

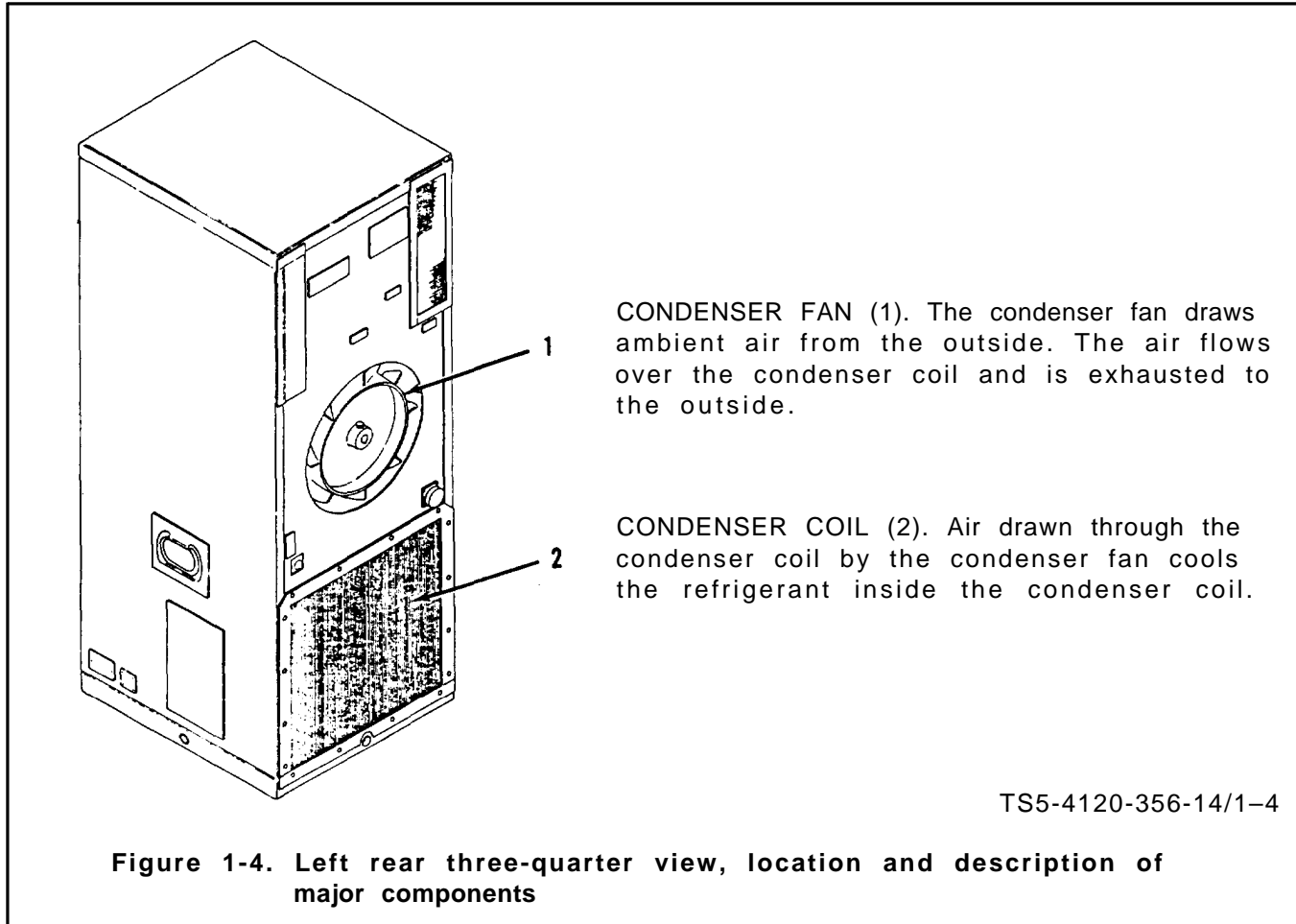
EVAPORATOR FAN (4). The evaporator fan draws air through an air filter, over the evaporator coil, and exhausts it into the conditioned area.

CONTROL PANEL (5). The control panel contains the manual thermostat control, the fan speed switch, and selector switch for controlling cooling or heating temperature, fan speed, and mode of operation.

COMPRESSOR (6). A hermetically sealed electric motor driven compressor is used for pumping refrigerant through the system.

Figure 1-3. Right front three-quarter view, location and description of major components

TS5-4120-356-14/1-3



Section III. Technical Principles of Operation

1-13. PRINCIPLES OF OPERATION

a. General. The air conditioner is a fully self-contained unit capable of providing cooling, heating or ventilation to the conditioned area.

b. Cooling.

(1) The cooling section consists primarily of compressor, high and low pressure cut-out switches, condenser coil, evaporator coil, and a fan motor which operates both a condenser fan and an evaporator fan. When the selector switch is placed in the "COOL" position, the fan motor and the compressor start. The cooling section is under the control of the thermostat, which serves to maintain the temperature of the conditioned area at the desired level.

(2) The compressor is a motor driven unit which is used to pump refrigerant through the system. The high pressure cut-out switch stops the unit if the compressor discharge pressure rises above 460 psig (32.3 ks/cm²).

(3) The refrigerant, in a gaseous vapor state, is pumped by the compressor to the condenser coil. As the refrigerant flows through the condenser coil,

the condenser fan draws outside air into the condenser coil area and exhausts it back outside. This action serves to change the refrigerant from the gaseous state to a liquid state.

(4) The refrigerant, in the liquid state, flows from the condenser coil to the evaporator coil. The evaporator fan draws air from the conditioned area and blows it across the evaporator coil. Refrigerant within the evaporator coil absorbs heat from the circulating air. The cooled air is then blown into the conditioned area by the evaporator fan.

(5) The absorption of heat by the refrigerant, as it passes through the evaporator coil, causes the refrigerant to change from the liquid state back into a gaseous vapor state. The vaporized refrigerant is then routed to the suction side of the compressor.

(6) As the evaporator fan blows cooled air into the conditioned area, the temperature gradually decreases. When the temperature in the conditioned area falls below the setting of the air conditioner thermostat, the cooling section is switched to by-pass mode. In this mode, the fan motor and the compressor continue to operate, but the refrigerant is routed through a by-pass circuit, so that the evaporator fan no longer blows cooled air into the conditioned area. When the temperature in the conditioned area again rises above the setting of the thermostat, the by-pass circuit is shut off and the refrigerant again flows through the cooling circuit, causing cooled air to be blown into the conditioned area. When the air conditioner is operating in the "COOL" setting, the fan motor and the compressor are operating continuously, either in the cooling mode or in the by-pass mode. This feature allows the unit to present a constant electrical load to the power supply circuit.

c. Heating. The heating section consists primarily of six electrical resistance type heaters. High heat is provided when the selector switch is set to the "HI-HEAT" position. In this position, all six of the heater elements are energized. Low heat is provided when the selector switch is set to the "LO-HEAT" position. In this position, only three of the six heater elements are energized. Heat is blown into the conditioned area by the evaporator fan. The heater elements are under control of the thermostat, which serves to maintain the temperature in the conditioned area at the desired level.

d. Ventilating. The fan motor starts when the selector switch is placed in the "VENTILATE" position. The evaporator fan draws air from the outside and blows it into the conditioned area. In this mode, the compressor is not operating.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. Description and Use of Operator's Controls and Indicators

2-1. **GENERAL**

The description and use of the operator's controls and indicators is shown in figures 2-1 and 2-2.

Section II. Preventive Maintenance Checks and Services (PMCS)

2-2. **GENERAL**

The preventive maintenance checks and services to be performed on this equipment are given in table 2-1.

- a. Before you operate: Perform your BEFORE (B) PMCS.
- b. While you operate: Perform your DURING (D) PMCS.
- c. If your air conditioner fails to operate, report it to Organizational Maintenance.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services

<p>Perform weekly as well as before operations PMCS if:</p> <p>(1) You are the assigned operator and have not operated the unit since the last weekly PMCS.</p> <p>(2) You are operating the unit for the first time.</p> <p>NOTE</p> <p>If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.</p> <p>B-BEFORE A-AFTER D-DURING W-WEEKLY M-MONTHLY</p>								
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	w	M			
1	●					Air Filter	Check for cleanliness	Clogged air filter restricting air flow
2		●				General Maintenance	Be alert for unusual noises or improper operation. If either condition is detected, notify organizational maintenance	

INTAKE GRILLE DAMPER

Controls flow of air from conditioned area to the evaporator fan. Push damper down to limit to fully close intake grille. Damper may also be positioned between open and closed limits for partially opened intake grille.

DAMPER DOOR CONTROL

Controls flow of outside air to the evaporator fan. Door is spring-loaded open. Chain links in keyhole slot in panel. Pull chain out to close damper door. Door may be set at partially closed position by use of any of the chain links between open and closed limits.

SELECTOR SWITCH

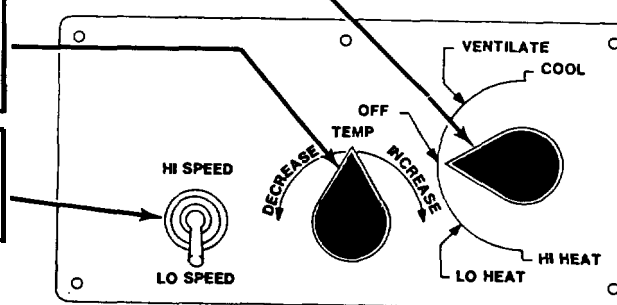
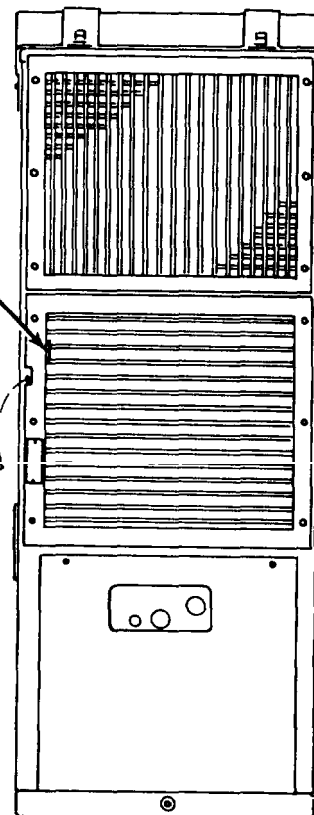
VENTILATE: Selects ventilation mode. Turns fan motor on.
COOL: Selects cooling mode. Turns fan motor and compressor on.
LO-HEAT: Selects low heat mode. Turns fan motor and three of six heater elements on.
HI-HEAT: Selects high heat mode. Turns fan motor and six heater elements on.
OFF: Turns unit completely off.

THERMOSTAT

Adjust and maintains temperature of conditioned air entering conditioned area

FAN SPEED SWITCH

Adjusts speed of fan motor to either high speed or low speed.



BEFORE STARTING UNIT:
MAKE SURE NO AIR OPENINGS ARE BLOCKED.

TO START:

1. FOR VENTILATION ONLY, TURN SELECTOR SWITCH TO VENTILATE. ADJUST FAN SPEED SWITCH TO DESIRED SPEED, HI-SPEED OR LO-SPEED.
2. FOR COOLING, TURN SELECTOR SWITCH TO COOL AND ADJUST THERMOSTAT TO DESIRED TEMPERATURE. ADJUST FAN SPEED SWITCH TO DESIRED SPEED, HI-SPEED OR LO-SPEED.
3. FOR HEATING, TURN SELECTOR SWITCH TO EITHER LO-HEAT OR HI-HEAT AS DESIRED. ADJUST THERMOSTAT TO DESIRED TEMPERATURE. ADJUST FAN SPEED SWITCH TO DESIRED SPEED, HI-SPEED OR LO-SPEED.

TO STOP UNIT: TURN SELECTOR SWITCH TO OFF.

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Figure 2-1. Front side. Operator's controls and indicators

HIGH PRESSURE CUT-OUT RESET BUTTON

The high pressure cut-out switch stops the unit if compressor discharge pressure rises above 460 psig (32.343 ks/cm²). To restart the unit, wait a few minutes for the pressure to decrease, then push the high pressure cut-out reset button.

LOW PRESSURE CUT-OUT RESET BUTTON

The low pressure cut-out switch stops the unit if compressor suction pressure falls below 25 psig (1.758 ks/cm²). To restart the unit, wait a few minutes for the pressure to increase, then push the low pressure cut-out reset button.

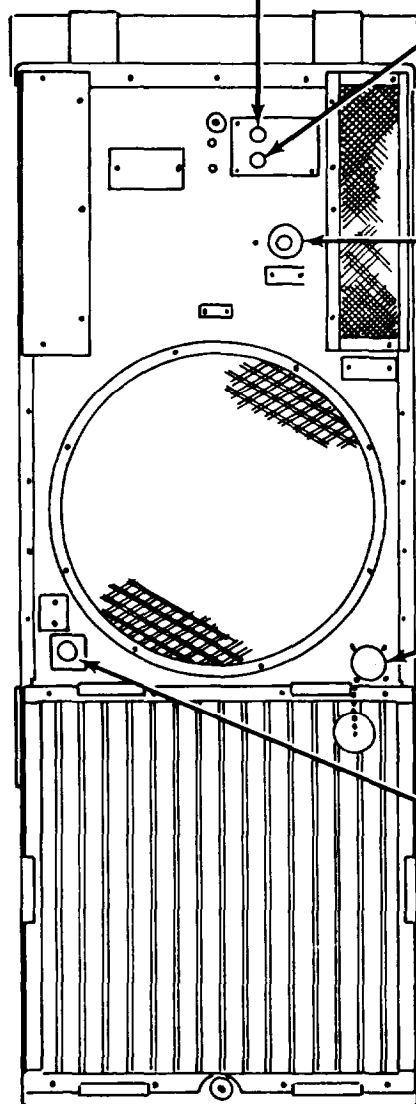
SIGHT GLASS

The sight glass indicates the refrigerant moisture content. When the indicator is green, the refrigerant is dry (normal condition). A color shading into yellow indicates that the refrigerant has become contaminated with moisture. A shortage of refrigerant is indicated by bubbles in the sight glass.

ELECTRICAL RECEPTACLE CONNECTOR
For connection of 208 volt, 50/60 Hz, 3-phase electrical power source.

CIRCUIT BREAKER KNOB

The circuit breaker cuts off all electrical power to the unit in case of an electrical power overload. To reset the circuit breaker, first pull out, then push in the circuit breaker knob.



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Figure 2-2. Rear side. Operator's controls and indicators

Section III. Operation Under Usual Conditions

2-3.

GENERAL

a. The instructions in this section are for the information and guidance of personnel responsible for the operation of the air conditioner.

b. The operator must know how to perform every operation of which the air conditioner is capable. This section gives instructions on starting and stopping the air conditioner, basic motions of the air conditioner, and on coordinating basic motions to perform specific tasks for which the equipment is designed.

c. Although the air conditioner is normally used for mechanically cooling and heating the control space automatically, it may also be used to ventilate only. Care should be taken to insure that doors to the conditioned space close with a good seal against the ambient (outside) air. Frequent door opening will impose an abnormal load on the air conditioner, preventing normal on and off cycles.

d. The operator must be observant at all times, particularly concerning unusual sounds that would indicate malfunctioning of the air conditioner. When unusual sounds occur, stop operation and report the condition to Organizational Maintenance.

2-4.

OPERATION

a. Preparation for Starting.

(1) Make sure that the air conditioner cover is unzipped and rolled up, and that the retaining straps are attached to the top.

(2) Refer to paragraph 2-2 and perform the daily preventive maintenance checks and services.

(3) Make sure that the air conditioner is connected to a 208 volt, 3-phase, 50/60Hz electrical power source.

(4) Make sure that none of the air openings of the air conditioner are blocked.

b. Starting. (Refer to figures 2-1 and 2-2.)

(1) Cooling operation.

(a) Position the thermostat for temperature desired.

(b) Place the fan speed toggle switch in the desired position.

(c) Place the selector switch to "COOL" position.

(d) For cooling with 100 percent recirculated air, close damper door.

(e) For cooling with mixture of recirculated air and fresh air,

open damper door and partially close intake damper.

(f) For cooling with a mixture of recirculated air and fresh air drawn through a chemical biological, radiological filter unit when outdoor air is contaminated, close damper door and partially close intake grille damper. (Applicable only if the unit is equipped with a chemical biological radiological (CBR) filter unit.

(2) Heating Operation. (Refer to figure 2-1 and 2-2.)

(a) Position thermostat for desired temperature.

(b) Place fan speed toggle switch in desired position.

(c) Place selector switch on 'LO-HEAT" or "HI-HEAT" position.

(d) For heating with 100 percent recirculated air, close damper door and open intake grille damper.

(e) For heating with a mixture of recirculated air and fresh air, open damper door and partially close intake grille damper.

(f) For heating with a mixture of recirculated air and fresh air drawn through a chemical, biological., radiological filter unit when outdoor air is contaminated, close damper door-and partially-close intake grille damper. (Applicable only if the unit is equipped with a chemical, biological, radiological (CBR) filter unit.

(3) Ventilating Operation. (Refer to figures 2-1 and 2-2.)

(a) Place selector switch in "VENTILATE" position.

(b) Place fan speed toggle switch in desired position.

(c) Open damper door and close intake grille damper.

NOTE

If the air conditioner fails
to start, pull, then push
the circuit breaker knob.

c. Stopping. Turn the selector switch to "OFF". (Refer to figure 2-1.)

Section IV. Operation Under Unusual Conditions

2-5.

OPERATION IN EXTREME COLD

a. The air conditioner is designed to operate on the cooling cycle without forming frost or ice on the evaporator coil at an ambient (outside) temperature as low as 50°F (10°C).

b. If cooling air is desired at ambient (outside) temperatures lower than

50 °F (10 °C), set the selector switch knob to "VENTILATE".

NOTE

The air conditioner can be operated on the heating mode in ambient temperatures as low as -50 °F.

- c. Make sure that the electrical system is free of ice and moisture.

CAUTION

Do not disturb the wiring during cold weather unless absolutely necessary. Cold wiring and insulation is brittle and is easily broken.

2-6. OPERATION IN EXTREME HEAT

NOTE

Unit Preventive Maintenance Checks and Services (PMCS) should be performed at daily intervals.

a. General. The air conditioner is designed to operate in temperatures up to 120 °F (49 °C). Extra care should be taken to minimize the cooling load when operating in extreme high temperatures.

- b. Protection.

(1) Check all openings in the enclosure, especially doors and windows, to be sure they are tightly closed. Limit in and out traffic if possible.

(2) When appropriate, use shades or awnings to shut out direct rays of the sun.

(3) When possible, limit the use of electric lights and other heat producing equipment.

(4) Limit the amount of hot, outside air introduced through the fresh air damper to that essential for ventilation.

NOTE

Weatherstripping, the installation of storm doors, and windows, if appropriate, and insulation of surfaces exposed to the outside is recommended when operating in extremely high temperatures for extended periods.

- c. Cleaning.

(1) Clean outside grilles, coils, filters, and mist eliminator more frequently.

2-7. OPERATION IN DUSTY OR SANDY AREAS

NOTE

Unit Preventive Maintenance Checks and Services (PMCS) should be performed at daily intervals.

a. General. Dusty and sandy conditions can seriously reduce the efficiency of the air conditioner by clogging the air filter, mist eliminator, and coils. This will cause a restriction in the volume of airflow. Accumulation of dust or sand in the condenser coil and/or in the compressor compartment may cause overheating of the refrigeration system. Dust or sand may also clog the condensate trap and water drain lines.

CAUTION

Never operate the air conditioner without having the air filters in place.

b. Protection.

- (1) Shield the air conditioner from dust as much as possible.
- (2) Take advantage of any natural barriers which offer protection.
- (3) Limit the amount of dusty or sandy outside air introduced through the fresh air damper.
- (4) Roll down and secure the fabric cover on the back of the cabinet during periods of shutdown.

c. Cleaning.

- (1) Keep the air conditioner as clean as possible.
- (2) Pay particular attention to the outside grilles, condenser, filters, mist eliminator, louvers, and electrical components.
- (3) In extreme conditions, daily cleaning of condenser, filters, and outside grilles may be necessary.

2-8. OPERATION UNDER RAINY OR HUMID CONDITIONS

The air conditioner control panel must be protected to prevent direct contact with rain or heavy moisture.

2-9. OPERATION IN SALT WATER AREAS

- a. Exposure to salt water and air may cause corrosion of exposed metal surfaces.
- b. Wash down the exterior of the unit with clean fresh water at frequent intervals. Take care not to damage electrical components with water.
- c. Inspect the unit daily and clean the evaporator and condenser coils and the air filter as often as required to maintain proper operation.

2-10. OPERATION AT HIGH ALTITUDES

The air conditioner is designed to operate without special attention at altitudes up to 5,000 feet.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. Repair Parts, Special Tools, TMDE, and Support Equipment

3-1. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Modified Table of Organizational and Equipment (MTOE) applicable to your unit.

3-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

There are no special tools, TMDE, or support equipment required to perform Organizational Maintenance on the air conditioner.

3-3. REPAIR PARTS

Repair parts are listed and illustrated in the Repair Parts and Special Tools List TM 5-4120-356-24P covering Organizational Maintenance of this equipment.

Section II. Service Upon Receipt

3-4. ASSEMBLY AND PREPARATION FOR USE

a. Unpacking.

(1) Move the air conditioner to the installation site before removing shipping container. Cut the metal bands and remove top, end, and sides of carton, and the inner covering. Remove bolts securing base of unit to carton, and using the handles, lift unit from carton.

(2) Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD form 6, Packaging Improvement Report.

(3) Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of TM 38-750.

(4) Check to see if the equipment has been modified.

(5) Prior to placing the unit in operation, accomplish depreservation in accordance with the instructions outlined in DA Form 2258 (Depreservation Guide of Engineer Equipment). DA Form 2258 is attached to or near the operational controls.

b. Assembly. There are no assembly procedures. However, the air conditioner should be inspected after receipt as follows:

(1) Remove the front, rear, and top panels from the unit and inspect the air conditioner for physical damage to components and for oil leaks from the compressor motor. (Refer to paragraph 3-9 for panel removal.)

(2) Manually turn the fans to see that they turn freely with no rubbing or binding.

c. Installation.

(1) The air conditioner should be mounted level and in proper alignment with the shelter wall. The evaporator air outlet and return should not be restricted by grilles or covers. Adequate space shall be provided at the front and sides of the unit for the removal of panels for service and maintenance.

(2) Position the unit in the desired location.

(3) Bolt unit to the floor or other flat surface. Refer to base plan (figure 3-1) for dimensions. An additional fastening device is located on the upper rear side of the unit for additional mounting rigidity if required. Refer to figure 3-2 for the location of the additional fastening device. Four drain plugs are located in the base of the unit, one on each side, one in front, and one in the rear. Refer to figure 3-2 for their location. Remove any one of the plugs from its drain fitting and connect a drain hose to the fitting. Lay out the drain hose so that condensate drains away from the unit.

(4) If the unit is to be used with ducts carrying air to and from the conditioned space, remove front discharge and intake grilles. Install grilles in the duct.

(5) If a chemical, biological, radiological (CBR) filter unit is to be attached to the unit, remove the CBR inlet cover (see figure 3-2).

(6) The unit is equipped for 208 volt, 3-phase, 50/60 Hz power. Connect a source of 208 volt, 3-phase, 50/60 Hz power to the electrical receptacle connector (see figure 3-2).

3-5. PREPARATION FOR MOVEMENT

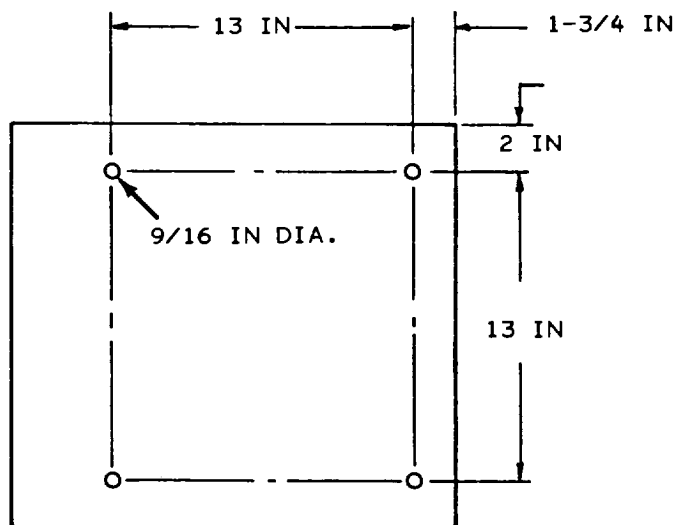
a. Limited Movement. For movement a short distance involving limited handling, it is necessary only to detach the air conditioner from the shelter and disconnect the electrical power cable.

b. Extensive Movement. Detach the air conditioner from the shelter and disconnect the power cable. Seal all-openings in the cabinet with barrier material and sealing tape. Cover the entire cabinet with a protective barrier material.

Section III. Preventive Maintenance Checks and Services (PMCS)

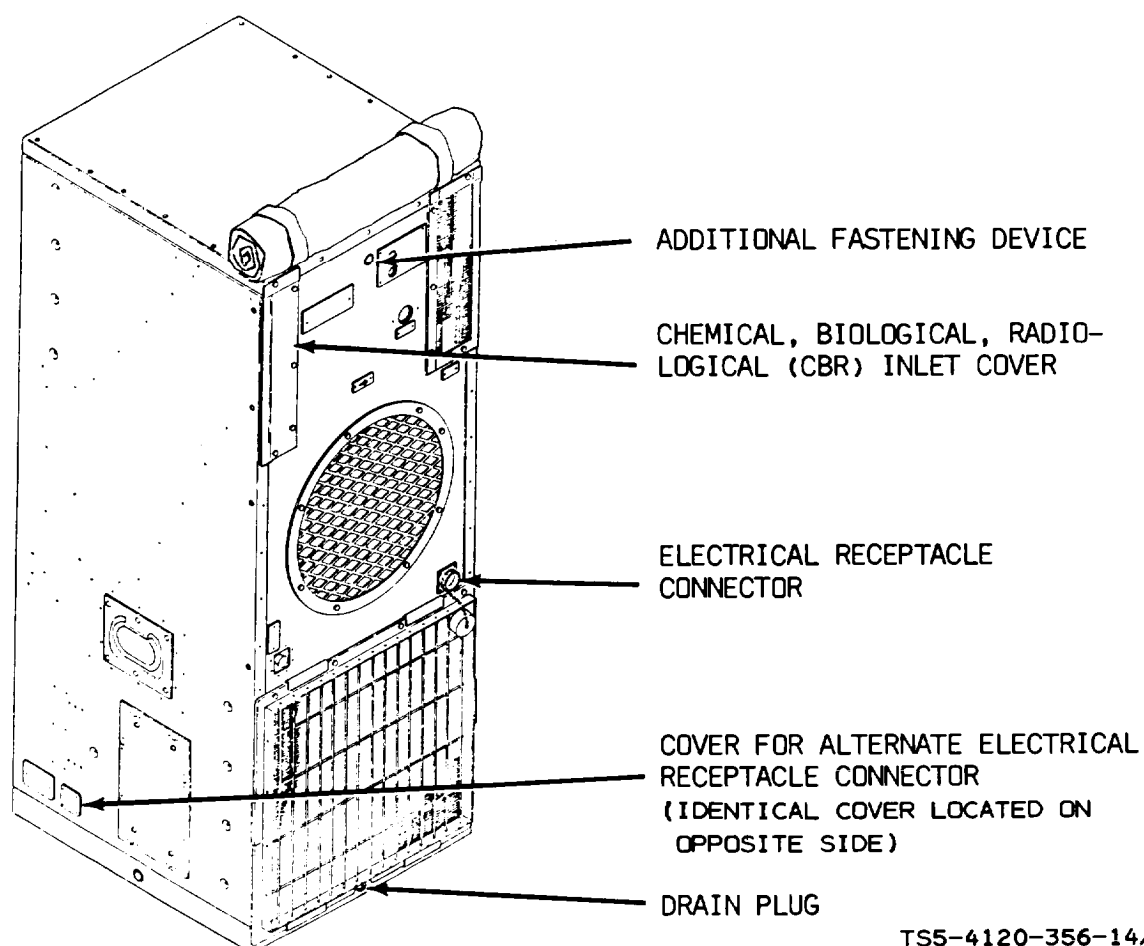
3-6. GENERAL

Organizational Preventive Maintenance Checks and Service are contained in table 3-1.



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Figure 3-1. Base plan



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Figure 3-2. Left rear three-quarter view

Table 3-1. Organizational Preventive Maintenance Checks and Services

B-BEFORE D-DURING						A-AFTER W-WEEKLY	M-MONTHLY	
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	W	M			
1				●		Air filter	Check for cleanliness	Clogged air filter restricting air flow
2				●		Refrigerant sight glass	Check for bubbling or fogging. Report condition to Direct Support Maintenance if either condition exists Check color of refrigerant. Should be green. If color in sight glass is yellow, report condition to Direct Support Maintenance	Low refrigerant level Refrigerant has become contaminated by moisture
3		●				General maintenance	Be alert for unusual noises or improper operation	
4					●	Air conditioner	Visually inspect entire unit for cracks, breaks, and loose or missing hardware	
5					●	Refrigerant system	Assure that refrigerant hoses and tubing are free of leakage, kinking, etc. Report all defects found to Direct Support Maintenance	
6				●		Condenser and evaporator coils	Check coil fins for dirt or other foreign matter which would restrict air flow	

a. If your equipment fails to operate, troubleshoot with proper equipment. Report any deficiencies using the proper forms, see TM 38-750.

b. Equipment is Not Ready/Available If: column. This column shall contain the criteria that will cause the equipment to be classified as not ready/available for readiness reporting purposes. An entry in this column will:

(1) Identify conditions that make the equipment not ready/available for readiness reporting purposes.

(2) Deny use of the equipment until corrective maintenance has been performed.

Section IV. Troubleshooting

3-7. TROUBLESHOOTING TABLE

a. The troubleshooting table (table 3-1) lists the most common malfunctions which you may find during the operation or maintenance of the air conditioner or its components. You should perform the test/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions which may occur. However, all tests or inspections and corrective actions are listed for most common malfunctions. If a malfunction is not listed, or is not corrected by listed corrective action, notify your supervisor.

Table 3-2. Organizational Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. AIR CONDITIONER FAILS TO START		
	Step 1. Controls not properly set.	Set controls for starting. (Refer to figure 2-1.)
	Step 2. Power supply leads loose or not connected.	Check power supply leads and tighten, or connect leads as required.
	Step 3. Circuit breaker tripped.	Pull, then push circuit breaker knob. (Refer to figure 2-2.)
2. AIR CONDITIONER NOISY DURING OPERATION		
	Step 1. Panels loose.	Tighten fasteners or replace defective fasteners as required.

Table 3-2. Organizational Troubleshooting (continued)

MALFUNCTION	
TEST OR INSPECTION	CORRECTIVE ACTION
AIR CONDITIONER NOISY DURING OPERATION (continued)	
Step 2. Loose component.	Tighten component.
3. INSUFFICIENT COOLING	
Step 1. Thermostat improperly set.	Set thermostat for cooler operation. (See figure 2-1.)
Step 2. Refrigerant low or contaminated.	Check sight glass. If refrigerant appears yellow rather than green, or if bubbles appear in the refrigerant, report the condition to Direct Support Maintenance.
4. NO COOL AIR DISCHARGE	
Step 1. Selector switch set in wrong position.	Set selector switch for cooling. (See figure 2-1.)
Step 2. Thermostat improperly set.	Set thermostat for desired temperature. (See figure 2-1.)
Step 3. Air filter is dirty or clogged.	Remove and clean air filter. (Refer to paragraph 3-9I)
Step 4. High pressure cut-out switch tripped.	Reset high pressure cut-out switch. (See figure 2-2.)
Step 5. Low pressure cut-out switch tripped.	Reset low pressure cut-out switch. (See figure 2-2.)
5. EXCESSIVE COOLING	
Step 1. Thermostat set for too cool operation.	Reset thermostat for temperature desired. (See figure 2-2.)

Table 3-2. Organizational Troubleshooting (continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
EXCESSIVE COOLING (continued)		
	Step 2. Selector switch set to "COOL" rather than "VENTILATE".	Set selector switch to "VENTILATE".
6. INSUFFICIENT HEATING	Step 1. Thermostat improperly set.	Set thermostat for desired temperature. (See figure 2-1.)
	Step 2. Selector switch set to "LO-HEAT" instead of "HI-HEAT".	Set selector switch to "HI-HEAT". (See figure 2-1.)
7. NO HOT AIR DISCHARGE	Step 1. Selector switch set in wrong position.	Set selector switch to "LO-HEAT" or "HI-HEAT" as desired.
	Step 2. Thermostat improperly set.	Set thermostat for desired temperature. (See figure 2-1.)
	Step 3. Air filter dirty or clogged.	Remove and clean air filter. (Refer to paragraph 3-9I.)
8. EXCESSIVE HEATING	Step 1. Thermostat improperly set.	Set thermostat for desired temperature. (See figure 2-1.)
	Step 2. Selector switch set to "HI-HEAT" instead of "LO-HEAT".	Set selector switch to "LO-HEAT". (See figure 2-1.)

Section V. Maintenance Procedures

3-8. GENERAL

The entire air conditioning unit is enclosed in a single unit frame with removable panels, covers and grilles for easy access to components. For purposes of maintenance, this manual covers the unit in groups of similar components and component systems.

3-9. CASING AND RELATED PARTS

a. Fabric Cover. (See figure 3-3.)(1) Inspection.

- (a) Inspect zipper for proper operation.
- (b) Inspect for missing or defective attaching hardware.
- (c) Inspect for damage which would impair serviceability.

(2) Replace. Replace fabric cover if damage has been sustained which would impair serviceability. Refer to steps (3) and (4) for removal of damaged cover and installation of a new cover.

(3) Removal.

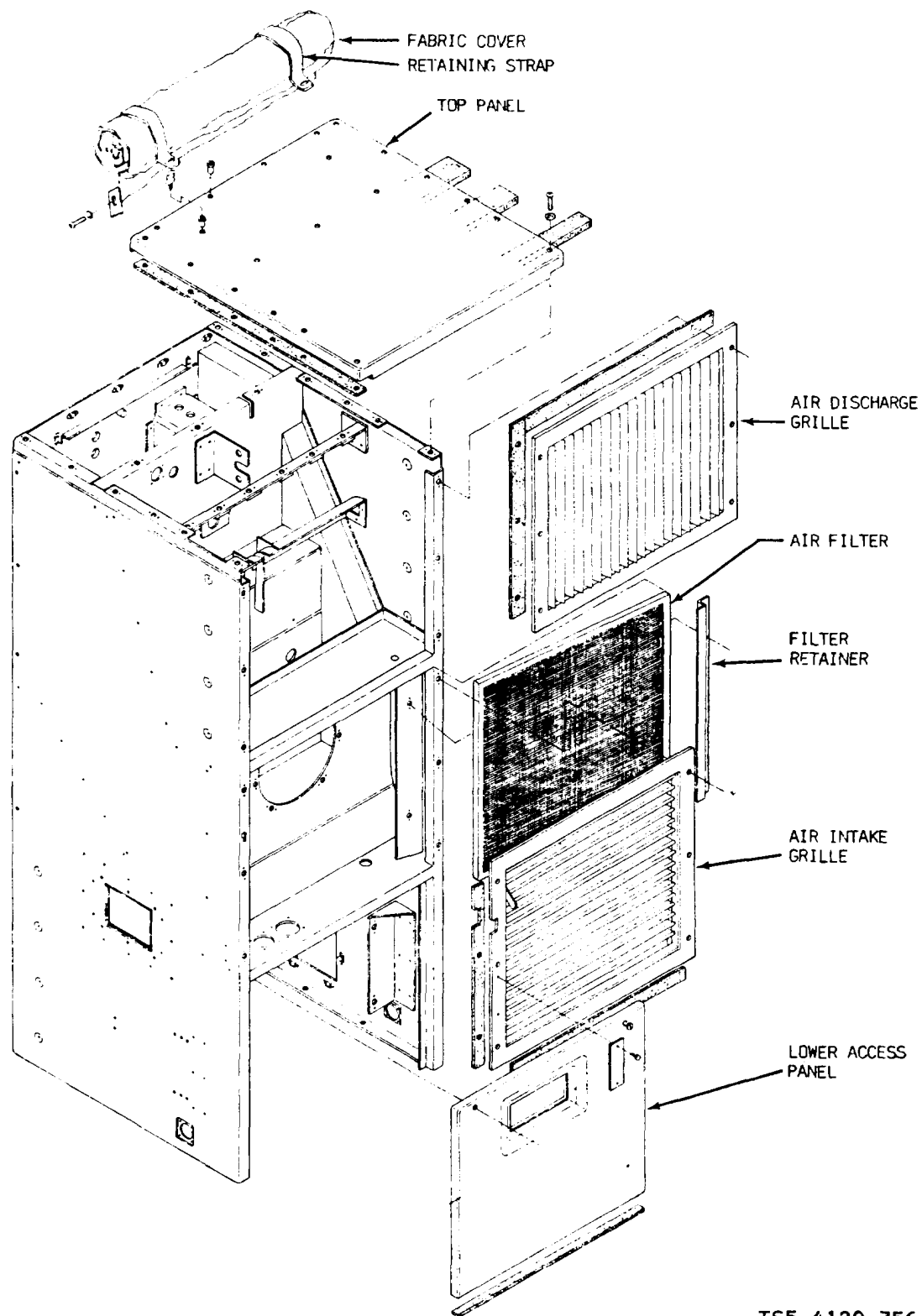
- (a) If fabric cover is rolled and fastened at the top, turn both turn-button fasteners and release retaining straps.
- (b) Remove all attaching screws and washers from fabric cover.
- (c) Remove fabric cover from the unit.

(4) Installation.

- (a) Place fabric cover on air conditioner and secure with attaching screws and washers.
- (b) If unit is to be placed in immediate operation, roll cover up and attach retaining straps to turn-button fasteners on top panel of unit. (See figure 3-3.)
- (c) If unit is not to be placed in immediate operation, zip cover in place to protect the air conditioner while not in use.

b. Top Panel Assembly. (See figure 3-3.)

- (1) Removal. Remove attaching screws and washers and remove top panel.



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Figure 3-3. Front view, outer panels

(2) Inspection.

(a) Inspect top panel assembly for damage which would impair serviceability.

(b) Inspect top panel assembly for missing, damaged or insecurely attached insulation and gaskets.

(3) Repair. Attach insecurely attached insulation and or gaskets with adhesive.

(4) Replace.

(a) Panel. Replace top panel assembly if damaged so that serviceability would be impaired.

(b) Gasket. Replace gasket if damaged or missing. New gaskets are installed by removing the strip from the gasket adhesive backing and pressing the gasket in place.

(c) Insulation. Replace damaged or missing insulation on top panel assembly. Secure insulation to panel with adhesive.

(5) Installation. Position top panel assembly on air conditioner and secure with attaching screws and washers.

c. Air Discharge Grille. (See figure 3-3.)

(1) Removal. Remove attaching screws and remove air discharge grille from air conditioner.

(2) Inspection.

(a) Inspect air discharge grille for damage which would impair serviceability.

(b) Inspect for bent grille parts.

(c) Inspect for missing or damaged gasket.

(3) Service.

WARNING

When using compressed air for blowing and cleaning, air hose pressure must not exceed 30 psig (2 ks/cm²), and individuals must wear eye protection equipment.

(a) Wash grille with a stream of freshwater.

(b) Dry grille with compressed air.

(4) Repair. Straighten minor bends and dents in grille.

(5) Replace.

(a) Grille. Replace air discharge grille if damage has been sus-

tained which would impair serviceability.

(b) Gasket. Replace gasket if damaged or missing. New gaskets are installed by removing the strip from the gasket adhesive backing and pressing the gasket in place.

(6) Installation. Position air discharge grille on air conditioner and secure with attaching screws and washers.

d. Air Intake Grille. (See figure 3-3.)

(1) Removal. Remove attaching screws and remove air intake grille from the air conditioner.

(2) Inspection.

(a) Inspect the air intake grille for damage which would impair serviceability.

(b) Inspect for bent grille pieces.

(c) Inspect for missing or damaged gasket.

(3) Service.

WARNING

When using compressed air for blowing and cleaning, air hose pressure must not exceed 30 psig (2 ks/cm²), and individuals must wear eye protection equipment.

(a) Wash grille with a stream of freshwater.

(b) Dry grille with compressed air.

(4) Repair. Straighten minor bends and dents in grille.

(5) Replace.

(a) Grille. Replace air intake grille if there is sufficient damage to the grille that serviceability would be impaired.

(b) Gasket. Replace gasket if damaged or missing. New gaskets are installed by removing the strip from the gasket adhesive backing and pressing the gasket in place.

(6) Installation. Position the air intake grille on the air conditioner and secure with attaching screws.

e. Lower Access Panel. (See figure 3-3.)

(1) Removal. Loosen attaching screws and remove lower access panel from the air conditioner.

(2) Inspection

(a) Inspect lower access panel for damage which would impair serviceability.

(b) Inspect lower access panel for missing or damaged attaching hardware.

(c) Inspect lower access panel for missing, loose or damaged gasket and or insulation.

(3) Repair.

(a) Replace missing or damaged attaching hardware.

(b) Secure loose insulation to panel with adhesive.

(4) Replace.

(a) Panel. Replace lower access panel if there is any damage which would impair serviceability.

(b) Gasket. Replace gasket if damaged or missing. New gaskets are installed by removing the strip from the gasket adhesive backing and pressing the gasket in place.

(c) Insulation. Replace insulation if damaged or missing. Secure new insulation to lower access panel with adhesive.

(5) Installation. Position lower access panel on the air conditioner and secure with attaching screws.

f. Chemical, Biological, Radiological Filter Cover (CBR). (see figure 3-4.)

(1) Inspection. Inspect CBR cover for damage which would impair serviceability.

(2) Replace. Replace the CBR cover if there is any damage to the cover which would impair serviceability. Refer to steps (3) and (4) for removal of damaged CBR cover and the installation of a new cover.

(3) Removal. Remove attaching screws from CBR cover and remove cover.

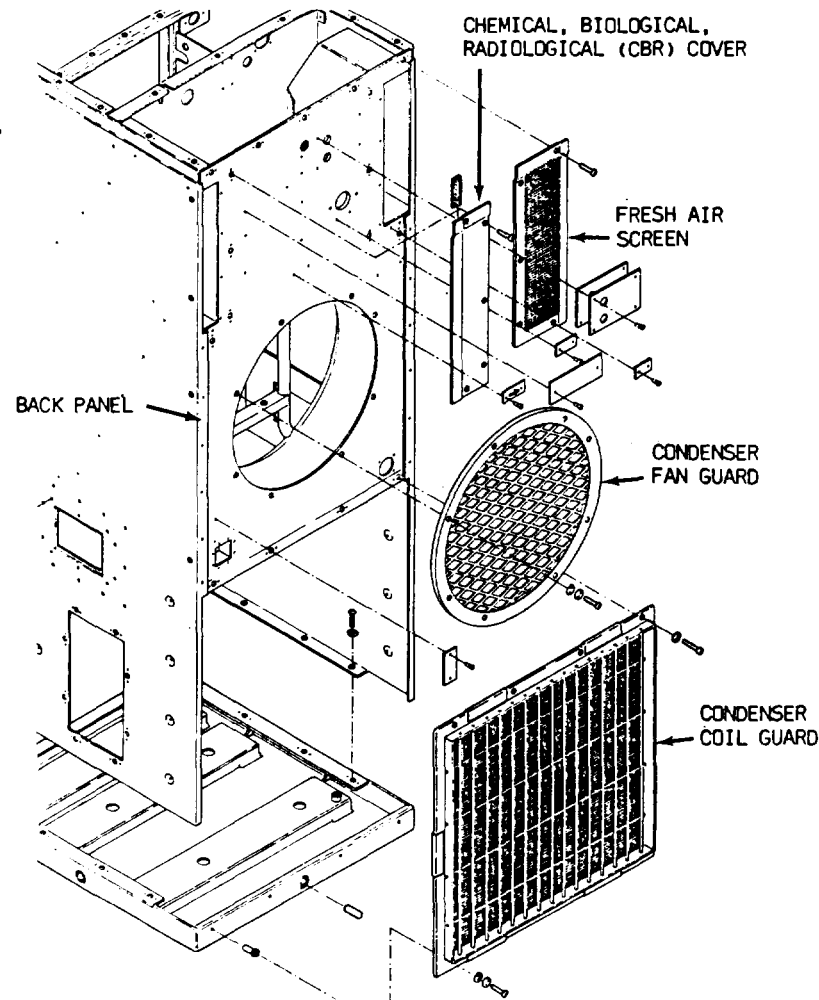
(4) Installation. Position CBR cover on air conditioner and secure with attaching screws.

g. Fresh Air Screen. (See figure 3-4.)

(1) Removal. Remove attaching screws from the fresh air screen and remove screen from unit.

(2) Inspection. Inspect fresh air screen for damage which would impair serviceability.

(3) Service.



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Figure 3-4. Rear view. Outer panels

WARNING

When using compressed air for blowing and cleaning, air hose pressure must not exceed 30 psig (2 ks/cm²), and individuals must wear eye protection equipment.

- (a) Wash fresh air screen with a stream of freshwater.
- (b) Dry fresh air screen with compressed air.
- (4) Replace. Replace fresh air screen if there is any damage to the screen which would impair serviceability.
- (5) Installation. Position the fresh air screen on the air conditioner and secure with attaching screws.

h. Condenser Coil Guard. (See figure 3-4.)

(1) Removal. Remove attaching screws and washers from the condenser coil guard and remove coil guard from the air conditioner.

(2) Inspection. Inspect the condenser coil guard for damage which would impair serviceability.

(3) Service.

WARNING

When using compressed air for blowing and cleaning, air hose pressure must not exceed 30 psig (2 ks/cm²), and individuals must wear eye protection equipment.

(a) Wash the condenser coil guard with a stream of fresh water.

(b) Dry condenser coil guard with compressed air.

(4) Replace. Replace the condenser coil guard if there is any damage which would impair serviceability.

(5) Installation. Position the condenser coil guard on the air conditioner and secure with attaching screws.

j. Condenser Fan Guard. (See figure 3-4.)

(1) Removal. Remove attaching screws and washers from condenser fan guard and remove guard from the air conditioner.

(2) Inspection. Inspect the condenser fan guard for damage which would impair serviceability.

(3) Service.

WARNING

When using compressed air for blowing and cleaning, air hose pressure must not exceed 30 psig (2 ks/cm²), and individuals must wear eye protection equipment.

(a) Wash the condenser fan guard with a stream of fresh water.

(b) Dry the condenser fan guard with compressed air.

(4) Replace. Replace the condenser fan guard if there is damage to the guard which would impair serviceability.

(5) Installation. position the condenser fan guard on the air conditioner and secure with attaching screws and washers.

k. Back Panel. (See figure 3-4.)

(1) Inspection. Inspect nut plates on back panel for stripped threads or loose rivets.

(2) Repair. Replace any nut plates which have stripped threads, loose rivets or are otherwise damaged beyond use.

1. Air Filter. (See figure 3-3.)

(1) Removal.

(a) Remove attaching screws and remove air intake grille.

(b) Remove attaching screws and remove filter retainer.

(c) Remove air filter from air conditioner.

(2) Inspection. Inspect air filter for damage which would impair serviceability and for dirt or clogging.

(3) Service.

WARNING

When using compressed air for blowing and cleaning, air hose pressure must not exceed 30 psig (2 ks/cm²), and individuals must wear eye protection equipment.

(a) Wash the air filter with a stream of freshwater.

(b) Dry the air filter with compressed air.

(4) Replace. Replace air filter if there is any damage to the air filter which would impair serviceability.

(5) Installation.

(a) Position new or serviced air filter and filter retainer in the air conditioner.

(b) Secure filter retainer with attaching screws.

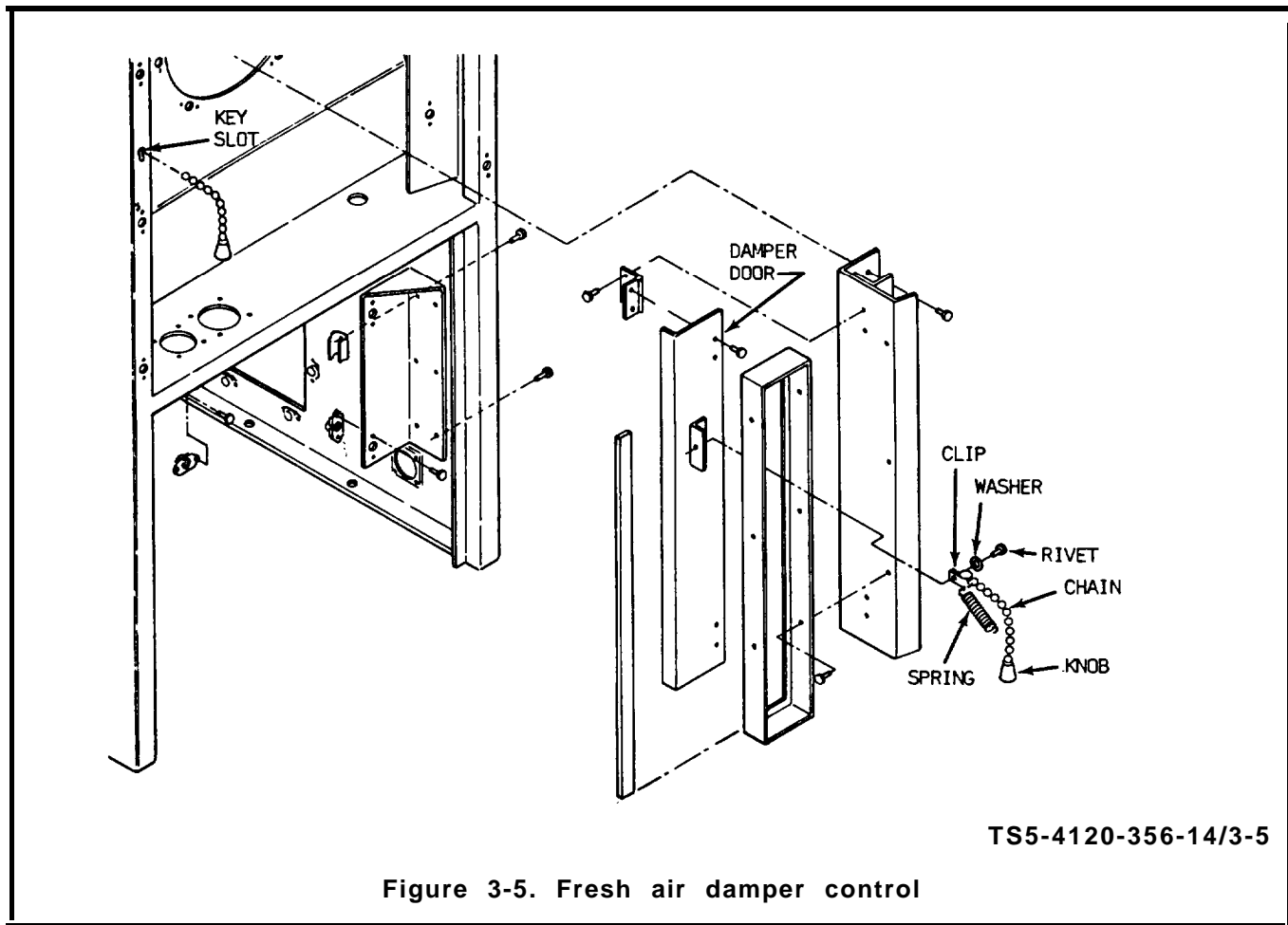
(c) Position air intake grille on air conditioner and secure with attaching screws.

m. Fresh Air Damper Control. (See figure 3-5.)

(1) Inspection.

(a) Inspect fresh air damper control for bidding and for damage which would impair serviceability.

(b) Inspect spring for proper tension.



(2) Adjust. Adjust position of spring on chain if damper door is not being held fully closed when chain is pulled out to its limit.

(3) Replace. Replace fresh air damper control if chain is broken or if there is any damage to the control which would impair serviceability. Refer to paragraphs (5) and (6) for removal and installation procedures.

(4) Repair. Replace spring if damaged or not providing sufficient tension. Replace chain if broken.

(5) Removal.

(a) Detach spring.

(b) Spread clip and detach chain. Remove chain from unit.

(6) Installation.

(a) Thread new chain through key hole slot and position in clip.

(b) Apply pressure to both sides of clip so that clip closes and retains chain.

(c) Attach spring to chain.

o. Mist Eliminator. (See figure 3-6.)

(1) Removal.

(a) Refer to paragraph 3-9b and remove top panel.

(b) Grasp the mist eliminator firmly at the top and pull it out of the unit.

(2) Inspection Inspect the mist eliminator for damage which would impair serviceability.

(3) Service.

WARNING

When using compressed air for blowing and cleaning-air hose pressure must not exceed 30 psig (2 ks/cm²), and individuals must wear eye protection equipment.

(a) Wash the mist eliminator with a stream of freshwater.

(b) Dry the mist eliminator with compressed air.

(4) Replace. Replace the mist eliminator if there is any damage which would impair serviceability.

(5) Installation.

(a) Push mist eliminator down into air conditioner from the top.

(b) Refer to paragraph 3-9b and reinstall top panel.

p. Information, Identification and Instruction Plates. (See figure 3-7.)

Replace any plate which has been damaged to the extent that serviceability is impaired.

q. Casing Assembly Insulation

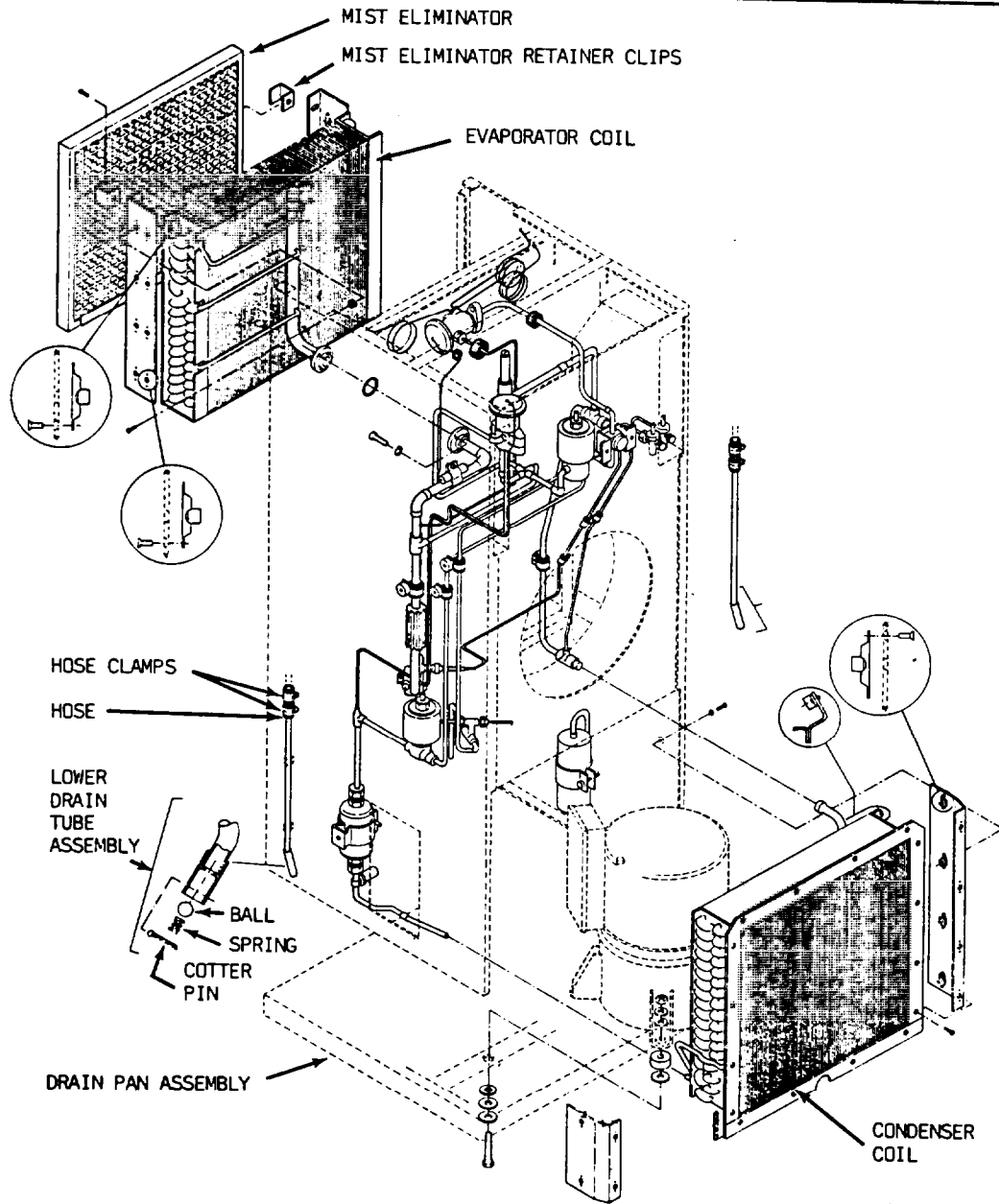
(1) Repair. Attach any loose insulation with adhesive.

(2) Replace.

CAUTION

Do not break into or damage refrigerant system when replacing insulation.

Replace any missing insulation or any insulation which is damaged beyond repair.



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Figure 3-6. Mist eliminator, lower drain tube and drain pan

r. Drain Pan Assembly. (See figure 3-6.)

(1) Inspect.

(a) Refer to paragraph 3-9e and remove the lower panel.

(b) Inspect drain pan assembly for contamination.

(2) Service.

(a) Clean drain pan assembly with a fiber bristle brush, a clean cloth and water.

(b) Dry drain pan assembly with clean dry cloth.

(3) Installation. Refer to paragraph 3-9e and install lower panel.

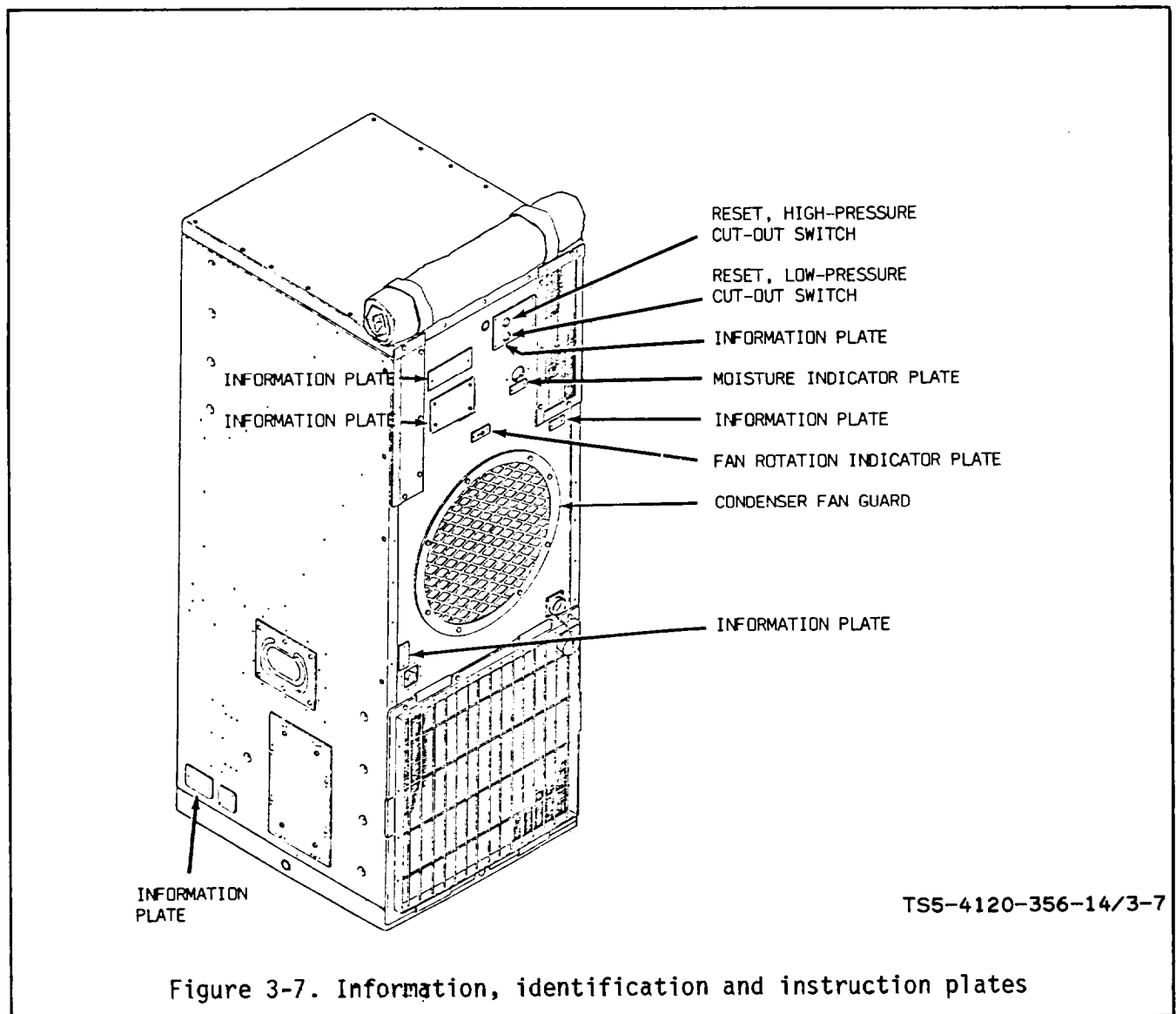


Figure 3-7. Information, identification and instruction plates

s. Lower Drain Tube Assembly. (See figure 3-6.) There are two lower drain tube assemblies. One tube on the left side and one tube on the right side in the lower portion of the air conditioner. The following instructions apply to both drain tube assemblies.

(1) Inspection.

(a) Loosen retaining screws and remove lower access panel.

(b) Remove cotter pin, spring and ball from the lower drain tube assembly and inspect for contamination or corrosion which would prevent the ball valve from functioning.

(c) Inspect the hose connecting the lower drain tube to the upper tube for cracks, and breaks and any damage which would impair serviceability.

(2) Service. Clean ball seat, spring and ball with water and a fiber bristle brush and dry thoroughly.

(3) Repair. Replace any damaged or missing parts.

(4) Replace. Replace the entire lower drain tube assembly (left and/or right) if there is any damage which would impair serviceability. Refer to steps (5) and (6) for removal and installation.

(5) Remove. Remove clamps from rubber connecting hose. Remove lower drain tube assembly from spring clips on sides of cabinet and remove drain tube(s) from cabinet.

(6) Installation.

(a) Position lower drain tube assembly in spring clips on side of cabinet.

(b) Connect lower drain tube assembly to upper tube with short section of rubber hose.

(c) Secure lower drain tube assembly to upper tube with two hose clamps around rubber section.

(d) Install lower access panel.

3-10.

CONTROL BOX AND JUNCTION BOX

a. Control Box.

(1) Inspection.

(a) Remove lower access panel, air intake grille and air filter to gain access to the control box. (Refer to paragraph 3-9.)

(b) Inspect control box for signs of burn-out and for other damage which would impair serviceability. Refer to steps (3) and (4) for removal and installation of control box.

(2) Replace. Replace the control box in case of burn-out or other damage which would impair serviceability.

(3) Removal.

WARNING

Disconnect the air conditioner from the electrical power source before removing the control box.

(a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Remove the lower access panel, air intake grille and air filter. (Refer to paragraph 3-9.)

(c) Refer to figure 3-8 and remove the control box from the unit.

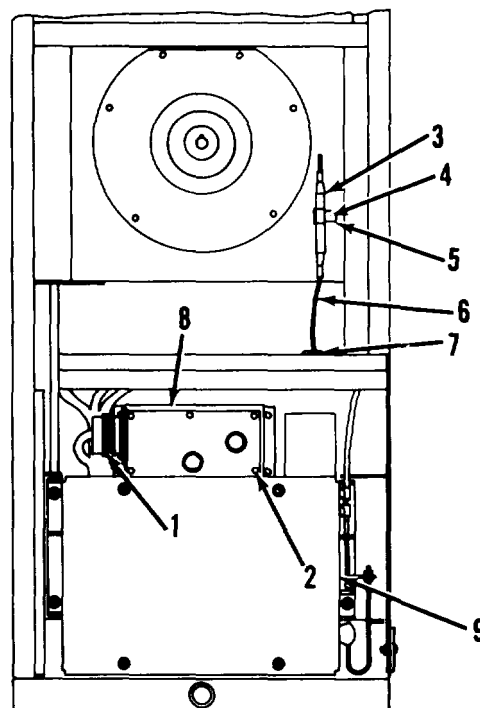
1. ELECTRICAL CONNECTOR PLUG P7
2. SCREW
3. TEMPERATURE SENSING BULB
4. SCREW
5. CLAMP
6. CAPILLARY TUBE
7. GROMMET
8. CONTROL BOX
9. JUNCTION BOX

CAUTION

USE CARE IN HANDLING TEMPERATURE SENSING BULB, CAPILLARY TUBE AND GROMMET TO AVOID DAMAGE TO THE EQUIPMENT.

REMOVAL OF CONTROL BOX

1. REFER TO PARAGRAPH 3-10a FOR PRELIMINARY STEPS IN THE REMOVAL OF THE CONTROL BOX.
2. DISCONNECT ELECTRICAL CONNECTOR (1) FROM CONTROL BOX.
3. REMOVE FOUR SCREWS (2).
4. IF THE CONTROL BOX IS NOT BEING REPLACED, IT IS NOT NECESSARY TO REMOVE THE TEMPERATURE SENSING BULB FROM ITS MOUNTING POSITION. TO GAIN ACCESS TO THE REAR OF THE CONTROL BOX, PULL THE CONTROL BOX OUT OF THE AIR CONDITIONER AND PLACE IT ON A SURFACE WHICH IS AT APPROXIMATELY THE SAME HEIGHT AS THE CONTROL BOX SO THAT THERE IS NO STRAIN ON THE CAPILLARY TUBE.
5. IF CONTROL BOX IS TO BE REPLACED, THE TEMPERATURE SENSING BULB MUST BE REMOVED FROM ITS MOUNTING POSITION. PROCEED AS FOLLOWS:
6. LOOSEN SCREW (4) IN CLAMP (5) AND SLIDE THE TEMPERATURE SENSING BULB (3) OUT OF CLAMP.
7. PEEL SEALER FROM OUTER EDGE OF GROMMET (7) AND REMOVE GROMMET FROM MOUNTING HOLE. LEAVE GROMMET SEALED IN PLACE AROUND CAPILLARY TUBE (6).
8. CAREFULLY SLIDE TEMPERATURE SENSING BULB THROUGH GROMMET MOUNTING HOLE.
9. REMOVE CONTROL BOX (8) FROM THE UNIT.



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INSTALLATION OF CONTROL BOX

1. IF TEMPERATURE SENSING BULB HAS BEEN LEFT IN PLACE ON AIR CONDITIONER, PROCEED TO STEP 5. IF TEMPERATURE SENSING BULB HAS BEEN REMOVED FROM AIR CONDITIONER, PROCEED AS FOLLOWS:
2. CAREFULLY SLIDE THE TEMPERATURE SENSING BULB UP THROUGH THE GROMMET MOUNTING HOLE.
3. CAREFULLY PUSH THE GROMMET INTO THE GROMMET MOUNTING HOLE. SEAL GROMMET WITH SEALING COMPOUND MIL-C-14255 TYPE II.
4. SLIDE TEMPERATURE SENSING BULB (3) INTO CLAMP (5) AND TIGHTEN SCREW (4).
5. PLACE CONTROL BOX IN MOUNTING POSITION AND SECURE WITH FOUR SCREWS (2) AND CONNECT ELECTRICAL CONNECTOR (1).
6. REFER TO PARAGRAPH 3-10a FOR FINAL STEPS IN INSTALLATION OF CONTROL BOX.

Figure 3-8. Removal and installation of control box

(4) Installation.

- (a) Refer to figure 3-8 and install the control box in the unit.
- (b) Install air filter, air intake grille and lower access panel.

b. Selector Switch.

WARNING

Disconnect the air conditioner from the electrical power source before removing electrical components.

(1) Removal.

- (a) Turn selector switch to the "OFF" position and disconnect the air conditioner from the source of electrical power.
- (b) Remove the lower access panel, air intake grille and air filter.
- (c) Refer to figure 3-8 and remove the control box from the air conditioner.
- (d) Refer to figure 3-9 and remove the selector switch from the control box.

(2) Test. (See figure 3-10.)

- (3) Replace. Replace the selector switch if any failure occurs during testing.

(4) Installation.

- (a) Refer to figure 3-9 and install the selector switch in the control box.
- (b) Refer to figure 3-8 and install the control box in the unit.
- (c) Reinstall the air filter, air intake grille and lower access panel. (Refer to paragraph 3-9.)

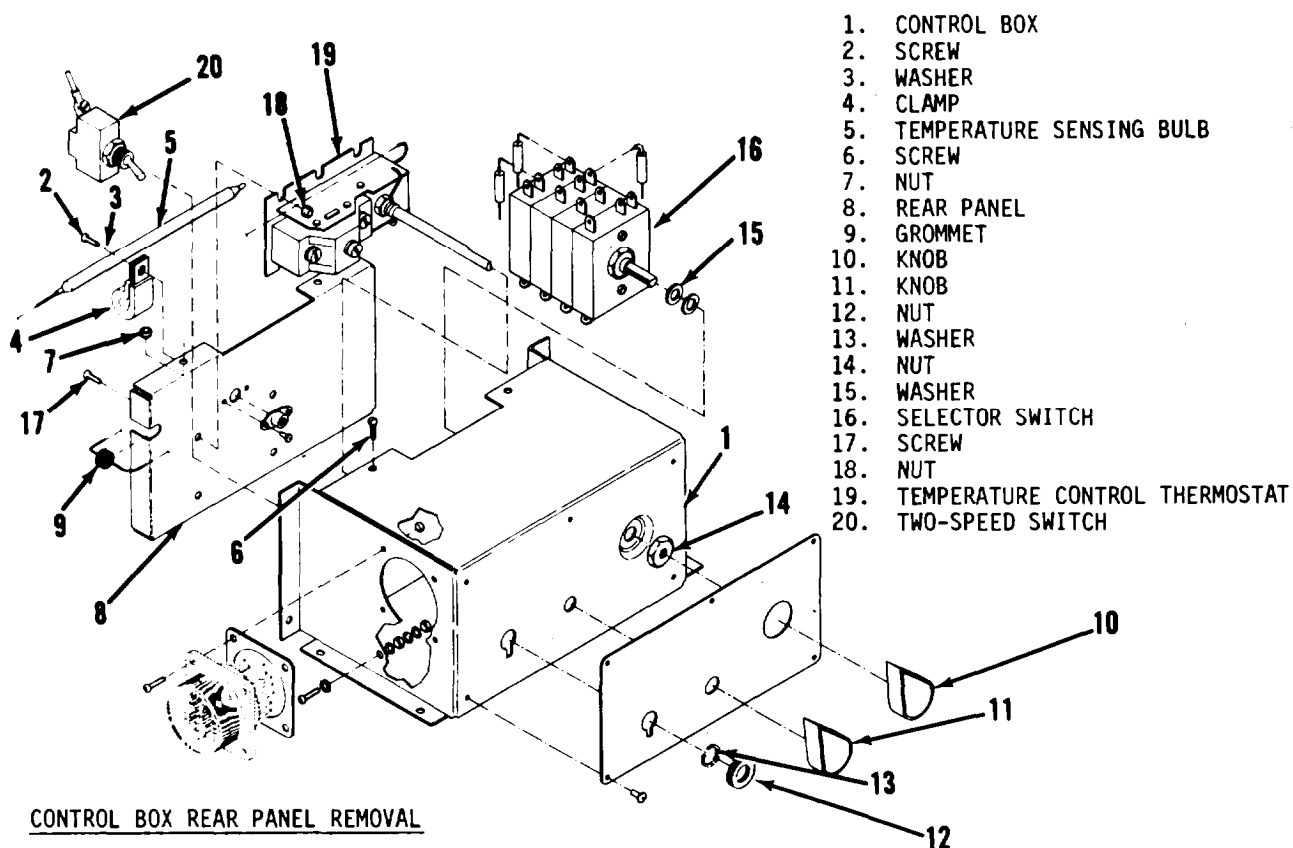
c. Temperature Control Thermostat.

WARNING

Disconnect the air conditioner from the electrical power source before removing the temperature control thermostat.

(1) Removal.

- (a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the source of electrical power.



CONTROL BOX REAR PANEL REMOVAL

1. LOOSEN SETSCREWS IN KNOB (11) AND REMOVE KNOB FROM PANEL.
2. REMOVE FOUR SCREWS (6) AND NUTS (7) AND REMOVE REAR PANEL (8) FROM CONTROL BOX (1).
3. REMOVE GROMMET (9) AND CAPILLARY TUBE FROM REAR PANEL.

CONTROL BOX REAR PANEL INSTALLATION

1. POSITION GROMMET (9) AND CAPILLARY TUBE IN MOUNTING NOTCH ON REAR PANEL.
2. POSITION REAR PANEL ON CONTROL BOX WITH TEMPERATURE CONTROL THERMOSTAT SHAFT EXTENDING THROUGH MOUNTING HOLE.
3. SECURE REAR PANEL WITH FOUR SCREWS (6) AND NUTS (7).
4. INSTALL KNOB (11) ON SHAFT OF TEMPERATURE CONTROL THERMOSTAT AND TIGHTEN SETSCREWS.

SELECTOR SWITCH REMOVAL

1. REFER TO PARAGRAPH 3-10b FOR PRELIMINARY STEPS IN REMOVAL OF SELECTOR SWITCH.
2. REMOVE CONTROL BOX REAR PANEL.
3. LOOSEN SETSCREWS IN KNOB (10) AND REMOVE KNOB FROM PANEL.
4. REMOVE NUT (14) FROM SHAFT OF SELECTOR SWITCH (16) AND PULL SELECTOR SWITCH FREE FROM PANEL AND CONTROL BOX.
5. REMOVE WASHER (15) FROM SHAFT OF SELECTOR SWITCH.
6. TAG AND DISCONNECT ELECTRICAL LEADS FROM SELECTOR SWITCH.

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Figure 3-9. Removal of control box rear panel and components (sheet 1 of 2)

SELECTOR SWITCH INSTALLATION

1. CONNECT ELECTRICAL LEADS TO THE SELECTOR SWITCH (16). REMOVE TAGS FROM LEADS.
2. INSTALL WASHER (15) ON SHAFT OF SELECTOR SWITCH.
3. INSERT SHAFT OF SELECTOR SWITCH INTO MOUNTING HOLE IN CONTROL BOX AND SECURE WITH NUT (14).
4. INSTALL KNOB (10) ON SHAFT OF SELECTOR SWITCH AND TIGHTEN SETSCREWS.
5. INSTALL CONTROL BOX REAR PANEL.
6. REFER TO PARAGRAPH 3-10b FOR FINAL STEPS IN INSTALLATION OF SELECTOR SWITCH.

TEMPERATURE CONTROL THERMOSTAT REMOVAL

1. REFER TO PARAGRAPH 3-10c FOR PRELIMINARY STEPS IN THE REMOVAL OF THE TEMPERATURE CONTROL THERMOSTAT.
2. REMOVE CONTROL BOX REAR PANEL.
3. REMOVE FOUR SCREWS (17) AND NUTS (18) AND REMOVE TEMPERATURE CONTROL THERMOSTAT (19) FROM REAR PANEL OF CONTROL BOX.
4. TAG AND DISCONNECT ELECTRICAL LEADS FROM TEMPERATURE CONTROL THERMOSTAT.

TEMPERATURE CONTROL THERMOSTAT INSTALLATION

1. CONNECT ELECTRICAL LEADS TO TEMPERATURE CONTROL THERMOSTAT (19) AND REMOVE TAGS.
2. POSITION TEMPERATURE CONTROL THERMOSTAT ON REAR PANEL (8) AND SECURE WITH FOUR SCREWS (17) AND NUTS (18).
3. INSTALL CONTROL BOX REAR PANEL, AND INSTALL KNOB ON THERMOSTAT SHAFT.
4. REFER TO PARAGRAPH 3-10c FOR FINAL STEPS IN INSTALLATION OF THERMOSTAT.

TWO-SPEED SWITCH REMOVAL

1. REFER TO PARAGRAPH 3-10d FOR PRELIMINARY STEPS IN THE REMOVAL OF THE TWO-SPEED SWITCH.
2. REMOVE CONTROL BOX REAR PANEL.
3. REMOVE NUT (12) AND WASHER (13) FROM SHAFT OF TWO-SPEED SWITCH (20) AND PULL SWITCH FREE FROM MOUNTING HOLE.
4. TAG AND DISCONNECT ELECTRICAL LEADS FROM SWITCH.

TWO-SPEED SWITCH INSTALLATION

1. CONNECT ELECTRICAL LEADS TO TWO-SPEED SWITCH (20) AND REMOVE TAGS FROM LEADS.
2. INSERT SHAFT OF SWITCH INTO MOUNTING HOLE IN CONTROL BOX AND SECURE WITH NUT (12) AND WASHER (13).
3. INSTALL CONTROL BOX REAR PANEL.
4. REFER TO PARAGRAPH 3-10d FOR FINAL STEPS IN INSTALLATION OF TWO-SPEED SWITCH.

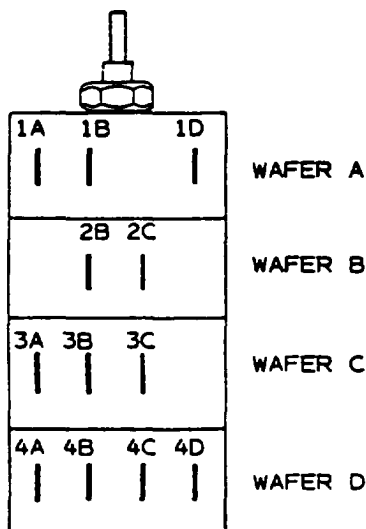
TS5-4120-356-14/3-9

Figure 3-9. Removal of control box rear panel and components (sheet 2 of 2)

SELECTOR SWITCH POSITION	SWITCH FUNCTION	SWITCH WAFERS AND TERMINALS CONNECTED			
		A	B	C	D
1	HEAT (HIGH)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C 32 AND 3A	41 AND 4C 42 AND 4A
2	HEAT (LOW)	12 AND 1A	21 AND 2C 22 AND 2B	31 AND 3C	
3	OFF				
4	VENT		21 AND 2C 22 AND 2B	31 AND 3C	
5	COOL	12 AND 1B 11 AND 1D	21 AND 2C 22 AND 2B	31 AND 3C 32 AND 3B	41 AND 4D 42 AND 4B

WIRING CHART

FLAT ON SHAFT TO BE IN THIS LOCATION WHEN SWITCH IS IN POSITION NO. 3



POSITION NO. 5 STOP

POSITION NO. 4

POSITION NO. 3

POSITION NO. 2

POSITION NO. 1 STOP

CONTINUITY CHECKING

1. TURN SHAFT OF SELECTOR SWITCH COUNTER-CLOCKWISE UNTIL IT STOPS (POSITION 1).
2. REFER TO WIRING CHART AND CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN FOR WAFERS A, B, C AND D, POSITION 1.
3. TURN SHAFT OF SELECTOR SWITCH CLOCKWISE ONE CLICK TO POSITION NO. 2. CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN FOR WAFERS A, B AND C, POSITION 2.
4. TURN SHAFT OF SELECTOR SWITCH CLOCKWISE TWO CLICKS TO POSITION NO. 4. CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN FOR WAFERS B AND C, POSITION 4.
5. TURN SHAFT OF SELECTOR SWITCH CLOCKWISE ONE CLICK TO POSITION NO. 5. CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN FOR WAFERS A, B, C AND D, POSITION NO. 5.

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Figure 3-10. Test procedures for selector switch

(b) Remove the lower access panel, air intake grille and air filter from the unit.

(c) Refer to figure 3-8 and remove the control box from the unit.

(d) Refer to figure 3-9 and remove the temperature control thermostat from the control box.

(2) Test. (See figure 3-11.)

(3) Replace. Replace the temperature control thermostat if any failure occurs during testing.

(4) Installation

(a) Refer to figure 3-9 and Install the temperature control thermostat in the control box.

(b) Refer to figure 3-8 and install the control box into the air conditioner.

(c) Reinstall the air filter, air intake grille and lower access panel.

d. Two-Speed Switch.

WARNING

Disconnect the air conditioner from the electrical power source before removing the two-speed switch.

(1) Removal.

conditioner from (a) Turn selector switch to "OFF" position and disconnect the air conditioner from the source of electrical power.

(b) Remove the lower access panel, air intake grille and air filter.

(c) Refer to figure 3-8 and remove the control box from the unit.

control box. (d) Refer to figure 3-9 and remove the two-speed switch from the control box.

(2) Test. (See figure 3-11.)

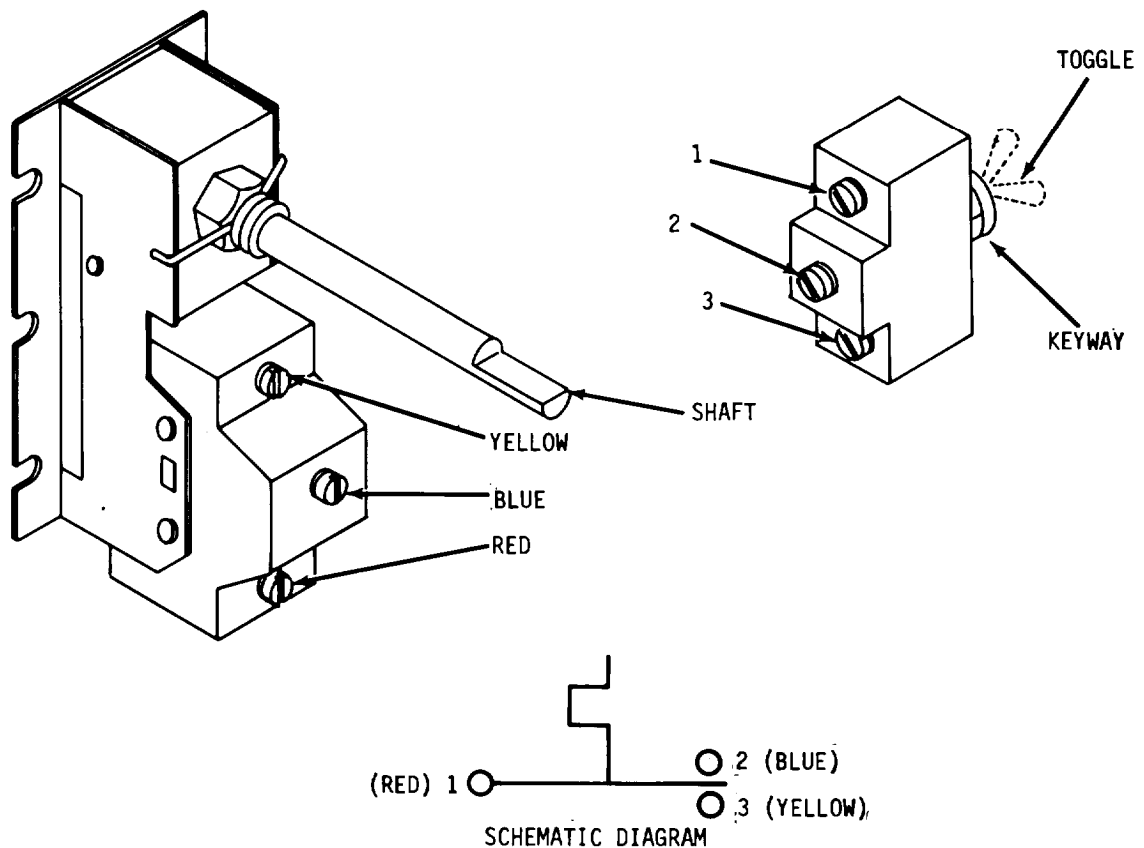
testing. (3) Replace. Replace the two-speed switch if any failure occurs during testing.

(4) Installation.

control box. (a) Refer to figure 3-9 and install the two-speed switch in the control box.

(b) Refer to figure 3-8 and install the control box into the unit.

panel. (c) Reinstall the air filter, air intake grille and lower access panel.



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Figure 3-11. Temperature control thermostat and two-speed switch tests

e. Junction Box.

(1) Inspection. Inspect the junction box for burn-out and for any damage which would impair serviceability.

(2) Replace. Replace the junction box in case of burn-out or damage which would impair serviceability. Refer to steps (3) and (4) for removal and installation of the junction box.

WARNING

Disconnect the air conditioner from the electrical power source before removing the junction box or its components.

(3) Removal.

(a) Turn selector switch to "OFF" position and disconnect the air conditioner from the source of electrical power.

(b) Remove the lower access panel, air intake grille and air filter.

(c) Refer to figure 3-12 and remove the junction box from the unit.

(4) Installation.

(a) Refer to figure 3-12 and install the junction box in the unit.

(b) Reinstall the air filter, air intake grille and the lower access panel on the air conditioner.

f. Fuses.

WARNING

Disconnect the air conditioner from the electrical power source before removing fuses from the junction box.

(1) Removal.

(a) Turn selector switch to "OFF" position and disconnect the air conditioner from the source of electrical power.

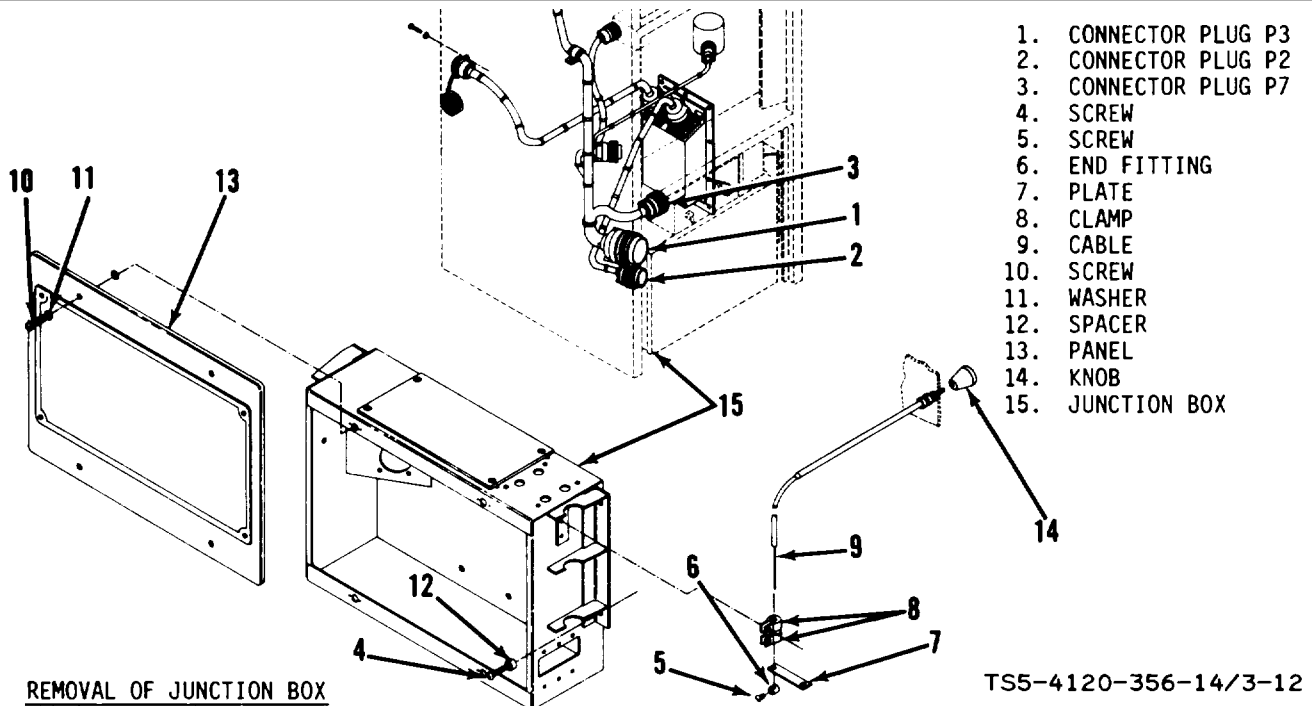
(b) Remove the lower access panel from the air conditioner.

(c) Refer to figure 3-12 and remove panel (13) from the junction box.

(d) Refer to figure 3-13 and remove the three fuses from the junction box .

(2) Test. (See figure 3-13.)

(3) Replace. Replace any fuse which fails test.



REMOVAL OF JUNCTION BOX

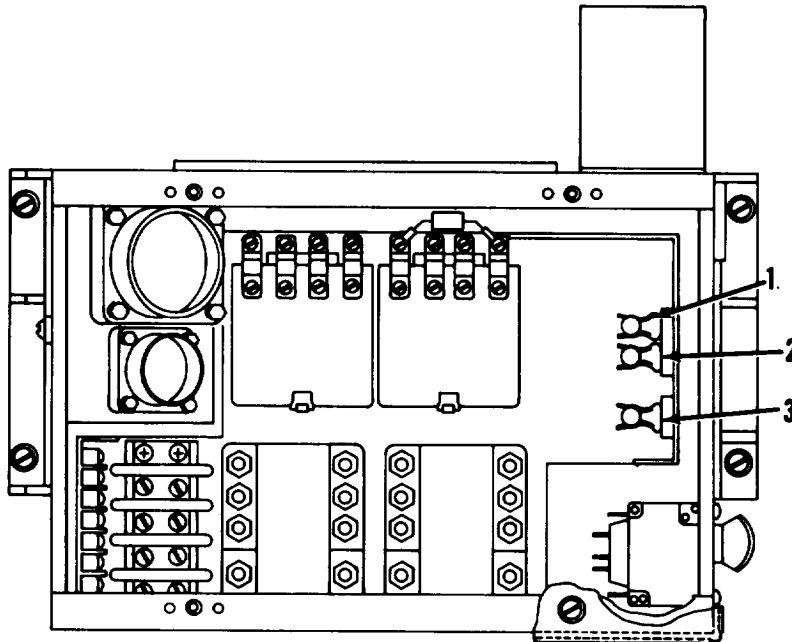
TS5-4120-356-14/3-12

1. REFER TO PARAGRAPH 3-10e FOR PRELIMINARY STEPS IN THE REMOVAL OF THE JUNCTION BOX.
2. IF THE JUNCTION BOX IS TO BE REPLACED, REFER TO FIGURE 3-8 AND REMOVE THE CONTROL BOX. IF THE JUNCTION BOX IS BEING PULLED OUT OF THE UNIT FOR MAINTENANCE PURPOSES ONLY, THE CONTROL BOX MAY BE LEFT IN PLACE ON TOP OF THE JUNCTION BOX.
3. REMOVE FOUR SCREWS (4) AND SPACERS (12) AND PULL JUNCTION BOX OUT OF UNIT.
4. DISCONNECT CONNECTOR PLUGS (1, 2). IF CONTROL BOX HAS BEEN LEFT IN PLACE, DISCONNECT CONNECTOR PLUG (3).
5. REMOVE FOUR SCREWS (10) AND WASHERS (11) AND REMOVE PANEL (13) FROM JUNCTION BOX (15).
6. IF THE JUNCTION BOX IS BEING PULLED OUT OF THE UNIT FOR MAINTENANCE PURPOSES ONLY, THE CIRCUIT BREAKER CABLE MAY BE LEFT ATTACHED TO THE SIDE OF THE JUNCTION BOX.
7. IF THE JUNCTION BOX IS TO BE REPLACED, REMOVE SCREW (5) AND SLIDE END FITTING (6) OFF END OF CABLE (9). PULL ON KNOB (14) UNTIL CABLE (9) CLEARS CLAMPS (8).

INSTALLATION OF JUNCTION BOX

1. POSITION COVER (13) ON JUNCTION BOX (15) AND SECURE WITH FOUR SCREWS (10) AND WASHERS (11).
2. IF CIRCUIT BREAKER CABLE HAS BEEN REMOVED, THREAD CABLE (9) THROUGH CLAMPS (8) AND PLATE (7). THREAD END OF FITTING (6) ONTO CABLE (9) AND SECURE WITH SCREW (5).
3. CONNECT CONNECTOR PLUGS (1, 2). IF CONTROL BOX HAS BEEN LEFT IN PLACE ON JUNCTION BOX, CONNECT CONNECTOR PLUG (3).
4. IF CONTROL BOX HAS BEEN REMOVED FROM JUNCTION BOX, REFER TO FIGURE 3-8 AND INSTALL CONTROL BOX.
5. POSITION JUNCTION BOX IN UNIT AND SECURE WITH FOUR SCREWS (4) AND SPACERS (12).
6. REFER TO PARAGRAPH 3-10e FOR FINAL-STEPS IN INSTALLATION OF JUNCTION BOX.

Figure 3-12. Removal and installation of junction box



- 1. FUSE
- 2. FUSE
- 3. FUSE

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REMOVAL OF FUSES

1. REFER TO PARAGRAPH 3-10f FOR PRELIMINARY STEPS IN THE REMOVAL OF FUSES.
2. GRASP EACH FUSE WITH FUSE PULLER AND PULL FUSE FROM HOLDER. TAG EACH FUSE.

TEST OF FUSES

1. USING A CIRCUIT TESTER, CHECK FOR CONTINUITY BETWEEN THE TWO ENDS OF EACH FUSE.
2. REPLACE ANY FUSE WHICH DOES NOT SHOW CONTINUITY.

INSTALLATION OF FUSES

1. USING FUSE PULLER, PRESS EACH FUSE INTO ITS PROPER HOLDER. REMOVE TAGS.
2. REFER TO PARAGRAPH 3-10f FOR FINAL STEPS IN INSTALLATION OF FUSES.

Figure 3-13. Removal, test and installation of fuses

(4) Installation.

- (a) Refer to figure 3-13 and install fuses in junction box.
- (b) Refer to figure 3-12 and install panel (13) on junction box.
- (c) Reinstall lower access panel on air conditioner.

g. Circuit Breaker.

WARNING

Disconnect the air conditioner from the electrical power source before removing circuit breaker from junction box.

(1) Removal.

(a) Turn selector switch to "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Remove the lower access panel, air intake grille and air filter.

(c) Refer to figure 3-12 and remove the junction box from the unit.

(d) Refer to figure 3-14 and remove the circuit breaker from the junction box.

(2) Inspection. Inspect the circuit breaker for damage which would impair serviceability.

(3) Test. (See figure 3-14.)

(4) Replace. Replace the circuit breaker if there is any damage which would impair serviceability or if any failure occurs during testing.

(5) Installation.

(a) Refer to figure 3-14 and install the circuit breaker in the junction box.

(b) Refer to figure 3-12 and install the junction box in the air conditioner.

(c) Reinstall the air filter, air intake grille and lower access panel.

h. Heater Relay K2 and Compressor Relay K1

WARNING

Disconnect the air conditioner From the electrical power source before removing relays from the junction box.

(1) Removal.

(a) Turn selector switch to "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Remove lower access panel, air intake grille and air filter.

(c) Refer to figure 3-12 and remove the junction box from the unit.

(d) Refer to figure 3-15 and remove heater relay K2 and/or compressor start relay K1.

Inspection. Inspect the relays for damage which would impair serviceability.

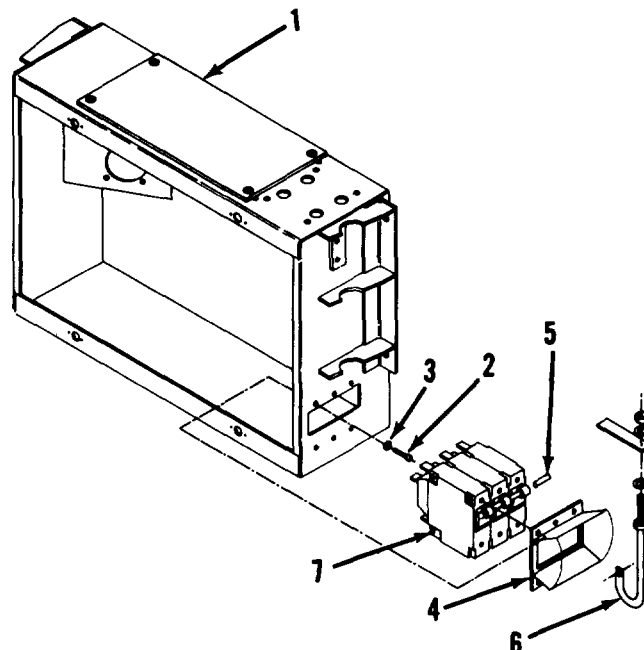
(3) Test. (See figure 3-16.)

(4) Replace. Replace relay K1 and/or K2 if there is any damage to the relays which would impair serviceability or if any failure occurs during testing.

REMOVAL OF CIRCUIT BREAKER

1. REFER TO PARAGRAPH 3-10g FOR PRELIMINARY STEPS IN REMOVAL OF THE CIRCUIT BREAKER.
2. REMOVE SIX SCREWS (2) AND WASHERS (3) AND PULL COVER (4) LOOSE FROM JUNCTION BOX (1).
3. REMOVE PIN (5) FROM ARM (6) AND SEPARATE ARM FROM CIRCUIT BREAKER.
4. TAG AND DISCONNECT ELECTRICAL LEADS FROM CIRCUIT BREAKER.
5. REMOVE CIRCUIT BREAKER (7) FROM JUNCTION BOX (1).

1. JUNCTION BOX
2. SCREW
3. WASHER
4. COVER
5. PIN
6. ARM
7. CIRCUIT BREAKER



INSTALLATION OF CIRCUIT BREAKER

1. POSITION CIRCUIT BREAKER IN JUNCTION BOX AND CONNECT ELECTRICAL LEADS TO CIRCUIT BREAKER TERMINALS. REMOVE TAGS FROM LEADS.
2. INSERT END OF ARM (6) THROUGH HOLE IN COVER (4).
3. POSITION END OF ARM (6) ON CIRCUIT BREAKER SWITCH LEVER AND SECURE WITH PIN (5).
4. SECURE COVER (4) AND CIRCUIT BREAKER (7) TO JUNCTION BOX (1) WITH SIX SCREWS (2) AND WASHERS (3).
5. REFER TO PARAGRAPH 3-10g FOR FINAL STEPS IN INSTALLATION OF CIRCUIT BREAKER.

CIRCUIT BREAKER
SWITCH TO "ON"
POSITION:
CHECK FOR
CONTINUITY
BETWEEN
TERMINALS

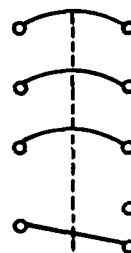
C1 AND C2
B1 AND B2
A1 AND A2
C AND NO

TABLE A

CIRCUIT BREAKER
SWITCH TO "OFF"
POSITION:
CHECK FOR
SHORT CIRCUIT
BETWEEN
TERMINALS

C1 AND C2
B1 AND B2
A1 AND A2
C AND NO

TABLE B



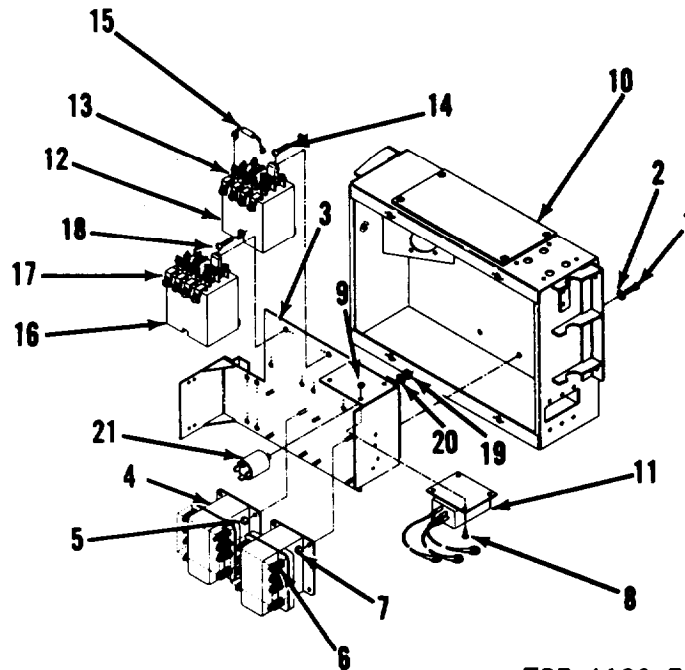
CIRCUIT BREAKER SCHEMATIC DIAGRAM

1. REFER TO TABLE A AND CONTINUITY CHECK THE CIRCUIT BREAKER. REPLACE CIRCUIT BREAKER IF NO CONTINUITY BETWEEN TERMINALS LISTED.
2. REFER TO TABLE B AND SHORT CIRCUIT CHECK CIRCUIT BREAKER. REPLACE CIRCUIT BREAKER IF ANY SHORT CIRCUITS ARE FOUND.

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Figure 3-14. Circuit breaker removal, installation and test

1. SCREW
2. WASHER
3. BRACKET
4. HEATER RELAY K2
5. NUT
6. COMPRESSOR START RELAY K1
7. NUT
8. SCREW
9. NUT
10. JUNCTION BOX
11. TIME DELAY RELAY K3
12. RELAY COVER
13. FAN RELAY K4
14. SCREW
15. DIODE CR2
16. RELAY COVER
17. FAN RELAY K5
18. SCREW
19. NUT
20. WASHER
21. RECTIFIER CR1



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REMOVAL OF BRACKET

1. REMOVE EIGHT SCREWS (1) AND WASHERS (2) .
2. PULL BRACKET (3) AND ASSOCIATED COMPONENTS AND WIRING HARNESS AWAY FROM JUNCTION BOX AS FAR AS CONNECTING HARNESS WILL ALLOW.

INSTALLATION OF BRACKET

1. POSITION BRACKET IN JUNCTION BOX.
2. SECURE BRACKET WITH EIGHT SCREWS (1) AND WASHERS (2).

REMOVAL OF HEATER RELAY K2

1. REFER TO PARAGRAPH 3-19h FOR PRELIMINARY STEPS IN REMOVAL OF HEATER RELAY K2.
2. TAG AND DISCONNECT ELECTRICAL LEADS FROM RELAY (4).
3. REMOVE FOUR NUTS (5) AND PULL RELAY (4) FREE FROM BRACKET.

INSTALLATION OF HEATER RELAY K2

1. POSITION RELAY (4) ON BRACKET (3) AND SECURE WITH FOUR NUTS (5).
2. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON RELAY (4). REMOVE TAGS FROM LEADS.
3. REFER TO PARAGRAPH 3-10h FOR FINAL STEPS IN INSTALLATION OF HEATER RELAY K2.

REMOVAL OF COMPRESSOR START RELAY K1

1. REFER TO PARAGRAPH 3-10h FOR PRELIMINARY STEPS IN REMOVAL OF COMPRESSOR START RELAY K1.
2. TAG AND DISCONNECT ELECTRICAL LEADS FROM RELAY (6).
3. REMOVE FOUR NUTS (7) AND PULL RELAY (6) FREE FROM BRACKET.

INSTALLATION OF COMPRESSOR START RELAY K1

1. POSITION RELAY (6) ON BRACKET (3) AND SECURE WITH FOUR NUTS (7).
2. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON RELAY (6). REMOVE TAGS FROM LEADS.
3. REFER TO PARAGRAPH 3-10h FOR FINALS STEPS IN INSTALLATION OF COMPRESSOR START RELAY K1.

Figure 3-15. Removal and installation of relays (sheet 1 of 2)

REMOVAL OF TIME DELAY RELAY K3

1. REFER TO PARAGRAPH 3-10j FOR PRELIMINARY STEPS IN REMOVAL OF TIME DELAY RELAY K3.
2. REFER TO ABOVE INSTRUCTIONS AND REMOVE BRACKET (3) FROM JUNCTION BOX.
3. REMOVE NUT (19) AND WASHER (20) AND **PULL** RECTIFIER (21) AWAY FROM BRACKET (3). (NOTE: DO NOT REMOVE ELECTRICAL LEADS FROM RECTIFIER.)
4. REMOVE FOUR SCREWS (8) AND NUTS (9) AND PULL RELAY (11) AWAY FROM BRACKET (3).
5. TAG AND UNSOLDER ELECTRICAL LEADS FROM RELAY (11).

INSTALLATION OF TIME DELAY RELAY K3

1. SOLDER ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON RELAY (11). REMOVE TAGS FROM LEADS.
2. POSITION RELAY (11) ON BRACKET (3) AND SECURE WITH FOUR SCREWS (8) AND NUTS (9).
3. POSITION RECTIFIER (21) ON BRACKET (3) AND SECURE WITH WASHER (20) AND NUT (19).
4. REFER TO ABOVE INSTRUCTIONS AND INSTALL BRACKET (3) IN JUNCTION BOX.
5. REFER TO PARAGRAPH 3-10j FOR FINAL STEPS IN INSTALLATION OF TIME DELAY RELAY K3.

REMOVAL OF FAN RELAY K4

1. REFER TO PARAGRAPH 3-10k FOR PRELIMINARY STEPS IN REMOVAL OF FAN RELAY K4.
2. REFER TO ABOVE INSTRUCTIONS AND REMOVE BRACKET (3) FROM JUNCTION BOX.
3. TAG AND DISCONNECT ELECTRICAL LEADS FROM RELAY (13) .
4. TAG FOR POLARITY AND DISCONNECT DIODE (15) FROM RELAY (13).
5. REFER TO ABOVE INSTRUCTIONS AND REMOVE COMPRESSOR START RELAY K1 (6).
6. OPERATE SLIDE LATCH ON BACK OF RELAY COVER (12) AND REMOVE COVER FROM RELAY (13).
7. LOOSEN THREE SCREWS (14) AND REMOVE RELAY (13) FROM BRACKET (3) .

INSTALLATION OF FAN RELAY K4

1. POSITION RELAY (13) ON BRACKET (3) AND PLACE THREE SCREWS (14) IN MOUNTING SLOTS IN BASE OF RELAY . SECURE RELAY TO BRACKET BY TIGHTENING SCREWS.
2. PLACE RELAY COVER (12) ON RELAY (13) AND SECURE WITH SLIDE LATCH ON BACK OF RELAY COVER.
3. REFER TO ABOVE INSTRUCTIONS AND INSTALL COMPRESSOR START RELAY K1 (6).
4. CONNECT DIODE (15) TO APPROPRIATE TERMINALS ON RELAY (13). MAKE SURE POLARITY IS CORRECT.
5. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON RELAY (13). REMOVE TAGS FROM LEADS.
6. REFER TO ABOVE INSTRUCTIONS AND INSTALL BRACKET (3) IN JUNCTION BOX.
7. REFER TO PARAGRAPH 3-10k FOR FINAL INSTRUCTIONS ON INSTALLATION OF FAN RELAY K4.

REMOVAL OF FAN RELAY K5

1. REFER TO PARAGRAPH 3-10k FOR PRELIMINARY STEPS IN REMOVAL OF FAN RELAY K5.
2. REFER TO ABOVE INSTRUCTIONS AND REMOVE BRACKET (3) FROM JUNCTION BOX.
3. TAG AND DISCONNECT ELECTRICAL LEADS FROM RELAY (17).
4. REFER TO ABOVE INSTRUCTIONS AND REMOVE HEATER RELAY K2 (4).
5. OPERATE SLIDE LATCH ON BACK OF RELAY COVER (16) AND REMOVE RELAY COVER FROM RELAY (17).
6. LOOSEN THREE SCREWS (18) AND REMOVE RELAY (17) FROM BRACKET (3).

INSTALLATION OF FAN RELAY K5

1. POSITION RELAY (17) ON BRACKET (3) AND PLACE THREE SCREWS (18) IN MOUNTING SLOTS IN BASE OF RELAY . SECURE RELAY TO BRACKET BY TIGHTENING SCREWS.
2. PLACE RELAY COVER (16) ON RELAY (17) AND SECURE WITH SLIDE LATCH ON BACK OF RELAY COVER.
3. REFER TO ABOVE INSTRUCTIONS AND INSTALL HEATER RELAY K2 (4).
4. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON RELAY (17). REMOVE TAGS FROM LEADS.
5. REFER TO ABOVE INSTRUCTIONS AND INSTALL BRACKET (3) IN JUNCTION BOX.
6. REFER TO PARAGRAPH 3-10k FOR FINAL STEPS IN INSTALLATION OF FAN RELAY K5.

Figure 3-15. Removal and installation of relays (sheet 2 of 2)

DE-ENERGIZED
CHECK FOR
CIRCUIT
BETWEEN

A1 AND A2
B1 AND B2
C1 AND C2

TABLE A

DE-ENERGIZED
CHECK FOR
CONTINUITY
BETWEEN

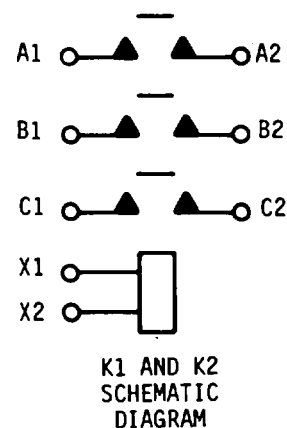
X1 AND X2

TABLE B

ENERGIZED
CHECK FOR
CONTINUITY
BETWEEN

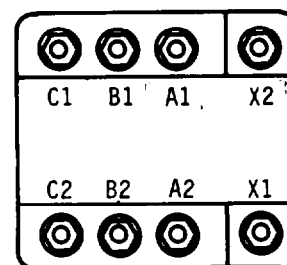
A1 AND A2
B1 AND B2
C1 AND C2

TABLE C



TEST PROCEDURE FOR RELAY K3

1. TAG AND DISCONNECT WIRE V14B16 FROM TB2 TERMINAL 3, WIRE V12B16 FROM TB2 TERMINAL 2, AND WIRE V13D16N FROM RELAY K1 TERMINAL X1.
2. CHECK FOR SHORT CIRCUIT BETWEEN WIRES REMOVED IN STEP 1. REPLACE RELAY K3 IF ANY SHORT CIRCUIT IS FOUND.
3. RECONNECT WIRES DISCONNECTED IN STEP 1. REMOVE TAGS FROM WIRES.



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TEST PROCEDURES FOR RELAYS K1 AND K2

1. REFER TO FIGURE 3-15 AND REMOVE RELAYS K1 AND K2.
2. WITH RELAY DE-ENERGIZED, CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS SHOWN IN TABLE A. IF ANY SHORT CIRCUIT IS FOUND, REPLACE RELAY.
3. WITH RELAY DE-ENERGIZED, CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN IN TABLE B. IF ANY OPEN CIRCUIT IS FOUND, REPLACE RELAY.
4. ENERGIZE RELAY COIL BETWEEN TERMINALS X1 AND X2 WITH 28 ± 1 VDC.
5. WITH RELAY ENERGIZED, CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN IN TABLE C. IF ANY OPEN CIRCUIT IS FOUND, REPLACE RELAY.
6. DE-ENERGIZE RELAY.
7. REFER TO FIGURE 3-15 AND REINSTALL RELAYS K1 AND K2.

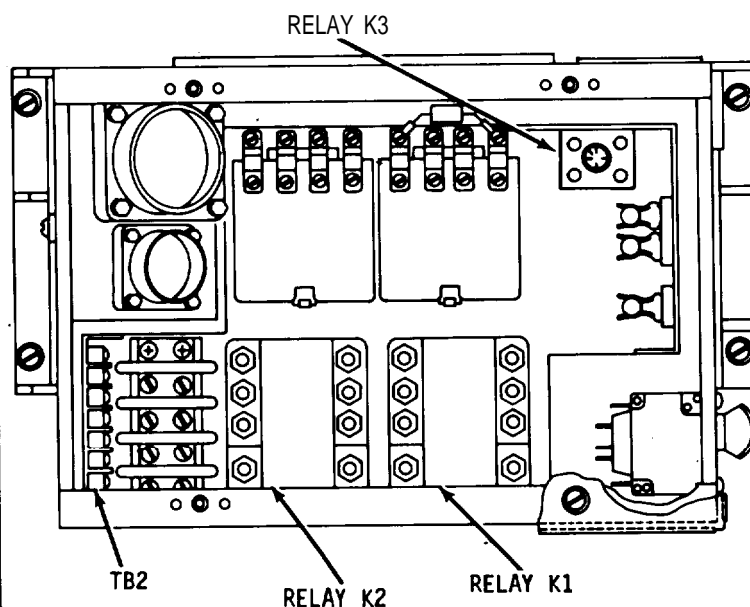


Figure 3-16. Test procedures for relays K1, K2 and K3

(5) Installation.

- (a) Refer to figure 3-15 and install relays K1 and/or K2.
- (b) Refer to figure 3-12 and install junction box in unit.
- (c) Reinstall air filter, air intake grille and lower access panel.

j. Time Delay Relay K3.

WARNING

Disconnect the air conditioner from the electrical power source before inspecting, testing or removing relay K3.

(1) Inspection.

- (a) Turn selector switch to "OFF" position and disconnect the air conditioner from the electrical power source.
- (b) Remove the lower access panel, air intake grille and air filter.
- (c) Refer to figure 3-12 and remove panel from junction box.
- (d) Inspect time delay relay K3 for damage which would impair serviceability.

(2) Test. (See figure 3-16.)

(3) Replace. Replace time delay relay K3 if there is any damage to the relay which would impair serviceability or if any failure occurs during testing. Refer to steps (4) and (5) for removal of defective relay and the installation of a new relay.

(4) Removal.

- (a) Refer to figure 3-12 and remove the junction box from unit.
- (b) Refer to figure 3-15 and remove time delay relay K3.

(5) Installation.

- (a) Refer to figure 3-15 and install time delay relay K3.
- (b) Refer to figure 3-12 and install junction box in the unit.
- (c) Reinstall air filter, air intake grille and lower access panel.

k. Fan Relays K4 and K5

WARNING

Disconnect the air conditioner from the electrical power source before inspecting, testing or removing relays K4 or K5.

(1) Inspection

- (a) Turn selector switch to "OFF" position and disconnect the air conditioner from the electrical power source.
- (b) Remove the lower access panel, air intake grille and air filter.
- (c) Refer to figure 3-12 and remove panel from junction box.
- (d) Inspect fan relays K4 and K5 for damage which would impair serviceability.

(2) Test. (See figure 3-17.)

(3) Replace. Replace fan relays K4 and/or K5 if there is any damage which would impair serviceability or if any failure occurs during testing. Refer to steps (4) and (5) for removal of defective relay(s) and the installation of new relay(s).

(4) Removal.

- (a) Refer to figure 3-12 and remove junction box from unit.
- (b) Refer to figure 3-15 and remove relay K4 and/or K5.

(5) Installation.

- (a) Refer to figure 3-15 and install fan relay K4 and/or K5.
- (b) Refer to figure 3-12 and install junction box in unit.
- (c) Reinstall air filter, air intake grille and lower access panel.

I. Transformer.

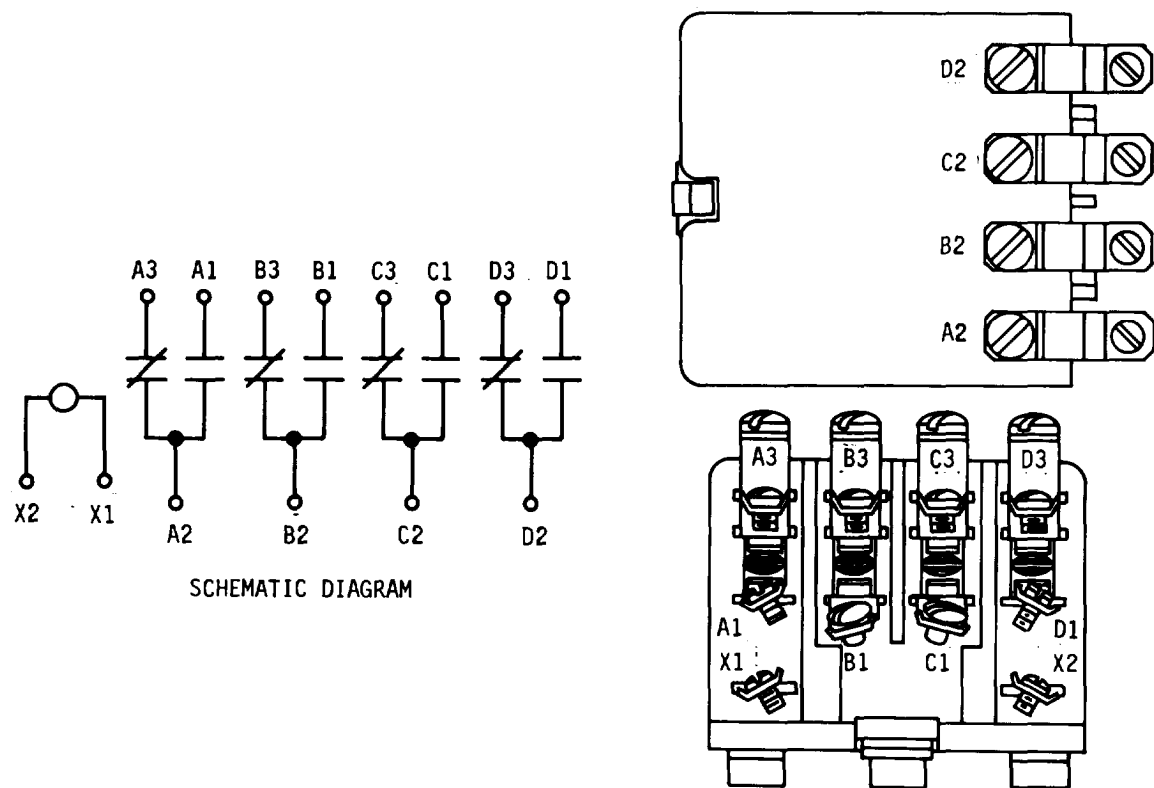
WARNING

Disconnect the air conditioner from the electrical power source before inspecting, testing or removing the transformer.

(1) Inspection.

- (a) Turn the selector switch to "OFF" position and disconnect the air conditioner from the electrical power source.
- (b) Loosen attaching screws and remove lower access panel.
- (c) Refer to figure 3-12 and remove junction box panel.
- (d) Inspect transformer for burn-out or other damage which would impair serviceability.

(2) Test. (See figure 3-18.)



SCHEMATIC DIAGRAM

DE-ENERGIZED CHECK FOR CONTINUITY BETWEEN
X1 AND X2
A2 AND A3
B2 AND B3
C2 AND C3
D2 AND D3

TABLE A

DE-ENERGIZED CHECK FOR SHORT CIRCUIT BETWEEN
A1 AND A2
B1 AND B2
C1 AND C2
D1 AND D2
X1 AND CASE

TABLE B

ENERGIZED CHECK FOR CONTINUITY BETWEEN
A1 AND A2
B1 AND B2
C1 AND C2
D1 AND D2

TABLE C

ENERGIZED CHECK FOR SHORT CIRCUIT BETWEEN
A2 AND A3
B2 AND B3
C2 AND C3
D2 AND D3

TABLE D

TEST PROCEDURES FOR RELAYS K4 AND K5

1. WITH RELAY DE-ENERGIZED, CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN IN TABLE A. REPLACE RELAY IF ANY OPEN CIRCUIT IS FOUND.
2. WITH RELAY DE-ENERGIZED, CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS SHOWN IN TABLE B. REPLACE RELAY IF ANY SHORT CIRCUIT IS FOUND.
3. ENERGIZE RELAY COIL BETWEEN TERMINALS X1 AND X2 WITH 28 ± 1 VOLT DC.
4. WITH RELAY ENERGIZED, CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN IN TABLE C. REPLACE RELAY IF ANY OPEN CIRCUIT IS FOUND.
5. WITH RELAY ENERGIZED, CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS SHOWN IN TABLE D. REPLACE RELAY IF ANY SHORT CIRCUIT IS FOUND.
6. DE-ENERGIZE RELAY.

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Figure 3-17. Test procedures for fan relays K4 and K5

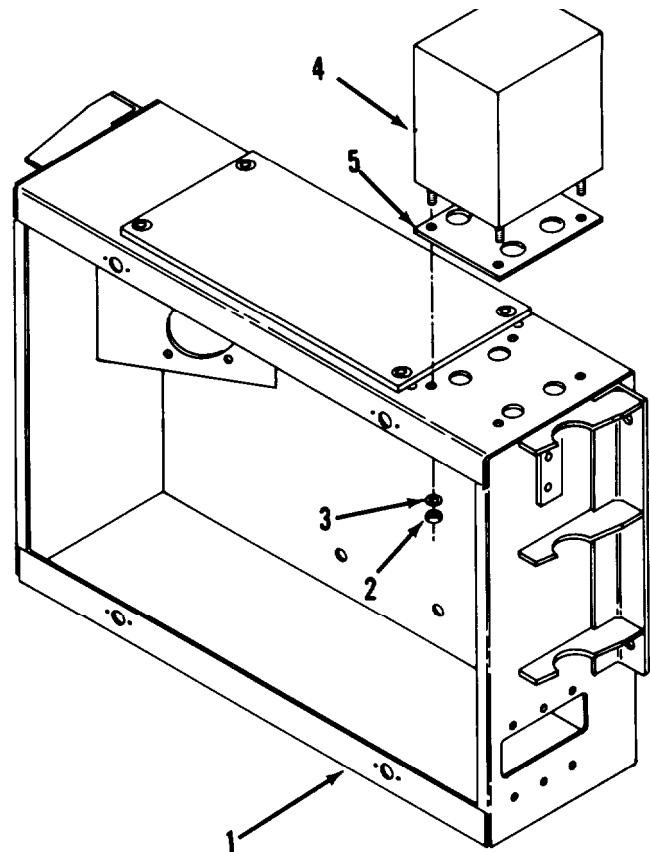
REMOVAL OF TRANSFORMERWARNING

Disconnect the air conditioner from the electrical power source before attempting to remove components from the junction box.

1. REFER TO PARAGRAPH 3-10I FOR PRELIMINARY STEPS IN REMOVAL OF THE TRANSFORMER.
2. TAG AND DISCONNECT ELECTRICAL LEADS FROM TRANSFORMER.
3. REMOVE FOUR NUTS (2) AND WASHERS (3) FROM TRANSFORMER MOUNTING STUDS.
4. REMOVE TRANSFORMER (4) AND INSULATION (5) FROM JUNCTION BOX (1).
5. SEPARATE INSULATION (5) FROM TRANSFORMER (4).

INSTALLATION OF TRANSFORMER

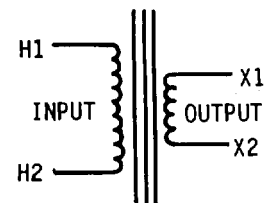
1. POSITION INSULATION (5) ON TRANSFORMER (4) AND POSITION TRANSFORMER ON TOP OF JUNCTION BOX (1).
2. SECURE TRANSFORMER TO JUNCTION BOX WITH FOUR NUTS (2) AND WASHERS (3).
3. CONNECT ELECTRICAL LEADS TO PROPER TERMINALS ON TRANSFORMER. REMOVE TAGS FROM ELECTRICAL LEADS.
4. REFER TO PARAGRAPH 3-10I FOR FINAL STEPS IN INSTALLATION OF TRANSFORMER.



1. JUNCTION BOX
2. NUT
3. WASHER
4. TRANSFORMER
5. INSULATION

TRANSFORMER TEST

1. CHECK FOR CONTINUITY BETWEEN TERMINAL H1 AND H2. REPLACE TRANSFORMER IF AN OPEN CIRCUIT IS FOUND.
2. CHECK FOR CONTINUITY BETWEEN TERMINALS X1 AND X2. REPLACE TRANSFORMER IF AN OPEN CIRCUIT IS FOUND.
3. CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS H1 AND X1. REPLACE TRANSFORMER IF A SHORT CIRCUIT IS FOUND.
4. CHECK FOR SHORT CIRCUIT BETWEEN TERMINAL H1 AND THE TRANSFORMER CASE. REPLACE TRANSFORMER IF A SHORT CIRCUIT IS FOUND.
5. CHECK FOR SHORT CIRCUIT BETWEEN TERMINAL X1 AND THE TRANSFORMER CASE. REPLACE TRANSFORMER IF A SHORT CIRCUIT IS FOUND.

TRANSFORMER SCHEMATIC DIAGRAM

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Figure 3-18. Removal installation and testing of transformer

(3) Replace. Replace the transformer if damaged to the extent that serviceability would be impaired or if any failure occurs during testing. Refer to steps (4) and (5) for removal of defective transformer and the installation of a new transformer.

(4) Removal. (See figure 3-18.)

(5) Installation.

(a) Refer to figure 3-18 and install transformer in the junction box.

(b) Install junction box panel and lower access panel.

m. Terminal Boards TB1 and TB2

WARNING

Disconnect the air conditioner from the electrical power source before attempting to perform the following procedures on the terminal boards.

(1) Inspection.

(a) Turn selector switch to "OFF" position and disconnect the air conditioner from electrical power source.

(b) Loosen attaching screws and remove lower access panel.

(c) Remove attaching screws and washers and remove, junction box cover.

(d) Inspect terminal boards TB1 and TB2 for damage which would impair serviceability.

(2) Replace. Replace terminal board TB1 and/or TB2 if there is any damage which would impair serviceability. Refer to steps (3) and (4) for removal and installation of terminal boards.

(3) Removal.

(a) Refer to figure 3-12 and remove junction box from unit.

(b) Refer to figure 3-15 and remove bracket from junction box.

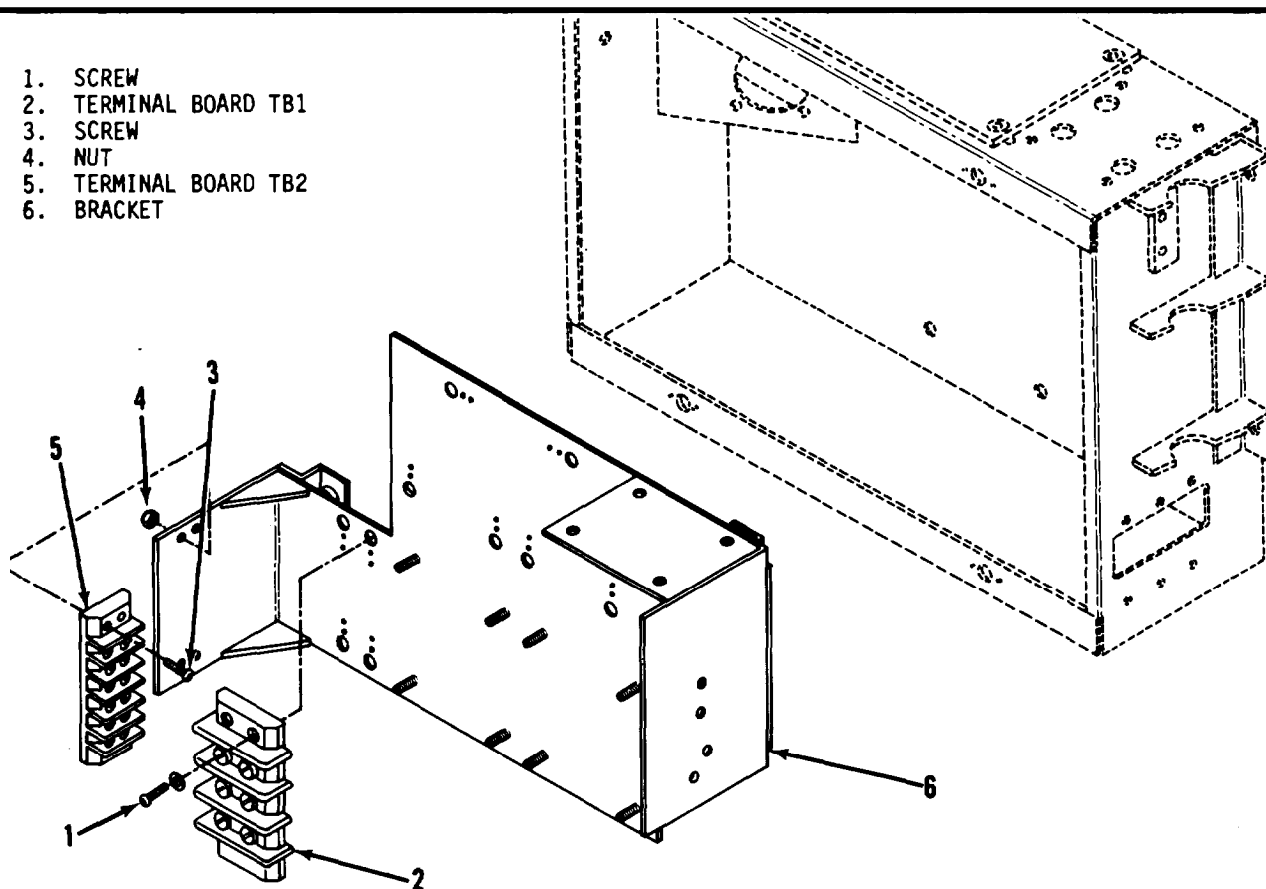
(c) Refer to figure 3-19 and remove terminal board TB1 and/or TB2 from junction box.

(4) Installation.

(a) Refer to figure 3-19 and 3-15 and install terminal board TB1 and/or TB2 and bracket in junction box.

(b) Install lower access panel and secure with attaching screws.

1. SCREW
2. TERMINAL BOARD TB1
3. SCREW
4. NUT
5. TERMINAL BOARD TB2
6. BRACKET



REMOVAL OF TERMINAL BOARD TB1

1. REFER TO PARAGRAPH 3-10m FOR PRELIMINARY STEPS IN THE REMOVAL OF TERMINAL BOARD TB1.
2. TAG AND DISCONNECT ELECTRICAL LEADS FROM TB1.
3. REMOVE FOUR SCREWS (1) AND REMOVE TERMINAL BOARD (2) FROM BRACKET (6).

INSTALLATION OF TERMINAL BOARD TB1

1. POSITION TERMINAL BOARD TB1 (2) ON BRACKET (6) AND SECURE WITH FOUR SCREWS (1).
2. CONNECT ELECTRICAL LEADS TO PROPER TERMINALS ON TERMINAL BOARD AND REMOVE TAGS FROM LEADS.
3. REFER TO PARAGRAPH 3-10m FOR FINAL STEPS IN THE INSTALLATION OF TERMINAL BOARD TB1.

REMOVAL OF TERMINAL BOARD TB2

1. REFER TO PARAGRAPH 3-10m FOR PRELIMINARY STEPS IN THE REMOVAL OF TERMINAL BOARD TB2.
2. TAG AND DISCONNECT ELECTRICAL LEADS FROM TB2.
3. REMOVE FOUR SCREWS (3) AND NUTS (4) THEN REMOVE TERMINAL BOARD (5) FROM BRACKET (6).

INSTALLATION OF TERMINAL BOARD TB2

1. POSITION TERMINAL BOARD TB2 (5) ON BRACKET (6) AND SECURE WITH FOUR SCREWS (3) AND NUTS (4).
2. CONNECT ELECTRICAL LEADS TO THE PROPER TERMINALS ON TERMINAL BOARD AND REMOVE TAGS FROM LEADS.
3. REFER TO PARAGRAPH 3-10m FOR FINAL STEPS IN THE INSTALLATION OF TERMINAL BOARD TB2.

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Figure 3-19. Removal and installation of terminal boards

n. Electrical Receptacles J7, J3 and J2.

WARNING

Disconnect the air conditioner from the electrical power source before attempting to perform maintenance on the electrical receptacles.

(1) Inspection.

(a) Turn selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Loosen attaching screws and remove the lower access panel.

(c) Remove the junction box from the air conditioner with the control box attached. (See figure 3-12.)

(d) Remove the rear panel from the control box. (See figure 3-9.)

(e) Refer to figure 3-20 and inspect electrical receptacles J7, J3 and J2 for damage which would impair serviceability.

(2) Replace. Replace electrical receptacle J7, J3 and/or J2 if damage would impair serviceability. Refer to steps (3) and (4) for removal of damaged receptacle(s) and the installation of new receptacle(s).

(3) Removal. Refer to figure 3-20 and remove damaged receptacle J7, J3 and/or J2.

(4) Installation.

(a) Install electrical receptacles. (See figure 3-20.)

(b) Install rear panel on control box. (See figure 3-9.)

(c) Install the junction box with control box attached in unit. (See figure 3-12.)

(d) Install lower access panel on air conditioner and secure with attaching screws.

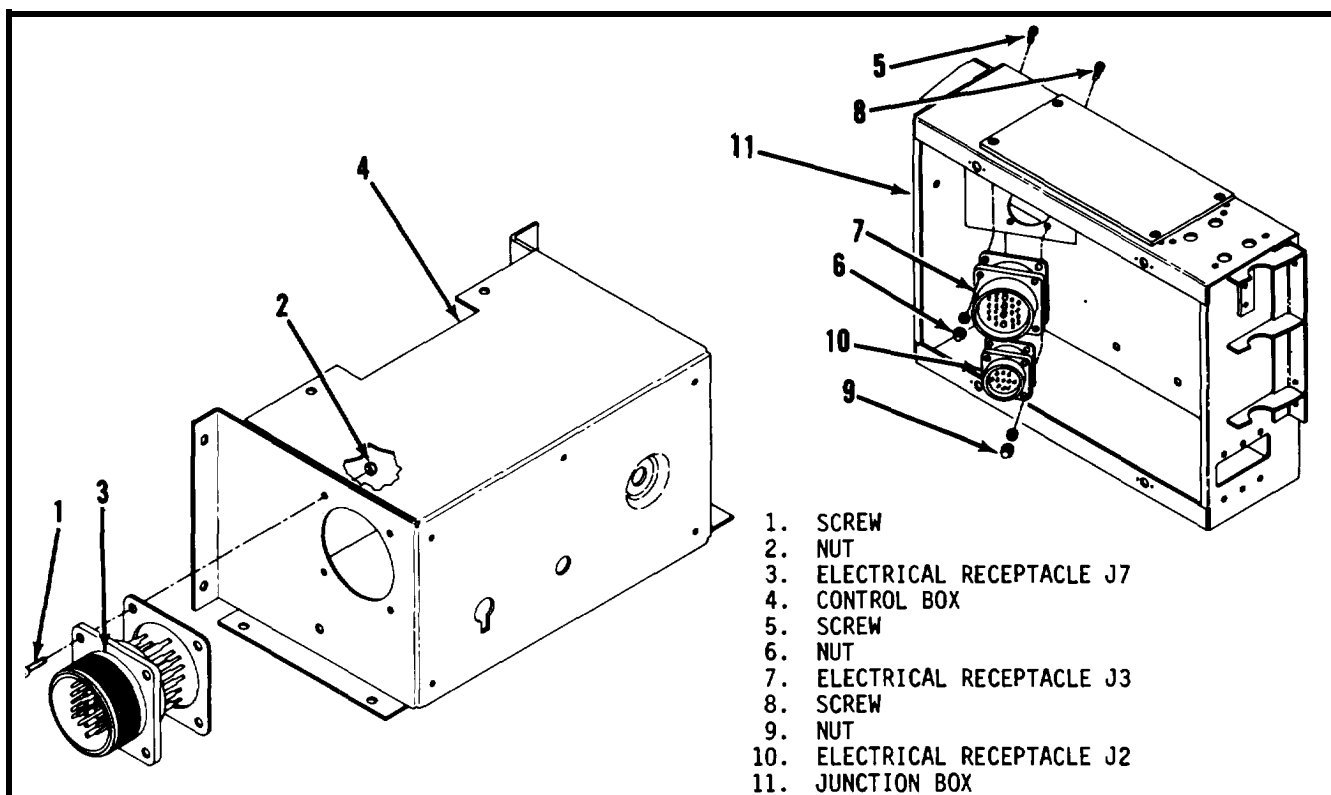
O. Rectifier.

WARNING

Disconnect the air conditioner from the electrical power source before attempting to remove or test the rectifier.

(1) Removal.

(a) Turn selector switch to the "OFF" position and disconnect the



REMOVAL OF ELECTRICAL RECEPTACLE J7

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1. REMOVE FOUR SCREWS (1) AND NUTS (2) AND PULL ELECTRICAL RECEPTACLE J7 (3) FREE FROM CONTROL BOX (4).
2. TAG AND DISCONNECT ELECTRICAL LEADS FROM ELECTRICAL RECEPTACLE J7 (3).

INSTALLATION OF ELECTRICAL RECEPTACLE J7

1. CONNECT ELECTRICAL LEADS TO PROPER TERMINALS ON RECEPTACLE J7 (3). REMOVE TAGS FROM LEADS.
2. POSITION RECEPTACLE J7 (3) IN CONTROL BOX (4) AND SECURE WITH FOUR SCREWS (1) AND NUTS (2).

REMOVAL OF ELECTRICAL RECEPTACLE J3

1. REMOVE FOUR SCREWS (5) AND NUTS (6) AND PULL RECEPTACLE J3 (7) FREE FROM JUNCTION BOX (11).
2. TAG AND DISCONNECT ELECTRICAL LEADS FROM RECEPTACLE J3 (7).

INSTALLATION OF ELECTRICAL RECEPTACLE J3

1. CONNECT ELECTRICAL LEADS TO PROPER TERMINALS ON RECEPTACLE J3 (7). REMOVE TAGS FROM LEADS.
2. POSITION RECEPTACLE J3 (7) IN JUNCTION BOX (11) AND SECURE WITH FOUR SCREWS (5) AND NUTS (6).

REMOVAL OF ELECTRICAL RECEPTACLE J2

1. REMOVE FOUR SCREWS (8) AND NUTS (9) AND PULL RECEPTACLE J2 (10) FREE FROM JUNCTION BOX (11).
2. TAG AND DISCONNECT ELECTRICAL LEADS FROM RECEPTACLE J2 (10).

INSTALLATION OF ELECTRICAL RECEPTACLE J2

1. CONNECT ELECTRICAL LEADS TO PROPER TERMINALS ON RECEPTACLE J2 (10). REMOVE TAGS FROM LEADS.
2. POSITION RECEPTACLE J2 (10) IN JUNCTION BOX (11) AND SECURE WITH FOUR SCREWS (5) AND NUTS (6).

Figure 3-20. Removal and installation of electrical receptacles J7, J3 and J2

air conditioner from the electrical power source.

- (b) Loosen attaching screws and remove lower access panel from it.
- (c) Remove the junction box with control box attached. (See figure 3-12.)
- (d) Refer to figure 3-21 and remove rectifier from junction box.
- (2) Test. (See figure 3-21.)
- (3) Replace. Replace the rectifier if any failure occurs during testing.
- (4) Installation.
 - (a) Refer to figure 3-21 and install new rectifier in junction box.
 - (b) Install junction box with control box attached in unit. (See figure 3-12.)
 - (c) Install lower access panel on air conditioner.

3-11. **RFI FILTER ASSEMBLY**

WARNING

Disconnect the air conditioner from the electrical power source before attempting to perform maintenance on the RFI filter assembly.

a. Removal.

(1) Turn selector switch to "OFF" position and disconnect the air conditioner from the source of electrical power.

(2) Refer to figure 3-22 and remove the RFI filter assembly.

b. Test. (See figure 3-22.)

c. Replace Replace the RFI filter assembly if any failure occurs during testing.

d. Installation. (See figure 3-22.)

3-12. **COMPRESSOR ASSEMBLY**

WARNING

Disconnect the air conditioner from the electrical power source before attempting inspection of the compressor assembly.

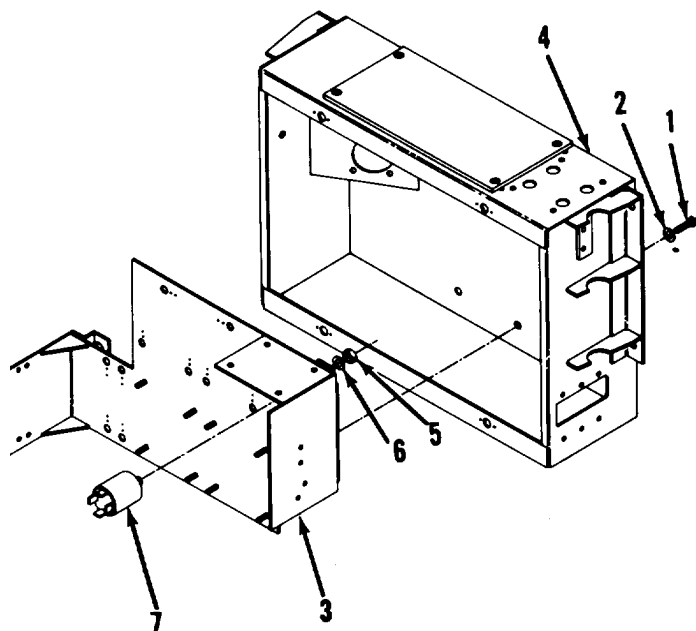
a. Inspection. Maintenance at the organizational level is limited to inspecting the external area of the compressor assembly for leaks and other obvious defects. If such defects are found, notify Direct Support Maintenance.

REMOVAL OF RECTIFIER

1. REFER TO PARAGRAPH 3-10o FOR PRELIMINARY STEPS IN THE REMOVAL OF THE RECTIFIER.
2. REMOVE EIGHT SCREWS (1) AND WASHERS (2) AND PULL BRACKET (3) FREE FROM JUNCTION BOX (4).
3. REMOVE NUT (5) AND WASHER (6) AND PULL RECTIFIER (7) FROM BRACKET (3).
4. TAG AND DISCONNECT ELECTRICAL LEADS FROM RECTIFIER (7).

INSTALLATION OF RECTIFIER

1. CONNECT ELECTRICAL LEADS TO PROPER TERMINALS ON RECTIFIER. REMOVE TAGS FROM LEADS.
2. POSITION RECTIFIER (7) ON BRACKET (3) AND SECURE WITH NUT (5) AND WASHER (6).
3. POSITION BRACKET (3) IN JUNCTION BOX (4) AND SECURE WITH EIGHT WASHERS (2) AND SCREWS (1).
4. REFER TO PARAGRAPH 3-10o FOR FINAL STEPS IN INSTALLATION OF THE RECTIFIER.



1. SCREW
2. WASHER
3. BRACKET
4. JUNCTION BOX
5. NUT
6. WASHER
7. RECTIFIER

CONTINUITY CHECK

NEGATIVE PROBE ON TERMINAL	POSITIVE PROBE ON TERMINAL
2	4
4	3
2	1
1	3

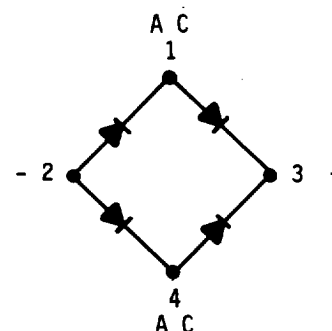
TABLE A

SHORT CIRCUIT CHECK

NEGATIVE PROBE ON TERMINAL	POSITIVE PROBE ON TERMINAL
4	2
3	4
1	2
3	1

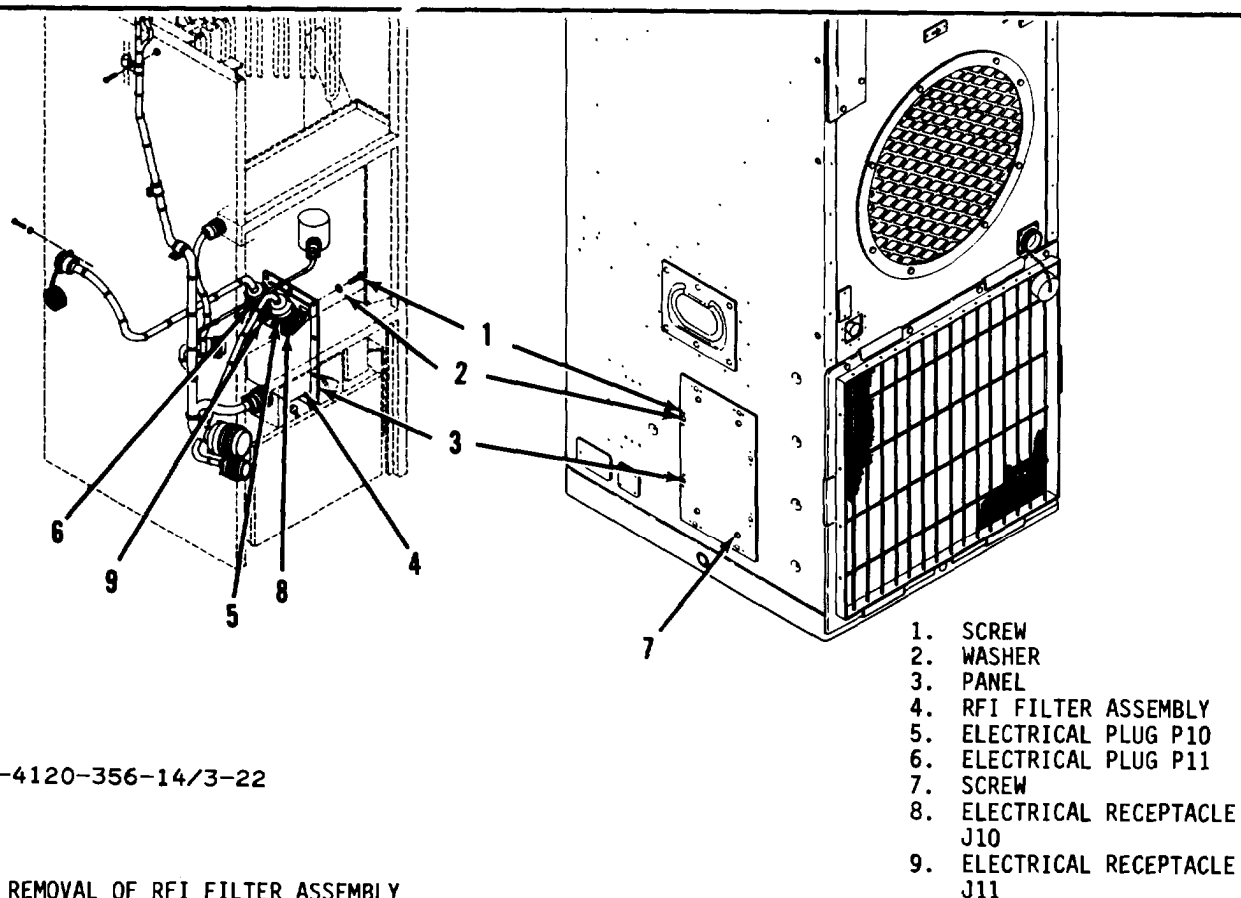
TABLE B

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RECTIFIER SCHEMATIC DIAGRAMRECTIFIER TEST

1. REMOVE THE RECTIFIER FROM THE CIRCUIT.
2. REFER TO TABLE A AND CONTINUITY CHECK THE RECTIFIER. REPLACE RECTIFIER IF ANY OPEN CIRCUIT IS FOUND.
3. REFER TO TABLE B AND SHORT CIRCUIT CHECK THE RECTIFIER. REPLACE THE RECTIFIER IF ANY SHORT CIRCUIT IS FOUND.

Figure 3-21. Removal, installation and testing of rectifier



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REMOVAL OF RFI FILTER ASSEMBLY

1. REFER TO PARAGRAPH 3-11 FOR PRELIMINARY STEPS IN REMOVING RFI FILTER ASSEMBLY.
2. REMOVE EIGHT SCREWS (1) AND WASHERS (2) FROM PANEL (3).
3. PULL PANEL (3) AND ATTACHED RFI FILTER ASSEMBLY (4) OUT OF AIR CONDITIONER.
4. DISCONNECT ELECTRICAL PLUGS P10 (5) AND P11 (6) FROM RECEPTACLES J10 (8) AND J11 (9).
5. REMOVE SIX SCREWS (7) AND SEPARATE RFI FILTER ASSEMBLY (4) FROM PANEL (3).

INSTALLATION OF RFI FILTER ASSEMBLY

1. POSITION THE RFI FILTER ASSEMBLY (4) ON PANEL (3) AND SECURE WITH SIX SCREWS (7).
2. CONNECT ELECTRICAL PLUGS P10 (5) AND P11 (6) TO RECEPTACLES J10 (8) AND J11 (9).
3. POSITION PANEL (3) WITH ATTACHED RFI FILTER ASSEMBLY (4) IN AIR CONDITIONER AND SECURE WITH EIGHT WASHERS (2) AND SCREWS (1).

RFI FILTER ASSEMBLY TEST

1. CHECK FOR CONTINUITY BETWEEN PIN A OF J10 AND PIN A OF J11.
2. CHECK FOR CONTINUITY BETWEEN PIN B OF J10 AND PIN B OF J11.
3. CHECK FOR CONTINUITY BETWEEN PIN C OF J10 AND PIN C OF J11.
4. CHECK FOR CONTINUITY BETWEEN PIN D OF J10 AND PIN D OF J11.

SCHEMATIC DIAGRAM

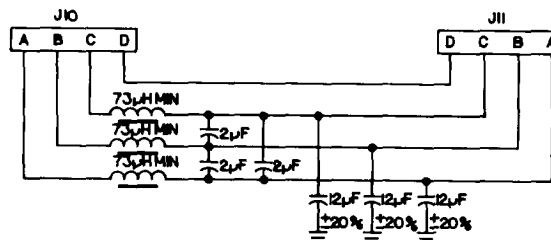


Figure 3-22. Removal, installation and testing of RFI filter assembly

- (1) Turn selector switch to the "OFF" position and disconnect the air conditioner from source of electrical power.
- (2) Loosen screws and remove lower access panel.
- (3) Refer to figure 3-12 and partially remove the control box and junction box from the unit.
- (4) Refer to figure 3-23 and inspect the external area of the compressor assembly for leaks and other obvious defects which would impair serviceability. If such defects are found, report the condition to Direct Support Maintenance.
- (5) If no defects are found, reinstall the control box and junction box in accordance with figure 3-12 and install the lower access panel on the air conditioner.

b. Compressor Crankcase Heater.

- (1) Test.
 - (a) Turn selector switch to the "OFF" position and disconnect the air conditioner from source of electrical power.
 - (b) loosen attaching screws and remove lower access panel.
 - (c) Check for continuity between pins F and G of the compressor electrical receptacle J3. (See figure 3-24.)
- (2) Replace. If no continuity exists between pins F and G of the compressor receptacle J3, replace the compressor crankcase heater.

3-13. REFRIGERANT COMPONENTS

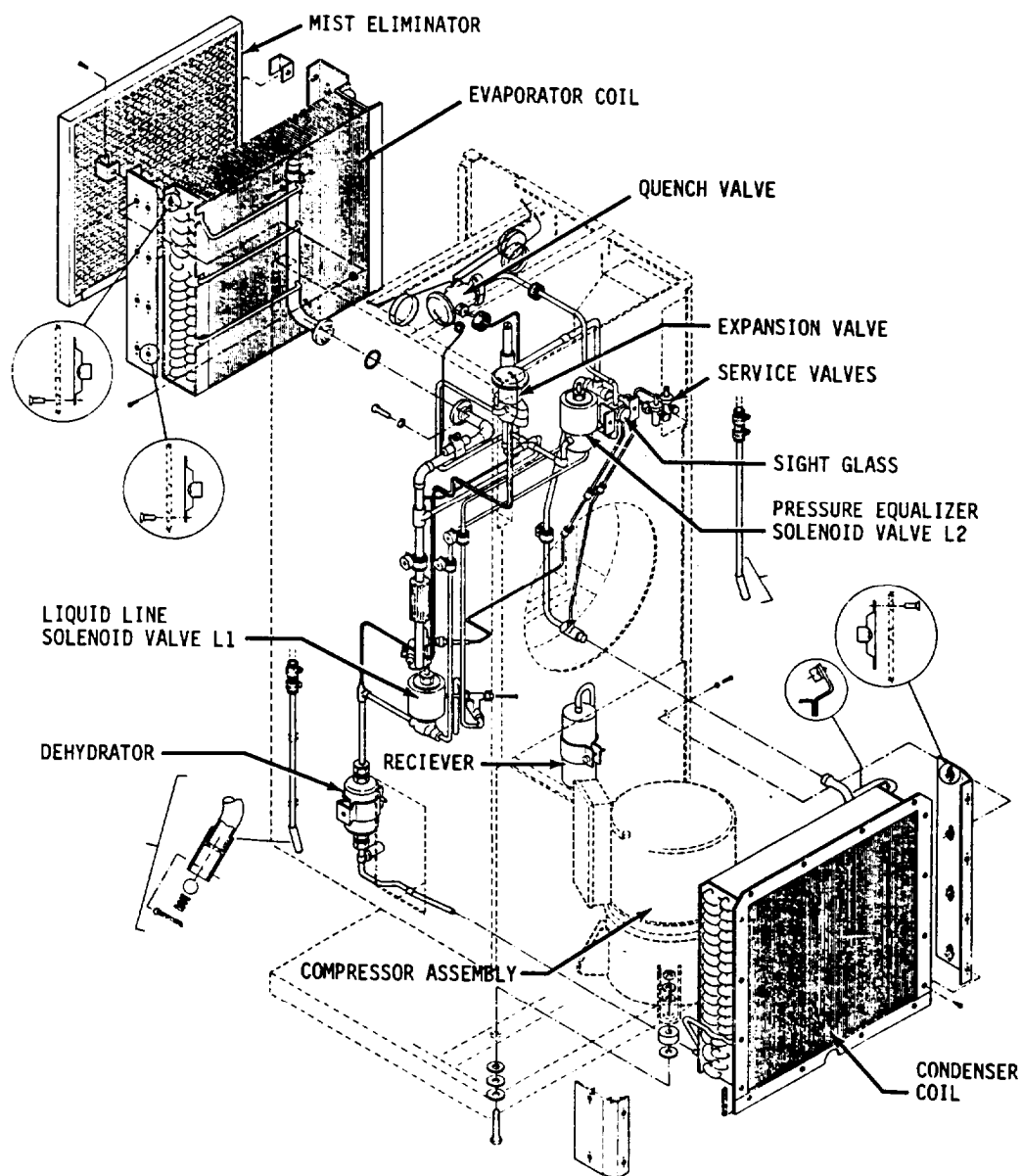
WARNING

Disconnect the air conditioner from the electrical power source before attempting to perform tests or inspections on any of the refrigerant system components.

a. Liquid Line Solenoid Valve L1 and Pressure Equalizer solenoid Valve L2.

Maintenance at the organizational level is limited to testing the operation of the solenoid valves and solenoid valve coils. Do not open the refrigerant system.

- (1) Turn selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.
- (2) Remove the lower access panel, fabric cover and top panel from the air conditioner. (See figure 3-9.)
- (3) Partially remove the junction box and control box. (See figure 3-12.)



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Figure 3-23. Location of refrigerant system components

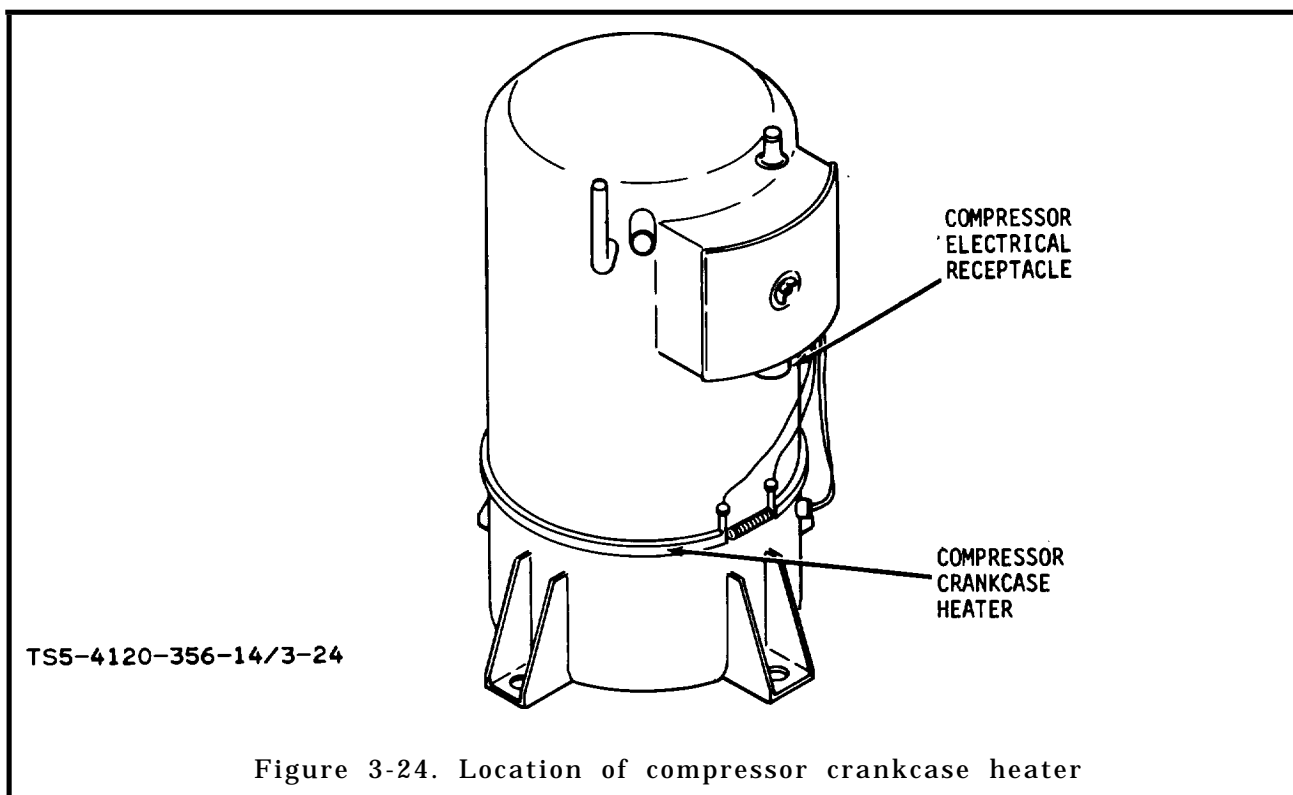


Figure 3-24. Location of compressor crankcase heater

(4) Refer to figure 3-25 and test the liquid line Solenoid valve L1 and the pressure equalizer solenoid valve L2.

(5) If both solenoid valves test OK, proceed to step (8).

(6) In case of test failure of solenoid valve L1, proceed as follows:

(a) Disconnect plug P5 from liquid line solenoid valve L1. (See figure 3-25.)

(b) Check for continuity across pins A and B of receptacle J5 on solenoid valve L1.

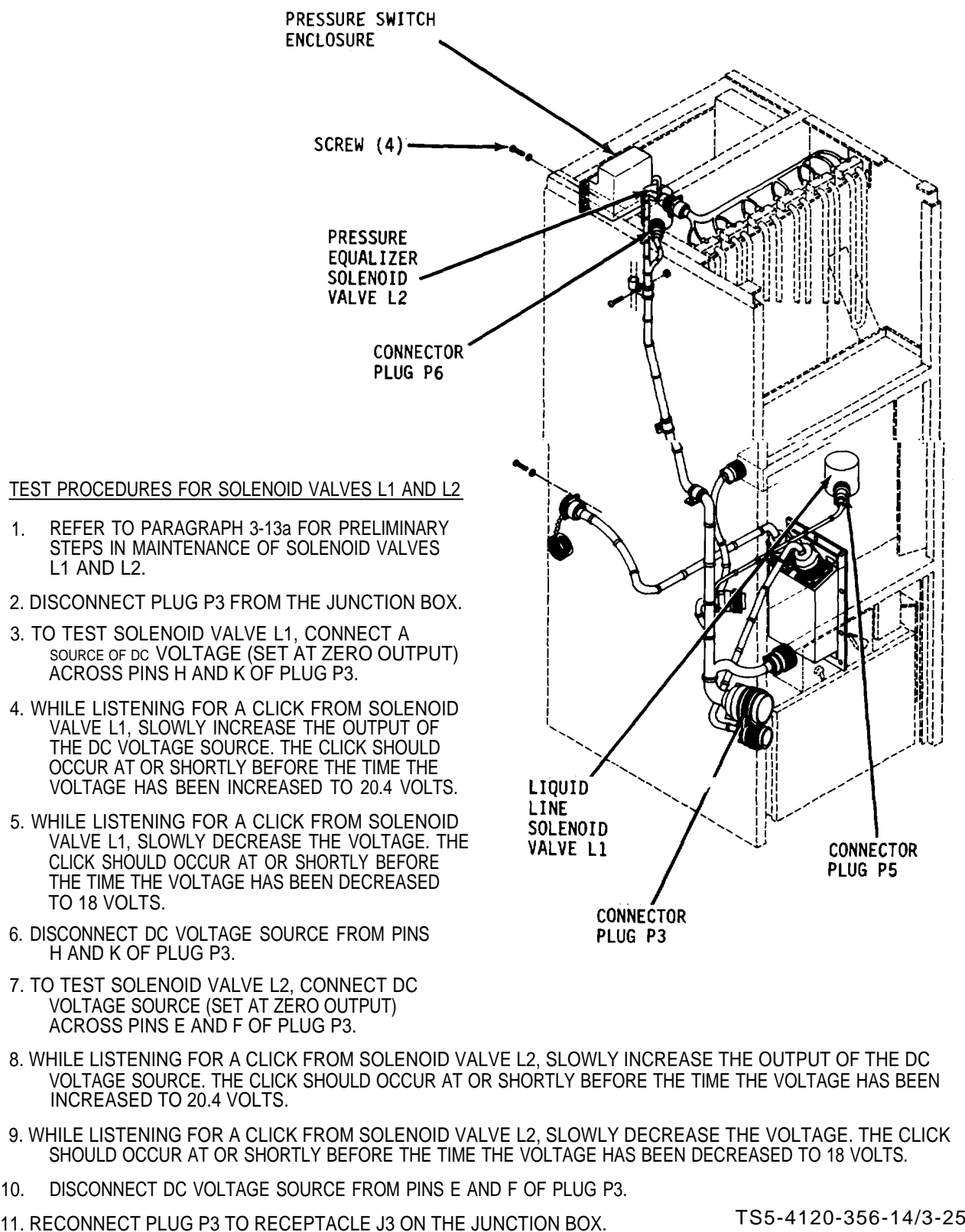
(c) If an open circuit is found, see figure 3-26 and replace the solenoid valve coil.

(d) If no open circuit is found, check for continuity between pin A of plug P5 and pin K of plug P3, and between pin B of plug P5 and pin H of plug P3.

(e) Replace electrical wiring if any open circuit is found.

(f) After replacement of solenoid valve coil or electrical wiring, refer to figure 3-25 and connect plug P5 to receptacle J5 on liquid line solenoid valve L1, then repeat test procedure given in figure 3-25 for liquid line solenoid valve L1.

(g) If repeat test of liquid line solenoid valve is satisfactory, proceed to step (8).



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Figure 3-25. Solenoid Valves L1 and L2 test procedures

(h) If liquid line solenoid valve fails repeat test, notify Direct Support Maintenance.

(7) In case of test failure of solenoid valve L2, proceed as follows:

(a) Refer to figure 3-25 and remove four screws from the pressure cut-out switch enclosure and pull enclosure and pressure switches aside sufficiently to provide access to solenoid valve L2.

(b) Refer to figure 3-25 and disconnect plug P6 from pressure equalizer valve L2 and plug P3 from junction box.

(c) Check for continuity across pins A and B of receptacle J6 on solenoid valve L2.

(d) If an open circuit is found, refer to figure 3-26 and replace solenoid valve coil.

(e) If no open circuit is found, check for continuity between pin A of plug P6 and pin E of plug P3 and between pin B of plug P6 and pin F of plug P3.

(f) Replace electrical wiring if any open circuit is found.

(g) After replacement of solenoid valve coil or electrical wiring, refer to figure 3-25 and connect plug P6 to receptacle J6 on solenoid valve L2, then repeat test procedure given in figure 3-25 for pressure equalizer solenoid valve L2.

(h) If repeat test of solenoid valve L2 is satisfactory, secure pressure cut-out switch enclosure to panel with four attaching screws, then proceed to step (8).

(i) If solenoid valve L2 fails repeat test, notify Direct support Maintenance.

(8) If operation of both solenoid valves is now satisfactory, refer to figure 3-12 and install the junction box and control box, then refer to paragraph 3-9 and install the lower access panel, top panel and fabric cover.

b. Sight Glass Liquid Indicator. Maintenance of the sight glass at the organizational level is limited to inspecting the sight glass for external damage which would impair serviceability. If such damage is found, report the condition to Direct Support Maintenance.

c. Condenser Coil. Maintenance of the condenser coil at the organizational maintenance level is limited to cleaning. Clean coil as follows:

(1) Remove the condenser coil guard in accordance with paragraph 3-9.

(2) Clean the condenser coil by brushing with a fiber bristle brush.

(3) After cleaning, reinstall the condenser coil guard.

d. Evaporator Coil. Maintenance of the evaporator coil at the organizational maintenance level is limited to cleaning. Clean coil as follows:

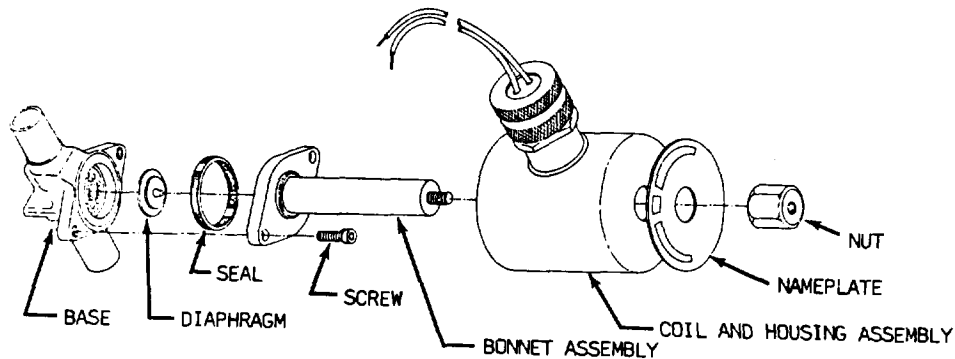


Figure 3-26. Disassembly of solenoid valve

- (1) Refer to paragraph 3-9 and remove the fabric cover, top panel, air discharge grille and mist eliminator.
- (2) Clean the evaporator coil by brushing with a fiber bristle brush.
- (3) After cleaning, reinstall the mist eliminator, air discharge grille, top panel and fabric cover in accordance with paragraph 3-9.

3-14.

HEATER ASSEMBLY

a. Heater Elements.

(1) Test.

(a) To gain access to the heater elements, remove fabric cover and top panel assembly in accordance with paragraph 3-9.

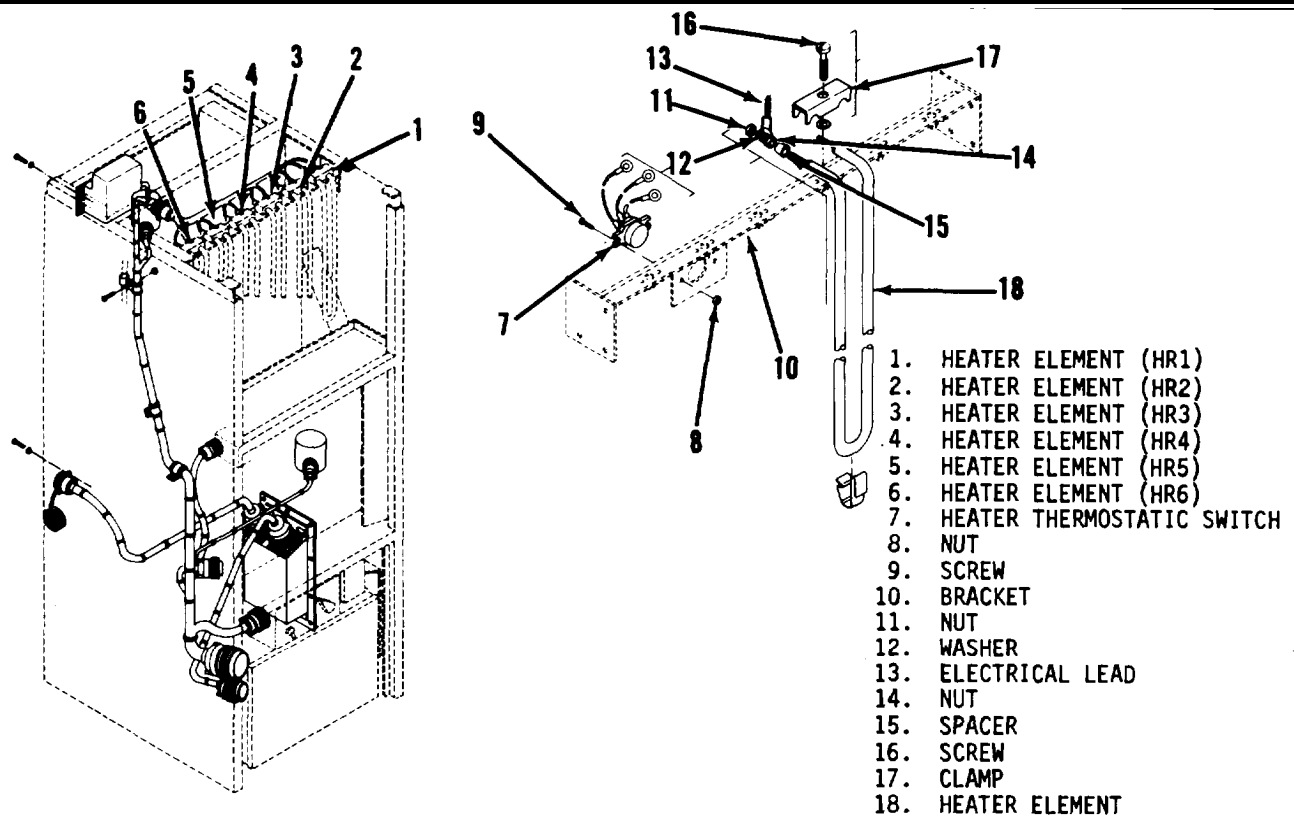
(b) With the air conditioner connected to a source of electrical power, turn the thermostat knob clockwise to its limit and the selector switch to "HI-HEAT" position.

(c) Observe heater elements. Elements 1 through 6 should become hot. (See figure 3-27)

(d) Turn selector switch to the "OFF" position.

(e) If any heater elements fails to function properly during this test, disconnect electrical power to the air conditioner. Refer to wiring diagram figure 3-28 and check wiring continuity for the improperly functioning heater element or elements. Check continuity of heater element. Repair any defective wiring found or replace defective heater or heaters.

(2) Replace.

**HEATER ELEMENT REMOVAL**

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1. REFER TO PARAGRAPH 3-14 FOR PRELIMINARY STEPS IN REMOVAL OF HEATER ELEMENTS.
2. TAG ELECTRICAL LEADS (13) ON BOTH THREADED ENDS OF ELEMENT(S). (18) TO BE REMOVED.
3. REMOVE NUT (11), WASHER (12), ELECTRICAL LEAD (13), NUT (14) AND SPACER (15) FROM BOTH ENDS ELEMENTS OR ELEMENT TO BE REMOVED.
4. LOOSEN SCREW (16) AND CLAMP (17) AND REMOVE HEATER ELEMENTS OR ELEMENT (18).

HEATER ELEMENT INSTALLATION

1. POSITION HEATER ELEMENT (18) ON TOP OF BRACKET (10) AND UNDER CLAMP (17) AND TIGHTEN CLAMP WITH SCREW (16) TO SECURE HEATER ELEMENT.
2. INSTALL SPACER (15), NUT (14), ELECTRICAL LEAD (13), WASHER (12) AND NUT (11) ON BOTH ENDS OF ELEMENTS OR ELEMENT BEING INSTALLED.
3. REFER TO PARAGRAPH 3-14 FOR FINAL STEPS IN HEATER ELEMENT INSTALLATION.

HEATER THERMOSTATIC SWITCH REMOVAL

1. REFER TO PARAGRAPH 3-14 FOR PRELIMINARY STEPS IN HEATER THERMOSTATIC SWITCH REMOVAL.
2. TAG AND DISCONNECT ELECTRICAL LEADS ON HEATER THERMOSTATIC SWITCH (7).
3. REMOVE TWO NUTS (8) AND SCREWS (9) FROM THERMOSTATIC SWITCH (7) AND REMOVE SWITCH FROM BRACKET (10).

HEATER THERMOSTATIC SWITCH INSTALLATION

1. POSITION THERMOSTATIC SWITCH (7) ON BRACKET (10) AND SECURE WITH TWO NUTS (8) AND SCREWS (9)
2. CONNECT ELECTRICAL LEADS TO PROPER TERMINALS. REMOVE TAGS.
3. REFER TO PARAGRAPH 3-14 FOR FINAL STEPS IN THERMOSTATIC SWITCH INSTALLATION.

Figure 3-27. Removal and installation of heater elements and heater thermostat

WARNING

Disconnect the air conditioner from the electrical power source before attempting to replace the heater elements or electrical wiring.

(a) Replace electrical wiring or any heater element which shows evidence of damage which would impair serviceability or which fails during testing.

(b) If any heater element fails to function properly during test, and wiring continuity checks OK, refer to step (3) and replace defective heater element or elements.

(3) **Remove and Install.**

(a) Turn selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) If heater element or elements are to be replaced, refer to figure 3-27 for removal and installation.

(c) Reinstall top panel assembly and fabric cover in accordance with paragraph 3-9.

b. **Heater Thermostatic Switch.**

WARNING

Disconnect the air conditioner from the electrical power source before attempting to test or replace the heater thermostatic switch.

(1) **Test.**

(a) Turn selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Remove fabric cover and top panel to gain access to the thermostatic switch in accordance with paragraph 3-9.

(c) Refer to figure 3-27 and remove the thermostatic switch.

(d) Refer to figure 3-29 and test the thermostatic switch.

(2) **Replace.** Replace the thermostatic switch if any failure occurs during testing in accordance with the procedures shown in figure 3-27.

(3) **Installation.** Install the thermostatic switch in accordance with the procedures shown in figure 3-27. Reinstall top panel and fabric cover.

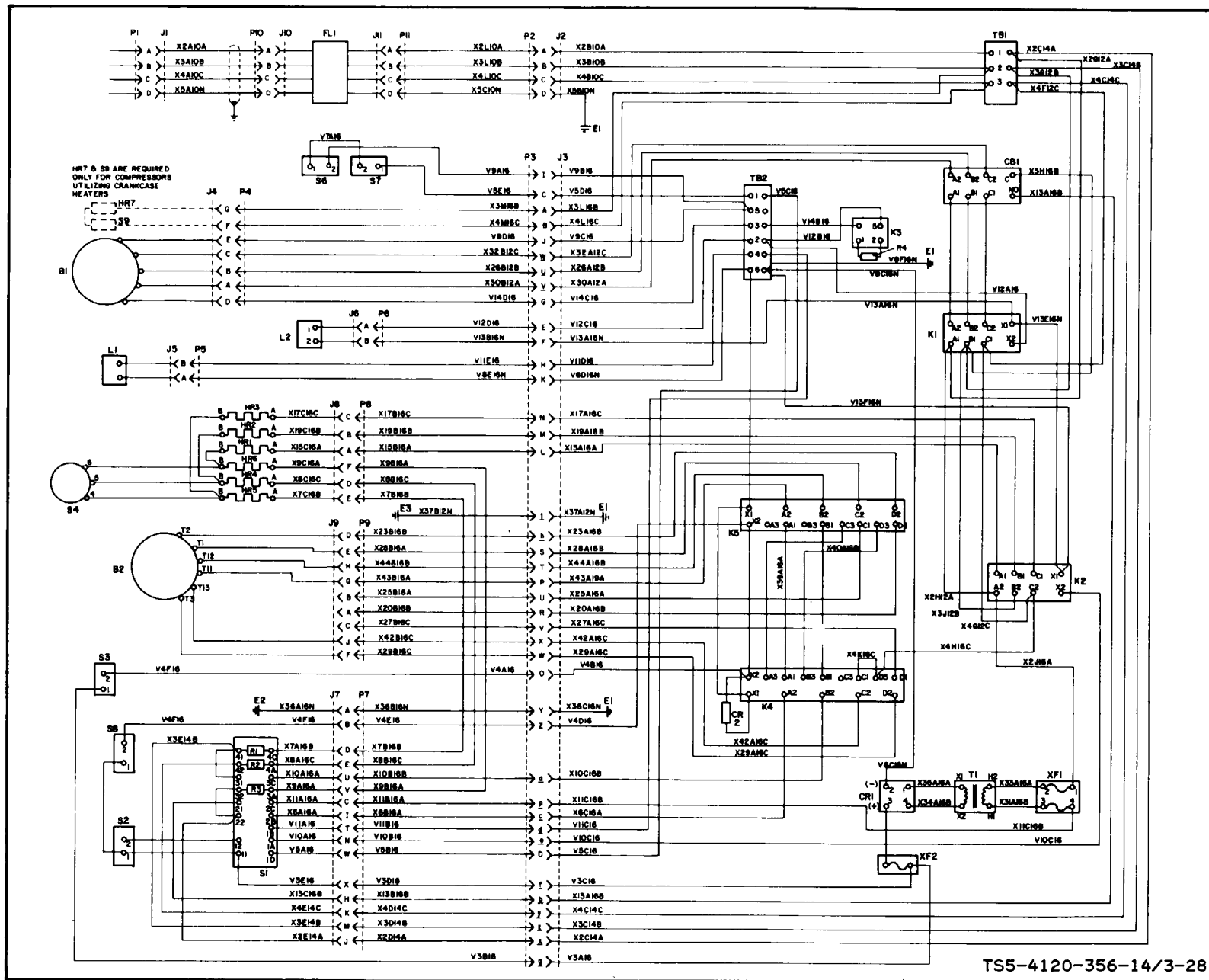


Figure 3-28. Wiring diagram (sheet 1 of 2)

<u>COMPONENT REFERENCE LIST</u>			
<u>REF. DESIG.</u>	<u>DESCRIPTION</u>	<u>REF. DESIG.</u>	<u>DESCRIPTION</u>
B1	COMPRESSOR	P5	CONNECTOR PLUG, SOLENOID VALVE, LIQUID LINE
B2	MOTOR, FAN	P6	CONNECTOR PLUG, SOLENOID VALVE, EQUALIZER
CB1	CIRCUIT BREAKER, COMPRESSOR	P7	CONNECTOR PLUG, CONTROL MODULE
CR1	RECTIFIER, SEMICONDUCTOR	P8	CONNECTOR PLUG, HEATER
CR2	DIODE, SEMICONDUCTION	P9	CONNECTOR PLUG, FAN MOTOR
E1	JUNCTION BOX GROUND	R1, R2,	RESISTOR, FIXED
E2	CONTROL MODULE GROUND	R3	RESISTOR, FIXED
E3	SYSTEM GROUND	S1	SWITCH, ROTARY SELECTOR
HR1 - 6	HEATER ELEMENTS	S2	THERMOSTAT
J1	CONNECTOR, POWER INPUT	S3	SWITCH, PRESSURE
J2	CONNECTOR, JUNCTION BOX	S4	SWITCH, HEATER CUT-OUT
J3	CONNECTOR, JUNCTION BOX	S6	SWITCH, HIGH PRESSURE CUT-OUT
J4	CONNECTOR, COMPRESSOR	S7	SWITCH, LOW PRESSURE CUT-OUT
J5	CONNECTOR, SOLENOID VALVE, LIQUID LINE	S8	SWITCH, FAN SPEED
J6	CONNECTOR, SOLENOID VALVE, EQUALIZER	T1	TRANSFORMER
J7	CONNECTOR, CONTROL MODULE	TB1	TERMINAL BOARD
J8	CONNECTOR, HEATERS	TB2	TERMINAL BOARD
J9	CONNECTOR, FAN MOTOR	XF1	FUSEHOLDER
K1	RELAY, COMPRESSOR START	XF2	FUSEHOLDER
K2	RELAY, HEATER	FL1	FILTER, RADIO FREQUENCY
K3	RELAY, TIME DELAY	J10	CONNECTOR, FILTER INPUT
K4	RELAY, ARMATURE	J11	CONNECTOR, RECEPTACLE
K5	RELAY, ARMATURE	P10	CONNECTOR PLUG, FILTER INPUT
L1	VALVE, SOLENOID, LIQUID LINE	P11	CONNECTOR PLUG, FILTER
L2	VALVE, SOLENOID, EQUALIZER		
P1	CONNECTOR PLUG, POWER INPUT		
P2	CONNECTOR PLUG, JUNCTION BOX		
P3	CONNECTOR PLUG, JUNCTION BOX		
P4	CONNECTOR PLUG, COMPRESSOR		

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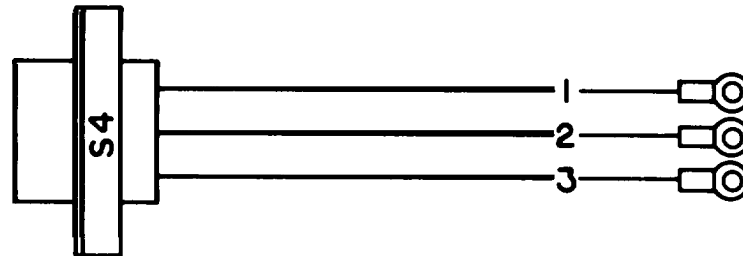
Figure 3-28. Wiring diagram (sheet 2 of 2)

3-15. **FANS AND FAN MOTOR****WARNING**

Disconnect the air conditioner from the electrical power source before attempting to test or replace the fans or the fan motor.

a. Evaporator Fan(1) Removal.

(a) Turn selector switch to "OFF" position and disconnect the air conditioner the electrical power source.



WIRE NO. (REF)	WIRE MARKING AND IDENT NO.
1	X21A16B
2	X22A16C
3	X24A16A

TEST OF HEATER THERMOSTATIC SWITCH S4

NOTE

OPERATING TEMPERATURES
FOR HEATER THERMOSTATIC
SWITCH ARE AS FOLLOWS:

OPEN : $194^{\circ}\text{F} \pm 5^{\circ}\text{F}$
($90^{\circ}\text{C} \pm 5^{\circ}\text{C}$)

CLOSE : $110^{\circ}\text{F} \pm 5^{\circ}\text{F}$
($61^{\circ}\text{C} \pm 5^{\circ}\text{C}$)

PERFORM TEST AT AMBIENT
TEMPERATURE UNDER 194°F
(90°C).

1. CHECK FOR CONTINUITY BETWEEN WIRE NUMBER 1 AND WIRE NUMBER 2.
2. CHECK FOR CONTINUITY BETWEEN WIRE NUMBER 1 AND WIRE NUMBER 3.
3. CHECK FOR CONTINUITY BETWEEN WIRE NUMBER, 2 AND WIRE NUMBER 3.
4. OPEN CIRCUIT BETWEEN ANY OF THE ABOVE POINTS CONSTITUTES FAILURE OF THIS TEST.

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Figure 3-29. Test of heater thermostatic switch S4

(b) Remove the evaporator air intake grille and air filter. (See figure 3-3.)

(c) Refer to figure 3-30 and remove the evaporator fan.

(2) Inspect. Inspect the fan and/or ring for evidence of damage which would impair serviceability.

(3) Replace. Replace fan and/or ring if damaged to an extent that serviceability would be impaired.

(4) Installation.

(a) Refer to figure 3-30 and install evaporator fan.

(b) Reinstall evaporator air intake grille and air filter. (See figure 3-3.)

.b. Condenser Fan.

(1) Removal.

(a) Turn selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Loosen attaching screws and remove condenser fan guard. (See figure 3-3.)

(c) Refer to figure 3-30 and remove condenser fan.

(2) Inspect. Inspect the condenser fan for evidence of damage which would impair serviceability.

(3) Replace. Replace condenser fan if damaged to an extent that serviceability would be impaired.

(4) Installation.

(a) Install the condenser fan in accordance with the procedures shown in figure 3-30.

(b) Reinstall the condenser fan guard and secure with attaching screws. (See figure 3-3.)

c. Fan Motor.

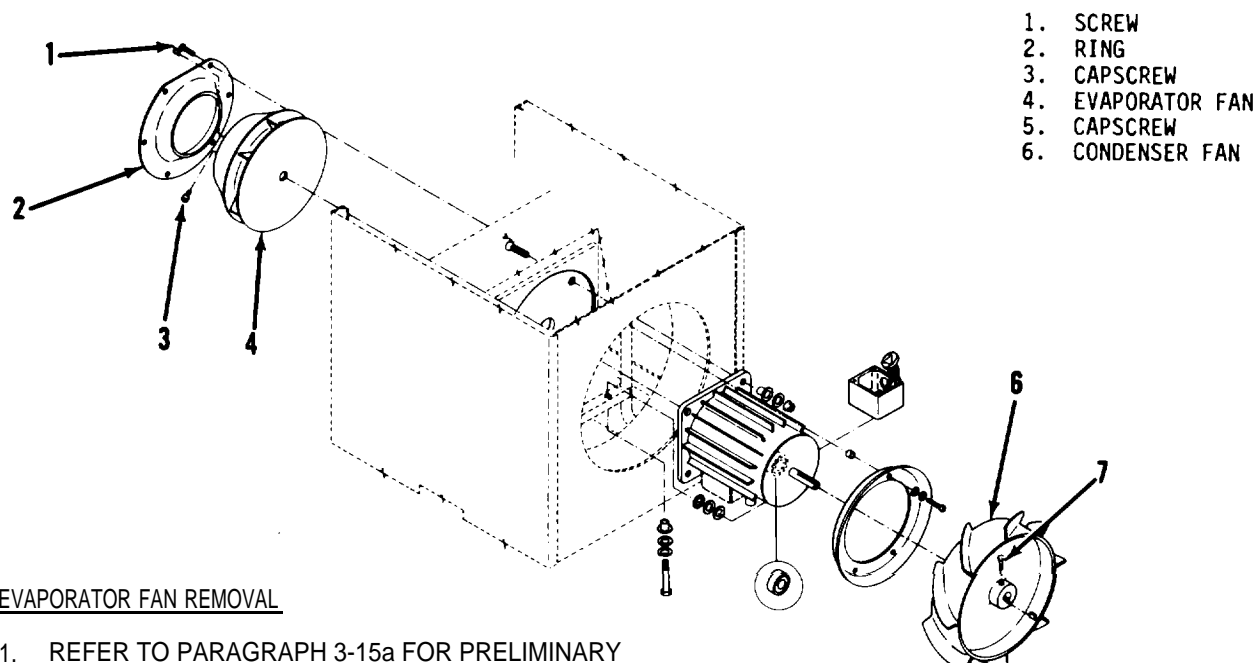
(1) Removal.

(a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Remove the evaporator air intake grille, air filter and condenser fan guard in accordance with figures 3-3 and 3-4.

(c) Refer to figure 3-30 and remove condenser fan and evaporator fan.

(d) Refer to figure 3-31 and remove the condenser fan.



EVAPORATOR FAN REMOVAL

1. REFER TO PARAGRAPH 3-15a FOR PRELIMINARY STEPS IN REMOVAL OF EVAPORATOR FAN
2. REMOVE SIX SCREWS (1) AND REMOVE RING (2).
3. LOOSEN CAP SCREWS (3) AND REMOVE EVAPORATOR FAN (4) USING SUITABLE PULLER.

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EVAPORATOR FAN INSTALLATION

CAUTION

USE ONLY A SOFT Mallet FOR TAPPING THE EVAPORATOR FAN INTO PLACE.

1. POSITION EVAPORATOR FAN (4) ON FAN MOTOR SHAFT. MAKE SURE THAT KEY SLOT IN HUB OF EVAPORATOR FAN IS ALIGNED WITH THE KEY ON MOTOR SHAFT. TAP EVAPORATOR FAN ONTO MOTOR SHAFT WITH A SOFT Mallet UNTIL FACE OF FAN HUB IS FLUSH WITH END OF MOTOR SHAFT.
2. TIGHTEN CAP SCREW (3) OVER KEY IN MOTOR SHAFT FIRST. TIGHTEN BOTH CAP SCREWS (3) TO A TORQUE OF 82 INCH POUNDS.
3. POSITION RING (2) AND ATTACH WITH SIX SCREWS (1).
4. REFER TO PARAGRAPH 3-15a FOR FINAL STEPS IN INSTALLATION OF EVAPORATOR FAN.

CONDENSER FAN REMOVAL

1. REFER TO PARAGRAPH 3-15b FOR PRELIMINARY STEPS IN THE REMOVAL OF THE CONDENSER FAN.
2. LOOSEN CAP SCREWS (5) AND REMOVE CONDENSER FAN (6) USING SUITABLE PULLER.

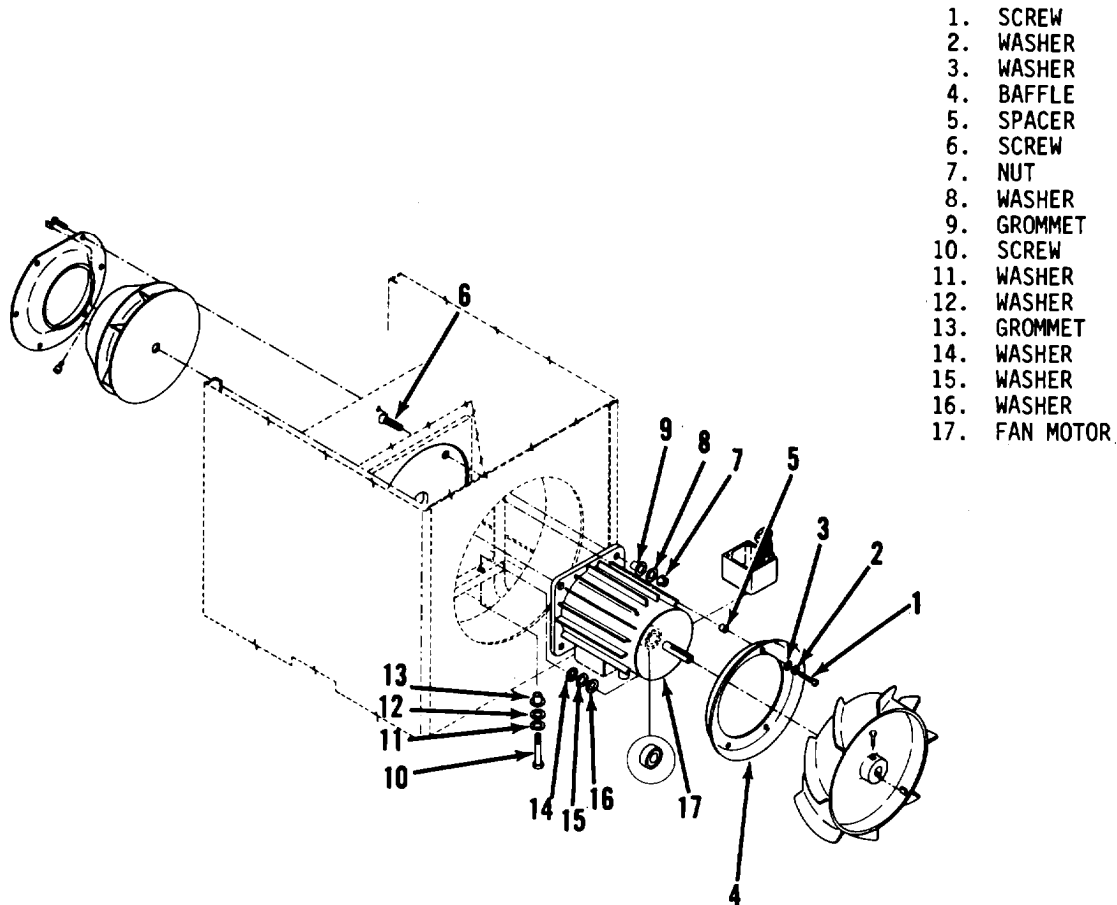
CONDENSER FAN INSTALLATION

CAUTION

USE ONLY A SOFT Mallet FOR TAPPING THE CONDENSER FAN INTO PLACE.

1. POSITION CONDENSER FAN (6) ON END OF FAN MOTOR SHAFT. MAKE SURE THAT KEY SLOT IN HUB OF FAN IS ALIGNED WITH KEY ON MOTOR SHAFT. TAP CONDENSER FAN ONTO MOTOR SHAFT WITH A SOFT Mallet UNTIL FACE OF FAN HUB IS FLUSH WITH END OF MOTOR SHAFT.
2. TIGHTEN CAP SCREW (5) OVER KEY IN MOTOR SHAFT FIRST. TIGHTEN BOTH CAPSCREWS (5) TO A TORQUE OF 82 INCH POUNDS.
3. REFER TO PARAGRAPH 3-15b FOR FINAL STEPS IN THE INSTALLATION OF THE CONDENSER FAN.

Figure 3-30. Removal and installation of evaporator and condenser fans



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REMOVAL OF FAN MOTOR

1. REFER TO PARAGRAPH 3-15c FOR PRELIMINARY STEPS IN REMOVAL OF FAN MOTOR.
2. TAG AND DISCONNECT ELECTRICAL LEADS AS NECESSARY.
3. REMOVE FOUR SCREWS (1) AND WASHERS (2, 3), BAFFLE (4) AND FOUR SPACERS (5).
4. REMOVE FOUR SCREWS (6), NUTS (7), WASHERS (8) AND GROMMETS (9).
5. REMOVE TWO SCREWS (10), WASHERS (11, 12) AND GROMMETS (13).
6. REMOVE MOTOR (17) FROM MOTOR MOUNT AND REMOVE TWO EACH OF WASHERS (14, 15, 16).

INSTALLATION OF FAN MOTOR

1. POSITION TWO SCREWS (10), WASHERS (12, 13) AND GROMMETS (13) ON UNDER SIDE OF MOTOR MOUNT WITH SCREWS (10) EXTENDING THROUGH MOUNTING HOLES. POSITION WASHERS (14, 15, 16) ON SCREWS (10).
2. POSITION MOTOR (17) ON MOTOR MOUNT AND SECURE WITH HARDWARE POSITIONED IN STEP 1.
3. INSTALL FOUR SCREWS (6), GROMMETS (9), WASHERS (8) AND NUTS (7).
4. POSITION BAFFLE (4) AND FOUR SPACERS (5) ON MOTOR MOUNT AND SECURE WITH FOUR SCREWS (1) AND FOUR EACH OF WASHERS (2, 3).
5. CONNECT ELECTRICAL LEADS AND REMOVE TAGS.
6. REFER TO PARAGRAPH 3-15c FOR FINAL STEPS IN INSTALLATION OF FAN MOTOR.

Figure 3-31. Removal and installation of fan motor

(2) Inspection. Inspect fan motor for evidence of damage which would impair serviceability.

(3) Test.

(a) Check continuity of rotor windings for open windings or windings shorted to motor frame.

(b) Rotate motor shaft by hand to check for binding, indicating worn bearings.

(4) Repair. If worn bearings are indicated during inspection or test, refer to figure 3-32 and repair motor.

(5) Replace. Replace fan motor if serviceability is impaired by unrepairable damage, if test indicates open windings, windings shorted to motor frame or if bearing damage is unrepairable.

(6) Installation.

(a) Refer to figure 3-31 and install the fan motor.

(b) Refer to figure 3-30 and install the condenser fan and the evaporator fan.

(c) Reinstall the air filter, evaporator air intake grille and the condenser fan guard. (See figures 3-3 and 3-4.)

3-16. WIRING HARNESES AND CONNECTORS.

WARNING

Disconnect the air conditioner from the electrical power source before attempting to perform maintenance on the wiring harnesses or connectors.

a. Wiring Harnesses.

(1) Inspection

(a) To gain access to the wiring harnesses, remove fabric cover, top panel, condenser fan guard and lower access panel in accordance with paragraph 3-9.

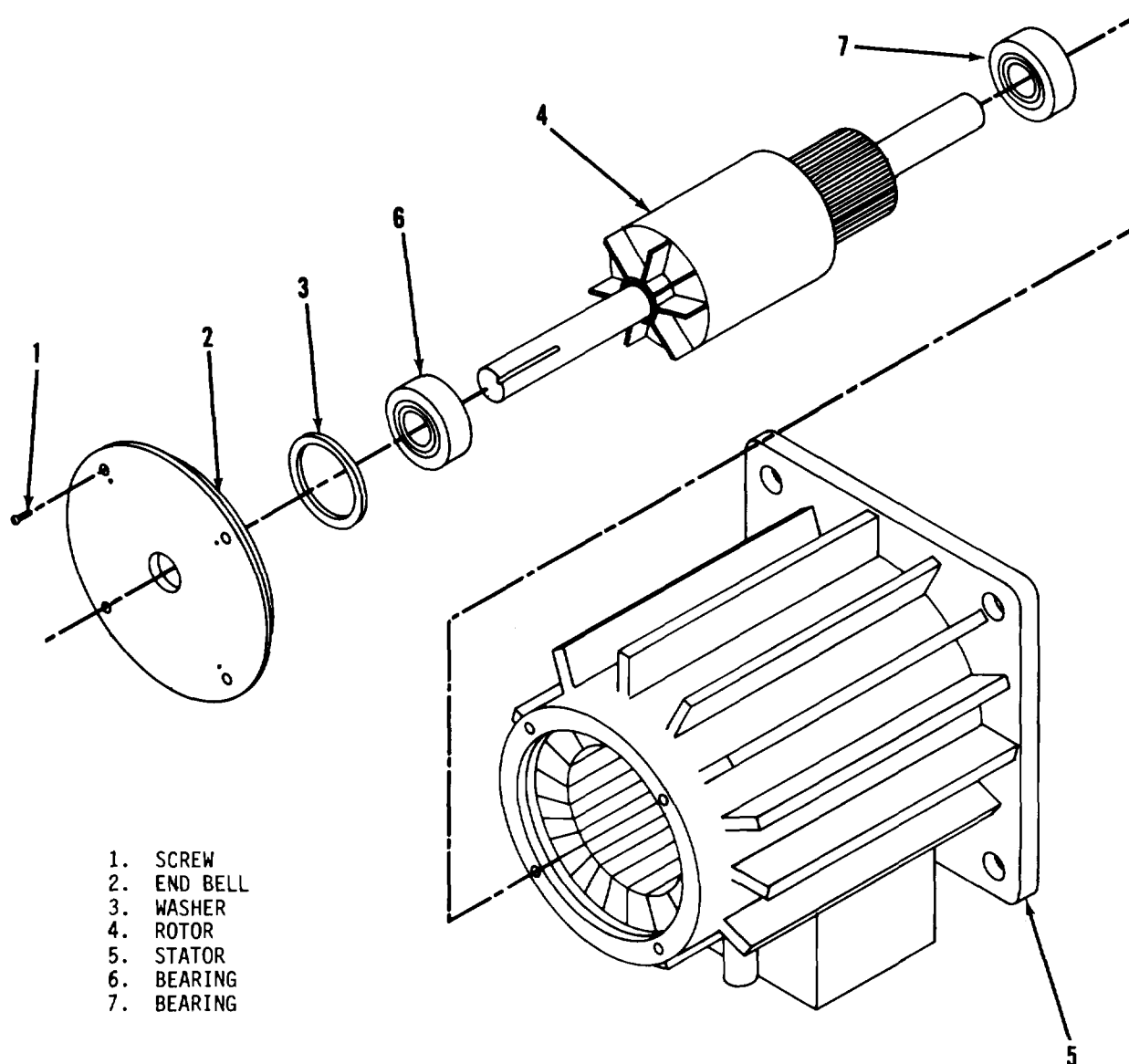
(b) Refer to paragraph 3-15b and remove the evaporator fan.

(c) Refer to figure 3-12 and partially remove the junction box and control box.

(d) See figure 3-33 and remove pressure switch from enclosure.

(e) See figure 3-22 and remove the RFI filter assembly from the air conditioner to provide access to connector plugs P10 and P11.

(f) Refer to figure 3-33 and inspect wiring harnesses for damage which would impair serviceability.

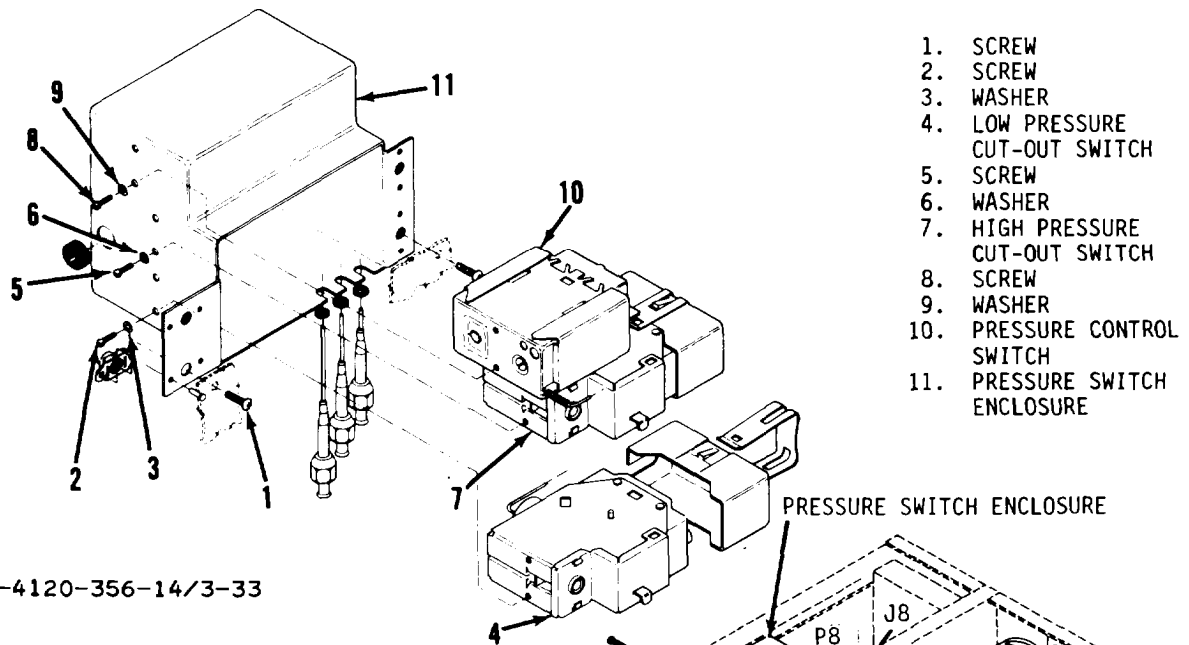


FAN MOTOR REPAIR

1. REMOVE FOUR SCREWS (1) FROM END BELL (2) AND REMOVE END BELL FROM STATOR (5).
2. REMOVE ROTOR (4) FROM STATOR (5) AND REMOVE WASHER (3) AND BEARINGS (6, 7) .
3. REPLACE BEARINGS (6, 7) IF WORN, DEFECTIVE OR OTHERWISE DAMAGED BEYOND USE.
4. INSTALL BEARINGS (6, 7) AND WASHER (3) ON ROTOR (4).
5. INSTALL ROTOR (4) WITH BEARINGS INTO STATOR (5).
- 6.. POSITION END BELL (2) ON STATOR (5) AND SECURE WITH FOUR SCREWS (1).

Figure 3-32. Fan Motor Repair

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REMOVAL OF PRESSURE SWITCHES FROM ENCLOSURE

CAUTION

DO NOT DISCONNECT REFRIGERANT CONNECTIONS FROM PRESSURE SWITCHES WHILE PERFORMING ORGANIZATIONAL MAINTENANCE PROCEDURES.

1. REMOVE FOUR SCREWS (1) AND PULL PRESSURE SWITCH ENCLOSURE (11) AWAY FROM PANEL.
2. REMOVE TWO SCREWS (2) AND WASHERS (3) FROM LOW PRESSURE CUT-OUT SWITCH (4) .
3. REMOVE TWO SCREWS (5) AND WASHERS (6) FROM HIGH PRESSURE CUT-OUT SWITCH (7).
4. REMOVE TWO SCREWS (8) AND WASHERS (9) FROM PRESSURE CONTROL SWITCH (10).
5. PULL PRESSURE SWITCHES (4, 7, 10) OUT OF PRESSURE SWITCH ENCLOSURE (11).

INSTALLATION OF PRESSURE SWITCHES IN ENCLOSURE

1. POSITION PRESSURE SWITCHES (4, 7, 10) IN ENCLOSURE.
2. SECURE PRESSURE CONTROL SWITCH WITH TWO SCREWS (8) AND WASHERS (9) .
3. SECURE HIGH PRESSRE CUT-OUT SWITCH (7) WITH TWO SCREWS (5) AND WASHERS (6) .
4. SECURE LOW PRESSURE CUT-OUT SWITCH (4) WITH TWO SCREWS (2) AND WASHERS (3).
5. POSITION PRESSURE SWITCH ENCLOSURE (11) ON PANEL AND SECURE WITH FOUR SCREWS (1):

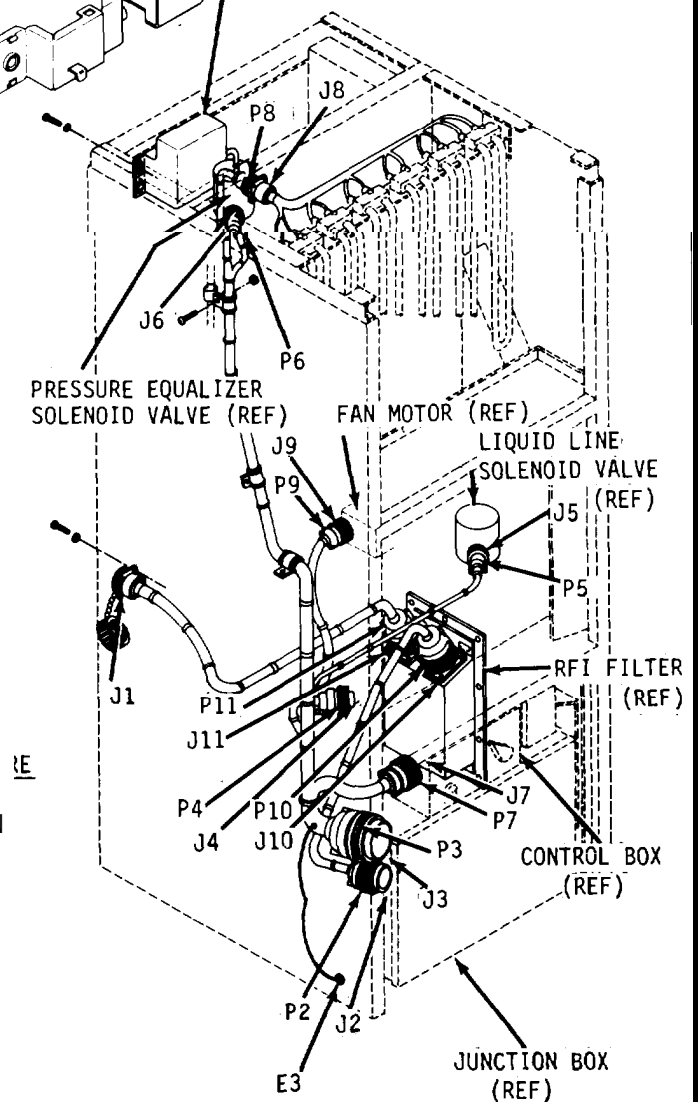


Figure 3-33. Removal and installation of pressure switches

(2) Test.

(a) Disconnect connector plugs P2 through P11.

(b) Refer to table 3-3 and continuity check the wiring harnesses.

(3) Repair.

(a) Repair any damaged portions of the wiring harnesses by replacing individual wires as required.

(b) Repair any portions of the wiring harnesses which do not check out for continuity by replacing individuals wires as may be required.

(4) Replace. Replace any wiring harness if damage is unrepairable.

b. Receptacle Connectors.

(1) Inspect.

(a) Inspect receptacle connectors J1 through J11 for bent or missing pins.

(b) Inspect receptacle connectors for any other damage which would impair serviceability.

(2) Replace. Replace any receptacle connector which has bent or missing pins or other damage which would impair serviceability.

c. Plug Connectors.

(1) Inspect.

(a) Inspect plug connectors P2 through P11 for bent or missing pins.

(b) Inspect plug connectors for any other damage which would impair serviceability.

(2) Replace. Replace any plug connector which has bent or missing pins or other damage which would impair serviceability.

d. Close-up Procedures After Maintenance of Wiring Harnesses

(1) Reconnect plugs P2 through P11. (See figure 3-33.)

(2) Install RFI filter assembly. (See figure 3-22.)

(3) Install pressure switches. (See figure 3-33.)

(4) Install junction box and control box. (See figure 3-12.)

(5) Install evaporator fan. (See figure 3-30.)

(6) Install lower access panel, condenser fan guard, top panel and fabric cover.

Table 3-3. Wiring Harness Continuity Check

STEP NO.	TERMINAL NO.	TO	TERMINAL NO.	STEP NO.	TERMINAL NO.	TO	TERMINAL NO.
1	J1-A		P10-A	27	P3-S		P9-E
2	J1-B		P10-B	28	P3-T		P9-H
3	J1-C		P10-C	29	P3-P		P9-G
4	J1-D		P10-D	30	P3-U		P9-B
5	P11-A		P2-A	31	P3-R		P9-A
6	P11-B		P2-B	32	P3-V		P9-C
7	P11-C		P2-C	33	P3-X		P9-J
8	P11-D		P2-D	34	P3-W		P9-F
9	P3-A		P4-G	35	P3-O		S3-2
10	P3-B		P4-F	36	P3-Y		P7-A
11	P3-C		S7-1	37	P3-Z		P7-B
12	P3-I		S6-2	38	P3-a		P7-U
13	P3-J		P4-E	39	P3-p		P7-C
14	P3-w		P4-C	40	P3-c		P7-I
15	P3-u		P4-B	41	P3-d		P7-T
16	P3-v		P4-A	42	P3-e		P7-N
17	P3-G		P4-D	43	P3-D		P7-W
18	P3-E		P6-A	44	P3-f		P7-X
19	P3-F		P6-B	45	P3-b		P7-H
20	P3-H		P5-B	46	P3-y		P7-K
21	P3-K		P5-A	47	P3-z		P7-M
22	P3-N		P8-C	48	P3-x		P7-J
23	P3-M		P8-B	49	P3-g		S3-1
24	P3-L		P8-A	50	P7-D		P8-E
25	P3-t		E3	51	P7-F		P8-D
26	P3-h		P9-D	52	P7-V		P8-F

CHAPTER 4

DIRECT SUPPORT MAINTENANCE

Section I. Repair Parts, Special Tools, TMDE, and Support Equipment

4-1. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list TM 5-4120-356-24P covering direct support maintenance of this equipment.

4-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Tool Kit, Service, Refrigeration Unit, LINW5362 is the only special tool required to perform direct support maintenance on the air conditioner..

Section II. Troubleshooting

4-3. TROUBLESHOOTING TABLE

a. The troubleshooting table (table 4-1) lists the common malfunctions which you may find during the operation or maintenance of the air conditioner or its components. You should perform the test/inspections and corrective actions in the order listed.

b. For a specific malfunction, perform procedures listed in troubleshooting table 3-2 before performing the procedures listed in table 4-1.

c. This manual can not list all malfunctions which may occur. However, all tests or inspections and corrective actions are listed for most common malfunctions. If malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 4-1. Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. COMPRESSOR WILL NOT START		
	Step 1. Inspect compressor for burnout (paragraph 4-12).	Replace burned out compressor (paragraph 4-12).
	Step 2. Inspect for burned out fuse(s) (paragraph 3-10f).	Replace burned out fuse(s).
	Step 3. Inspect and test circuit breaker (paragraph 3-10g).	Replace damaged or defective circuit breaker.
	Step 4. Inspect and test thermostat (paragraph 3-10c).	Replace damaged or defective thermostat.

Table 4-1. Troubleshooting (continued)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

COMPRESSOR WILL NOT START (continued)

Step 5. Inspect and test selector switch (paragraph 3-10b).

Replace damaged or defective selector switch.

Step 6. Inspect and test compressor relay (paragraph 3-10h).

Replace damaged or defective compressor relay.

Step 7. Inspect and test time delay relay (paragraph 3-10j).

Replace damaged or defective time delay relay.

Step 8. Inspect for loose electrical connections and defective wiring (paragraph 3-16).

Tighten loose connections. Repair or replace defective wiring.

Step 9. Inspect and test high and low pressure cut-out switches (paragraph 4-13a and 4-13b).

2. COMPRESSOR SHORT CYCLES

Step 1. Check air conditioner operating pressures for excessive refrigerant in system (paragraph 4-12f).

Release excessive refrigerant from system until the proper charge is attained (figure 4-2).

Step 2. Inspect and test liquid line solenoid valve (paragraph 3-13a).

Repair or replace damaged or defective solenoid valve (paragraph 4-14b).

Step 3. Inspect and test pressure equalizer solenoid valve (paragraph 3-13a)

Repair or replace damaged solenoid valve (paragraph 4-14c).

3. INSUFFICIENT COOLING

Step 1. Check for insufficient refrigerant in system (bubbles in sight glass).

Add refrigerant (paragraph 4-11).

Table 4-1. Troubleshooting (continued)

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION**

INSUFFICIENT COOLING (continued)

- Step 2. If adding refrigerant to the system does not clear up bubbles in the sight glass, there may be air in the system.

Open system and remove refrigerant (figure 4-2). Purge the system in accordance with paragraph 4-8, evacuate the system (figure 4-4) and recharge the system with refrigerant in accordance with paragraph 4-10.

- Step 3. Check for inoperative fans.

Perform corrective actions listed in section 10 of this troubleshooting table.

- Step 4. Check air conditioner operating pressures for excessive refrigerant in the system in accordance with paragraph 4-12f.

Release excess refrigerant from the system until the proper charge is attained (figure 4-2).

- Step 5. Inspect expansion valve and check superheat (paragraph 4-14j).

Repair or replace damaged or defective expansion valve. Adjust expansion valve if superheat is not correct in accordance with paragraph 4-14j.

- Step 6. Inspect quench valve and check superheat (paragraph 4-14k).

Repair or replace damaged or defective quench valve. Adjust quench valve if superheat is not correct in accordance with paragraph 4-14k.

- Step 7. Inspect and test pressure equalizer solenoid valve in accordance with paragraph 3-13a.

Repair or replace damaged or defective solenoid valve in accordance with paragraph 4-14c.

- Step 8. Inspect and test liquid line solenoid valve in accordance with paragraph 3-13a.

Repair or replace damaged or defective solenoid valve in accordance with paragraph 4-14b.

Table 4-1. Troubleshooting (continued)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

INSUFFICIENT COOLING (continued)

Step 9. Clogged dehydrator (drier)

Replace dehydrator in accordance with paragraph 4-14d.

Step 10. Restriction in liquid line.

Open system and remove refrigerant (figure 4-2). Purge system in accordance with paragraph 4-8. Evacuate system (figure 4-4) and recharge the system with refrigerant in accordance with paragraph 4-10.

4. REFRIGERANT SYSTEM CONTINUOUSLY LOSING REFRIGERANT

Step 1. Check refrigerant tubing and components for leaks in accordance with paragraph 4-4c.

Repair leaks if possible in accordance with paragraph 4-4d. Replace unrepairable tubing or components.

Step 2. Check for defective relief valve in accordance with paragraph 4-14g.

Replace defective pressure relief valve.

5. AIR CONDITIONER NOISY DURING OPERATION

Step 1. Check air conditioner operating pressures for excessive refrigerant in the system in accordance with paragraph 4-12f.

Release excess refrigerant from the system until the proper charge is attained (see figure 4-2).

Step 2. Check for noisy compressor, indicating worn bearings or insufficient clearance between rotating parts.

Replace compressor in accordance with procedures given in paragraph 4-12.

Step 3. Inspect expansion valve and check superheat in accordance with paragraph 4-14j.

Repair or replace damaged or defective expansion valve. Adjust expansion valve if superheat is not correct in accordance with paragraph 4-14j

Table 4-1. Troubleshooting (continued)

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION**

AIR CONDITIONER NOISY DURING OPERATION (continued)

- Step 4. Inspect quench valve and check superheat in accordance with paragraph 4-14k.

Repair or replace damaged or defective quench valve. Adjust quench valve superheat in accordance with paragraph 4-14k.

6. AIR CONDITIONER STOPS DUE TO HIGH PRESSURE SWITCH TRIPPING

- Step 1. Check air conditioner operating pressures for excessive refrigerant in the system in accordance with paragraph 4-12f.

Release excess refrigerant from the system until the proper charge is attained (see figure 4-2).

- Step 2. Check for restriction in condenser air flow.

Clean condenser coil and/or remove restriction in accordance with paragraph 3-13c.

7. AIR CONDITIONER OPERATES CONTINUOUSLY ON COOLING CYCLE

- Step 1. Check for insufficient refrigerant in the system indicated by bubbles in the sight glass.

Add refrigerant in accordance with the procedures given in paragraph 4-11.

- Step 2. If adding refrigerant to the system does not clear up bubbles in the sight glass, there may be air in the system.

Remove refrigerant from the system (see figure 4-2). Purge the system in accordance with paragraph 4-8. Evacuate the system (see figure 4-4) and recharge the system with refrigerant in accordance with paragraph 4-10.

8. SIGHT GLASS SHOWS YELLOW INSTEAD OF GREEN

- Step 1. Yellow in sight glass is caused by contamination in the refrigerant.

Open the system and remove refrigerant (see figure 4-2). Remove dehydrator (drier) (see figure 4-16) and purge the system in accordance with the procedures given in paragraph 4-8. Install a new dehydrator (drier) (see figure 4-16),

Table 4-1. Troubleshooting (continued)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

SIGHT GLASS SHOWS YELLOW INSTEAD OF GREEN (continued)

evacuate the system (see figure 4-4) and recharge the system with refrigerant in accordance with paragraph 4-10.

Step 2. Check for yellow in the sight glass after system has been purged.

If sight glass still shows yellow, replace the compressor in accordance with the procedures given in paragraph 4-12.

9. AIR CONDITIONER WILL NOT START IN ANY MODE

Step 1. Check electrical power source.

Repair electrical power source.

Step 2. Check for burned out fuse(s) (paragraph 3-10f).

Replace burned out fuse(s).

Step 3. Check circuit breaker in accordance with paragraph 3-10g).

Reset circuit breaker. Replace damaged or defective circuit breaker.

Step 4. Check and test selector switch in accordance with paragraph 3-10b).

Replace damaged or defective selector switch.

Step 5. Continuity check internal power circuit in accordance with paragraph 3-16.

Repair or replace damaged or defective wiring.

10. FANS DO NOT OPERATE

Step 1. Continuity check fan motor circuit (see figure 3-28).

Repair or replace damaged or defective wiring.

Step 2. Inspect and test fan motor in accordance with paragraph 3-15.

Repair or replace damaged or defective fan motor.

Table 4-1. Troubleshooting (continued)

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

FANS DO NOT OPERATE (continued)

- Step 3. Inspect and test fan speed switch in accordance with paragraph 3-10d.

Replace damaged or defective fan speed switch.

- Step 4. Inspect and test fan motor relays in accordance with paragraph 3-10k.

Replace damaged or defective relay(s).

11. UNIT DOES NOT OPERATE IN HEATING MODE

- Step 1. Continuity check heater circuit (see figure 3-28).

Repair or replace damaged or defective wiring.

- Step 2. Inspect and test heater thermostatic switch in accordance with paragraph 3-14b.

Replace damaged or defective heater thermostatic switch.

- Step 3. Inspect and test selector switch in accordance with paragraph 3-10b.

Replace damaged or defective selector switch.

Section III. Maintenance Procedures

4-4. **GENERAL MAINTENANCE PROCEDURES**

a. Removing and Installing Panels and Grilles Direct Support Maintenance of the air conditioner components normally requires the removal of panels and grilles to provide access to the interior of the unit, and installation of these panels and grilles after maintenance has been accomplished. Refer to paragraph 3-9 for required removal and installation of panels and grilles during accomplishment of Direct Support Maintenance.

b. Soldering and Brazing.

(1) Use a silver solder on all soldered connections. Silver solder with a 50 percent silver capacity and a melting point of approximately 1300°F (704°C) is recommended.

(2) Continually pass dry nitrogen through the tubing or connections being soldered or brazed to prevent the formation of harmful copper oxides.

c. Checking for Refrigerant System Leaks.

(1) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(2) Refer to figure 4-5 and install pressure gages.

(3) If refrigerant system has been opened and refrigerant removed, proceed to step (5).

(4) If refrigerant system has not been opened, check system static pressure on the suction side and on the discharge side of the compressor. If pressure on both the suction side and the discharge side is at least 100 psig (7.0ks/mc²), proceed to step (6). If pressure on both the suction side and the discharge side is not at least 100 psig (7.0ks/cm²) proceed with step (5).

(5) Add vaporized refrigerant to both the suction side and the discharge side of the compressor through the service valves until the suction pressure and the discharge pressure are at least 100 psig (7.0ks/mc²).

(6) Using available leak detector, check areas of the refrigerant system showing collected refrigerant oil and associated accumulated dust. Pinpoint and tag each leak found.

d. Repairing Refrigerant System Leaks.

(1) Refer to paragraph 4-6 and release refrigerant from the system. Leave service valves open.

(2) If leak is to be brazed, proceed as follows:

(a) Connect a source of vaporized nitrogen to the service valve closest to the leak.

(b) Release nitrogen into the system while brazing the leaking area.

(c) Disconnect the nitrogen source from the service valve.

(3) If the leak is in a fitting, proceed as follows:

(a) Remove the fitting and associated component from the system.

(b) Clean fitting.

CAUTION

Use care in applying leak lock or high vacuum grease so that when the fitting is installed, none of the material gets inside the refrigerant system.

(c) Apply high vacuum grease (NSN 9150-00-965-2408) or equivalent to the seats of flare nut fittings.

(d) Apply leak lock (NSN 4030-00-999-6313) to the threads of threaded fittings.

(e) Install the fittings and associated component and tighten fittings.

(4) Repressurize the system with vaporized refrigerant to get 100 psig (7.0ks/mc²) on both sides (suction and discharge) of the compressor.

(5) Using available leak detector, verify that the repaired area is no longer leaking. Repeat steps (1) through (5) if the repaired area is still leaking.

e. If refrigerant leak detection and repair procedures have been performed as a result of the replacement of refrigerant component or components, refer to, and complete applicable installation procedures for the replaced component or components.

f. If refrigerant leak detection and repair procedures have not been performed as a result of the replacement of refrigerant components, proceed as follows:

(1) Release refrigerant from the system in accordance with paragraph 4-6.

(2) Purge the refrigerant system in accordance with paragraph 4-8.

(3) Evacuate the refrigerant system in accordance with paragraph 4-9.

(4) Charge the system with refrigerant in accordance with paragraph 4-10.

4-5. REFRIGERANT SYSTEM

Nearly all operations for the correction of malfunctions found in troubleshooting or maintenance activities of Direct Support Maintenance require that the refrigerant system be opened. Refer to paragraphs 4-6 through 4-10 for procedures used in opening and closing the refrigerant system. See figure 4-1 for a flow diagram of the refrigerant system.

4-6. RELEASING REFRIGERANT FOR SERVICE

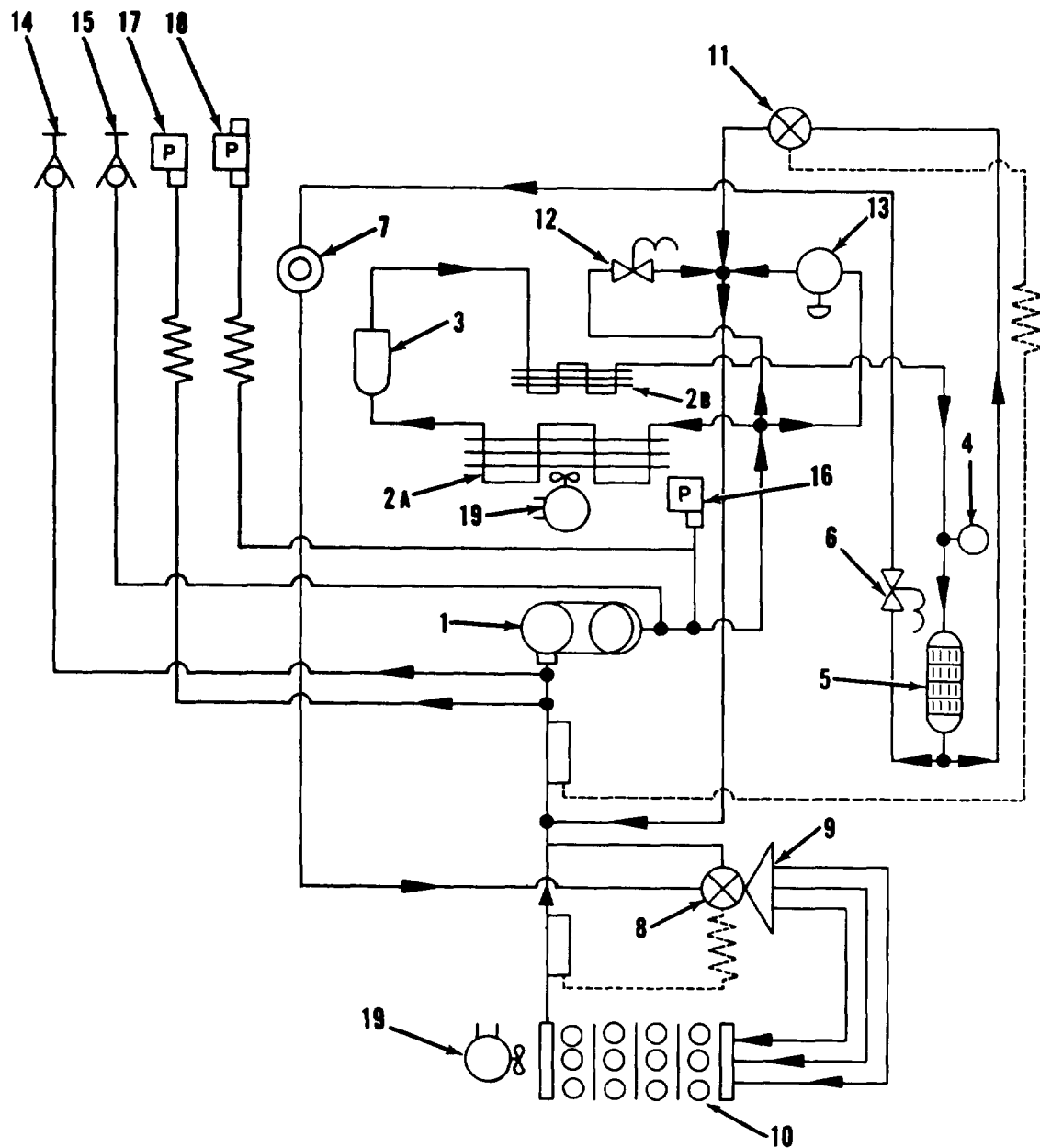
Opening the refrigerant system for the replacement of components or other maintenance activities requires the release of refrigerant from the system. Refer to figure 4-2 when releasing refrigerant.

4-7. REPLACEMENT OF DEHYDRATOR (DRIER)

The dehydrator (drier) prevents the accumulation of moisture and contaminates within the refrigerant system. The dehydrator must be replaced each time the system is exposed to the atmosphere. Release refrigerant in accordance with paragraph 4-6 before removing the dehydrator from the system. Refer to figure 4-16 for replacement of the dehydrator.

4-8. PURGING THE REFRIGERANT SYSTEM

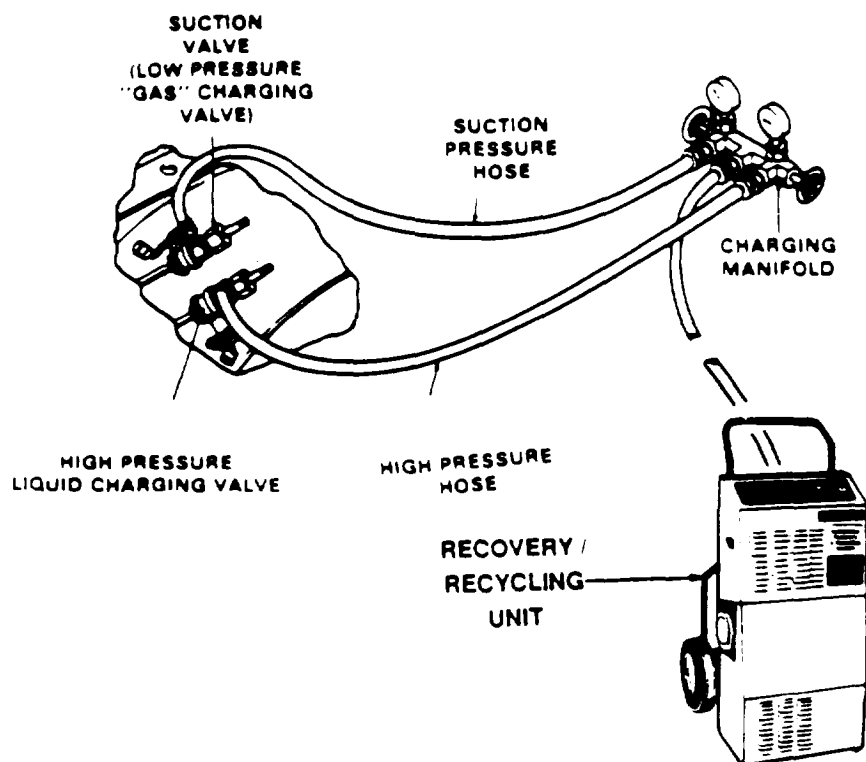
The refrigerant system must be purged each time the system is exposed to the atmosphere.



- | | |
|--|---------------------------------------|
| 1. COMPRESSOR | 11. QUENCH VALVE |
| 2A. CONDENSER COIL | 12. PRESSURE EQUALIZER SOLENOID VALVE |
| 2B. SUBCOOLER (PART OF CONDENSER COIL) | 13. PRESSURE REGULATING VALVE |
| 3. RECEIVER | 14. SUCTION PRESSURE SERVICE VALVE |
| 4. PRESSURE RELIEF VALVE | 15. DISCHARGE PRESSURE SERVICE VALVE |
| 5. DEHYDRATOR (DRIER) | 16. PRESSURE CONTROL SWITCH |
| 6. LIQUID LINE-SOLENOID VALVE | 17. LOW PRESSURE CUT-OUT SWITCH |
| 7. SIGHT GLASS | 18. HIGH PRESSURE CUT-OUT SWITCH |
| 8. EXPANSION-VALVE | 19. FAN MOTOR |
| 9. FLUID FLOW RESTRICTOR | |
| 10. EVAPORATOR COIL | |

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Figure 4-1. Refrigerant flow system



WARNING

Death or serious injury may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin-eye-contact is possible.

Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes refrigerant to break down and form carbonyl chloride (phosgene), a highly poisonous and corrosive gas.

RELEASING REFRIGERANT FOR SERVICE

NOTE

In accordance with environmental protection agency regulations refrigerants cannot be discharged into the atmosphere. A refrigerant recovery & recycling unit must be used whenever discharging the refrigerant system.

1. REMOVE FRESH AIR SCREEN FROM AIR CONDITIONER. (SERVICE VALVES ARE LOCATED BEHIND FRESH AIR SCREEN.)

NOTE

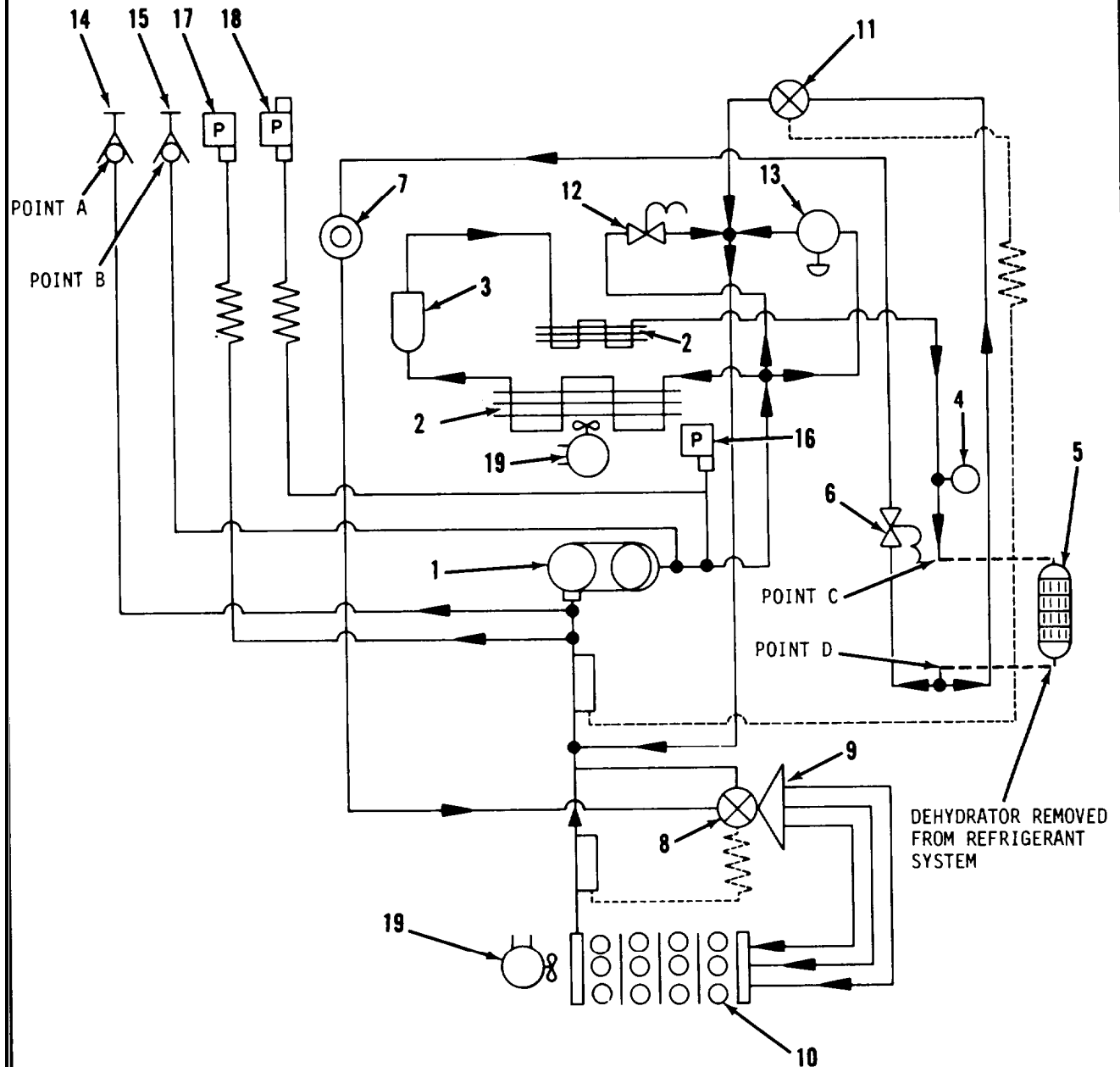
Operation of the recovery/recycling unit must be by AUTHORIZED PERSONNEL ONLY.

2. CONNECT AND OPERATE A RECOVERY/RECYCLING UNIT IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

Figure 4-2. Releasing refrigerant for service.

Nitrogen purging cleans the system of residual moisture and contaminants and also removes any liquid refrigerant which may be left in the system. All refrigerant, liquid and gaseous, must be removed before evacuating the system. Refer to figure 4-3 and purge the refrigerant system with gaseous nitrogen at approximately 30 psig (2.1 1 (ks/cm²) as follows:

- a. Refer to figure 4-2 and release refrigerant from the system in accordance with paragraph 4-6.
- b. Partially remove the junction from the air conditioner. It is not necessary to remove the junction box cover. (See figure 3- 1 2.)
- c. Disconnect electrical plug P3 from the junction box.
- d. Refer to paragraph 4-14d and remove the dehydrator (drier). Do not replace with a new dehydrator at this time.
- e. Perform all maintenance procedures required on the refrigerant system, including repairing leaks and inspecting, testing and replacing refrigerant system components.
- f. Refer to figure 4-3 and open valve (14)at point A and valve (15)at point B.
- g. Energize the pressure equalizer solenoid valve (12) by applying 24 volts dc across pins E and F of plug P3.
- h. Connect the nitrogen line to the valve at point A and release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.
- i. Remove the nitrogen line from the tubing at point A and connect it to the tubing at point B.
- j. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.
- k. Remove the nitrogen line from the tubing at point B and connect it to the tubing at point C.
- l. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.
- m. Remove the nitrogen line from the tubing at point C and connect it to the valve at point D.
- n. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.
- o. Remove nitrogen line from the valve at point D and cap tubing at points C and D until installation of a new dehydrator.
- p. Close valve (14) at point A and valve (15) at point B. De-energize the pressure equalizer solenoid valve (12).
- q. Refer to paragraph 4- 14d and install a new dehydrator.



- | | |
|--|---------------------------------------|
| 1. COMPRESSOR | 10. EVAPORATOR COIL |
| 2A. CONDENSER COIL | 11. QUENCH VALVE |
| 2B. SUBCOOLER (PART OF CONDENSER COIL) | 12. PRESSURE EQUALIZER SOLENOID VALVE |
| 3. RECEIVER | 13. PRESSURE REGULATING VALVE |
| 4. PRESSURE RELIEF VALVE | 14. SUCTION PRESSURE SERVICE VALVE |
| 5. DEHYDRATOR (DRIER) | 15. DISCHARGE PRESSURE SERVICE VALVE |
| 6. LIQUID LINE-SOLENOID VALVE | 16. PRESSURE CONTROL SWITCH |
| 7. SIGHT GLASS | 17. LOW PRESSURE CUT-OUT SWITCH |
| 8. EXPANSION VALVE | 18. HIGH PRESSURE CUT-OUT SWITCH |
| 9. FLUID FLOW RESTRICTOR | 19. FAN MOTOR |

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Figure 4-3. Flow diagram of refrigerant system with dehydrator removed

4-9. EVACUATING THE REFRIGERANT SYSTEM

After completion of system purging and before the system is charged with refrigerant, the system must be evacuated before new refrigerant is added. Refer to figure 4-4 for evacuation procedures.

4-10. CHARGING THE SYSTEM WITH REFRIGERANT

a. After completion of system evacuation in accordance with paragraph 4-9, the unit is ready for recharging.

NOTE

Whenever available, use recycled refrigerant for charging the refrigeration system.

b. Connect the refrigerant charging hookup as shown in figure 4-5 with a full cylinder of refrigerant R-22. Weigh the cylinder so that 4 pounds (1.8kg) of refrigerant can be measured into the system.

NOTE

The refrigerant cylinder used for recharging should be equipped with a large capacity filter drier.

c. Attach charging line to unit. Do not tighten. Be sure refrigerant cylinder is in an upright position so only gas will be drawn off.

d. Open refrigerant cylinder valve slightly and then close to purge air from the charging line. Tighten charging line on service valve fitting.

e. Open valve on refrigerant cylinder about 2 turns.

f. Open the system discharge valve about 2 turns and allow pressure to equalize

g. Start unit and run until 4 pounds (1.8kg) of refrigerant R-22 is added.

h. Backseat suction service valve.

i. Close refrigerant cylinder valve and remove charging line from valve.

j. Remove manifold and gages (see figure 4-5).

k. Turn selector switch to the "OFF" position.

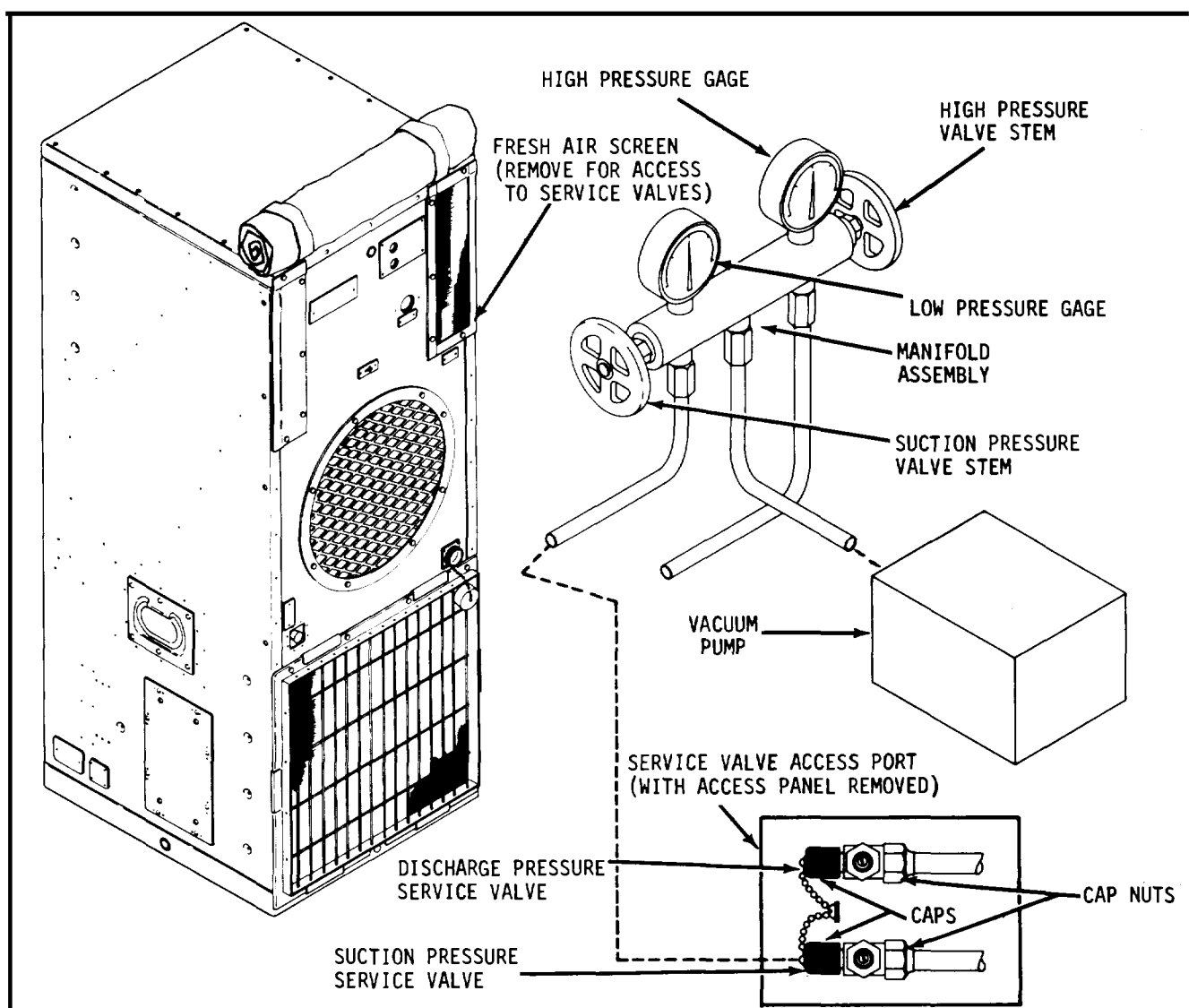
4-11. ADDING REFRIGERANT TO THE SYSTEM

a. General. Bubbles or a milky or frothy appearance of the refrigerant passing the sight glass in normal operation is an indication that the system needs additional refrigerant. The normal refrigerant charge in the unit when shipped is 4 pounds (1.8kg) of R-22 refrigerant. If bubbles or a milky or frothy appearance of the refrigerant is visible in the sight glass. add refrigerant as follows:

b. Adding Refrigerant.

(1) Refer to figure 4-5 and install pressure gages with R-22 refrigerant cylinder in an upright position.

(2) Start air conditioner by turning selector switch to the "COOL" position.



EVACUATING THE REFRIGERANT SYSTEM

1. MAKE SURE THAT THE CAP NUTS ON THE SERVICE VALVES ARE TIGHT.
2. CONNECT A VACUUM PUMP TO THE CENTER CONNECTOR OF THE MANIFOLD ASSEMBLY .
3. MAKE SURE ALL VALVES ARE CLOSED.
4. REMOVE CAP FROM SUCTION PRESSURE SERVICE VALVE.
5. CONNECT LINE FROM SUCTION PRESSURE SIDE OF MANIFOLD ASSEMBLY TO SUCTION PRESSURE SERVICE VALVE.

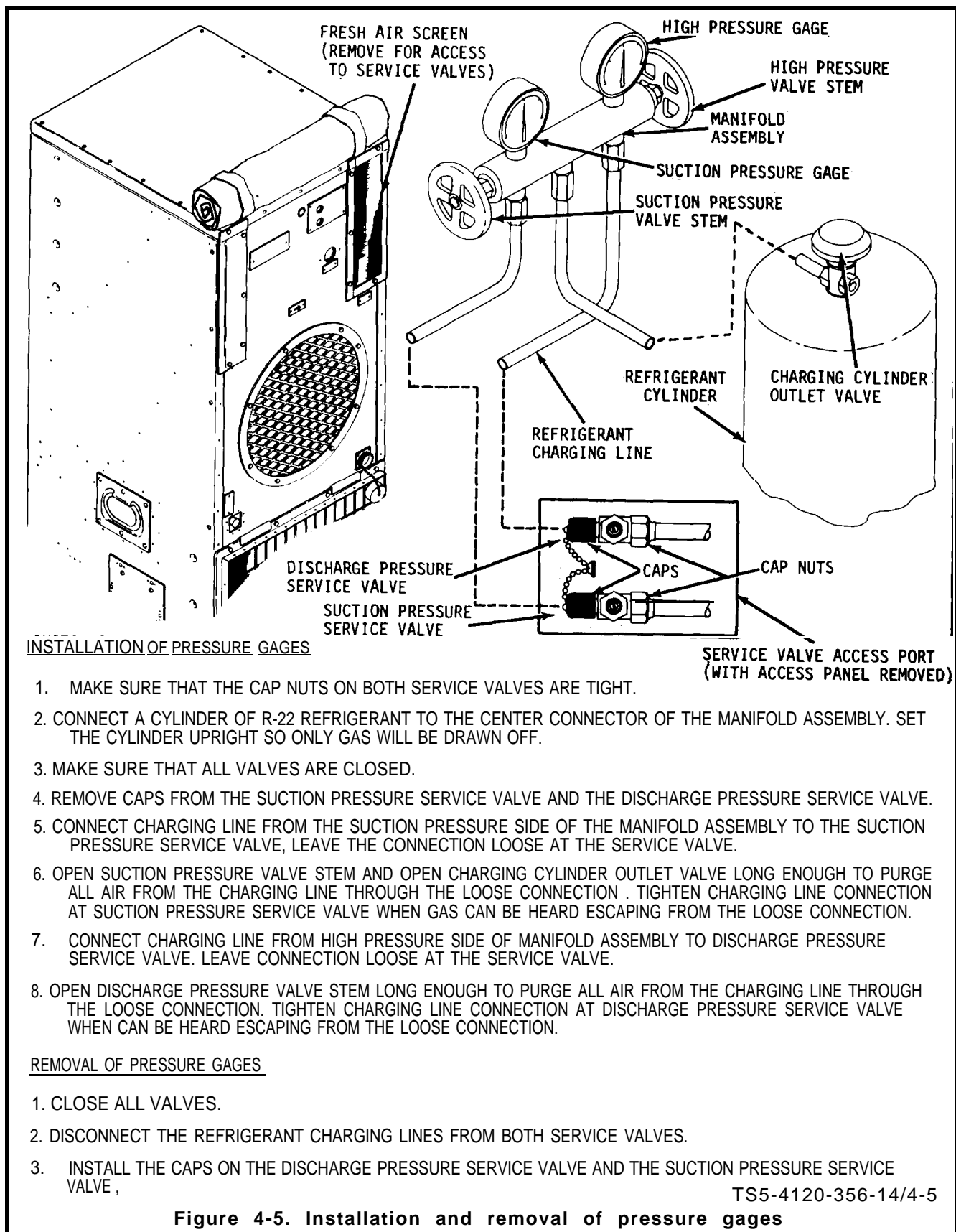
NOTE

DO NOT TURN CAP NUT WHEN OPENING
SUCTION PRESSURE SERVICE VALVE.

6. OPEN SUCTION PRESSURE SERVICE VALVE AND SUCTION PRESSURE VALVE STEM.
7. START VACUUM PUMP AND EVACUATE REFRIGERANT SYSTEM TO 100 MICRONS.
8. CLOSE SUCTION PRESSURE SERVICE VALVE AND SUCTION PRESSURE VALVE. STEM.
9. REFER TO PARAGRAPH 4-10 AND CHARGE THE SYSTEM WITH REFRIGERANT.

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Figure 4-4. Evacuating the refrigerant system



- (3) Turn thermostat control knob counter-clockwise to its limit.
- (4) Open charging cylinder outlet valve about two turns.
- (5) Open suction pressure service valve slowly while observing the sight glass. When the bubbles disappear and the sight glass becomes clear, close the suction pressure service valve.
- (6) Allow the air conditioner to continue to run for 10 minutes. If bubbles reappear, add more refrigerant until bubbles again disappear. Continue this cycle until no more bubbles appear. Add refrigerant a little at a time so that the system is not overcharged.
- (7) Turn selector switch to "OFF" position.
- (8) Refer to figure 4-5 and remove pressure gages and charging cylinder.

4-12. COMPRESSOR

a. General. The compressor is a hermetically sealed unit and may not be disassembled at the Direct Support Level.

b. Test.

WARNING

Disconnect the air conditioner from the electrical power source before attempting to perform maintenance or testing of the compressor.

- (1) Turn selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.
- (2) Refer to figure 3-12 and partially remove the junction box.
- (3) If the compressor is obviously burned out, proceed with step c.
- (4) If the compressor is inoperative, but does not appear to be burned out, refer to figure 3-28 (wiring diagram) and test the compressor wire harness for continuity.
- (5) Repair or replace any broken wires found and check for compressor operation. If compressor now operates properly, no further maintenance action is required on the compressor.
- (6) If no broken wires are found, or if compressor fails to operate after broken wires are repaired or replaced, refer to table 4-1 and troubleshoot the compressor.
- (7) If troubleshooting fails to isolate and correct the problem, proceed to step c.

c. Replace. Replace the compressor if burned out or if the compressor has damage which would impair serviceability. Refer to step d for removal of defective

compressor, step e for system clean up (flushing), and step f for the installation of a new compressor.

d. Removal.

(1) Refer to figure 4-1 and release refrigerant from the system.

(2) Refer to figure 4-6 and remove the compressor.

e. System Clean Up. When a hermetically sealed compressor burns out, the stator winding decomposes, forming carbon, water and acid which contaminates refrigerant system. These contaminants must be thoroughly removed from the system to prevent repeated compressor failures. Compressor burn out may also cause damage to the air conditioner electrical system. The following clean up procedures must be followed in any case of compressor failure.

(1) Perform removal procedures (step d, above).

(2) Refer to paragraph 4-14d and remove the dehydrator. DO not replace with a new dehydrator at this time.

(3) Flush the refrigerant system with trichlorotrifluoroethane refrigerant solvent R-114 (NSN 6830-00-782-6512). Flushing should be done under a pressure of 8 to 12 psig (0.56 to 0.84 ks/cm²), using a pump of approximately 1/3 horse power. The R-114 may be recirculated if run through a 10 micron filter. Procedures for flushing the system are as follows:

(a) Refer to figure 4-7 and connect the discharge line of the pump to the suction pressure service valve (14) at point "A".

(b) Connect the recovery line of the pump to the tubing at point "F"

(c) Open the suction pressure service valve (14) and close the discharge pressure service valve (15).

(d) Cap the tubing at points "C", "D" and "E".

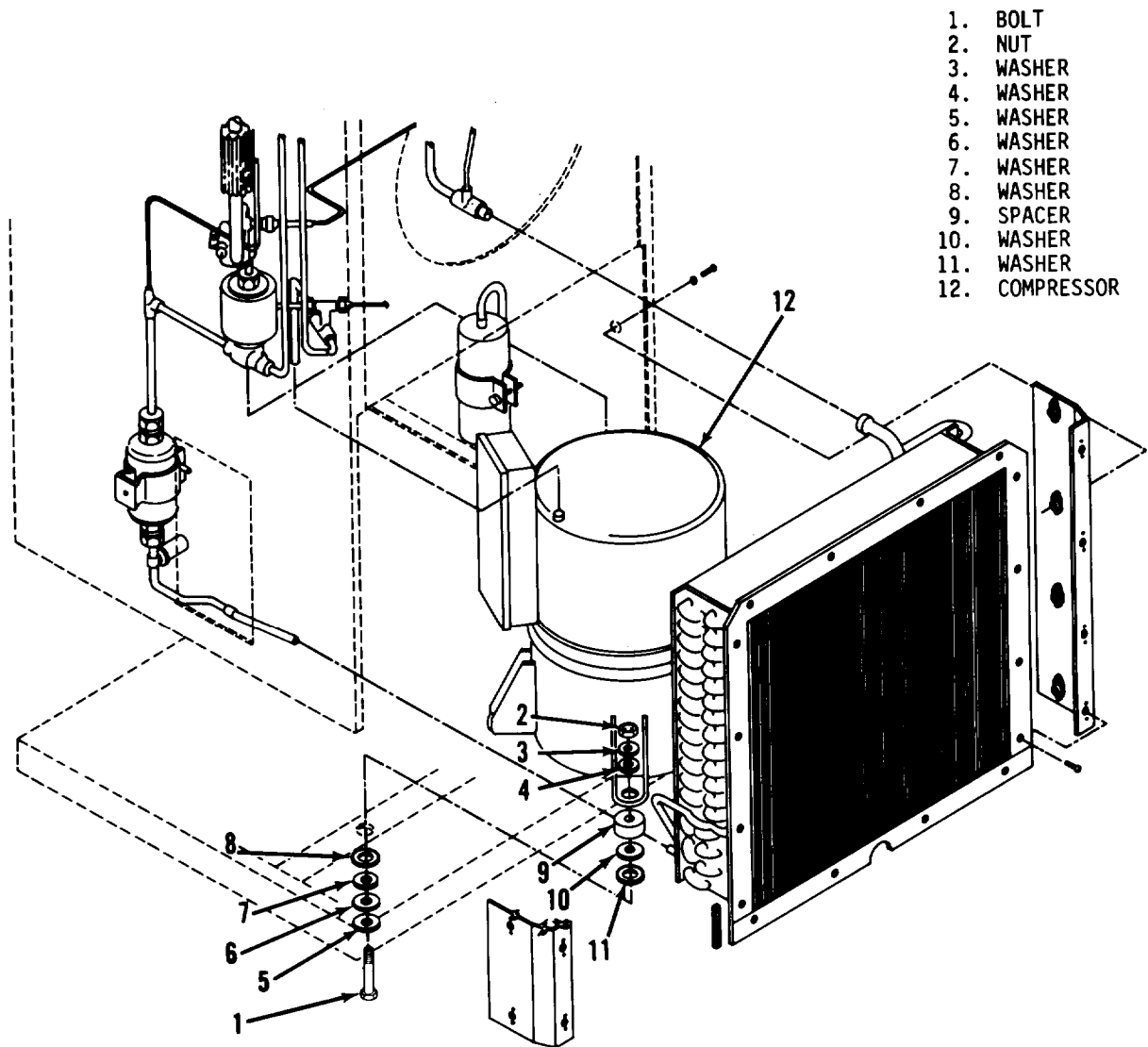
(e) Start the pump and flush the line for approximately 10 minutes then turn the pump off.

(f) Remove the discharge line of the pump from the suction pressure service valve (14) at point "A" and remove the recovery line from the pump to the tubing at point "F".

(g) Connect the discharge line of the pump to the tubing at point "F" and the recovery line to the valve at point "A".

(h) Start the pump and flush the line for approximately 10 minutes then turn the pump off.

(i) Remove the recovery line from the valve at point "A" and close the suction pressure service valve (14).



REMOVAL OF COMPRESSOR

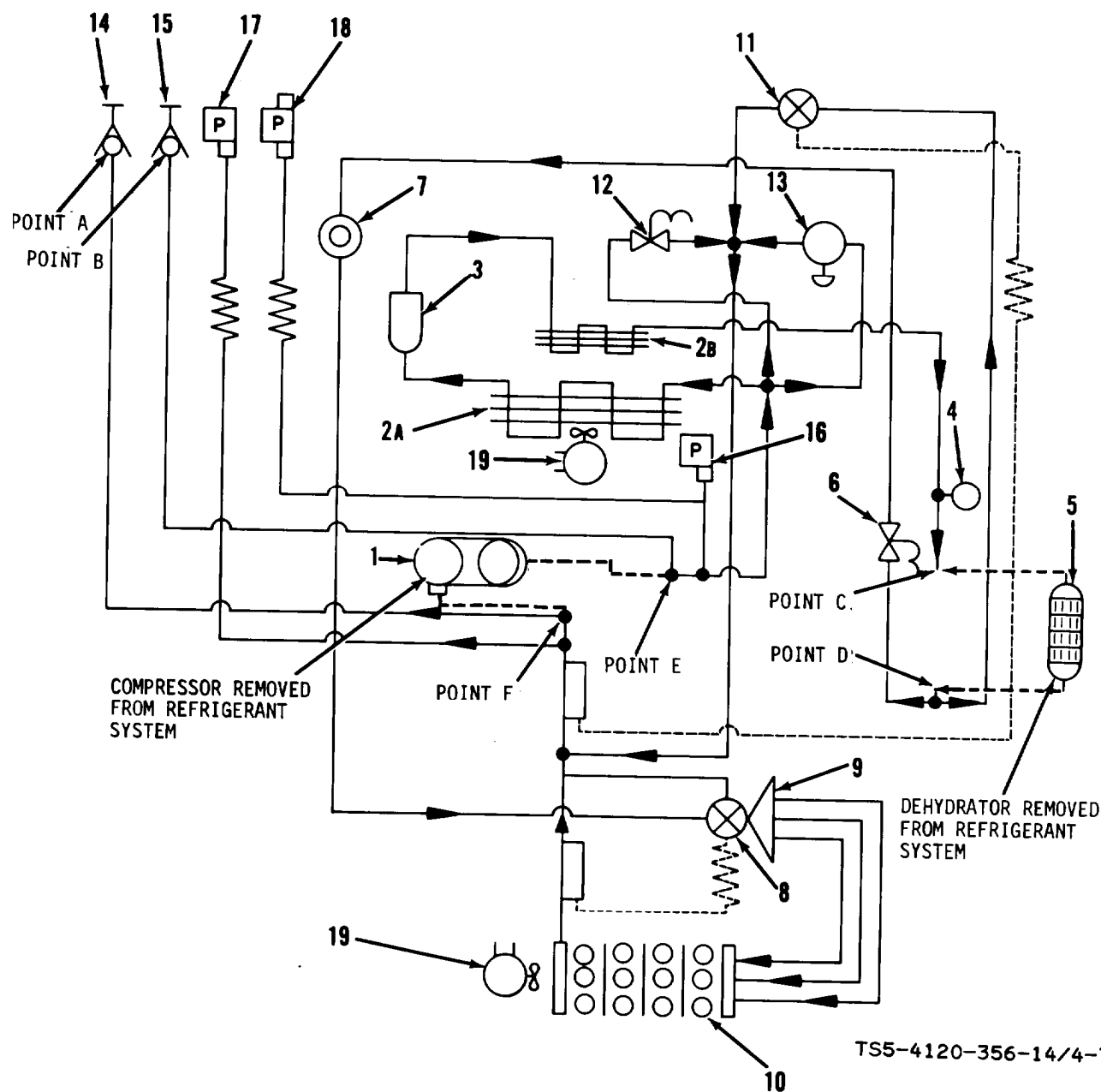
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1. REFER TO PARAGRAPH 4-12 FOR PRELIMINARY STEPS IN REMOVAL OF COMPRESSOR.
2. DISCONNECT COMPRESSOR ELECTRICAL CONNECTOR.
3. DISCONNECT TUBING FROM COMPRESSOR.
4. REMOVE FOUR BOLTS (1), NUTS (2), WASHERS (3, through 8), SPACER (9), AND WASHERS (10, 11) AND REMOVE COMPRESSOR FROM THE AIR CONDITIONER.

INSTALLATION OF COMPRESSOR

1. POSITION COMPRESSOR (12) IN THE AIR CONDITIONER AND SECURE WITH FOUR BOLTS (1), WASHERS (5 through 11), spacer (9), WASHERS (3, 4) AND NUTS (2).
2. BRAZE TUBING TO COMPRESSOR.
3. CONNECT ELECTRICAL CONNECTOR TO COMPRESSOR.
4. REFER TO PARAGRAPH 4-12 FOR FINAL STEPS IN INSTALLATION OF COMPRESSOR.

Figure 4-6. Removal and installation of compressor



- | | |
|--|--|
| 1. COMPRESSOR | 10. EVAPORATOR COIL |
| 2A. CONDENSER COIL | 11. QUENCH VALVE |
| 2B. SUBCOOLER (PART OF CONDENSER COIL) | 12. PRESSURE EQUALIZING SOLENOID VALVE |
| 3. RECEIVER | 13. PRESSURE REGULATING VALVE |
| 4. PRESSURE RELIEF VALVE | 14. SUCTION PRESSURE SERVICE VALVE |
| 5. DEHYDRATOR (DRIER) | 15. DISCHARGE PRESSURE SERVICE VALVE |
| 6. LIQUID LINE SOLENOID VALVE | 16. PRESSURE CONTROL SWITCH |
| 7. SIGHT GLASS | 17. LOW PRESSURE CUT-OUT SWITCH |
| 8. EXPANSION VALVE | 18. HIGH PRESSURE CUT-OUT SWITCH |
| 9. FLUID FLOW RESTRICTOR | 19. FAN MOTOR |

Figure 4-7. Flow diagram of refrigerant system with dehydrator and compressor removed

- (j) Connect the recovery line to the tubing at point "D".
- (k) Start the pump and flush the line for approximately 10 minutes then turn the pump off.
- (l) Switch the pump lines so that the recovery line is connected to the tubing at point "F" and the discharge line is connected to the tubing at point "D".
- (m) Start the pump and flush the line for approximately 10 minutes then turn the pump off.
- (n) Remove the discharge line from the tubing at point "D" and the recovery line from the tubing at point "F".
- (o) Cap the tubing at points "F" and "D", uncap the tubing at point "E" and open the valve at point "B".
- (p) Connect the discharge line to the tubing at point "E" and connect the recovery line to the valve at point "B".
- (q) Start the pump and flush the line for approximately 10 minutes then turn the pump off.
- (r) Switch the pump lines so that the recovery line is connected to the tubing at point "E" and the discharge line is connected to the valve at point "B".
- (s) Start the pump and flush the line for approximately 10 minutes then turn the pump off.
- (t) Remove the discharge line from the valve at point "B" and close the valve at point "B".
- (u) Remove the cap from the tubing at point "C" and connect the discharge line to the tubing at point "C".
- (v) Start the pump and flush the line for approximately 10 minutes then turn the pump off.
- (w) Switch the pump lines so that the recovery line is connected to the tubing at point "C" and the discharge line is connected to the tubing at point "E".
- (x) Start the pump and flush the line for approximately 10 minutes then turn the pump off.
- (Y) Refer to figure 3-12 and remove plug P3 from the junction box.
- (z) Energize the pressure equalizer solenoid valve (12) by applying 24 volts dc across pins E and F of plug P3.
- (aa) Remove the recovery line from the tubing at point "C" and cap the tubing at point "C".

(ab) Uncap the tubing at point "F" and connect the recovery line to the tubing at point "F".

(ac) Start pump and flush the line for approximately 10 minutes then turn the pump off.

(ad) Switch the pump lines so that the recovery line is connected to the tubing at point "E" and the discharge line is connected to the tubing at point "F".

(ae) Start the pump and flush the line for approximately 10 minutes then turn the pump off.

(4) Refer to figure 4-7 and purge the system with nitrogen at approximately 30 psig (2.11 ks/cm²) as follows:

(a) Allow the pressure equalizer solenoid valve to remain energized.

(b) Remove caps from tubing at points "C" and "D" and open valves at points "A" and "B".

(c) Connect the nitrogen line to the valve at point "A" and release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(d) Remove the nitrogen line from the valve at point "A" and connect it to the valve at point "B". Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(e) Remove the nitrogen line from the valve at point "B" and connect it to the tubing at point "C". Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(f) Remove the nitrogen line from the tubing at point "C" and connect it to the tubing at point "D". Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(g) Remove the nitrogen line from the tubing at point "D" and connect it to the tubing at point "E". Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(h) Remove the nitrogen line from the tubing at point "E" and connect it to the tubing at point "F". Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(i) Remove nitrogen line from the tubing at point "F".

(j) De-energize the pressure equalizer solenoid valve by removing the dc voltage source from across pins E and F of plug P3.

(k) Close valves (14, 15) at points "A" and "B".

(l) Cap all open tubing until installation of a new compressor.

f. Installation

- (1) Refer to paragraph 4-14d and install a new dehydrator.
- (2) Refer to figure 4-6 and install a new compressor.
- (3) Refer to paragraph 4-4c and check the system for refrigerant leaks. If any leaks are found, refer to paragraph 4-4d and repair leaks.
- (4) Reconnect plug P3 to J3 on junction box (see figure 3-12), and install junction box.
- (6) Refer to figure 4-4 and evacuate the refrigerant system.
- (6) Refer to paragraph 4-10 and charge the system with refrigerant. Leave the pressure gages connected.
- (7) With the unit operating in the cooling mode, check pressures. For proper discharge and suction lines pressure, see Table 4-1.1.
- (8) If pressures are satisfactory, close all valves, remove gages and turn the selector switch to the "OFF" position. If pressures are unsatisfactory, refer to Table 4-1-2.

Table 41.1. Troubleshooting**NORMAL TEMPERATURE-PRESSURE RELATIONSHIPS**

95°F (36°C) dry bulb return air to unit					
Outdoor ambient temperature	50°F 10°C	75°F 24°C	100°F 38°C	110°F 43.5°C	125°F 52°C
Gauge Pressures					
Suction (psig) (Kg/CM ²)	56-60 3.93-4.22	56-65 3.93-4.57	65-75 4.57-5.27	70-80 4.92-5.62	75-90 5.27-6.33
Discharge (psig) (Kg/CM ²)	135-155 9.50-10.90	185-205 13.00-14.41	275-295 19.33-20.74	375-380 26.36-26.72	400-420 28.12-29.53
80°F (27°C) dry bulb return air to unit					
Outdoor ambient temperature	50°F 10°C	75°F 24°C	100°F 38°C	125°F 52°C	
Gauge Pressures					
Suction (psig) (Kg/CM ²)	56 min. 3.93 min.	56 min. 3.93 min.	56-65 3.93-4.57	65-75 4.27-5.27	
Discharge (psig) (Kg/CM ²)	130-150 9.14-10.55	180-200 12.65-14.06	270-290 18.98-20.39	290-410 20.39-28.82	
NOTE: Dry bulb temperatures are measured with an ordinary thermometer					

TABLE 4-1.2. Pressure, Discharge and Suction Troubleshooting

	DISCHARGE	SUCTION
HIGH	<ol style="list-style-type: none"> 1. Ensure condenser coil is not dirty or partially blocked. 2. Check for loose or missing lower front panel connector cover plate, circuit breaker access cover, or filter mounting plate. 3. Check for excessive recirculation of hot condenser discharge air back into condenser intake. 4. Check for overcharge of refrigerant. 5. Check for air in refrigerant system. 6. Ensure fan motor is operating. 7. Ensure condenser fan is not loose on shaft. 8., Check for too much oil in refrigerant system. 9. Check for high suction pressure. 	<ol style="list-style-type: none"> 1. Check for high return air temperature. 2. Ensure equalizing solenoid valve is open. 3. Ensure compressor is running. 4. Check for expansion valve bulb damage or poor contact with suction line. 5. Test compressor. 6. Test quench valve. 7. Check for defective regulating valve. 8. Test expansion valve.
LOW	<ol style="list-style-type: none"> 1. Check for low outside air temperature. 2. Check for low refrigerant charge. 3. Ensure compressor is operating. 4. Test equalizing solenoid valve. 5. Check for defective pressure regulating valve. 6. Test compressor. 	<ol style="list-style-type: none"> 1. Ensure return air filter is clean. 2. Check for partially blocked discharge or return air ducts or openings. 3. Ensure evaporator coil is clean. 4. Check for low return air temperature. 5. Ensure refrigerant is fully charged. 6. Ensure liquid solenoid valve is closed. 7. Ensure fan motor is operating. 8. Check for loose evaporator fan. 9. Test expansion valve. 10. Check for excessive expansion valve superheat.

TABLE 4-1.2. pressure. Discharge and Suction Troubleshooting (cont.)

	DISCHARGE	SUCTION
LOW		<p>11. Check for plugged or kinked distributor tube.</p> <p>12. Check for suction line <i>or</i> evaporator coil tubing restriction.</p> <p>13. Ensure dehydrator (filter-drier) is not clogged.</p> <p>14. Ensure there is no moisture in refrigerant system.</p>

4.13. **PRESSURE SWITCHES****WARNING**

Disconnect the air conditioner from the electrical power source before attempting to perform maintenance on the pressure switches.

a. High Pressure Cut-Out Switch

(1) Removal. (See figure 4-8.)

(2) Test. (See figure 4-9.)

(3) Replace. Replace the high pressure cut-out switch if damage to the switch would impair serviceability or if switch fails during test.

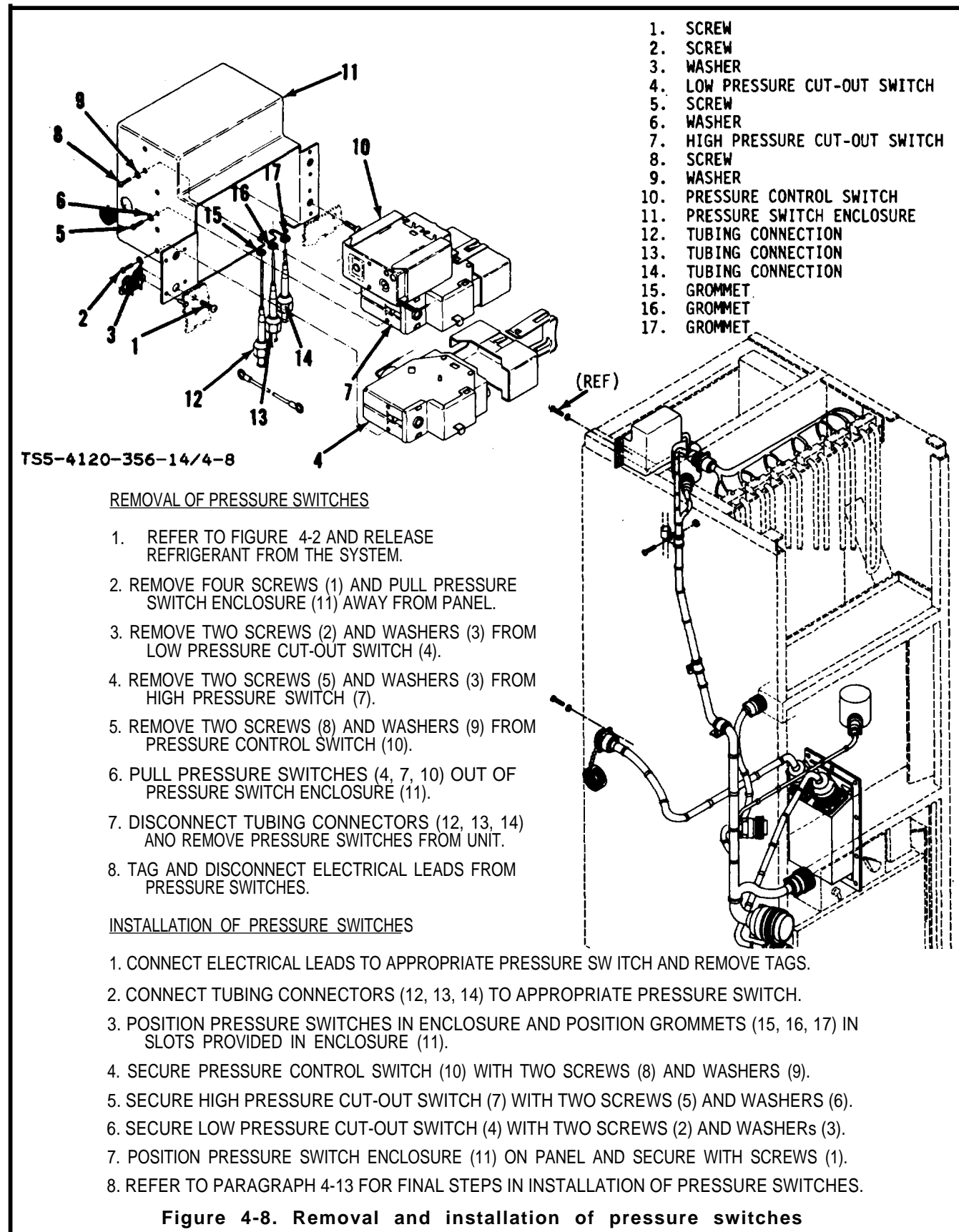
(4) Installation.

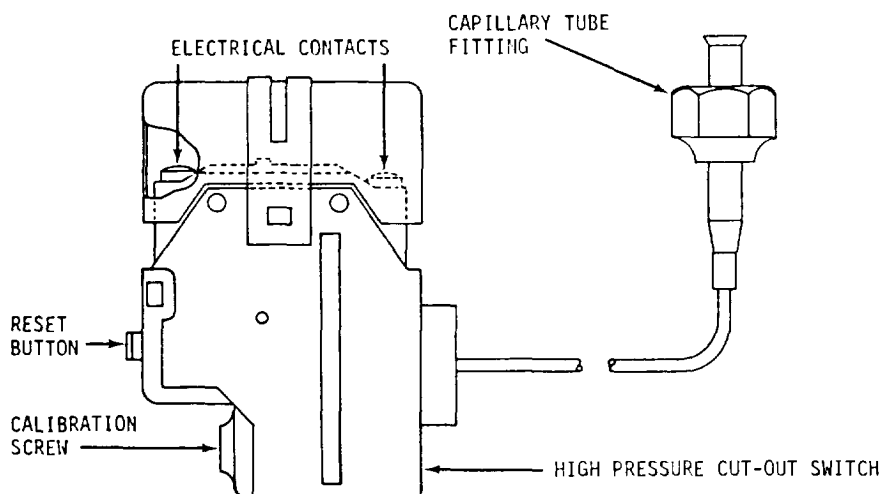
(a) Refer to figure 4-8 and install the high pressure cut-out switch in the unit.

(b) Perform any further maintenance of refrigeration system components required.

(c) Refer to paragraph 4-8 and purge the refrigerant system in accordance with the procedures given.

(d) Check the high pressure cut-out switch and the dehydrator for leaks in accordance with paragraph 4-4c. Repair any leaks found.





TEST

1. REFER TO FIGURE 4-8 FOR PRELIMINARY STEPS.
2. CONNECT A CIRCUIT TESTER ACROSS THE ELECTRICAL CONTACTS OF THE HIGH PRESSURE CUT-OUT SWITCH.
3. SET THE CIRCUIT TESTER UP FOR CONTINUITY TESTING.
4. CONNECT A SOURCE OF VAPORIZED NITROGEN TO THE CAPILLARY TUBE FITTING. NITROGEN SOURCE MUST BE EQUIPPED WITH A GAGE CALIBRATED FROM 0 TO 1000 PSIG (0 TO 100 ks/cm^2).
5. WHILE OBSERVING CIRCUIT TESTER, APPLY 415 PSIG (29 ks/cm^2) NITROGEN PRESSURE TO THE SWITCH. CIRCUIT TESTER SHOULD SHOW CONTINUITY BETWEEN THE ELECTRICAL CONTACTS OF THE SWITCH.
6. WHILE OBSERVING CIRCUIT TESTER, SLOWLY INCREASE NITROGEN PRESSURE TO THE SWITCH. SWITCH SHOULD TRIP (CIRCUIT TESTER SHOWS A BREAK IN CONTINUITY) WHEN NITROGEN PRESSURE REACHES 450 TO 470 PSIG (31.6 TO 33 ks/cm^2).
7. IF SWITCH DOES NOT TRIP AT ANY PRESSURE UP TO 550 PSIG (38.6 ks/cm^2), REPLACE THE SWITCH.
8. IF SWITCH TRIPS BETWEEN 450 AND 470 PSIG (31.6 TO 33 ks/cm^2), DECREASE PRESSURE TO 410 PSIG (28.8 ks/cm^2) AND PUSH THE RESET BUTTON. CIRCUIT TESTER SHOULD AGAIN SHOW CONTINUITY BETWEEN THE ELECTRICAL CONTACTS OF THE SWITCH.
9. IF THE SWITCH TRIPS BELOW 450 PSIG (31.6 ks/cm^2) OR ABOVE 470 PSIG (33 ks/cm^2), THE SWITCH MUST BE CALIBRATED. TURNING THE CALIBRATION SCREW CLOCKWISE INCREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. TURNING THE CALIBRATION SCREW COUNTER-CLOCKWISE DECREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. CALIBRATE THE SWITCH TO TRIP AT 460 PSIG (32.3 ks/cm^2).
10. IF SWITCH CANNOT BE CALIBRATED AT 460 ± 10 PSIG (32.3 ks/cm^2), REPLACE SWITCH.
11. DISCONNECT THE CIRCUIT TESTER LEADS FROM THE SWITCH CONTACTS AND DISCONNECT THE NITROGEN SOURCE FROM THE SWITCH CAPILLARY TUBE.
12. REFER TO PARAGRAPH 4-13a FOR FINAL STEPS IN MAINTENANCE OF THE HIGH PRESSURE CUT-OUT SWITCH.

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Figure 4-9. Test of high pressure cut-out switch

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Refer paragraph 4-10 and charge the system with refrigerant.

b. Low Pressure Cut-Out Switch

(1) Removal. (See figure 4-8.)

(2) Test. (See figure 4-10.)

(3) Replace. Replace low pressure cut-out switch if damage to the switch would impair serviceability or if switch fails during test.

(4) Installation.

(a) Refer to figure 4-8 and install the low pressure cut-out switch.

(b) Perform any further maintenance of refrigeration system components required.

(c) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.

(d) Check the low pressure cut-out switch and dehydrator for refrigerant leaks in accordance with paragraph 4-4c. Repair any leaks found in accordance with paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Charge the system with refrigerant in accordance with paragraph 4-10.

c. Pressure Control Switch

(1) Removal. (See figure 4-8.)

(2) Test. (See figure 4-11.)

(3) Replace. Replace the pressure control switch if damage to the switch would impair serviceability or if switch fails during test.

(4) Installation.

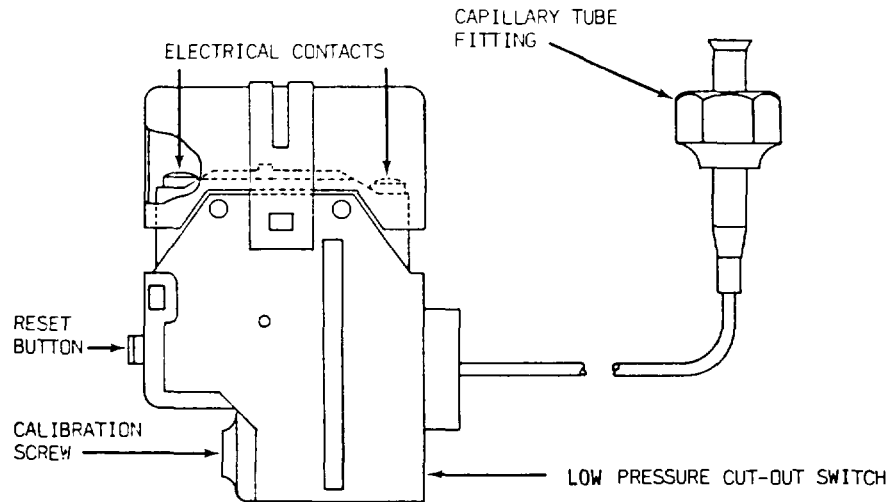
(a) Refer to figure 4-8 and install the pressure control switch.

(b) Perform any further maintenance of refrigeration system components required.

(c) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.

(d) Check the pressure control switch and dehydrator for leaks in accordance with paragraph 4-4c. Repair any leaks found in accordance with paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

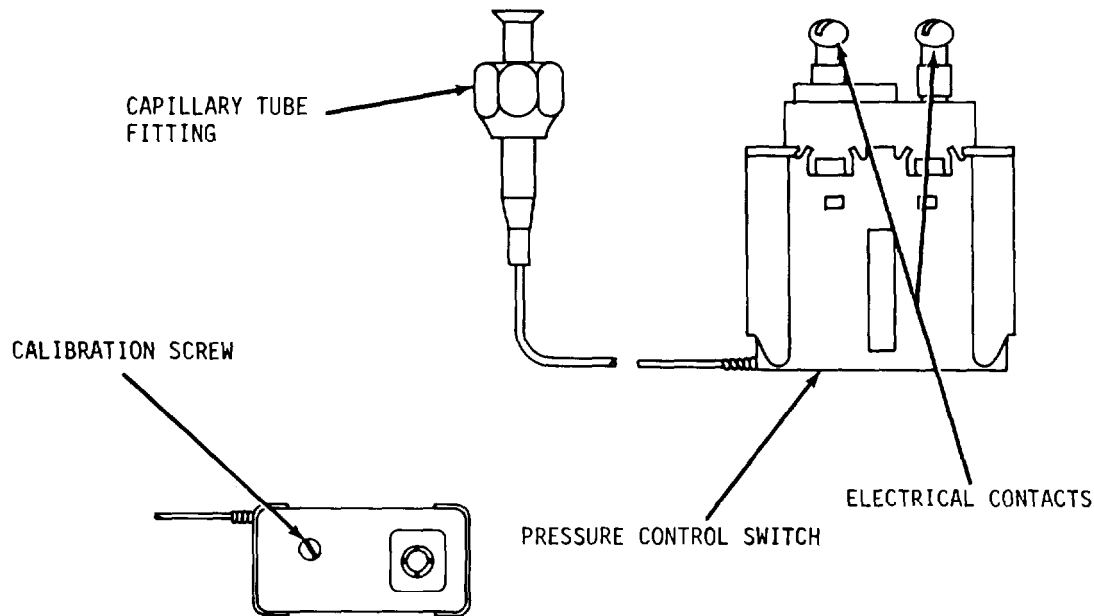


TEST

1. REFER TO PARAGRAPH 4-13b FOR PRELIMINARY STEPS IN MAINTENANCE OF THE LOW PRESSURE CUT-OUT SWITCH.
2. CONNECT A CIRCUIT TESTER ACROSS THE ELECTRICAL CONTACTS OF THE LOW PRESSURE CUT-OUT SWITCH.
3. SET THE CIRCUIT TESTER UP FOR CONTINUITY TESTING.
4. CONNECT A SOURCE OF VAPORIZED NITROGEN TO THE CAPILLARY TUBE FITTING OF THE SWITCH. NITROGEN SOURCE MUST BE EQUIPPED WITH A GAGE CALIBRATED FROM 0 TO 50 PSIG (0 TO 5 ks/cm^2).
5. WHILE OBSERVING CIRCUIT TESTER, APPLY 20 PSIG (1.4 ks/cm^2) NITROGEN PRESSURE TO THE SWITCH. CIRCUIT TESTER SHOULD SHOW NO CONTINUITY.
6. WHILE OBSERVING CIRCUIT TESTER, SLOWLY DECREASE NITROGEN PRESSURE. SWITCH SHOULD TRIP (CIRCUIT TESTER SHOW CONTINUITY) WHEN THE NITROGEN PRESSURE IS DECREASED TO 12 TO 2 PSIG (0.14 TO 0.84 ks/cm^2).
7. IF SWITCH DOES NOT TRIP, REPLACE SWITCH.
8. IF SWITCH TRIPS BETWEEN 12 AND 2 PSIG (0.14 AND 0.84 ks/cm^2), INCREASE PRESSURE TO 20 PSIG (1.4 ks/cm^2) AND PUSH THE RESET BUTTON. CIRCUIT TESTER SHOULD AGAIN SHOW NO CONTINUITY.
9. IF SWITCH TRIPS BELOW 2 PSIG (0.14 ks/cm^2) OR ABOVE 12 PSIG (0.84 ks/cm^2), THE SWITCH MUST BE CALIBRATED. TURNING THE CALIBRATION SCREW CLOCKWISE INCREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. TURNING THE CALIBRATION SCREW COUNTER-CLOCKWISE DECREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. CALIBRATE THE SWITCH TO TRIP AT 7 PSIG (0.49 ks/cm^2).
10. IF SWITCH CAN NOT BE CALIBRATED AS IN STEP 9, REPLACE THE SWITCH.
11. DISCONNECT THE CIRCUIT TESTER LEADS FROM THE SWITCH CONTACTS AND DISCONNECT THE NITROGEN SOURCE FROM THE CAPILLARY TUBE FITTING.
12. REFER TO PARAGRAPH 4-13b FOR FINAL STEPS IN MAINTENANCE OF THE LOW PRESSURE CUT-OUT SWITCH.

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Figure 4-10. Test of low pressure cut-out switch



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TEST

1. REFER TO PARAGRAPH 4-13c FOR PRELIMINARY STEPS IN MAINTENANCE OF THE PRESSURE CONTROL SWITCH
2. CONNECT A CIRCUIT TESTER ACROSS THE ELECTRICAL CONTACTS OF THE PRESSURE CONTROL SWITCH.
3. SET THE CIRCUIT TESTER FOR CONTINUITY TESTING.
4. CONNECT A SOURCE OF VAPORIZED NITROGEN TO THE CAPILLARY TUBE FITTING OF THE PRESSURE CONTROL SWITCH. NITROGEN SOURCE MUST BE EQUIPPED WITH A GAGE CALIBRATED FROM 0 TO 500 PSIG (0 TO 35 ks/cm²).
5. WHILE OBSERVING THE CIRCUIT TESTER, APPLY 350 PSIG (24.5 ks/cm²) NITROGEN PRESSURE TO THE SWITCH. CIRCUIT TESTER SHOULD SHOW NO CONTINUITY BETWEEN THE ELECTRICAL CONTACTS.
6. WHILE OBSERVING THE CIRCUIT TESTER, SLOWLY INCREASE NITROGEN PRESSURE TO THE SWITCH. SWITCH SHOULD TRIP (CIRCUIT TESTER SHOW CONTINUITY) WHEN NITROGEN PRESSURE IS INCREASED TO BETWEEN 384 AND 416 PSIG (27 TO 29 ks/cm²).
7. IF SWITCH DOES NOT TRIP AT ANY PRESSURE UP TO 500 PSIG (35 ks/cm²), REPLACE SWITCH.
8. IF SWITCH TRIPS BELOW 384 PSIG (27 ks/cm²) OR ABOVE 416 PSIG (29 ks/cm²), THE SWITCH MUST BE CALIBRATED. TURNING THE CALIBRATION SCREW CLOCKWISE INCREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. TURNING THE CALIBRATION SCREW COUNTER-CLOCKWISE DECREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. CALIBRATE THE SWITCH TO TRIP AT 400 PSIG (28 ks/cm²).
9. IF SWITCH CAN NOT BE CALIBRATED AS OUTLINED IN STEP 8, REPLACE THE SWITCH.
10. IF SWITCH TRIPS BETWEEN 384 AND 416 PSIG (27 AND 29 ks/cm²), DECREASE NITROGEN PRESSURE SLOWLY. SWITCH SHOULD AUTOMATICALLY RESET (CIRCUIT TESTER SHOW A BREAK IN CONTINUITY) WHEN NITROGEN PRESSURE HAS BEEN DECREASED TO BETWEEN 334 AND 366 PSIG (23 AND 26 ks/cm²).
11. IF SWITCH DOES NOT AUTOMATICALLY RESET WHEN THE NITROGEN PRESSURE HAS BEEN DECREASED TO BETWEEN 334 AND 366 PSIG (23 AND 26 ks/cm²), REPLACE THE SWITCH.
12. DISCONNECT THE CIRCUIT TESTER LEADS FROM THE SWITCH CONTACTS AND DISCONNECT THE NITROGEN SOURCE FROM THE SWITCH.
13. REFER TO PARAGRAPH 4-13c FOR FINAL STEPS IN MAINTENANCE OF THE PRESSURE CONTROL SWITCH.

Figure 4-11. Test of pressure control switch

(f) Refer to paragraph 4-10 and charge the system with refrigerant.

4-14.

REFRIGERANT COMPONENTS

a. Refrigerant Tubing and Fittings

(1) Inspect. Refer to figure 4-12 and inspect the refrigerant tubing and fittings for damage which would impair serviceability.

(2) Test.

(a) Check refrigerant tubing and fittings for leaks in accordance with the procedures given in paragraph 4-4c.

(b) Repair any leaks found in accordance with the procedures given in paragraph 4-4d.

(3) Replace. Replace any tubing or fittings which are damaged to an extent that serviceability would be impaired. Replacement procedures are as follows:

(a) Refer to figure 4-2 and release refrigerant from the system.

(b) Refer to figure 4-12 and remove the defective tubing and/or fittings.

(c) Install replacement tubing and/or fittings.

(d) Perform any further maintenance or refrigerant system components required.

(e) After tubing and fittings are replaced, purge the refrigerant system in accordance with paragraph 4-8.

(f) Check the replaced tubing and/or fittings and the dehydrator for leaks in accordance with paragraph 4-4c. If any leaks are found, repair in accordance with the procedures given in paragraph 4-4d.

(g) Refer to figure 4-4 and evacuate the refrigerant system.

(h) Charge the system with refrigerant in accordance with paragraph 4-10.

b. Liquid Line Solenoid Valve

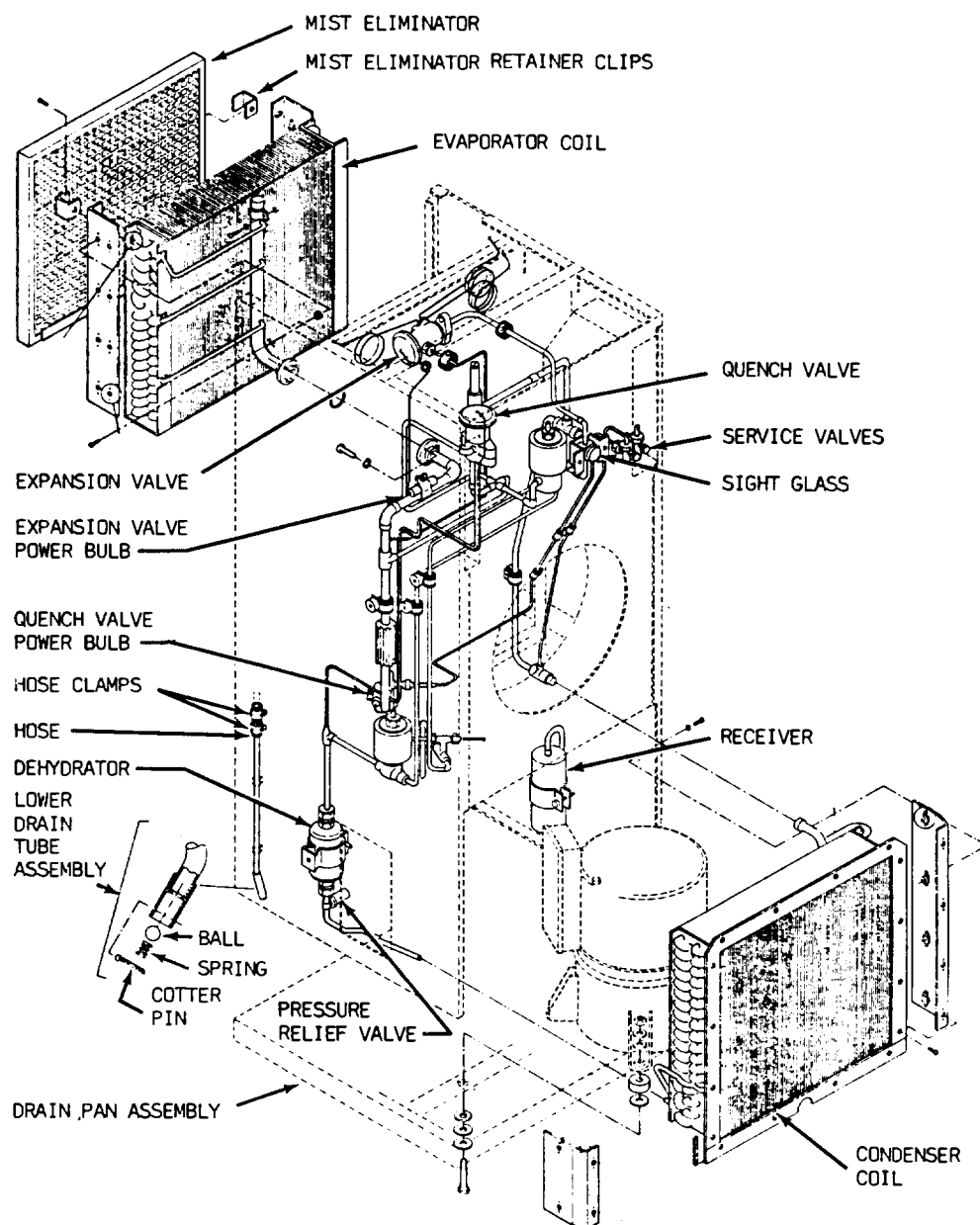
(1) General. Testing and repair of the liquid line solenoid valve is accomplished at the organizational maintenance level (refer to paragraph 3-13a).

(2) Removal.

(a) Refer to figure 4-2 and release refrigerant from the system.

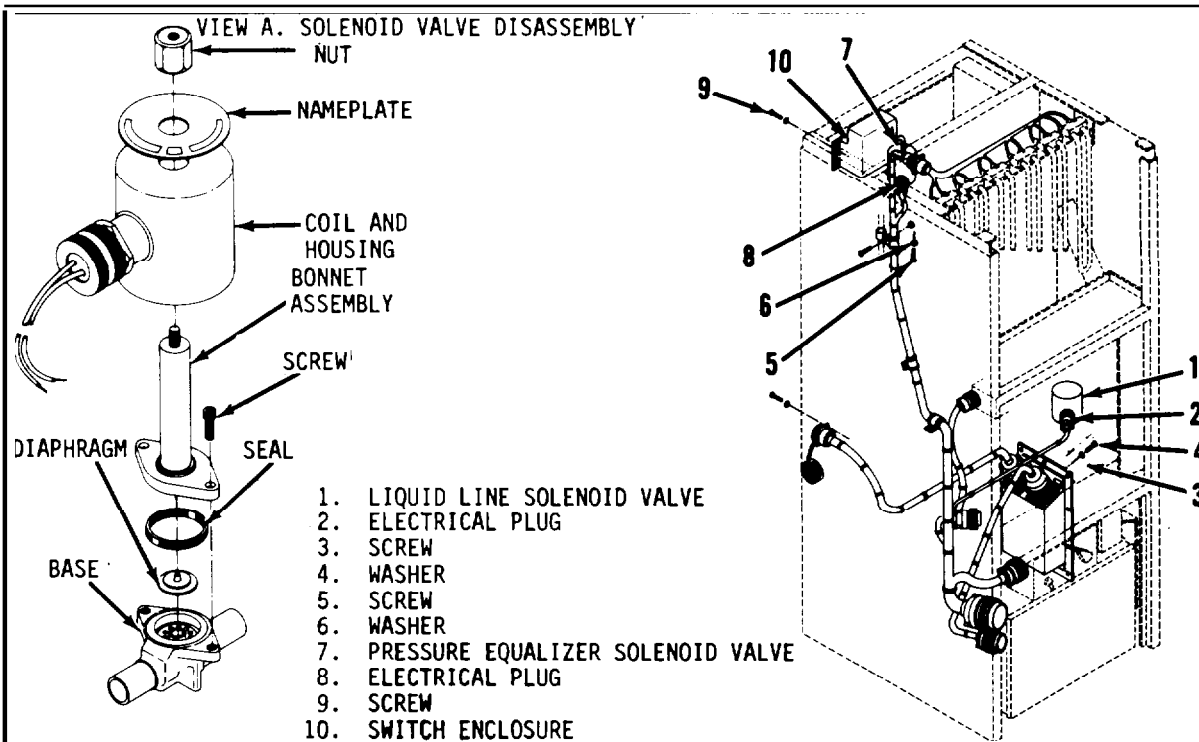
(b) Refer to figure 3-12 and partially remove the junction box.

(c) Refer to figure 3-22 and remove the RFI filter panel to provide access to the liquid line solenoid valve.



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Figure 4-12. Location of refrigerant components, tubing and fittings



REMOVAL OF LIQUID LINE SOLENOID VALVE

VIEW B. LIQUID LINE SOLENOID VALVE LOCATION

1. REFER TO PARAGRAPH 4-14b FOR PRELIMINARY STEPS IN REMOVAL OF LIQUID LINE SOLENOID VALVE.
2. DISCONNECT ELECTRICAL PLUG (2) FROM VALVE.

CAUTION

THE LIQUID LINE SOLENOID VALVE MUST BE DISASSEMBLED BEFORE DISCONNECTING THE TUBING FROM THE VALVE BASE TO AVOID HEAT DISTORTION.

3. REFER TO VIEW A AND DISASSEMBLE LIQUID LINE SOLENOID VALVE FROM BASE.
4. DISCONNECT TUBING FROM BASE OF LIQUID LINE SOLENOID VALVE.
5. REMOVE TWO SCREWS (3) AND TWO WASHERS (4) AND REMOVE VALVE BASE FROM AIR CONDITIONER.

INSTALLATION OF LIQUID LINE SOLENOID VALVE

1. POSITION LIQUID LINE SOLENOID VALVE BASE IN AIR CONDITIONER AND SECURE WITH TWO WASHERS (4) AND SCREWS (3).

CAUTION

BRAZE THE TUBING TO THE VALVE BASE BEFORE REASSEMBLING THE VALVE TO AVOID HEAT DISTORTION.

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2. CONNECT TUBING TO VALVE BASE.
3. REFER TO VIEW A AND REASSEMBLE THE LIQUID LINE SOLENOID VALVE.
4. CONNECT ELECTRICAL PLUG (2).
5. REFER TO PARAGRAPH 4-14b FOR FINAL STEPS IN INSTALLATION OF LIQUID LINE SOLENOID VALVE.

Figure 4-13. Removal and installation of solenoid valves (sheet 1 of 2)

REMOVAL OF PRESSURE EQUALIZER SOLENOID VALVE

1. REFER TO PARAGRAPH 4-14c FOR PRELIMINARY STEPS IN REMOVAL OF PRESSURE EQUALIZER VALVE.
2. REMOVE FOUR SCREWS (9) AND PULL PRESSURE SWITCH ENCLOSURE (10) TO THE SIDE TO PROVIDE ACCESS TO THE PRESSURE EQUALIZER SOLENOID VALVE (7).
3. DISCONNECT ELECTRICAL PLUG (8).

CAUTION

THE PRESSURE EQUALIZER SOLENOID VALVE MUST BE DISASSEMBLED BEFORE DISCONNECTING THE TUBING FROM THE VALVE BASE TO AVOID HEAT DISTORTION.

4. DISCONNECT TUBING FROM VALVE BASE.
5. REMOVE TWO SCREWS (5) AND WASHERS (6) AND REMOVE VALVE BASE FROM AIR CONDITIONER.

INSTALLATION OF PRESSURE EQUALIZER SOLENOID VALVE

1. POSITION PRESSURE EQUALIZER SOLENOID VALVE BASE IN AIR CONDITIONER AND SECURE WITH TWO WASHERS (6) AND SCREWS (5).

CAUTION

BRAZE THE TUBING TO THE VALVE BASE BEFORE RE-ASSEMBLING THE VALVE TO AVOID HEAT DISTORTION.

2. CONNECT TUBING TO VALVE BASE AND BRAZE.
3. REFER TO VIEW A AND REASSEMBLE PRESSURE EQUALIZER SOLENOID VALVE.
4. CONNECT ELECTRICAL PLUG (8).
5. POSITION PRESSURE SWITCH ENCLOSURE (10) ON PANEL AND SECURE WITH FOUR SCREWS (9).
6. REFER TO PARAGRAPH 4-14c FOR FINAL STEPS IN INSTALLATION OF PRESSURE EQUALIZER SOLENOID VALVE.

Figure 4-13. Removal and installation of solenoid valves (sheet 2 of 2)

(d) Refer to figure 4-13 and remove the liquid line solenoid valve from the air conditioner.

(3) Replace. Replace the liquid line solenoid valve if evidence is found of damage which would impair serviceability or if repair procedures fail to make the valve operable.

(4) Installation.

(a) Refer to figure 4-13 and install the liquid line solenoid valve.

(b) Perform any further maintenance of refrigerant components required.

(c) Purge the refrigerant system in accordance with procedures outlined in paragraph 4-8.

(d) Check the liquid line solenoid valve and the dehydrator for leaks in accordance with paragraph 4-4c. If any leak are found, repair in accordance with the procedures given in paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Charge the system with refrigerant in accordance with the procedures given in paragraph 4-10.

(g) Refer to figure 3-12 and install the junction box.

(h) Refer to figure 3-22 and install the RFI filter panel.

c. Pressure Equalizer Solenoid Valve

(1) General. Testing and repair of the pressure equalizer solenoid valve is accomplished at the organizational maintenance level (refer to paragraph 3-13d.)

(2) Removal.

(a) Refer to figure 4-2 and release refrigerant from the system.

(b) Refer to figure 4-13 and remove the pressure equalizer valve.

(3) Replace. Replace the pressure equalizer solenoid valve if evidence is found of damage which would impair serviceability or if repair procedures fail to make the valve operable.

(4) Installation.

(a) Refer to figure 4-13 and install the pressure equalizer valve.

(b) Perform any further maintenance of refrigerant components which may be required.

(c) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.

(d) Check the pressure equalizer solenoid valve and the new dehydrator for leaks in accordance with paragraph 4-4c. Repair any leaks found in accordance with the procedures given in paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Refer to figure 4-10 and charge the system with refrigerant.

d. Dehydrator (drier)

(1) Replace. The dehydrator (drier) must be replaced each time the refrigerant system is exposed to the atmosphere. Refer to paragraph (2) and (3) for removal of old dehydrator and the installation of a new dehydrator.

(2) Removal.

(a) Refer to figure 4-2 and release refrigerant from the system.

(b) Refer to figure 3-12 and partially remove the junction box.

(c) Refer to figure 4-14 and remove the dehydrator.

1. NUT
2. NUT
3. NUT
4. WASHER
5. SCREW
6. DEHYDRATOR
7. CLAMP

REMOVAL OF DEHYDRATOR

1. REFER TO PARAGRAPH 4-14d FOR PRELIMINARY STEPS IN REMOVAL OF THE DEHYDRATOR.
2. LOOSEN NUTS (1, 2) AND REMOVE TUBING FROM DEHYDRATOR (6).
3. REMOVE NUT (3), WASHER (4) AND SCREW (5) AND REMOVE DEHYDRATOR (6) FROM CLAMP (7).

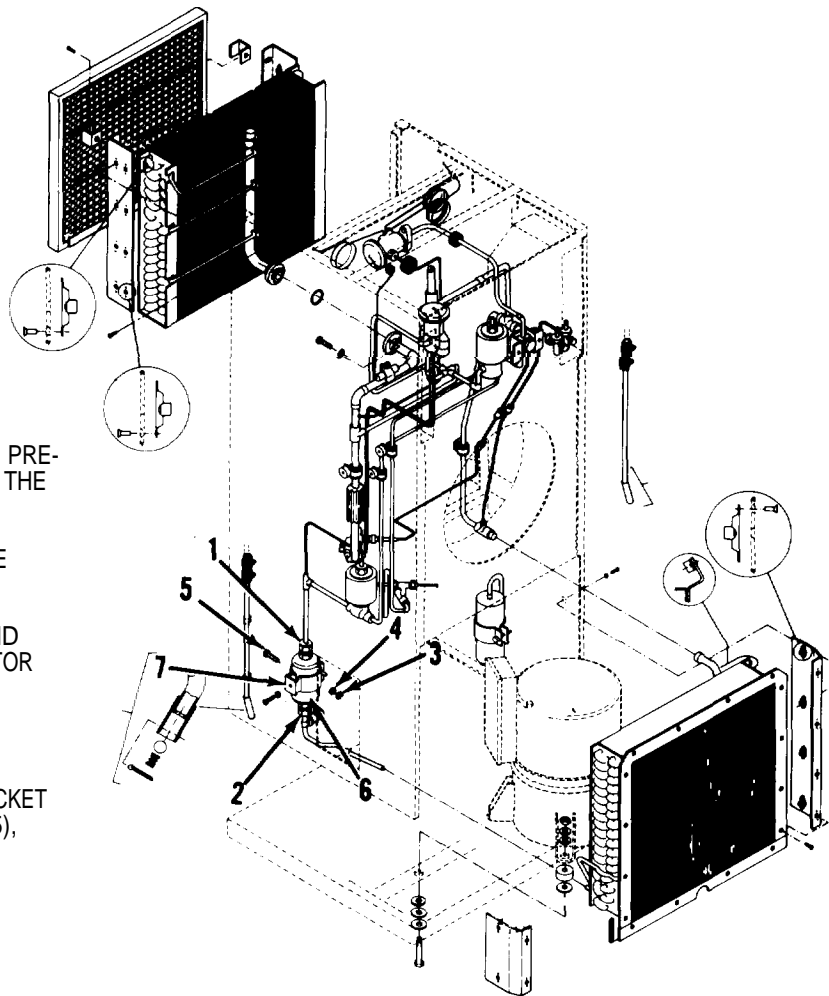
INSTALLATION OF DEHYDRATOR

1. POSITION DEHYDRATOR (6) IN BRACKET (7) AND SECURE WITH SCREW (5), WASHER (4) AND NUT (3).

CAUTION

USE CARE IN APPLYING LEAK LOCK TO THE THREADS OF THE DEHYDRATOR FLARE NUT FITTINGS SO THAT NONE OF THE MATERIAL GETS INSIDE THE REFRIGERANT SYSTEM.

2. APPLY LEAK LOCK (NSN 8030-00-999-6313) TO THE THREADS OF THE DEHYDRATOR FLARE FITTINGS.
3. CONNECT THE TUBING TO THE DEHYDRATOR AND TIGHTEN NUTS (1, 2),
4. REFER TO PARAGRAPH 4-14d FOR FINAL STEPS IN INSTALLATION OF THE DEHYDRATOR.



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Figure 4-14. Removal and installation of dehydrator

(3) Installation.

(a) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.

(b) Refer to figure 4-14 and install a new dehydrator.

(c) Check the dehydrator for leaks in accordance with paragraph 4-4c. If any leaks are found, refer to paragraph 4-4d and make repairs.

(d) Refer to figure 4-4 and evacuate the refrigerant system.

(e) Charge the system with refrigerant in accordance with the procedures given in paragraph 4-10.

(f) Refer to figure 3-12 and reinstall the junction box.

e. Sight Glass

(1) Inspection. Inspect the sight glass for defects or damage which would impair serviceability. (See figure 4-15.)

(2) Replace. Replace the sight glass if evidence is found of defects or damage which would impair serviceability. Refer to steps (3) and (4) for removal of defective sight glass and the installation of a new sight glass.

(3) Removal, (See figure 4-15.)

(4) Installation.

(a) Refer to figure 4-15 and install anew sight glass.

(b) Perform any further maintenance of refrigerant components required.

(c) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.

(d) Check sight glass and dehydrator for leaks in accordance with paragraph 4-4c. Repair any leaks found in accordance with paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Refer to paragraph 4-10 and charge the system with refrigerant.

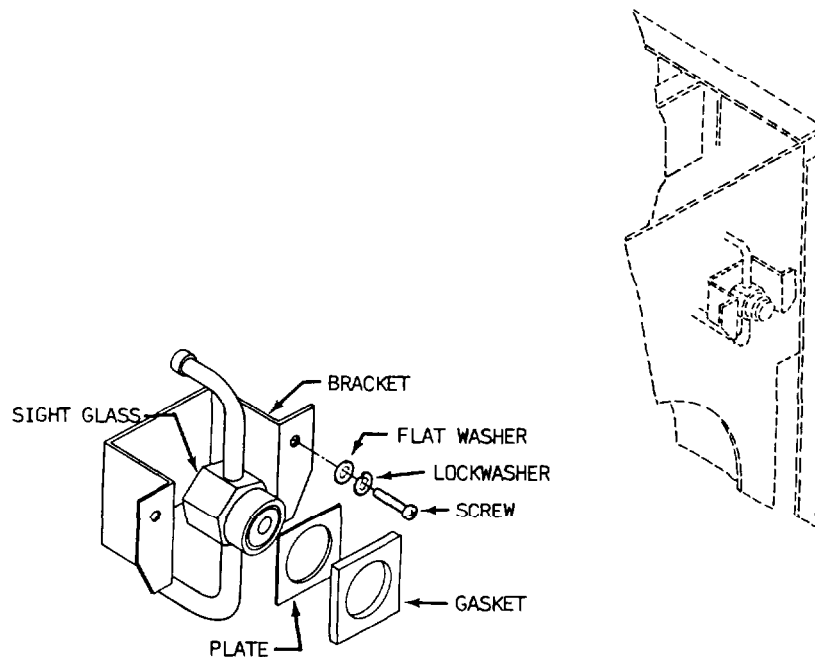
f. Pressure Regulator Valve

(1) Adjust.

(a) Disconnect the air conditioner from the electrical power source and turn the selector switch to the "OFF" position.

(b) Refer to figure 4-2 and release the refrigerant from the system.

(c) Adjust the pressure regulator valve in accordance with figure 4-16.



REMOVAL OF SIGHT GLASS

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
2. REMOVE TWO SCREW AND TWO WASHERS FROM BRACKET THEN REMOVE BRACKET FROM AIR CONDITIONER.
3. REMOVE RUBBER GASKET AND METAL PLATE FROM SIGHT GLASS
4. DISCONNECT SIGHT GLASS TUBING AND REMOVE SIGHT GLASS FROM AIR CONDITIONER.

INSTALLATION OF SIGHT GLASS

1. POSITION SIGHT GLASS IN AIR CONDITIONER AND BRAZE TUBING IN PLACE.
2. PLACE METAL PLATE AND RUBBER GASKET OVER SIGHT GLASS.
3. POSITION BRACKET IN AIR CONDITIONER AND SECURE WITH TWO SCREWS AND WASHERS.
4. REFER TO PARAGRAPH 4-14e FOR FINAL STEPS.

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Figure 4-15. Removal and installation of sight glass

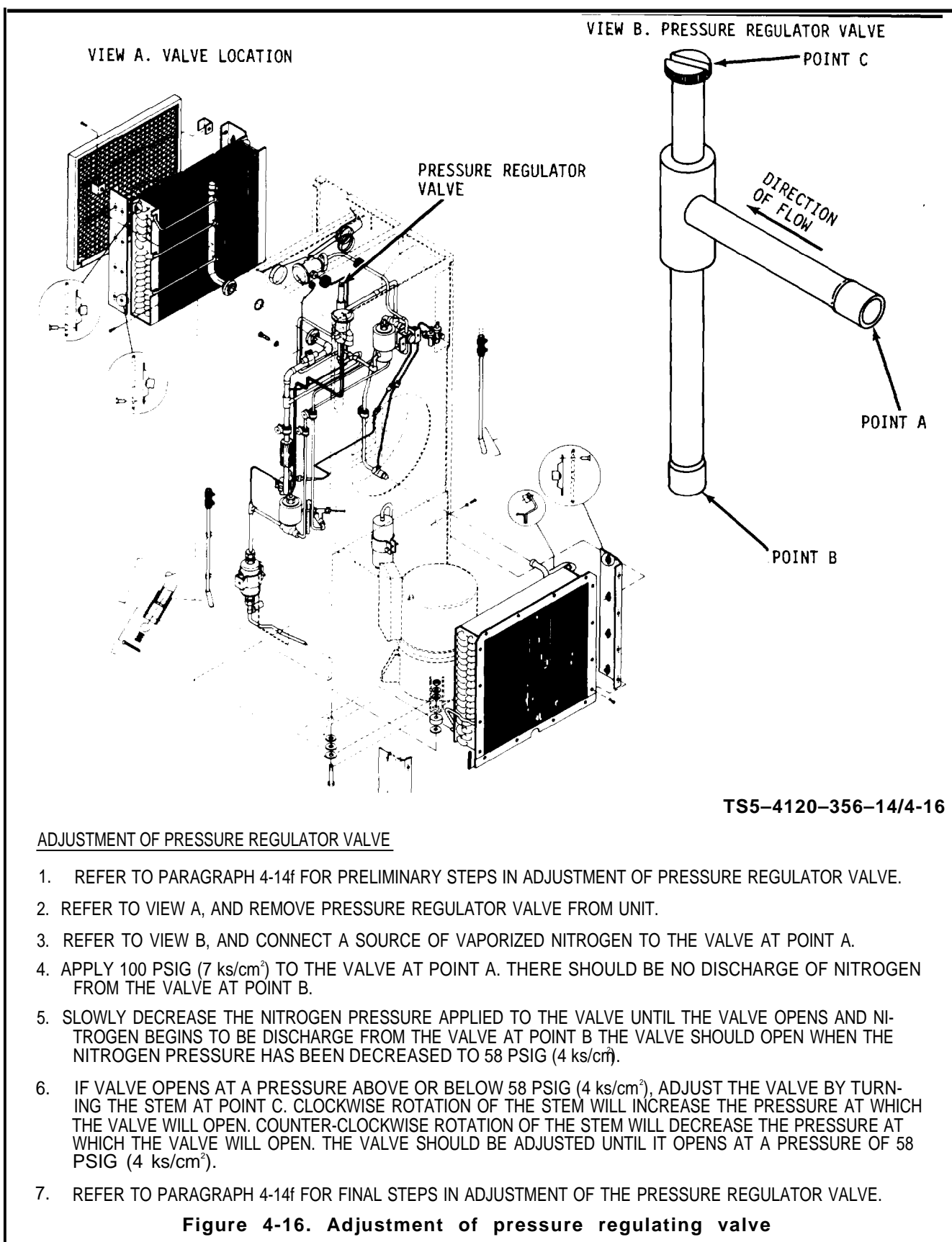
(2) Replace. Replace the pressure regulator valve if valve cannot be adjusted or if valve has sustained damage which would impair serviceability.

(3) Installation.

(a) Refer to figure 4-16 and install a new pressure regulator valve.

(b) Perform any further maintenance of refrigerant components required at this time.

(c) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.



(d) Check the pressure regulator valve and the dehydrator for leaks in accordance with the procedures given in paragraph 4-4c. Repair any leaks found in accordance with paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Charge the system with refrigerant in accordance with the procedures given in paragraph 4-10.

g. Pressure Relief Valve

(1) Inspection.

(a) Refer to figure 3-12 and partially remove the junction box.

(b) Refer to figure 3-22 and remove the RFI filter panel to provide access to the pressure relief valve.

(c) Refer to figure 4-12 and inspect the pressure relief valve externally for obvious defects and/or damage which would impair serviceability.

(2) Replace. If damage or defects are found which would impair serviceability of the pressure relief valve, replace the valve. Refer to steps (3) and (4) for removal of defective valve and installation of a new valve.

(3) Removal.

(a) Refer to figure 4-2 and release refrigerant from the system.

(b) Refer to figure 4-12 and remove the pressure relief valve.

(4) Installation.

CAUTION

Use care in applying leak lock to the threads of the pressure relief valve so that none of the material gets inside the refrigerant system when the valve is installed.

(a) Apply leak lock (NSN 8030-00-999-6313) or equivalent, to the threads of the pressure relief valve.

(b) Install the pressure relief valve by screwing it into the fitting at the base of the dehydrator.

(c) Perform any further maintenance of refrigerant system components which may be required.

(d) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.

(e) Check the pressure relief valve and the dehydrator for leaks in

in accordance with the procedures given in paragraph 4-4c. If any leaks are found, repair in accordance with paragraph 4-4d.

(f) Refer to figure 4-4 and evacuate the refrigerant system.

(g) Charge the system with refrigerant in accordance with the procedures given in paragraph 4-10.

(h) Reinstall the RFI filter pane (see figure 3-22). Reinstall the junction box (see figure 3-12).

h. Service Valves

(1) Inspection.

(a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Inspect the suction pressure service valve and the discharge pressure service valve externally for obvious defects and/or damage. Make sure that the valve caps are securely in place, the valve stems are tightly closed, and the cap nuts are seated securely on the valves.

(c) Check both service valves for leaks in accordance with paragraph 4-4c. If any leaks are found, repair in accordance with paragraph 4-4d.

(2) Replace. Replace the suction pressure service valve and/or the discharge pressure service valve if evidence is found of damage which would impair serviceability. Refer to steps (3) and (4) for removal of defective service valve(s) and the installation of new service valve(s).

(3) Removal. (See figure 4-17.)

(4) Installation.

(a) Install service valve(s) (see figure 4-17).

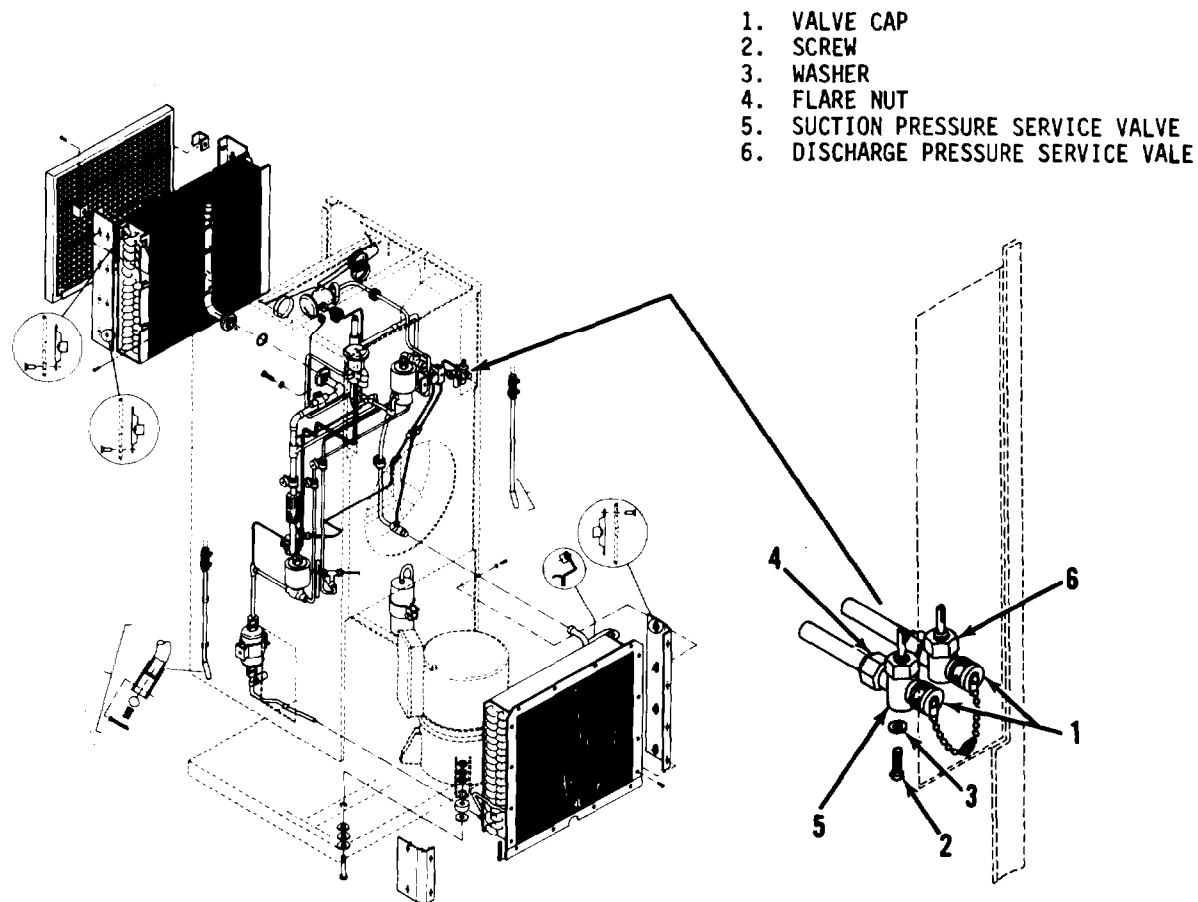
(b) Perform any further maintenance of refrigerant components required at this time.

(c) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.

(d) Check the service valves for leaks in accordance with paragraph 4-4c. If any leaks are found, repair in accordance with paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Charge the system with refrigerant in accordance with the procedures given in paragraph 4-10.



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REMOVAL OF SERVICE VALVES

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
2. REMOVE VALVE CAPS (1).
3. LOOSEN FLARE NUTS (4) AND REMOVE TUBING FROM SERVICE VALVES (5) AND (6).
4. REMOVE SCREW (2) AND WASHER (3) FROM EACH VALVE AND REMOVE VALVES FROM UNIT.

INSTALLATION OF SERVICE VALVES

1. POSITION SERVICE VALVES (5, 6) IN UNIT AND SECURE WITH SCREWS (2) AND WASHERS (3).

CAUTION

USE CARE IN APPLYING HIGH VACUUM GREASE TO FLARE NUT FITTINGS SO THAT NONE OF THE MATERIAL GETS INSIDE THE REFRIGERANT SYSTEM.

2. APPLY HIGH VACUUM GREASE (NSN 9150-00-965-2408) OR EQUIVALENT TO THE SEATS OF FLARE NUTS (4) AND CONNECT TUBING TO BOTH SERVICE VALVES (5, 6).
3. INSTALL VALVE CAPS (1) ON SERVICE VALVES (5, 6).
4. REFER TO PARAGRAPH 4-14h FOR FINAL STEPS IN MAINTENANCE OF THE SERVICE VALVES.

Figure 4-17. Removal and installation of service valves

i. Receiver.(1) Inspection.

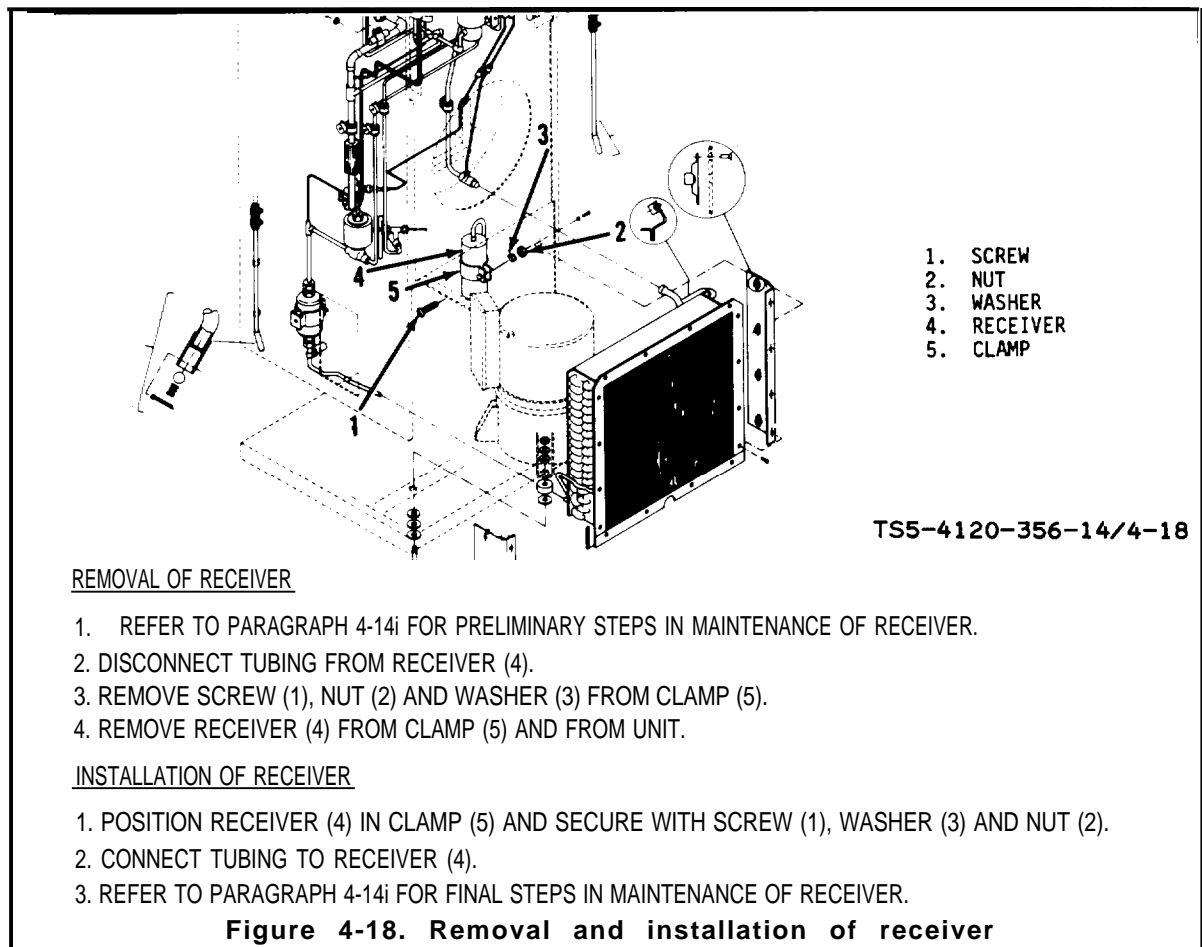
(a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Partially remove the junction box to provide access to the receiver (see figure 3-12).

(c) Refer to figure 4-18 and inspect the receiver for damage which would impair serviceability.

(d) Check the receiver for leaks in accordance with paragraph 4-4c. If any leaks are found, refer to paragraph 4-4d and make repairs.

(2) Replace. Replace the receiver if evidence is found of damage which would impair serviceability, or if unrepairable leaks are found. Refer to steps (3) and (4) for removal of defective receiver and the installation of a new receiver.

(3) Removal. (See figure 4-18.)

(4) Installation.

- (a) Refer to figure 4-18 and install anew receiver.
- (b) Perform any further maintenance of refrigerant compnents which may be required.
- (c) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.
- (d) Check the receiver and the dehydrator for leaks in accordance with paragraph 4-4c. Repair any leaks found in accordance with paragraph 4-4d.
- (e) Refer to figure 4-4 and evacuate the refrigerant system.
- (f) Refer to paragraph 4-10 and charge the system with refrigerant.

j. Expansion Valve

(1) Inspection.

- (a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.
- (b) Remove the condenser fan. (Refer to paragraph 3-15b.)
- (c) Inspect the expansion valve, power bult and tubing for obvious defects. (See figure 4-12.)
- (d) Check the expansion valve for refrigerant leaks in accordance with paragraph 4-4c. If expansion valve is leaking, refer to step (4) for repair.

(2) Test.

- (a) Refer to figure 4-12 and tape the bulb of a the thermometer to the suction line near the expansion valve power bulb.
- (b) Refer to figure 4-5 and install a suction pressure gage.
- (c) Reinstall the condenser fan in accordance with paragraph 3-15b.
- (d) Install and secure all panels on the air conditioner.
- (e) Connect the air conditioner to the electrical power source, turn the selector switch to the "COOL" position, and turn the thermostat control knob counter-clockwise to its limit. Operate the unit on "COOL" for approximately 30 minutes to stabilize the thermometer reading.
- (f) Note the pressure indicated on the suction pressure gage. To this pressure, add 2 psig (0.14 ks/cm²) for estimated line loss.
- g) Refer to table 4-2 and convert pressure (gage pressure plus 2 psig (0.14 ks/cm²) to the temperature.

Table 4-2. Conversion of temperature to pressure (R-22)

TEMPER- ATURE °F	TEMPER- ATURE °C	PRESS- URE PSIG	PRESS- URE ks/mc ²	TEMPER- ATURE °F	TEMPER- ATURE °C	PRESS- URE PSIG	PRESS- URE ks/mc ²	TEMPER- ATURE °F	TEMPER- ATURE °C	PRESS- URE PSIG	PRESS- URE ks/mc ²
0	-17.77	24.0	1.68	17	-8.33	39.8	2.8	34	1.11	60.1	4.22
1	-17.22	24.8	1.74	18	-7.77	40.8	2.67	35	1.66	61.5	4.31
2	-16.66	25.6	1.80	19	-7.22	41.9	2.95	36	2.22	62.8	4.42
3	-16.1	26.4	1.86	20	-6.66	43.0	3.02	37	2.77	64.2	4.51
4	-15.55	27.3	1.92	21	-6.11	44.1	3.10	38	3.33	65.6	4.61
5	-15.0	28.2	1.98	22	-5.55	45.3	3.19	39	3.88	67.1	4.72
6	-14.44	29.1	2.05	23	-5.0	46.4	3.26	40	4.44	68.5	4.82
7	-13.88	30.0	2.11	24	-4.44	47.6	3.35	41	5.0	70.0	4.92
8	-13.33	30.9	2.17	25	-3.88	48.8	3.43	42	5.55	71.4	5.02
9	-12.77	31.8	2.23	26	-3.33	49.9	3.50	43	6.11	73.0	5.13
10	-12.22	32.8	2.31	27	-2.77	51.2	3.60	44	6.66	74.5	5.24
11	-11.66	33.7	2.37	28	-2.22	52.4	3.68	45	7.22	76.0	5.34
12	-11.11	34.7	2.44	29	-1.66	53.6	3.77	46	7.77	77.6	5.46
13	-10.55	35.7	2.51	30	-1.11	54.9	3.86	47	8.33	79.2	5.57
14	-10.0	36.7	2.58	31	-0.55	56.2	3.95	48	8.88	80.8	5.68
15	-9.44	37.7	2.65	32	0	57.5	4.04				
16	-8.88	38.7	2.72	33	0.55	58.8	4.13				

(h) Calculate Superheat of expansion valve deducting temperature calculated in step (g) from the temperature indicated on the thermometer attached to the suction line. Superheat of the expansion valve should $6.0^{\circ} \pm 1.5^{\circ}\text{F}$ ($-14.44^{\circ} \pm 0.8^{\circ}\text{C}$).

(i) If superheat of the *expansion valve* is not correct, as given in step (g), refer to step (3) and adjust the expansion valve to the correct superheat.

(j) If superheat of expansion valve is correct, proceed as follows:

(k) Refer to paragraph 3-15b and remove the condenser fan.

(l) Refer to figure 4-12 and remove the thermometer bulb from the suction line near the expansion valve power bulb.

(m) Refer to paragraph 3-15b and reinstall the condenser fan.

(n) Refer to figure 4-5 and remove the suction pressure gage.

(3) Adjust.

CAUTION

Never adjust the expansion valve unless absolutely necessary. When adjusting the expansion valve, allow the unit to run on "COOL" at least 20 minutes between each adjustment. Make sure that the condenser fan and all panels are in place and secure during running period.

- (a) Refer to figure 4-19 and remove the seal cap from the expansion valve.

CAUTION

Adjusting the expansion valve to increase refrigerant flow may cause a floodback and damage the compressor. If refrigerant is fed too quickly, it will not turn to gas in the evaporator. The evaporator will flood, causing a "sweat back" or "frostback" down the suction line.

- (b) Refer to figure 4-19 and locate the adjusting screw. Turning the adjusting screw counter-clockwise increases flow and lowers both output temperature and superheat. Turning the adjusting screw clockwise decreases flow and raises both output temperature and superheat. Four complete turns will raise or lower superheat by approximately 2°F (1.1°C). Turn the adjusting screw to obtain superheat of 6.0°F ± 1.5°F (-14.44°C ± 0.8°C).

- (c) Allow the unit to run on "COOL" for approximately 20 minutes before adjusting to a new setting.

- (d) Calculate superheat of expansion valve. If superheat is now 6.0° ± 1.5°F (-14.44° ± 0.8°C), no further adjustment is necessary. If superheat is not correct, continue adjustment cycles until superheat reaches the required temperature.

- (e) Install the seal cap on the expansion valve and remove the thermometer bulb from the suction line near the power bulb of the expansion valve (see figure 4-12).

- (f) Reinstall the condenser fan (see paragraph 3-15b).

- (4) Repair. If expansion valve is leaking refrigerant, repair valve in accordance with the procedures given in figure 4-19.

- (5) Replace. If damage or defects are found which would impair serviceability, replace the expansion valve. Refer to steps (6) and (7) for removal of defective valve and installation of a new valve.

(6) Removal.

- (a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

- (b) Refer to paragraph 3-15b and remove the condenser fan.

- (c) Refer to figure 4-2 and release refrigerant from the system.

- (d) Refer to figure 4-12 and 4-19 and remove the expansion valve.

(7) Installation.

- (a) Refer to figure 4-12 and 4-19 and install the expansion valve.

- (b) Perform any further maintenance of refrigerant components that maybe required at this time.

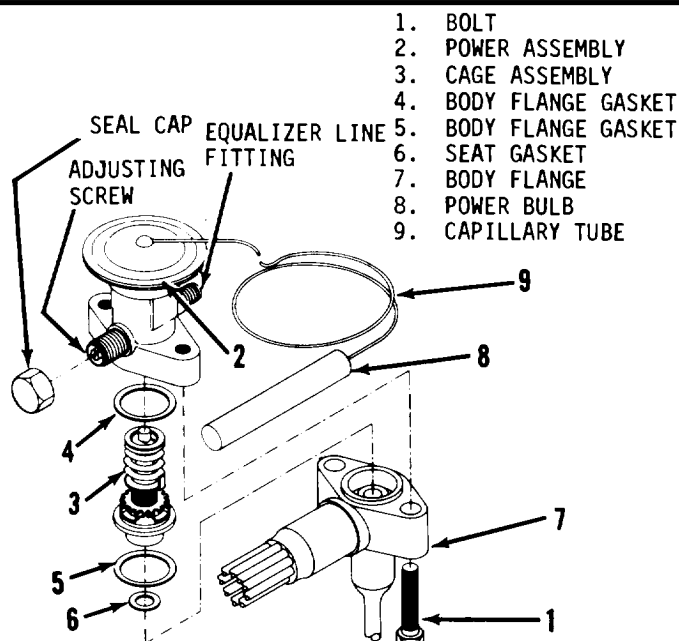
- (c) Reinstall the condenser fan and a new dehydrator.

- (d) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.

- (e) Check the expansion valve and dehydrator for leaks in accordance with paragraph 4-4c. Repair any leaks found in accordance with paragraph 4-4d.

REMOVAL

1. REFER TO PARAGRAPH 4-14 FOR PRELIMINARY STEPS IN REMOVAL OF EXPANSION VALVE.
2. DISCONNECT EQUALIZER LINE FROM POWER ASSEMBLY (2).
3. REMOVE BOLTS (1) FROM BODY FLANGE (7).
4. CAREFULLY LIFT OFF POWER ASSEMBLY (2).
5. REMOVE CAGE ASSEMBLY (3) AND THREE GASKETS (4, 5, 6).
6. IF EXPANSION VALVE IS TO BE REPLACED, DISCONNECT TUBING FROM BODY FLANGE AND REMOVE BODY FLANGE FROM MOUNTING. FREE EXPANSION VALVE POWER BULB (8) BY REMOVING BLACK INSULATION TAPE AND LOOSENING SCREWS IN CLAMP STRAP. REMOVE TIES FROM CAPILLARY TUBE (9).

REPAIR

1. REFER TO REMOVAL PROCEDURES AND REMOVE EXPANSION VALVE. IT IS NOT NECESSARY TO REMOVE THE POWER BULB OR THE BODY FLANGE UNLESS DEFECTS ARE FOUND IN ONE OR BOTH OF THESE ITEMS.
2. INSPECT POWER ASSEMBLY, CAGE ASSEMBLY AND BODY FLANGE FOR DAMAGE OR DEFECTS WHICH WOULD IMPAIR SERVICEABILITY. IF SUCH DAMAGE OR DEFECTS ARE FOUND, REPLACE DEFECTIVE PARTS.

INSTALLATION

1. IF BODY FLANGE HAS BEEN REMOVED, POSITION BODY FLANGE ON MOUNTING PROVISION AND BRAZE TUBING INTO PLACE.
2. APPLY HIGH VACUUM GREASE (NSN 9150-00-965-2408) OR EQUIVALENT, TO BOTH SIDES OF THREE GASKETS (4, 5, 6) AND INSTALL GASKETS ON CAGE ASSEMBLY (3).
3. INSTALL CAGE ASSEMBLY INTO BODY FLANGE.
4. INSTALL THE POWER ASSEMBLY ON THE CAGE ASSEMBLY. MAKE SURE THE CAGE ASSEMBLY LUGS LINE UP WITH THE SLOTS INSIDE THE POWER ASSEMBLY.

CAUTION

DO NOT OVERTORQUE BOLTS (1). OVERTORQUING OF BOLTS MAY RESULT IN VALVE DAMAGE.

5. INSTALL TWO BOLTS (1). TIGHTEN BOLTS EVENLY TO 300 INCH POUNDS.
6. IF POWER BULB HAS BEEN REMOVED, PLACE IT IN THE SAME POSITION OF THE SUCTION TUBE FROM WHICH IT WAS REMOVED, ASSURING CLEANLINESS AND GOOD PHYSICAL CONTACT.
7. SECURE POWER BULB BY TIGHTENING SCREWS IN CLAMP STRAP. WRAP POWER BULB WITH BLACK INSULATION TAPE.

CAUTION

USE CARE IN APPLYING LEAK LOCK TO THE THREADS OF THE EQUALIZER LINE FITTING, SO THAT NONE OF THE MATERIAL GETS INSIDE THE REFRIGERANT SYSTEM WHEN THE LINE IS INSTALLED.

8. APPLY LEAK LOCK (NSN 8030-00-999-6313) OR EQUIVALENT, TO THREADS OF THE EQUALIZER LINE FITTING AND CONNECT THE EQUALIZER LINE TO THE POWER ASSEMBLY.
9. REFER TO PARAGRAPH 4-14j FOR FINAL STEPS IN THE INSTALLATION OF THE EXPANSION VALVE ASSEMBLY.

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Figure 4-19. Expansion valve removal, repair and installation

(f) Refer to figure 4-4 and evacuate the refrigerant system .

(g) Charge the system with refrigerant in accordance with the procedures given in paragraph 4-10.

k. QUENCH Valve

(1) Inspection.

(a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Remove the condenser fan in accordance with paragraph 3-15b.

(c) Refer to figure 4-12 and inspect the quench valve, power bulb and tubing for obvious defects.

(d) Check the quench valve for leaks in accordance with paragraph 4-4c. If quench valve is leaking refrigerant, refer to step (4) for repair.

(2) Test.

(a) Refer to figure 4-12 and tape the bulb of a thermometer to the suction line near the quench valve power bulb.

(b) Refer to figure 4-5 and install a suction pressure gage.

(c) Reinstall the condenser fan and install and secure all panels on the air conditioner.

(d) Connect the air conditioner to the electrical power source, turn the selector switch to the "COOL" position and turn the thermostat control knob counter-clockwise to its limit. Operate the unit on "COOL" for approximately 30 minutes to stabilize the thermometer reading.

(e) Note the pressure indicated on the suction pressure gage. To this add 2 psig (0.14 ks/cm²) estimated suction line loss.

(f) Refer to table 4-2 and convert pressure (gage pressure plus 2 psig (0.14ks/cm²) temperature.

(g) Calculate superheat of quench valve by deducting temperature calculated in step (f) above from temperature indicated on thermometer attached to the suction line. Superheat of the quench valve should be $30.4^{\circ} \pm 0.5^{\circ}\text{F}$ ($-0.88^{\circ} \pm 0.5^{\circ}\text{C}$).

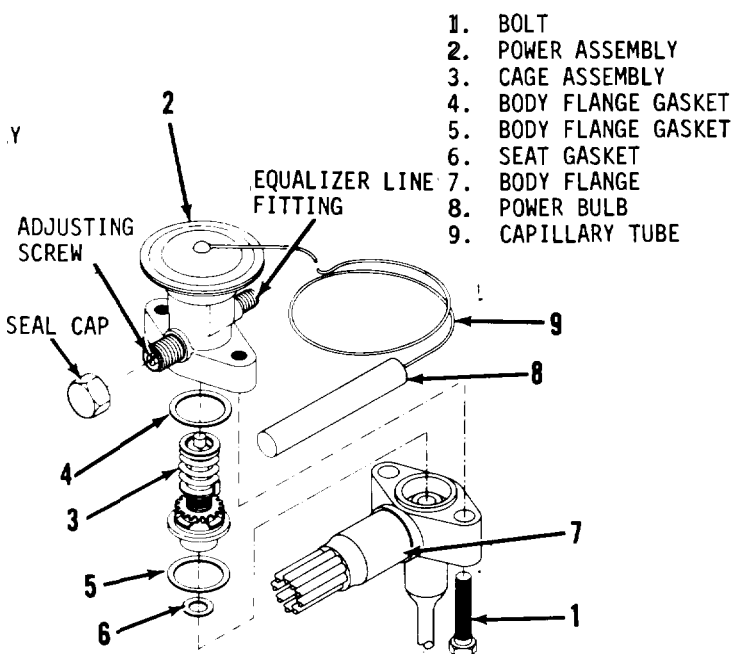
(h) If superheat of quench is not correct as given in step (g) above, refer to step (3) and adjust the quench valve to the correct superheat.

(i) If superheat of quench valve is correct, proceed as follows:

(j) Remove the condenser fan and remove the thermometer bulb from the suction line near the quench valve power bulb.

REMOVAL

1. REFER TO PARAGRAPH 4-14k FOR PRELIMINARY STEPS IN REMOVAL OF THE QUENCH VALVE.
2. DISCONNECT EQUALIZER LINE FROM POWER ASSEMBLY (2).
3. REMOVE BOLTS (1) FROM BODY FLANGE (7).
4. CAREFULLY LIFT OFF POWER ASSEMBLY (2).
5. REMOVE CAGE ASSEMBLY (3) AND THREE GASKETS (4, 5, 6).
6. IF THE QUENCH VALVE IS TO BE REPLACED, DISCONNECT TUBING FROM BODY FLANGE AND REMOVE BODY FLANGE FROM MOUNTING. FREE QUENCH VALVE POWER BULB (8) BY REMOVING BLACK INSULATION TAPE AND LOOSENING SCREWS IN CLAMP STRAP. REMOVE TIES FROM CAPILLARY TUBE (9) AND REMOVE CAPILLARY TUBE AND POWER BULB FROM THE AIR CONDITIONER.



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REPAIR

1. REFER TO REMOVAL PROCEDURES AND REMOVE THE QUENCH VALVE. IT IS NOT NECESSARY TO REMOVE THE POWER BULB OR THE BODY FLANGE UNLESS DEFECTS ARE FOUND IN ONE OR BOTH OF THESE ITEMS.
2. INSPECT POWER ASSEMBLY (2), CAGE ASSEMBLY (3) AND BODY FLANGE (7) FOR DAMAGE OR DEFECTS WHICH WOULD IMPAIR SERVICEABILITY. IF SUCH DAMAGE OR DEFECTS ARE FOUND, REPLACE DEFECTIVE PARTS.

INSTALLATION

1. IF BODY FLANGE HAS BEEN REMOVED, POSITION BODY FLANGE ON MOUNTING AND BRAZE TUBING INTO PLACE.
2. APPLY HIGH VACUUM GREASE (NSN 9150-00-965-2408) OR EQUIVALENT TO BOTH SIDES OF THE THREE GASKETS (4, 5, 6) AND INSTALL GASKETS ON CAGE ASSEMBLY (3).
3. INSTALL CAGE ASSEMBLY (3) INTO BODY FLANGE (7).
4. INSTALL THE POWER ASSEMBLY (2) ON THE CAGE ASSEMBLY. MAKE SURE THE CAGE ASSEMBLY LUGS LINE UP WITH THE SLOTS INSIDE THE POWER ASSEMBLY.

CAUTION

DO NOT OVERTORQUE BOLTS (1). OVERTORQUING OF BOLTS MAY RESULT IN VALVE DAMAGE.

5. INSTALL TWO BOLTS (1). TIGHTEN EVENLY AND TORQUE TO 300 INCH POUNDS.
6. IF POWER BULB HAS BEEN REMOVED, PLACE IT IN THE SAME POSITION ON THE SUCTION TUBE FROM WHICH IT WAS REMOVED ASSURING CLEANLINESS AND GOOD PHYSICAL CONTACT.
7. SECURE POWER BULB BY TIGHTENING SCREWS IN CLAMP STRAP. WRAP POWER BULB WITH BLACK INSULATION TAPE.

CAUTION

USE CARE IN APPLYING LEAK LOCK TO THE THREADS OF THE EQUALIZER LINE FITTING SO THAT NONE OF THE MATERIAL GETS INSIDE THE REFRIGERANT SYSTEM WHEN THE LINE IS INSTALLED.

8. APPLY LEAK LOCK (NSN 8030-00-999-6313) OR EQUIVALENT, TO THE THREADS OF THE EQUALIZER LINE FITTING AND CONNECT THE EQUALIZER LINE TO THE POWER ASSEMBLY.
9. REFER TO PARAGRAPH 4-14k FOR FINAL STEPS IN THE INSTALLATION OF THE QUENCH VALVE ASSEMBLY.

Figure 4-20. Removal, installation and repair of quench valve

(k) Reinstall the condenser fan and remove the suction pressure gage.

(3) Adjust.

CAUTION

Never adjust the quench valve unless absolutely necessary. When adjusting the quench valve, allow the unit to run on "COOL" at least 20 minutes between each adjustment. Make sure that the condenser fan and all panels are secured in place during the running period.

(a) Refer to figure 4-20 and remove the seal cap from the quench valve.

(b) Refer to figure 4-20 and locate the adjusting screw. Turning the adjusting screw counter-clockwise increases flow and lowers superheat. Turning the adjusting screw clockwise decreases flow and raises superheat. Four complete turns of the adjusting screw will raise or lower superheat by approximately 2°F (1.1°C). Turn the adjusting screw to obtain superheat of $30.4^{\circ}\text{F} \pm 0.5^{\circ}\text{F}$ ($0.88^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$).

(c) Allow the unit to run on "COOL" for approximately 20 minutes before adjusting to a new setting.

(d) Calculate superheat of quench valve. If superheat is now $30.4^{\circ}\text{F} \pm 0.5^{\circ}\text{F}$ ($0.88^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$), no further adjustment is necessary. If superheat is not correct, continue adjustment cycle until superheat reaches the required temperature.

(e) Refer to figure 4-20 and install the seal cap on quench valve.

(f) Remove the condenser fan and the thermometer bulb from the suction line near the power bulb of the quench valve.

(g) Reinstall the condenser fan.

(4) Repair. If quench valve is leaking refrigerant, refer to figure 4-20 and repair valve.

(5) Replace. If damage or defects are found which would impair serviceability, replace the quench. Refer to steps (6) and (7) for removal of defective valve and the installation of a new valve.

(6) Removal.

(a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Refer to paragraph 3-15b and remove the condenser fan.

(c) Refer to figure 4-2 and release refrigerant from the system.

(d) Refer to figures 4-12 and 4-20 and remove the quench valve.

(7) Installation.

- (a) Refer to figure 4-12 and 4-20 and install the quench valve.
- (b) Perform any further maintenance of refrigerant components required at this time.
- (c) Reinstall the condenser fan (paragraph 3-15b).
- (d) Purge the refrigerant system in accordance with the procedures given in paragraph 4-8.
- (e) Check the quench valve and the dehydrator for leaks in accordance with paragraph 4-4c. If any leaks are found, repair in accordance with the procedures given in paragraph 4-4d.
- (f) Refer to figure 4-4 and evacuate the refrigerant system.
- (g) Charge the system with refrigerant in accordance with the procedures given in paragraph 4-10.

1. Condenser Coil

(1) Inspection.

- (a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.
- (b) Remove the condenser fan (paragraph 3-15b).
- (c) Inspect the condenser coil for damage or defects which would impair serviceability.
- (d) Check the condenser coil for leaks in accordance with the procedure given in paragraph 4-4c. Repair any leaks found in accordance with the procedures given in paragraph 4-4d.

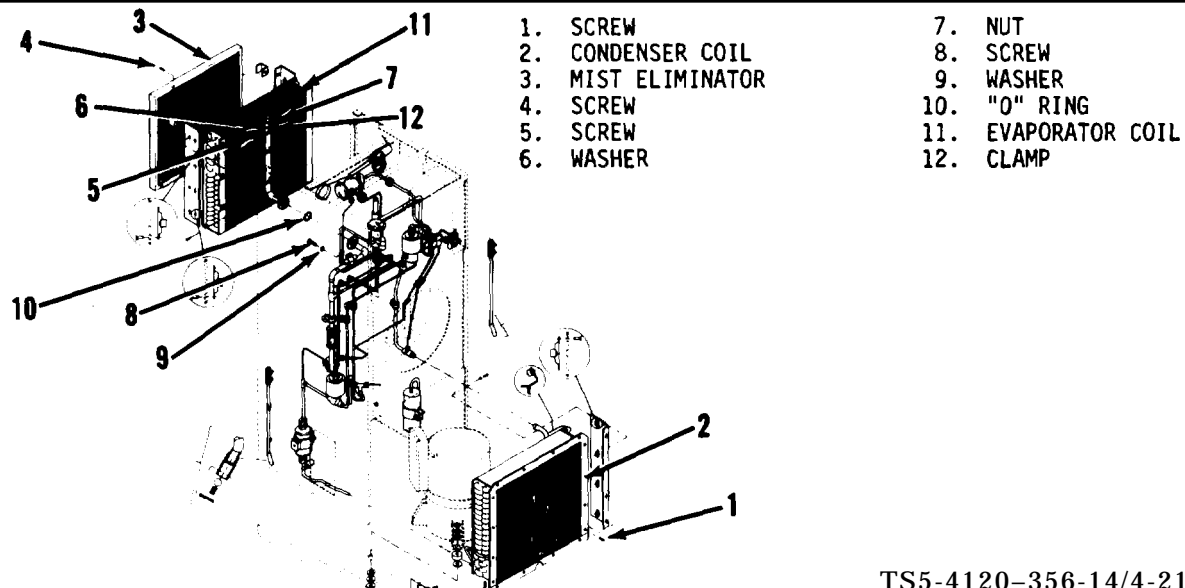
(2) Replace. Replace the condenser coil if evidence of defects or damage is found which would impair serviceability or if unrepairable leaks are found. Refer to steps (3) and (4) for removal and installation of the condenser coil.

(3) Removal.

- (a) Refer to figure 4-2 and release refrigerant from the system.
- (b) Refer to figure 4-21 and remove the condenser coil,

(4) Installation.

- (a) Refer to figure 4-21 and install the condenser coil.
- (b) Perform any further maintenance of refrigerant components that may be required at this time.



REMOVAL OF CONDENSER COIL

1. REFER TO PARAGRAPH 4-141 FOR PRELIMINARY STEPS IN THE REMOVAL OF THE CONDENSER COIL.
2. DISCONNECT CONDENSER COIL TUBING.
3. REMOVE SCREWS (1) AND REMOVE CONDENSER COIL (2) FROM AIR CONDITIONER.

INSTALLATION OF CONDENSER COIL

1. POSITION CONDENSER COIL (2) IN AIR CONDITIONER AND SECURE WITH SCREWS (1).
2. CONNECT CONDENSER COIL TUBING.
3. REFER TO PARAGRAPH 4-141 FOR FINAL STEPS IN THE INSTALLATION OF THE CONDENSER COIL.

REMOVAL OF EVAPORATOR COIL

1. REFER TO PARAGRAPH 4-14m FOR PRELIMINARY STEPS IN THE REMOVAL OF THE EVAPORATOR COIL.
2. REMOVE SCREWS (4).
3. REMOVE SCREWS (5), WASHER (6), NUT (7) AND CLAMP (12).
4. REMOVE SCREW (8) AND WASHER (9).
5. DISCONNECT EVAPORATOR COIL TUBING AND LIFT EVAPORATOR COIL (11) OUT OF AIR CONDITIONER, DISCARD "O" RING (10).

INSTALLATION OF EVAPORATOR COIL

1. PLACE NEW "O" RING (10) ON FITTING AND POSITION EVAPORATOR COIL (11) IN AIR CONDITIONER AND SECURE WITH SCREWS (4).
2. INSTALL SCREWS (8) AND WASHERS (9).
3. INSTALL CLAMP (12) AND SECURE WITH SCREW (5), WASHER (6) AND NUT (7).
4. INSTALL MIST ELIMINATOR (3).
5. REFER TO PARAGRAPH 4-14m FOR FINAL STEPS IN THE INSTALLATION OF THE EVAPORATOR COIL.

Figure 4-21. Removal and installation of condenser coil and evaporator coil

(c) Purge the refrigerant system in accordance with the procedures given in paragraph 48.

(d) Check the condenser coil and the dehydrator for leaks in accordance with the procedures given in paragraph 4-4c. Repair any leaks found in accordance with paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Refer to figure 4-10 and charge the system with refrigerant.

(g) Install the condenser fan (paragraph 3-15b).

m. Evaporator Coil.

(1) Inspection.

(a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

(b) Inspect the evaporator coil for damage or defects which would impair serviceability.

(c) Check the evaporator coil for leaks in accordance with the procedures given in paragraph 4-4c. Repair any leaks found in accordance with paragraph 4-4d.

(d) Check evaporator output by comparing the dry bulb temperatures of air entering and leaving the evaporator; the temperature difference should be 18-22°F across the evaporator.

(2) Replace. Replace the evaporator coil if evidence is found of defects or damage which would impair serviceability or if unrepairable leaks or damage is found. Refer to steps (3) and (4) for removal and installation of evaporator coil.

(3) Removal.

(a) Refer to figure 4-2 and release refrigerant from the system

(b) Refer to figure 3-27 and remove heater elements HR1, HR2 and HR3 to gain access to the evaporator coil.

(c) Refer to figure 4-21 and remove the evaporator coil.

(4) Installation.

(a) Refer to figure 4-21 and install the evaporator coil.

(b) Perform any further maintenance of refrigerant components which may be required.

(c) Purge the refrigerant system in accordance with the procedures given in paragraph 48.

(d) Refer to paragraph 4-4c and check the evaporator coil and dehydrator for refrigerant leaks. If any leaks are found, repair them in accordance with the procedure given in paragraph 4-4d.

(e) Refer to figure 4-4 and evacuate the refrigerant system.

(f) Refer to figure 4-10 and charge the system with refrigerant.

(g) Refer to figure 3-27 and install heater elements HR1, HR2 and HR3.

4-15. **CASING ASSEMBLY**

- a. Inspection. Inspect the entire casing assembly for damaged or defective rivnuts and nut plates.
- b. Repair. Replace any damaged or defective rivnuts or nut plates found.

CHAPTER 5

GENERAL SUPPORT MAINTENANCE

5-1. GENERAL MAINTENANCE PROCEDURES

a. Use a silver solder on all soldered connections. Silver solder with a 50 percent silver capacity and a melting point of approximately 1300° (704°C) is recommended.

b. Continually pass dry nitrogen through the tubing or connections being soldered or brazed to prevent the formation of harmful copper oxides.

5-2. REPLACEMENT OF CASING ASSEMBLY Replace the casing assembly if damage is unrepairable and would impair serviceability.

WARNING

Disconnect the air conditioner from the electrical power source before attempting to perform general maintenance on the unit.

a. Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.

b. Refer to figure 4-2 and release refrigerant from the system.

c. Remove all panels, grilles, filters and screens from the unit.

d. Remove all components and tubing from the casing assembly.

e. Install all components and tubing in new casing assembly.

f. Install panels, grilles, filters and screens in new casing assembly.

g. Refer to paragraph 4-8 and purge the refrigerant system.

h. Refer to figure 4-4 and evacuate the refrigerant system.

i. Refer to paragraph 4-10 and charge the system with refrigerant.

j. Connect the air conditioner to the electrical power source. Turn the selector switch to the "COOL" position and turn the thermostat control knob counterclockwise to its limit.

k. Using available leak detector, check the entire unit for refrigerant leaks. Repair any leaks found.

l. If air conditioner does not function properly, troubleshoot unit in accordance with table 4-1.

APPENDIX A**REFERENCES**

A-1	Fire Protection		
		TB 5-4200-200-10	Hand Portable Fire Extinguisher, Approved for Army Users
		TM 5-687	Repair and Utilities: Fire Protection Equipment and Appliances: Inspection, Operations, and Preventive Maintenance
A-2	Demolition		
		TM 750-244-3	Procedure for Destruction of Equipment
A-3	Painting		
		TM 43-0139	Painting Instructions for Field Use
A-4	Maintenance		
		FM 20-31	Electric Motor and Generator Repair
		TM 5-4120-356-24P	Repair Parts and Special Tools List
		TM 38-250	Crate Fabrication
		DA PAM 738-750	The Army Maintenance Management System (TAMMS)
A-5	Lubrication		
		C9100-IL	Fuels, Lubricants, Oils and Waxes
A-6	Cleaning		
		Fed. Spec. P-D-680	Dry Cleaning Solvent
A-7	Radio Suppression		
		TM 11-483	

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. Introduction

B-1. GENERAL

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in section II, designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capabilities and capacities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special and common tool sets) required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristic of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position, a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code in the SMR code.

i. Repair. The application of maintenance services², including fault location/troubleshooting³, removal/installation, and disassembly/assembly⁴ procedures, and maintenance actions⁵ to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable, operational conditioner as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the function to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)

²Services - inspect, test, service, adjust, align, calibrate, and/or replace.

³Fault locate/troubleshoot - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

⁴Disassemble/assemble - encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least component identified as maintenance significant (i.e., assigned SMR code) for the category of maintenance under consideration.

⁵Actions - welding, grinding, riveting, straightening, facing, remachining, and/or resurfacing.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

- C Operator or Crew
- O Organizational Maintenance
- F Direct Support Maintenance
- H General Support Maintenance

- D Depot Maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support Equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

a. A. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National Stock Number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5.

EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

Not applicable.

SECTION II. MAINTENANCE ALLOCATION CHART
FOR
TM18KV-208-3-60

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
01	CASING AND RELATED PARTS								
0101	Fabric Cover	Inspect Replace		0.5 1.0					
0102	Top Panel Assembly	Inspect Replace		0.2 0.5					
	Gasket	Inspect Replace		0.2 0.5					
	Insulation	Inspect Repair Replace		0.2 0.5 0.75					
0103	Air Discharge Grille	Inspect Service Repair Replace		0.2 0.75 1.0 0.5					
	Gasket	Replace		0.5					
0104	Air Intake Grille	Inspect Service Repair Replace		0.2 0.5 1.0 0.5					
	Gasket	Replace		0.5					
0105	Lower Panel	Inspect Repair Replace		0.2 1.0 0.5					
	Gasket	Inspect Replace		0.2 0.5					
0106	CBR Cover	Inspect Replace		0.2 0.2					
0107	Fresh Air Screen	Inspect Service Replace		0.2 0.5 0.2					
0108	Condenser Coil Guard	Inspect Service Replace		0.2 0.5 0.2					
0109	Condenser Fan Guard	Inspect Service Replace		0.2 0.5 0.2					
0110	Back Panel	Inspect Repair Replace		0.2 0.5 0.2					

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
0111	Fresh Air Damper Control	Inspect Adjust Replace Repair	0.1	0.2 0.5 0.75					
0112	Mist Eliminator	Inspect Service Replace		0.5 0.75 0.75					
0113	Information, Identification & Instruction Plates	Replace		1.0					
0114	Casing Assembly Insulation	Replace		3.5					*
0115	Drip Pan Assembly	Inspect Service		1.5 1.5					
0116	Lower Drain Tube Assembly	Inspect Service Repair Replace		0.5 0.8 1.0 1.5					
	Hose	Inspect Replace		0.75 1.0					
02	CONTROL BOX AND JUNCTION BOX								
0201	Control Box	Inspect Replace		1.0 2.5					
0202	Selector Switch	Test Replace		1.5 2.5					
0203	Temperature Control Thermostat	Test Replace		2.5 3.75					
0204	Two-Speed Switch	Test Replace		1.0 2.75					
0205	Junction Box	Inspect Replace		1.5 3.0					
0206	Fuses	Test Replace		1.0 1.0					
0207	Circuit Breaker	Inspect Test Replace		1.0 1.5 1.75					
0208	Heater & Compressor Relays	Inspect Test Replace		1.0 1.5 2.75					
*Replacement of insulation without breaking into refrigerant system									

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
0209	Time Delay Relay	Inspect Test Replace		1.0 1.0 1.5					
0210	Fan Relays	Inspect Test Replace		1.0 1.0 1.5					
0211	Transformer	Test Replace		1.0 1.5					
0212	Terminal Boards	Inspect Replace		1.0 1.75					
0213	Electrical Receptacles	Inspect Replace		2.25 3.75					
0214	Rectifier Assembly	Test Replace		1.0 1.25					
0215	RF I Filter Assembly	Test Replace		1.0 1.5					
03	COMPRESSOR ASSEMBLY								
0301	Compressor	Inspect Test Replace		1.0	1.5 12.0				
04	PRESSURE SWITCHES								
0401	High Pressure Cut- Out Switch	Test Replace			2.0 3.0				
0402	Low Pressure Cut- Out Switch	Test Replace			2.0 3.0				
0403	Pressure Control Switch	Test Replace			2.0 3.0				
05	REFRIGERANT COMPONENTS								
0501	Refrigerant tubing and Fittings	Inspect Test Replace			3.0 2.0 3.0				
0502	Solenoid Valves	Test Replace		2.0	3.5				
	Coil	Test Replace		1.0 1.5					
0503	Dehydrator	Replace		4.0					
0504	Sight Glass	Inspect Replace		0.5	4.0				

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
0505	Pressure Regulator Valve	Adjust Replace			2.0 3.0				
0506	Pressure Relief Valve	Inspect Replace			1.0 2.0				
0507	Service Valves	Inspect Replace			0.75 2.5				
	Expansion Valve	Inspect Test Adjust Repair Replace			0.75 1.0 2.5 2.0 3.5				
0509	Quench Valve	Inspect Test Adjust Repair Replace			0.75 1.0 2.5 2.0 3.5				
0510	Condenser Coil	Service Inspect Replace		1.0	0.5 12.0				
0511	Evaporator Coil	Service Inspect Replace		1.0	0.5 12.0				
06	HEATER ASSEMBLY								
0601	Electric Heating Elements	Test Replace		1.0 1.5					
0601	Heater Thermostatic Switch	Test Replace		1.0 1.5					
07	FANS AND MOTOR								
0701	Evaporator Fan Assembly	Inspect Replace		1.0 1.5					
0702	Condenser Fan Assembly	Inspect Replace		1.0 1.5					
0703	Fan Motor	Inspect Test Repair Replace		1.0 0.75 2.0 3.2					
08	WIRING HARNESES								
0801	Wiring Harnesses	Inspect Test Repair Replace		1.0 3.0 3.5 5.0					

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4)					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
0802	Receptacle Connectors	Inspect Replace		2.0 4.0					
0803	Plug Connectors	Inspect Replace		2.0 4.0					
09	FRAME AND CASING	Repair Replace			4.0	60.0			

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS

(1)	(2)	(3)	(4)	(5)
REFER- ENCE CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL STOCK NUMBER (NSN)	TOOL NUMBER
	F	Thermometer Set, Super-Heat Serviceman, (38508) 211-001	6685-00-874-5834	
	0	Tool Kit, Service, Refrigeration Unit (SC5180-90-CL-N18)	5180-00-597-1474	
	0	Soldering Gun Kit	3439-00-930-1638	
	F-H	Recovery and Recycling Unit, Refrigerant	4130-01-338-2707	17500B (07295)

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

C-1. SCOPE.

This appendix lists components of end item and basic issue items for the air conditioner to help you inventory items required for safe and efficient operation.

C-2. GENERAL.

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the air conditioner in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged. BII must be with the air conditioner during operation and whenever it is transferred between property accounts. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS.

The following provides an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

Not applicable.

b. Column (2) - National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number. (Enter portions of next two sentences, only in applicable.) If item needed differs for different models of this equipment, the model is shown under the "Usable On" heading in this column. These codes are identified as:

CODE

USED ON

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

e. Column (5) - Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II.

COMPONENTS OF END ITEM

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty r q r
		Control Panel 13218E8492-1 (97403)			1
		Evaporator Discharge Grille 13215E9857 (97403)			1
		Evaporator Intake Grille 13215E9854 (97403)			1
		Electrical Connector, Power Input MS3106R22S (96906)			1
	4130-01-051-7426	Cover, Fabric 13217E2346 (97403)			1

Section III.

BASIC ISSUE ITEMS

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty r q r
	7520-00-559-9618	Case, Manual			1

APPENDIX D**EXPENDABLE SUPPLIES AND MATERIALS LIST****Section I. Introduction****D-1. SCOPE**

This appendix lists expendable supplies and materials you will need to operate and maintain the air conditioner. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. EXPLANATION OF COLUMNS

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

- C - Operator/Crew
- O - Organizational Maintenance
- F - Direct Support Maintenance
- H - General Support Maintenance

c. Column 3 - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column 4 - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column 5 - Unit of Measure U/M. Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II

EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	F	9150-00-823-7905	Lub. Oil Ref. VV-L-825	GL
2	c	6850-00-264-9037	Dry Cleaning Solvent P-D-680 (81348)	GL
3	F	6850-00-837-9927	Monochlordifluoromethane, Technical: w/cylinder 22 lb. (Refrigerant 22) BB-F-1421, Type 22 (81348)	CY
4	F	6830-00-782-6512	Trichlorotrifluoroethane, Refrigerant Solvent (R-114). 50 lb. drum (73925)	LB
5	F	9150-00-965-2408	High Vacuum Grease 5.3 oz tube (71984)	OZ
6.	F	8030-00-999-6313	Leak Lock. Item Number 684176-10001 (08589)	OZ

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FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARDWOOD, MD 63108

DATE SENT

PUBLICATION NUMBER

TM 5-4120-356-14

PUBLICATION DATE

12 Aug 81

PUBLICATION TITLE Air Conditioner

Vertical Compact 18,000 BTU/HR

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA- GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG
AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the
manual states the engine has
6 Cylinders. The engine on my
set only has 4 Cylinders.
Change the manual to show 4
Cylinders.

Callout 16 on figure 4-3 is
pointing at a bolt. In key
to figure 4-3, item 16 is called
a shim - Please correct
one or the other.

I ordered a gasket, item
19 on figure B-16 by NSN
2 910-00-762-3001. I got a
gasket but it doesn't fit.
Supply says I got what
I ordered, so the NSN is
wrong. Please give me a
good NSN

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER

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PARA-
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FIGURE
NO

TABLE
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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigram = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.365	metric tons	short tons	1.102
pound-inches	newton-meters	.11375			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----

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