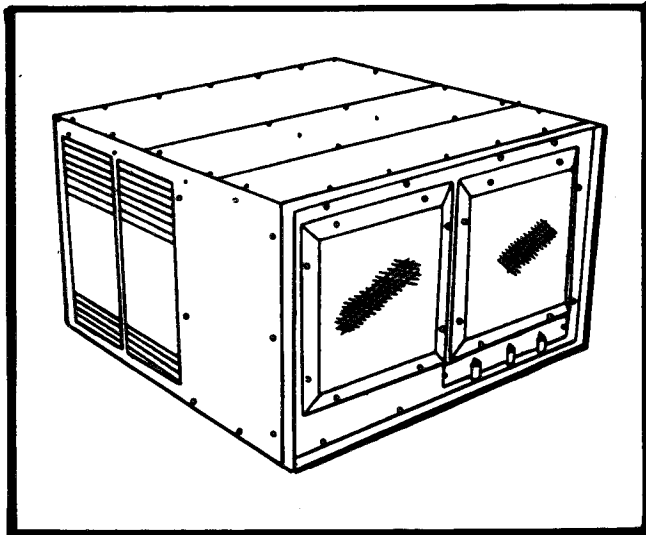


TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, AND  
DIRECT SUPPORT MAINTENANCE MANUAL

AIR CONDITIONER,  
HORIZONTAL,  
9,000 BTU/HR

A.R.E. MANUFACTURING CO., INC.  
MODEL FM9000  
NSN 4120-01-125-3947



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CHANGE

NO. 2

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 1 JULY 1992

Operator's, Organizational, and Direct Support  
Maintenance Manual

**AIR CONDITIONER, HORIZONTAL, 9,000 BTU/HR  
A.R.E. MANUFACTURING CO., INC.  
MODEL FM9000  
NSN 4120-01-125-3947**

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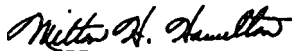
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Operator, Organizational, and  
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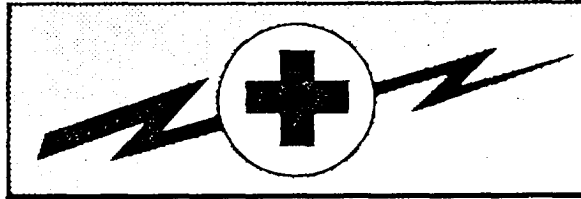
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## WARNI NG



DISCONNECT THE POWER SOURCE BEFORE PERFORMING ANY MAINTENANCE FUNCTION.

DRY CLEANING SOLVENT P-D-680 OR P-S-661 USED TO CLEAN PARTS IS POTENTIALLY DANGEROUS TO PERSONNEL AND PROPERTY. AVOID REPEATED AND PROLONGED SKIN CONTACT. DO NOT USE NEAR OPEN FLAME OR EXCESSIVE HEAT. FLASH POINT OF SOLVENT IS 100°F (38°C).

DEATH OR SERIOUS INJURY MAY OCCUR IF CAPACITOR IS NOT DISCHARGED PRIOR TO REMOVAL.

AVOID BODILY CONTACT WITH LIQUID REFRIGERANT AND AVOID INHALING REFRIGERANT GAS. BE ESPECIALLY CAREFUL THAT REFRIGERANT 12 DOES NOT COME IN CONTACT WITH EYES. IN CASE OF REFRIGERANT LEAKS, VENTILATE AREA IMMEDIATELY.

DO NOT USE COMPRESSED AIR FOR CLEANING PURPOSES EXCEPT WHERE REDUCED TO LESS THAN 30 PSI AND THEN ONLY WITH EFFECTIVE CHIP GUARDING AND PERSONAL PROTECTIVE EQUIPMENT.

PURGE SYSTEM WITH DRY NITROGEN PRIOR TO SOLDERING. REFRIGERANT HEATED TO 1200°F CREATES PHOSGENE GAS.





TECHNICAL MANUAL  
No. 5-4120-374-13

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D. C., 7 October 1983

Operator's Organizational, and Direct Support  
Maintenance Manual

AIR CONDITIONER, HORIZONTAL  
9,000 BTU/HR

(A.R.E. MFG.CO.INC. MODEL FM9000)

(41 20-01-125-3947)

REPORTING OF ERRORS

You can help to improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, U.S. Army Troop Support & Aviation Material Readiness Command, ATTN: DRSTS-MPSD, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120. A reply will be furnished to you.

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# CHAPTER 1

## INTRODUCTION

### CHAPTER OVERVIEW

The purpose of this chapter is two-fold:

- a. To provide you with the standard data required in all manuals (i.e., forms and record data).
- b. To acquaint you with the air conditioner. This is done by giving you a physical and functional description of those major equipment parts that you are likely to come in contact with.

## Section I. GENERAL INFORMATION

### 1-1. SCOPE

Type of Manual: Operator's, Organizational, Direct Support and General Support Maintenance

Model Number and Equipment Name: FM9000 Air Conditioner: Floor Mounted, Air Cooled, Electric Motor Driven, 3/4 HP, 60 Hertz AC, Single Phase, 9,000 BTU/HR, Horizontal

Purpose of Equipment: Provide filtered, cooled air to a desired predetermined range and circulating the air to provide cooling of equipment or personnel within the air conditioned area.

### 1-2. MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, the Army Maintenance Management Systems (TAMMS).

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

Refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use, for information about destruction.

### 1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs)

If your air conditioner needs improvement, let us know. Send us an E I R. 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 directly to Commander, U.S. Army Troop and Aviation Materiel Readiness Command, ATTN: DRSTS-MPSD, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120.

1-5. LIST OF ABBREVIATIONS

a	Ampere	l	liter
BTU/HR	British Thermal Units per Hour	lb	pound
C	Celcius	OD	Outside Diameter
COMPR	Compressor	psi	pounds per square inch
DB	Dry Bulb	pt	pint
F	Farenheit	rpm	revolutions per minute
hpr	Horsepower	SHR	Sensible Heat Ratio
in	inch	v	volts
kg	kilogram	vac	volts alternating current
kg/m <sup>2</sup>	kilograms per square meter	vdc	volts direct current

1-6. 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 5-4120-374-14-HR. This manual is published to aid in property accountability and is available through Commander, U.S. Army Adjutant General, 2800 Eastern Boulevard, Baltimore, Maryland 21220.

## Section II. EQUIPMENT DESCRIPTION

### 1-7. PURPOSE OF AIR CONDITIONER

The air conditioner is used primarily in van type enclosures. The units provide filtered, cooled air, as required, to maintain the service conditions necessary for the efficient operation of electronic equipment in the vans. The air conditioners also provide for the comfort of operating personnel housed within the vans.

#### Capabilities and Features

Floor mounted and air cooled

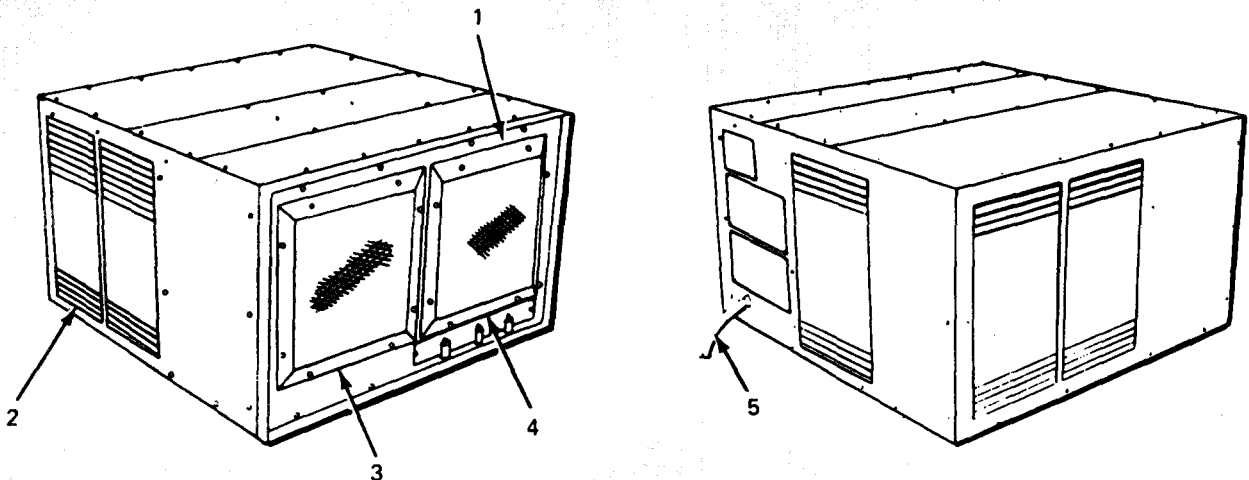
Electric motor driven and designed for continuous operation under varying loads

Furnishes 9,000 BTU/HR for cooling

- Air conditioner housing and panels
- Fan motor and fans
- Control panel
- Compressor
- Evaporator coil, expansion valves, and piping
- Condenser coil, dehydrator, valves and piping

### 1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

1. Return Air Grill – Adjustable and controls the amount of air passing through the air conditioner.
2. Condenser Inlet – Directs flow of air condenser
3. Air Diffuser Grill – Directs flow of evaporator outlet air.
4. Control Panel – Contains all control switches.
5. Power Cable – For connection to 115 volts, 60 Hz, single phase power source.



**1-9. PERFORMANCE DATA (ORGANIZATIONAL MAINTENANCE)**

a. Air Conditioner, Floor Mounted, 9,000 BTU/HR, 115 Volts, Single Phase, 60 Hertz,

Manufacturer . . . . .	A.R. E. Mfg. Co., Inc.
National Stock Number . . . . .	4120-01-125-3947
Model . . . . .	FM9000
Length . . . . .	27-5/8 in. (701.675mm)
Width . . . . .	26-1/2 in. (673.1 mm)
Height . . . . .	15-5/8 in. (396.875 mm)
Capacity . . . . .	9,000 BTU/HR
Weight . . . . .	136 lbs (61.69 kg)

b. Compressor (B1).

Manufacturer, . . . . .	Copeland Corp.
Model . . . . .	RRS4-0075-1AA-214
Military Part Number . . . . .	(97403) 13225E8600
Volts . . . . .	115
Hertz . . . . .	60
Phase . . . . .	Single
Weight (with oil). . . . .	45.5 pounds (20.65 kilograms)

c. Fan Motor (62).

Manufacturer . . . . .	Dayton Electric Mfg. Company
Model . . . . .	3M064A
Military Part Number . . . . .	13221E4583
volts . . . . .	115
Phase . . . . .	Single
RPM . . . . .	1250/1550
Horsepower . . . . .	1/4
Duty . . . . .	Continuous
Motor Drive . . . . .	Direct
Thermal Protector . . . . .	Automatic reset type open at 165°C (329°F)
Rotation (lead end) . . . . .	Counterclockwise

d. Start Capacitor (C1).

Manufacturer . . . . .	Sprague Mfg. Co.
Part Number . . . . .	014-0008-71
Capacitance . . . . .	189-227 Mfd.
Working Voltage. . . . .	220V-60 Hz.

e. Run Capacitor (C2).

Manufacturer . . . . .	General Electric Company
Part Number . . . . .	97F3835 w/Bracket 279A7235P22 & Boot 178A3744P21
Type . . . . .	Fixed, Oil Impregnant
Capacitance . . . . .	35 Microfarads
Working Voltage. . . . .	370 VAC
Military Part Number . . . . .	(97403) 13225E8601

f. Motor Capacitor (C3) (Supplied as Part of Motor).

Manufacturer . . . . .	P.R. Mallory
Part Number . . . . .	32BF3703
Capacitance . . . . .	3 mfd
Working Voltage. . . . .	370 volts



g. Start Relay (K1).

Manufacturer . . . . . Texas Instrument (Spencer) Relay  
 Part Number . . . . . 6409-26-935  
 Type . . . . . Current Type  
 Pick-Up Amps (Normally Closed). . . . . 33.6 Amps  
 Drop-out Amps . . . . . 27.8 Amps

h. Rotary Selector Switch (S1).

Manufacturer . . . . . Oak Industries, Incorporated  
 Part Number . . . . . 240T6HPC  
 Military Part Number . . . . . 13221E4549  
 Type . . . . . SPDT  
 Number of Switch Positions . . . . . 3

i. Thermostat (S2).

Manufacturer . . . . . Ranco  
 Part Number . . . . . A30-1792  
 Military Part Number . . . . . 13221E4554  
 Type . . . . . SPST, Normally Closed  
 Contacts Close (temp. drop) . . . . . 69°F to 71°F (20.6°C to 21.7°C)

j. Expansion Valve.

Manufacturer . . . . . The Singer Co., Controls Division  
 Part Number . . . . . 223-149  
 Military Part Number . . . . . 13221E4574  
 inlet . . . . . 1/4 ODF  
 Outlet . . . . . 1/2 ODF  
 Cap. Tube Length . . . . . 60 in. (1,524 mm)  
 Nominal Capacity . . . . . 1/2 ton  
 Superheat (factory set) . . . . . 8½°F to 9½°F bath temperature(-13°C to 12.5°C  
 at a 0°C bath temperature)

k. Sight Glass.

Manufacturer . . . . . Mueller Brass Co.  
 Part Number . . . . . A15966  
 Military Part Number . . . . . 13221E4548

**1-10. PERFORMANCE DATA (DIRECT SUPPORT MAINTENANCE)**

a. Dehydrator.

Manufacturer . . . . . Sporlan  
 Part Number . . . . . CO-52  
 Military Part Number . . . . . 13214E3557

b. Refrigerant Service Valves.

Manufacturer . . . . . Robinair Mfg. Corporation  
 Part Number . . . . . 40464  
 Military Part Number . . . . . 13219E9499  
 Valve Stem . . . . . Handle for opening and closing

c. Refrigerant.

Type . . . . . R 1 2  
 Capacity . . . . . 3lbs

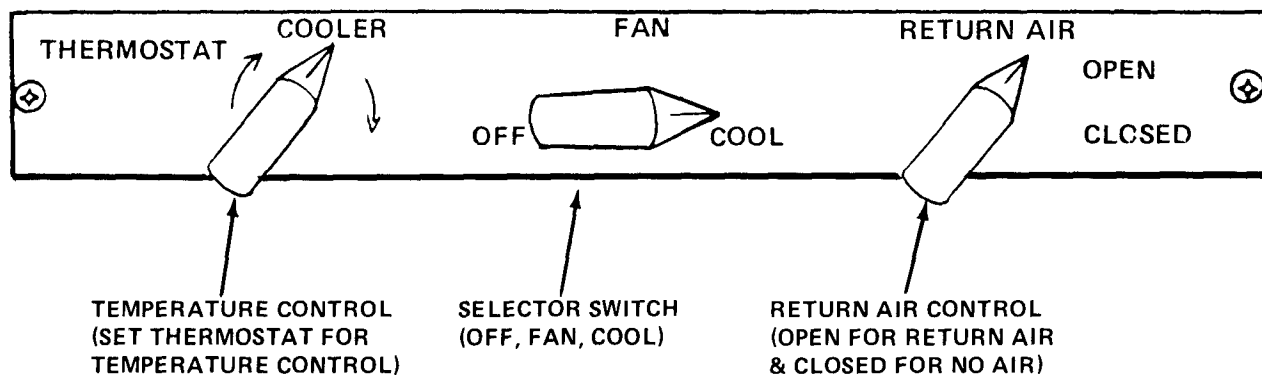
### Section III. TECHNICAL PRINCIPLES OF OPERATION

#### 1-11. GENERAL

The air conditioner is a floor-mounted, self-contained, electric motor driven unit that provides 9,000 BTU/HR for cooling. Once started, it operates automatically due to the relationship of the components, controls and instruments.

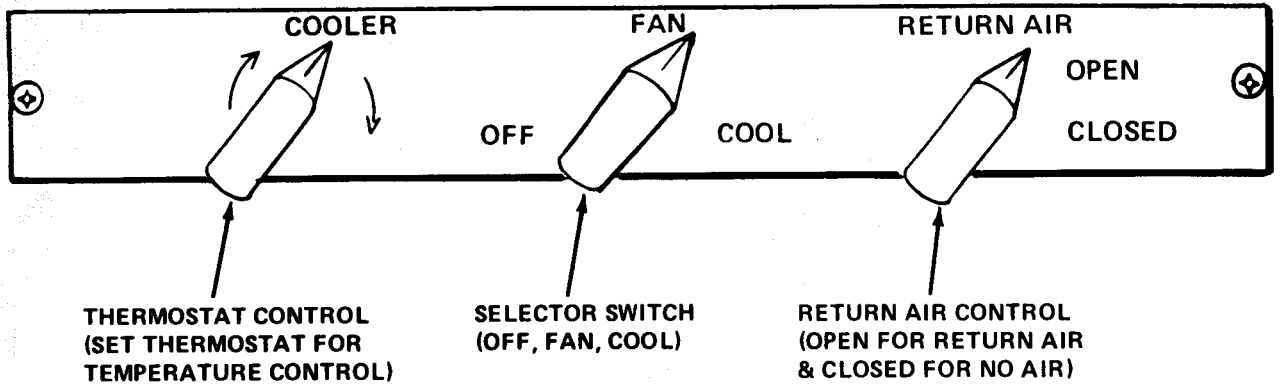
#### 1-12. COOLING

With the selector switch in the COOL position, the fan motor and the compressor are energized. The fan motor and compressor run continuously. The flow within the refrigerant circuit determines the cooling mode of unit. With the fan motor and compressor operating, the flow within the refrigerant circuit is controlled by the THERMOSTAT switch.



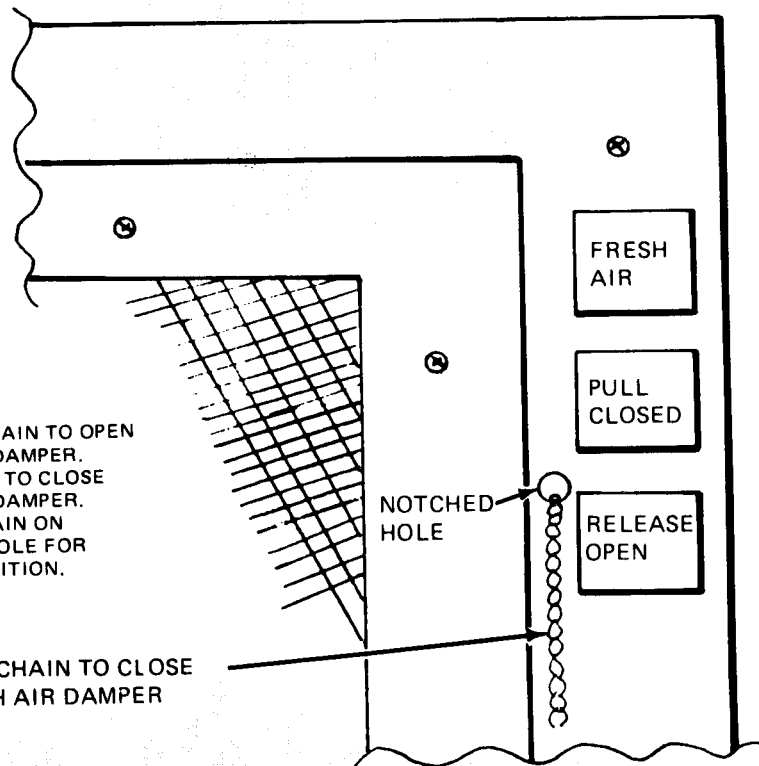
**1-13. VENTILATION**

Placing the selector switch in the FAN position energizes the fan motor which forces air out of the air diffuser grill. The amount of outdoor air used for ventilation is determined by the position of the FRESH AIR damper. A chain operates the fresh air damper.



- NOTE:
- (1) RELEASE CHAIN TO OPEN FRESH AIR DAMPER.
  - (2) PULL CHAIN TO CLOSE FRESH AIR DAMPER.
  - (3) SECURE CHAIN ON NOTCHED HOLE FOR CLOSED POSITION.

PULL CHAIN TO CLOSE FRESH AIR DAMPER





# CHAPTER 2

## OPERATING INSTRUCTIONS

### CHAPTER OVERVIEW

This chapter contains a functional description of the major components of the air conditioner, It explains how to operate the air conditioner. For your convenience, below is an index of this chapter.

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## Section I. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

### 2-1. GENERAL

- a. Before You Operate. Always keep in mind the CAUTIONS and WARNINGS, Perform (B) PMCS before you operate.
- b. While You Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform (D) PMCS while you operate.
- c. After You Operate. Be sure to perform (A) PMCS after operation.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms, See TM 38-750.

### 2-2. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

**NOTE**

**If the equipment must be kept on 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.**

Note: Within designated intervals, these checks are to be performed in the order listed.

B—Before                      D—During                      A—After

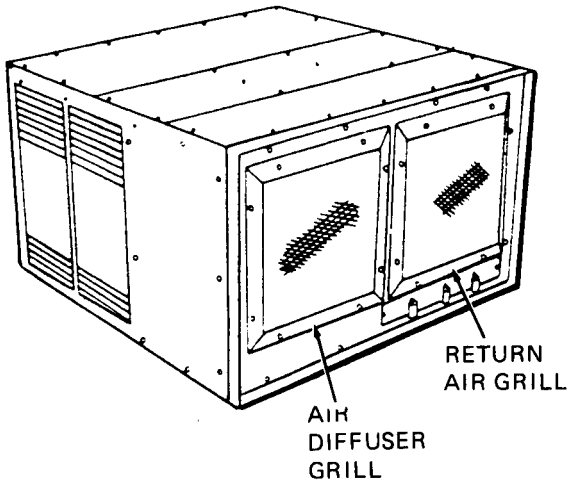
Item No.	Interval			Item to be Inspected	Procedures: Check For and Have Repaired or Adjusted As Necessary
	B	D	A		

1            ●            ●            Air Diffuser Grill

Inspect for cleanliness, obstructions, damage, and security of attachment. Report damaged condition to organizational maintenance personnel.

2            ●            ●            Return Air Grill

Inspect for cleanliness, obstructions, damage, and security of attachment. Rotate RETURN AIR control to adjust return air grill.

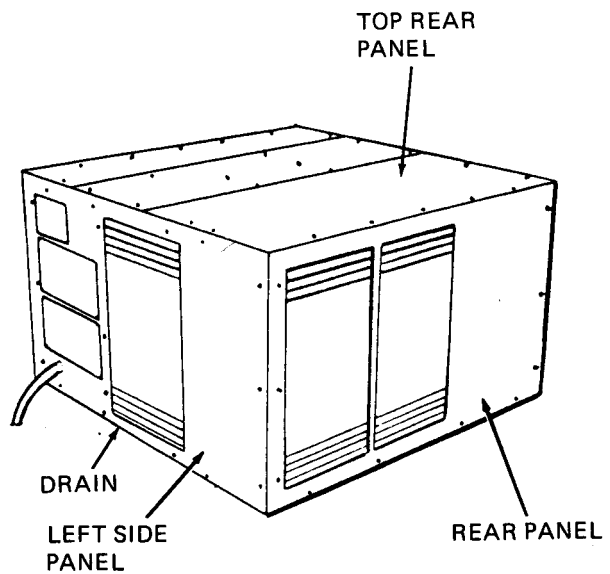
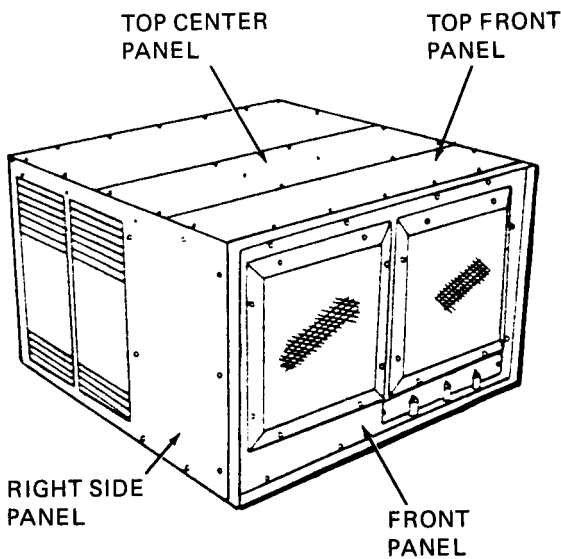


3            ●            ●            Housing Panels

Inspect for security of attachment and cleanliness. Report damaged condition to organizational maintenance personnel.

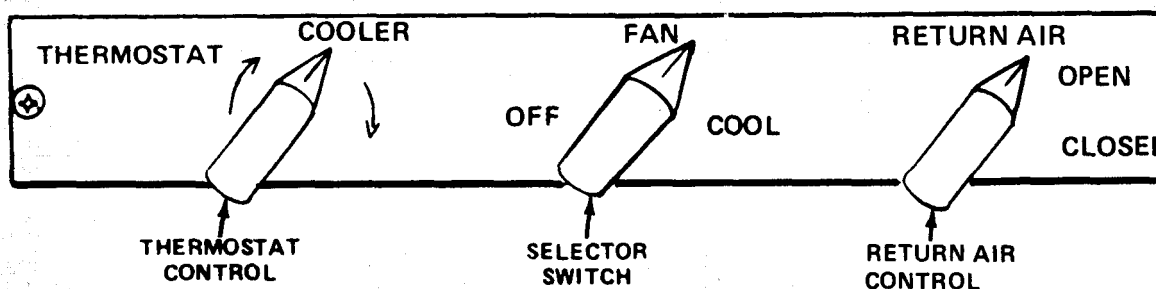
4            ●            ●            Drains

Inspect drains for obstructions. Remove obstruction as required.



Note: Within designated intervals, these checks are to be performed in the order listed.

Item No.	Interval			Item to be Inspected	Procedures: Check For and Have Repaired or As Necessary
	B	D	A		
5				Switches	Insure knobs are in place and check to see th switches function properly. Report damaged to organizational maintenance personnel.



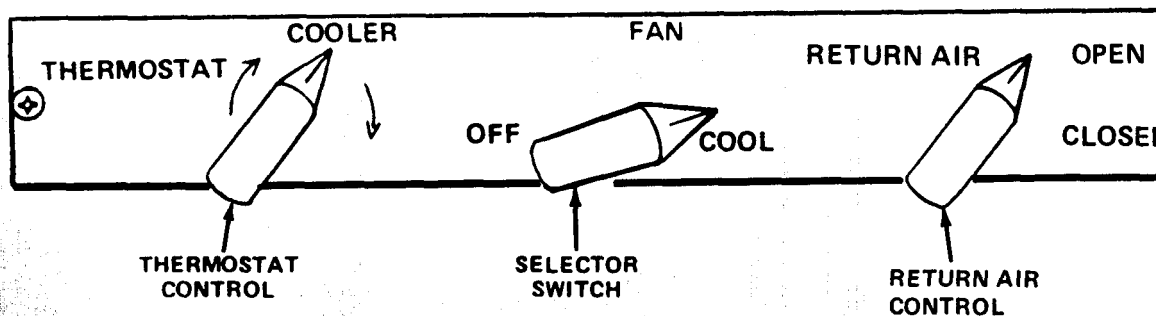
2.3. STARTING AND OPERATING INSTRUCTIONS FOR COOLING

1. Make sure you perform the preventive maintenance checks and services (paragraph 2-2).

**NOTE**

Only the COOLER position for the THERMOSTAT is marked on the front panel.

2. Set THERMOSTAT control to desired temperature.
3. Place RETURN AIR control in open position while in cooling mode.
4. Place selector switch in the FAN position to start fans.
5. Place selector switch in the COOL position. When the temperature in the area is above that of THERMOSTAT setting, the air conditioner will provide cooling air.

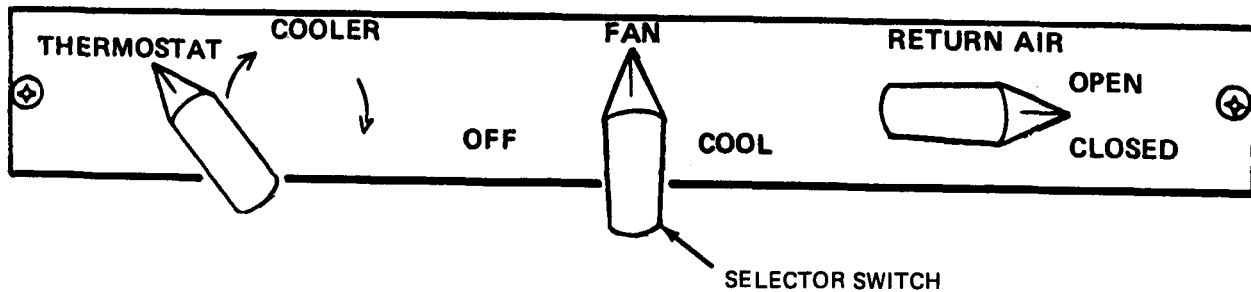


### 2-4. FRESH AIR MODE

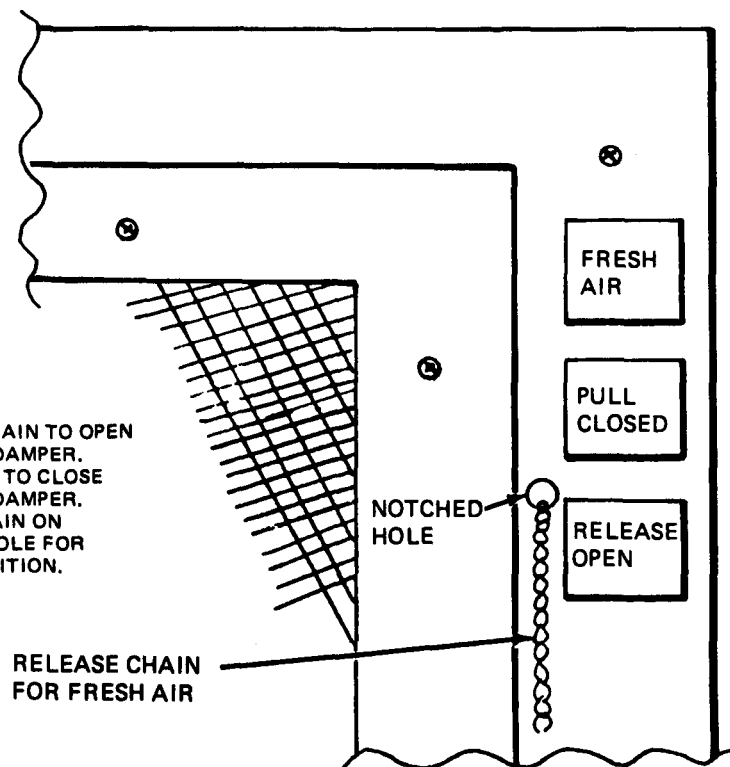
1. Make sure you perform the preventive maintenance checks and services (para. 2-2).
2. Turn thermostat counterclockwise to non-cooling position.
3. Place selector switch in the FAN position to start fans.
4. Close RETURN AIR control.
5. Adjust damper control chain for desired amount of fresh air.

### 2-5. STOPPING INSTRUCTIONS

Turn FAN selector switch to OFF position.

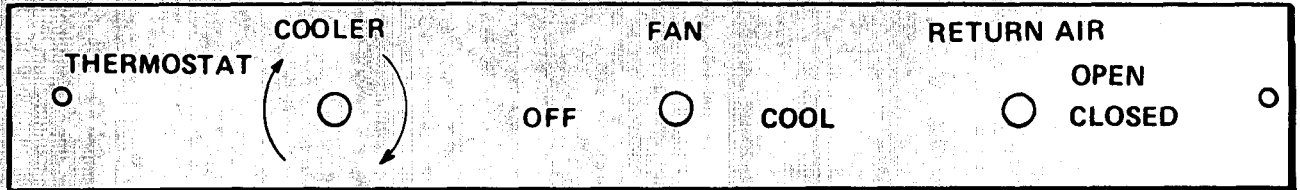


- NOTE:**
- (1) RELEASE CHAIN TO OPEN FRESH AIR DAMPER.
  - (2) PULL CHAIN TO CLOSE FRESH AIR DAMPER.
  - (3) SECURE CHAIN ON NOTCHED HOLE FOR CLOSED POSITION.





2-6. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES



<b>U. S. ARMY TROOP SUPPORT COMMAND</b>	
<b>AIR CONDITIONER: FLOOR MTG; AIR          COOLED; ELECTRIC MOTOR DRIVEN, 3/4-HP          AC 115V, SINGLE PHASE, 60 HZ:          9000BTU/HR</b>	
<b>NSN</b>	4120-01-125-3947
<b>PART NO. ASSY 97403-13221E4580</b>	
<b>MFD BY A.R.E. MFG. CO., INC.</b>	
<b>CONTRACT NO. DAAJ09-81-C-1654</b>	
<b>DATE</b>	6/82
<b>SERIAL NO.</b>	FA0002
<b>WT</b>	136
<b>LB</b>	

## Section II. OPERATION UNDER UNUSUAL CONDITIONS

### 2-7. 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.

### 2-8. OPERATION IN DUSTY OR SANDY CONDITIONS

**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.

**2-9. OPERATION UNDER RAINY OR HUMID CONDITIONS**

Take special precautions to keep equipment dry. If installed outdoors, cover the equipment with a waterproof cover when it is not in use. Remove cover during dry periods. Take all precautions to keep the electrical components free from moisture.

**CAUTION**

**Make sure power is disconnected from air conditioner before touching any wiring or other electrical parts.**

**2-10. OPERATION IN SALT WATER AREAS**

a. **General.** Wash the exterior and condenser section of the unit, particularly condenser air discharge louver control mechanism, with clean fresh water at frequent intervals. Be careful not to damage electrical system with water. Special attention must be given to prevent rust and corrosion.

**WARNING**

**Disconnect power source prior to washing the air conditioner.**

b. **Painting.** Paint all exposed areas where paint has cracked, peeled or blistered or report condition to organizational maintenance. Coat all exposed areas of polished metal with a light coat of grease.



# CHAPTER 3

## OPERATOR'S MAINTENANCE INSTRUCTIONS

### CHAPTER OVERVIEW

This chapter contains all the necessary maintenance instructions to keep your air conditioner in good repair.

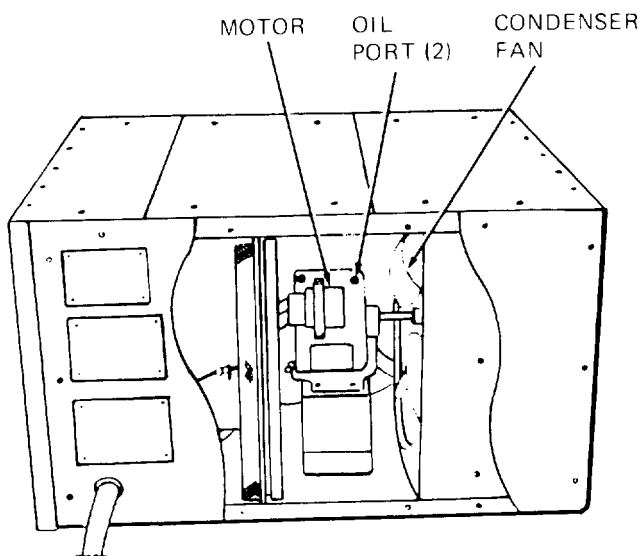
### INDEX

	Para	Page
Fan Motor Lubrication	3-1	3-1
Operator's Troubleshooting	3-2	3-2
Operator's Troubleshooting Table	3-3	3-2
Operator's Maintenance Procedures	3-4	3-3

## Section I. LUBRICATION INSTRUCTIONS

### 3-1. FAN MOTOR LUBRICATION

Uncap two (2) oil port caps and add SAE-20 oil every year. Recap oil port caps after lubrication.



## Section II. OPERATOR TROUBLESHOOTING

### 3-2. GENERAL

a. This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner. Each malfunction is followed by a list of probable causes and actions to take to remedy the malfunction. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur; nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

### 3-3. TROUBLESHOOTING TABLE

---

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

---

#### AIR CONDITIONER

##### 1. AIR CONDITIONER FAILS TO OPERATE.

Step 1. Check to see if main power cord is plugged in,

Connect power cable to receptacle supplying 115 VAC, single phase, 60 Hz power.

Step 2. Check to see if selector switch is in OFF position.

Place selector switch in FAN or COOL position.

##### 2. INSUFFICIENT COOLING

Step 1. Check to see if selector switch is in COOL position.

Place selector switch in COOL position.

Step 2. Check to see if THERMOSTAT is in COOLER position.

Place THERMOSTAT in COOLER position.

Step 3. Inspect air diffuser and return air grills for obstructions.

Remove obstructions from air diffuser and return air grills (para 3-5).

## Section III. OPERATOR MAINTENANCE PROCEDURES

### INDEX

Air Diffuser and Return Air Grills	Para 3-5	Page 3-6
Control Panel Switches	3-8	3-8
Drains	3-6	3-7
Housing Panels		

**WARNING**

Disconnect the power source before performing any maintenance function.

3-43-3

**WARNING**

Do not use compressed air for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

### 3 - 4 . HOUSING PANELS

This task covers:

a. Inspection

b. Service

#### INITIAL SETUP

**Materials/Parts**

Dry Cleaning Solvent, Appendix E, Items 2 & 3

**References**

N o n e

**Troubleshooting Reference**

None

**Approximate Time Required (in minutes)**

15

**TOTAL TIME**

15

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

#### INSPECTION AND SERVICE FRONT OF HOUSING

**WARNING**

Dry cleaning solvent, P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

1. Front Panel
  - a. Brush off any loose dirt or foreign matter from front panel.
  - b. Wipe off front panel with a cloth moistened with dry cleaning solvent, P-D-680 or P-S-661,
  - c. Inspect front panel for security of attachment and damage.
  - d. Report damaged condition to organizational maintenance personnel.
  
2. Left Side Panel
  - a. Brush off any loose dirt or foreign matter from left side panel.
  - b. Wipe off left side panel with a cloth moistened with dry cleaning solvent, P-D-680 or P-S-661,
  - a. Inspect left side panel for security of attachment and damage.
  - b. Report damaged condition to organizational maintenance personnel.

3-4. HOUSING PANELS (Cont)

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

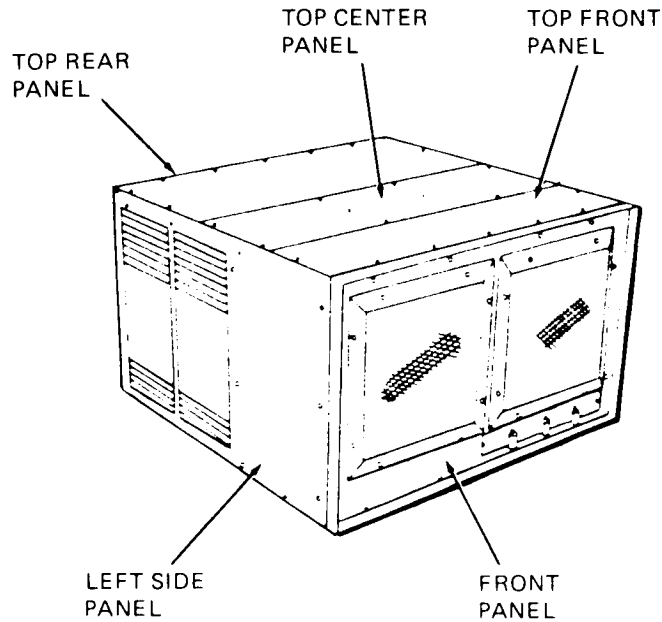
INSPECTION AND SERVICE

TOP OF HOUSING



Dry cleaning solvent, P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

3. Top Panels
- a. Brush off any loose dirt or foreign matter from top panels.
  - b. Wipe off top panels with a cloth moistened with dry cleaning solvent P-D-680 or P-S-661.
  - c. Inspect top panels for security of attachment and damage.
  - d. Report damaged condition to organizational maintenance personnel.



4. Rear Panel
- a. Brush off any loose dirt or foreign matter from rear panel.
  - b. Wipe off rear panel with a cloth moistened with dry cleaning solvent P-D-680 or P-S-661.
  - c. Inspect rear panel for security of attachment and damage.
  - d. Report damaged condition to organizational maintenance personnel.

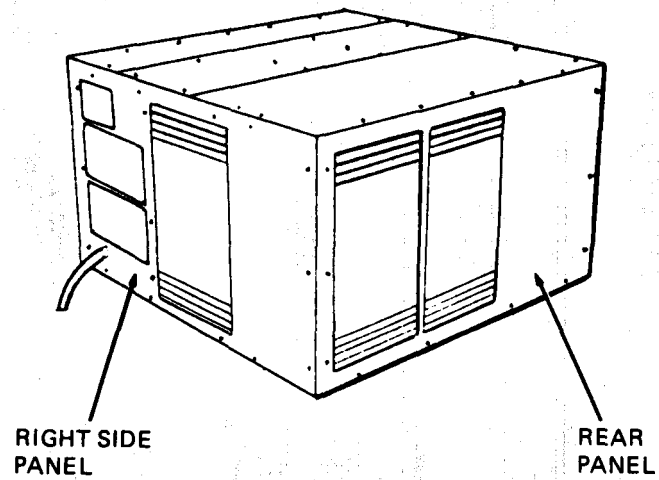


LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

INSPECTION AND SERVICE

RIGHT SIDE OF HOUSING

5. Right Side Panel
- a. Brush off any loose dirt or foreign matter from right side panel.
  - b. Wipe off right side panel with a cloth moistened with dry cleaning solvent P-D-680 or P-S-661.
  - c. Inspect right side panel for security of attachment and damage,
  - d. Report damaged condition to organizational maintenance personnel.



**3-5. AIR DIFFUSER AND RETURN AIR GRILLS**

This task covers: a. Inspection c. Adjustment  
 b. Service

**INITIAL SETUP**

Material/Parts	Troubleshooting Reference
Air Diffuser Grill	AIR CONDITIONER, Malfunction 2, Step 3
Return Air Grill	Approximate Time Required (in minutes)
Dry Cleaning Solvent, App. E, Items 2 & 3	Inspection and Service 15
References	Adjustment 5
None	<b>TOTAL TIME 20</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

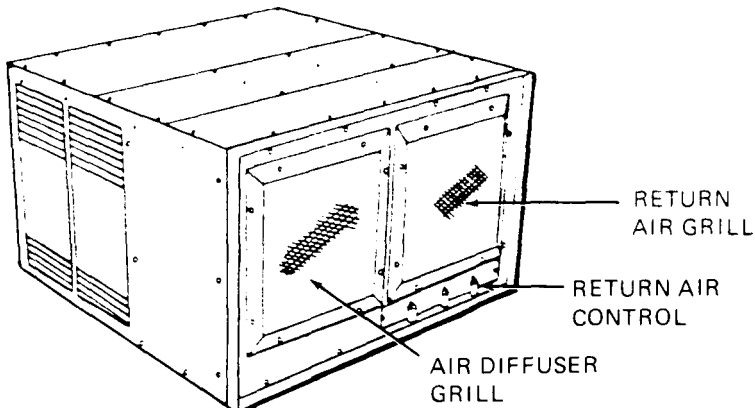
**INSPECTION AND SERVICE**

**FRONT OF HOUSING**



Dry cleaning solvent P-D-680 or P-S-661 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38° C).

1. Air Diffuser Grill
  - a. Brush off any loose dirt or foreign matter from air diffuser grill.
  - b. Wipe off air diffuser grill with a cloth moistened with dry cleaning solvent, P-D-680 or P-S-661.
  - c. Inspect for and remove any obstructions.
  - d. Inspect air diffuser grill for security of attachment and damage.
  - e. Report damaged condition to organizational maintenance personnel.
  
2. Return Air Grill
  - a. Brush off any loose dirt or foreign matter from return air grill.
  - b. Wipe off return air grill with a cloth moistened with dry cleaning solvent P-D-680 or P-S-661.
  - c. Inspect for and remove any obstructions.
  - d. Inspect return air grill for security of attachment and damage.
  - e. Report damaged condition to organizational maintenance personnel.
  
3. Return Air Control
  - a. Adjust return air grill louvers by rotating return air control from CLOSED to OPEN positions.
  - b. Verify return air grill louvers operate freely.
  - c. Report damaged condition to organizational maintenance personnel.



**3-6. DRAINS**

This task covers:

a. Inspection

b. Service

**INITIAL SETUP**

**Material/Parts**  
None

**Troubleshooting Reference**  
None

**References**  
None

**Approximate Time Required (in minutes)**  
 Inspection and Service 5  
**TOTAL TIME** 5

LOCATION/ITEM	ACTION	REMARKS
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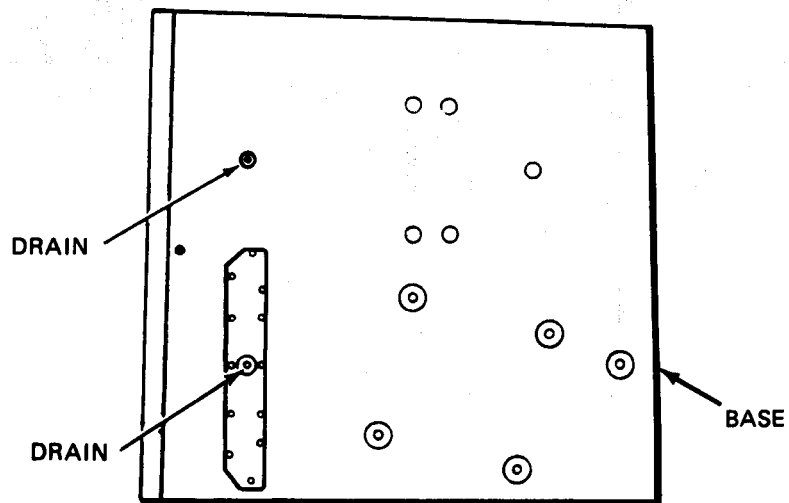
**INSPECTION AND SERVICE**

**FRONT OR REAR**

**Drains**

a. Inspect drains for obstructions.

b. Use a piece of soft wire to remove obstructions.



**3-7. CONTROL PANEL SWITCHES**

This task covers:

- a. Inspection

**INITIAL SETUP**

Material/Parts  
None

Troubleshooting Reference

- AIR CONDITIONER, Malfunction 1, Step 2
- AIR CONDITIONER, Malfunction 2, Step 1
- AIR CONDITIONER, Malfunction 2, Step 2

References  
None

Approximate Time Required (in minutes)

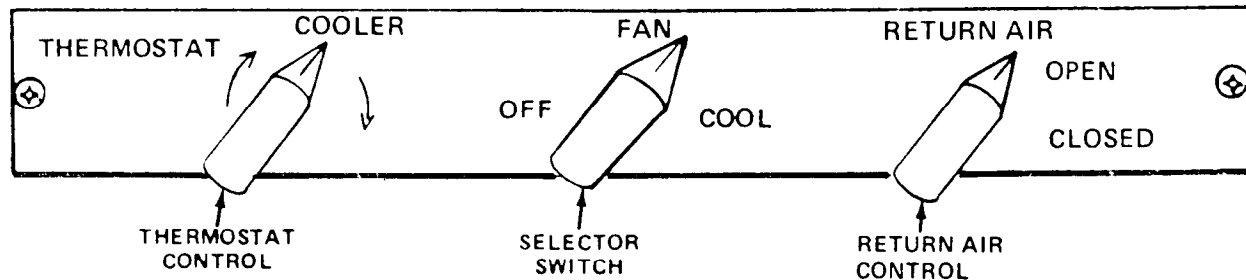
- Inspection 5
- TOTAL TIME 5

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

INSPECTION

CONTROL PANEL

1. Thermostat Control
  - a. Insure knob is in place and control rotates freely.
  - b. Report damaged condition to organizational maintenance personnel.
  
2. Selector Switch
  - a. Insure knob is in place and switch moves freely from position to position and functions properly.
  - b. Report damaged condition to organizational maintenance personnel.
  
3. Fresh Air Control
  - a. Insure knob is in place and check to see that the control moves freely between positions.
  - b. Report damaged condition to organizational maintenance personnel.



# CHAPTER 4

## ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

### CHAPTER OVERVIEW

This chapter contains all the necessary maintenance instructions for organizational maintenance personnel to keep your air conditioner in good repair.

### INDEX

Common Tools and Equipment	Para 4-2	Page 4-1
Consumable Materials	4-4	4-1
Maintenance Repair Parts	4-1	4-1
Organizational Maintenance Procedures	4-17	4-20
Organizational Troubleshooting	4-15	4-16
Organizational Troubleshooting Table	4-16	4-16
Organizational Preventive Maintenance Checks and Services (PMCS)	4-14	4-5
Preparation for Movement	4-35	4-78
Service Upon Receipt Checklist	4-5	4-2
Special Tools and Test Equipment	4-3	4-1

## Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

### 4.1. MAINTENANCE REPAIR PARTS

Repair parts for the air conditioner are listed and illustrated in TM 5-4120-374-24P.

### 4.2. COMMON TOOLS AND EQUIPMENT

For common tools and equipment, refer to the Table of Organization and Equipment (TOE).

### 4.3. SPECIAL TOOLS AND TEST EQUIPMENT

No special tools or test equipment are required.

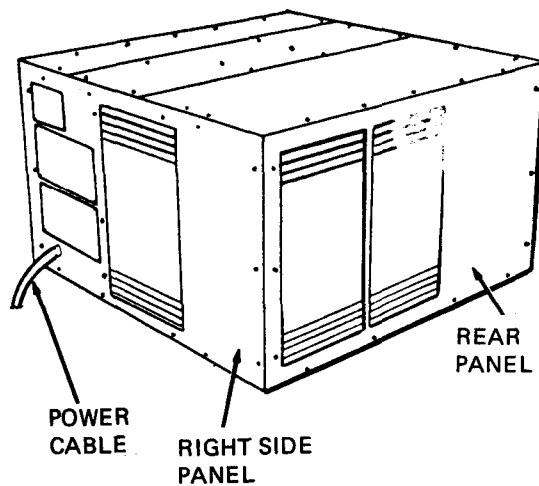
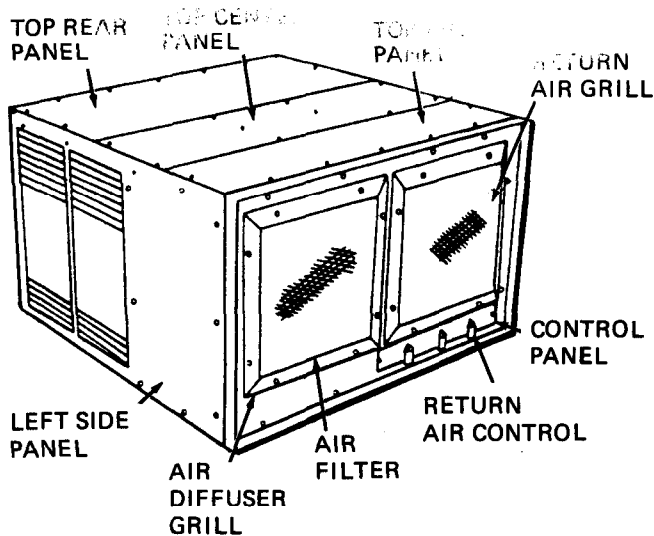
### 4.4. CONSUMABLE MATERIALS

Item No.	Name	Specification
1	Coater, Air Filter	MIL-L-2104
2	Dry Cleaning Solvent	P-D-680
3	Dry Cleaning Solvent	P-S-661
4	Adhesive	MMM-A-121

## Section II. SERVICE UPON RECEIPT

### 4-5. SERVICE UPON RECEIPT CHECKLIST

LOCATION	ITEM	ACTION	REFERENCE
1. Exterior	Housing Panels and Grills	a. Inspect for signs of rough handling and damage. b. Service or reject any component if damage prevents the air conditioner from working properly.	Para 4-18
2. Front	Air Filter	a. Remove top front panel. b. Remove air filter and inspect the filter for accumulation of dirt. c. Clean or reject filter.	Para. 4-19
3. Front	Return Air Grill	a. Check to see that the RETURN AIR control moves freely between the OPEN and CLOSED position and that the return air grill opens and closes properly. b. Adjust or reject RETURN AIR control.	Para 4-12
4. Front	Control Panel	a. Check for broken or damaged knobs. Insure that switches and controls move freely from position to position. b. Reject any component that is found to be malfunctioning.	Para 4-12
5. Power Cable	Power Cable	a. Inspect power cable electrical connector for damage. b. Repair or reject power cable.	Para 4-9



**4-6. ASSEMBLY AND PREPARATION FOR TYPICAL USE**

**4-7. POSITION THE UNIT**

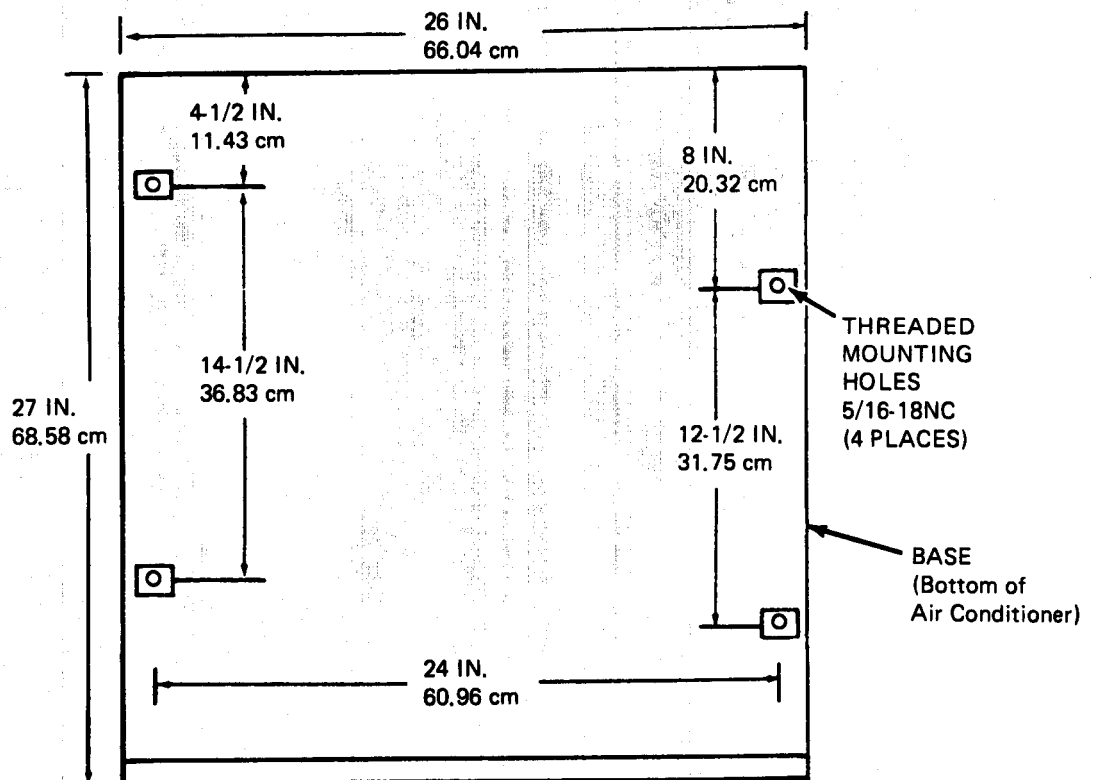
The total weight of the air conditioner is 136 pounds (61.69kg). Use a hand truck or fork lift of at least 200 pounds (90.8 kg) capacity to unload the air conditioner. Keep the air conditioner upright during unloading. Pick a place that is as level as possible. Install the air conditioner in a van, shelter, or any room through an opening 15-7/8 inches (40.3225cm) high by 26-1/4 inches (66.675 cm) long. Make sure that the air conditioner is installed so there is no restriction on the air flow, so that return air will collect the greatest amount of warm air in the space to be cooled. Make sure that the control panel is accessible to the operator and maintenance personnel.

**4-8. MOUNT THE UNIT**

Brace the air conditioner with two (2) brackets to resist shock. Bolt the air conditioner to the brackets using the four (4) threaded holes in the bottom of the air conditioner.

**NOTE**

Mounting brackets are not supplied with the air conditioner.

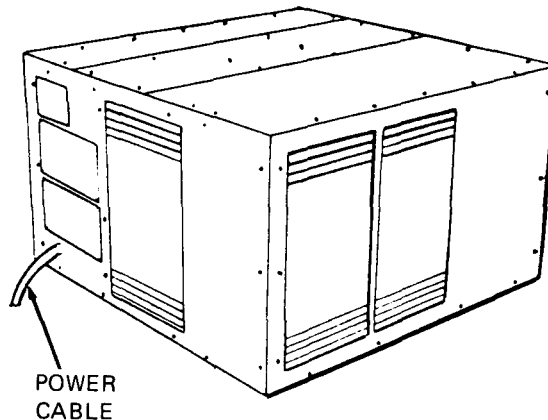
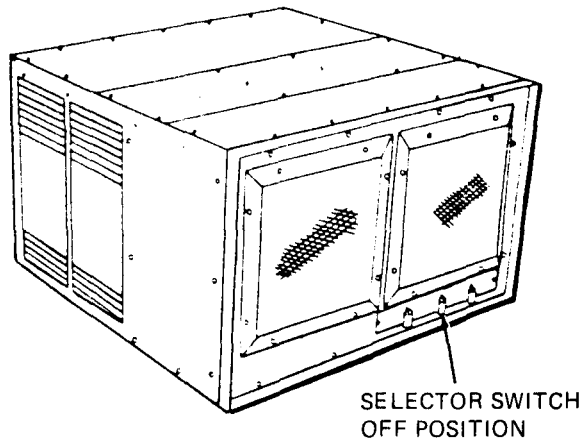


#### 4-9. CONNECT THE POWER SOURCE



Make sure the selector switch is in the OFF position,

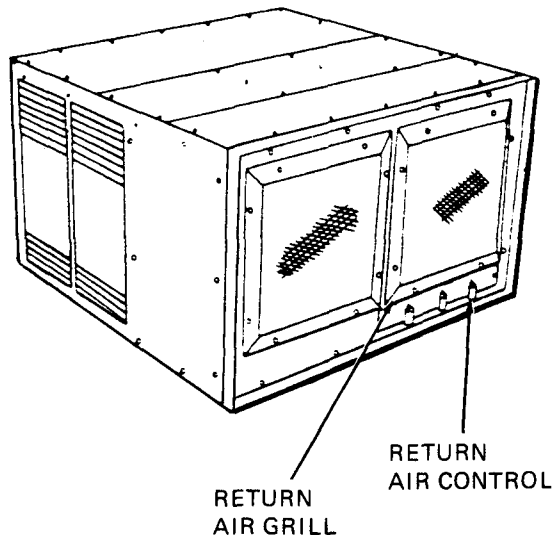
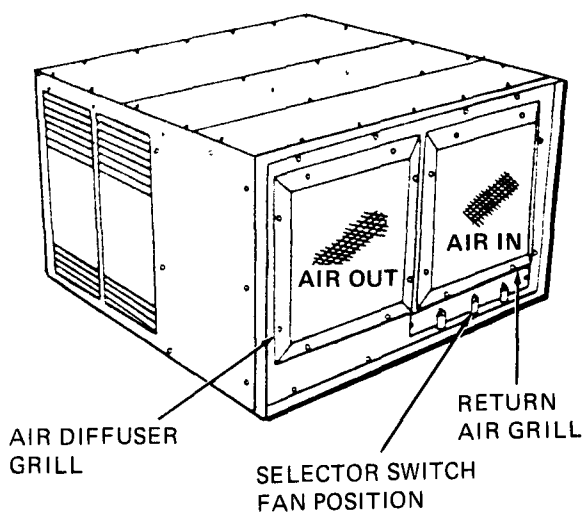
Connect the air conditioner power cable to a 115 volt, 60 hertz, single phase power source.



#### 4-10. INITIAL ADJUSTMENTS

#### 4-11. FAN ROTATION CHECK

Check for proper fan rotation as follows: Momentarily place the selector switch in the FAN position. Check to see that air is sucked through the air return grill and air is blown out through the air discharge grill.



#### 4-12. RETURN AIR GRILL CHECK

Rotate RETURN AIR control between CLOSED and OPEN positions. Make sure the return air grill louvers are closed with the RETURN AIR control in the CLOSED position and that they open with the RETURN AIR control in the OPEN position.



### Section III. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

#### 4-13. GENERAL

To insure that the air conditioner is ready for operation at all times, it must be inspected systematically so that the defects may be discovered and corrected before the result is serious damage or failure. Defects discovered during operation of the unit shall be noted for future corrections to be made as soon as an operation has ceased. Stop operation which would damage the equipment if operation were to continue. All deficiencies and shortcomings shall be recorded together with the corrective action taken on DA Form 2404 "Equipment Inspection and Maintenance Worksheet", at the earliest opportunity. If your equipment fails to operate, troubleshoot with proper equipment. Report any deficiencies using proper forms. See TM 38-750.

#### 4-14. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

**WARNING**

Dry cleaning solvent, P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

**WARNING**

Do not use compressed air for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

W-Weekly

Q-Quarterly

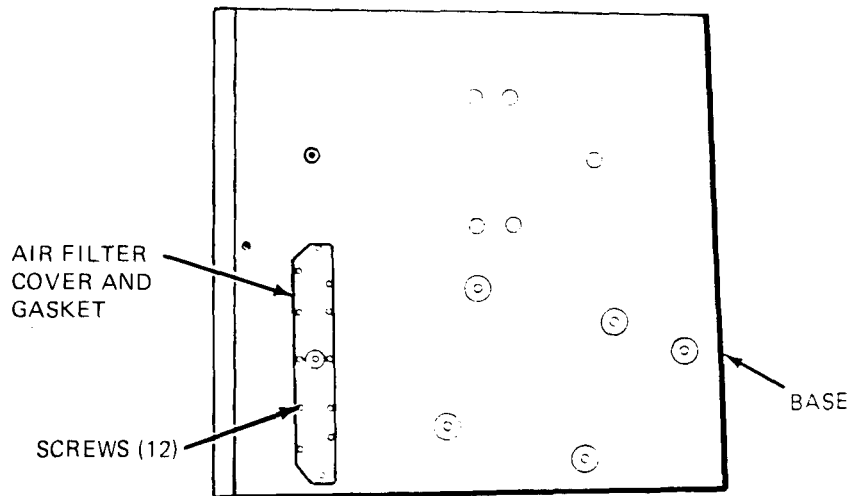
Item No.	Interval		Item to be Inspected	Procedures: Check for and Have Repaired or Adjusted as Necessary
	W	Q		

1	●		Air Filter	<p>a. Remove twelve (12) screws securing air filter cover to bottom of air conditioner. Remove air filter cover and gasket.</p> <p>b. Slide air filter down and out of air conditioner.</p>
---	---	--	------------	---

**WARNING**

Dry cleaning solvent, P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

- c. Clean air filter with P-D-680 or P-S-661 dry cleaning solvent or warm soapy water and dry with low pressure compressed air.
- d. Inspect air filter for damaged or clogged condition. Replace air filter if damage is indicated.
- e. Inspect two (2) rubber pads on bottom of air filter for damage. Replace pads if damage is indicated. Secure pads with adhesive per specification MMM-A-121.
- f. Dip or spray air filter with filter-kote or oil per specification MIL-L-2104 Grade 20, 30 or better. Drain off excessive oil before installation.
- g. Slide air filter up into air conditioner.
- h. Install gasket and air filter cover and secure with twelve (12) screws.



W—Weekly

Q—Quarterly

Item No.	Interval		Item To Be Inspected	Procedures: Check For and Have Repaired or Adjusted As Necessary
	W	Q		

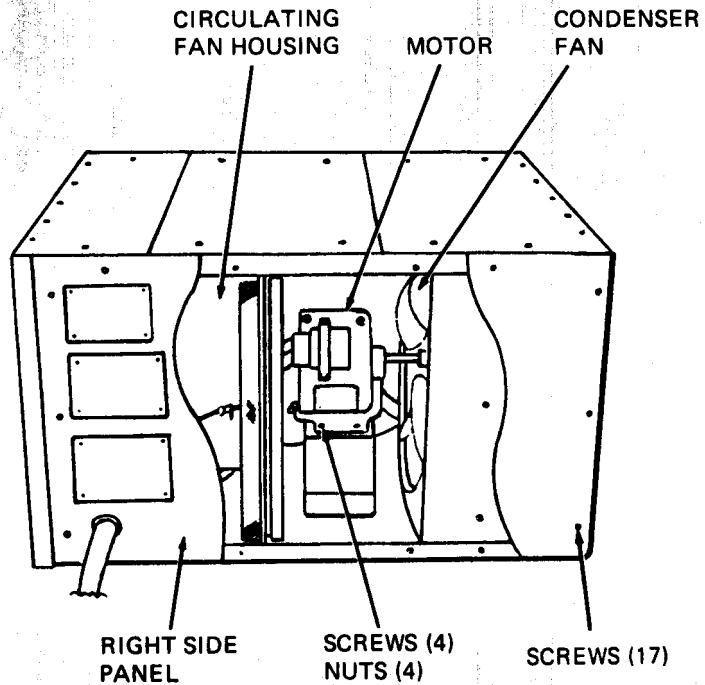
**NOTE**

For the following PMCS items, the air conditioner must be removed.

2

● Fan Motor

- a. Remove seventeen (17) screws securing right side panel to housing. Remove right side panel.
- b. Inspect fan motor for security of attachment.
- c. Align holes in right side panel with holes in housing.
- d. Secure right side panel with seventeen (17) screws.



W-Weekly

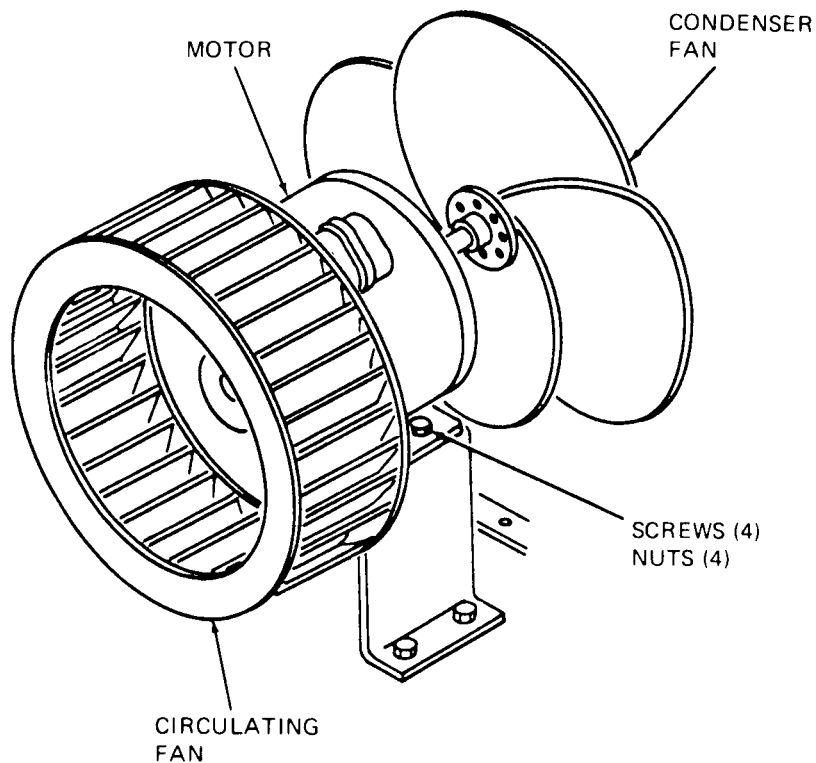
Q-Quarterly

Item No.	Interval		Item To Be Inspected	Procedures: Check for and Have Repaired or Adjusted As Necessary
	W	Q		

3

● Fans

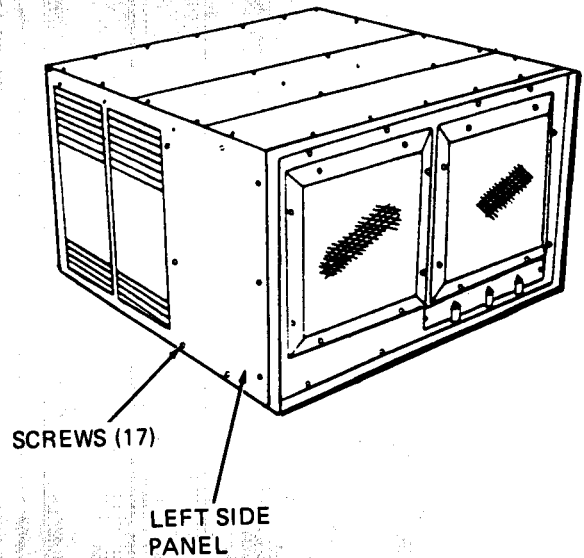
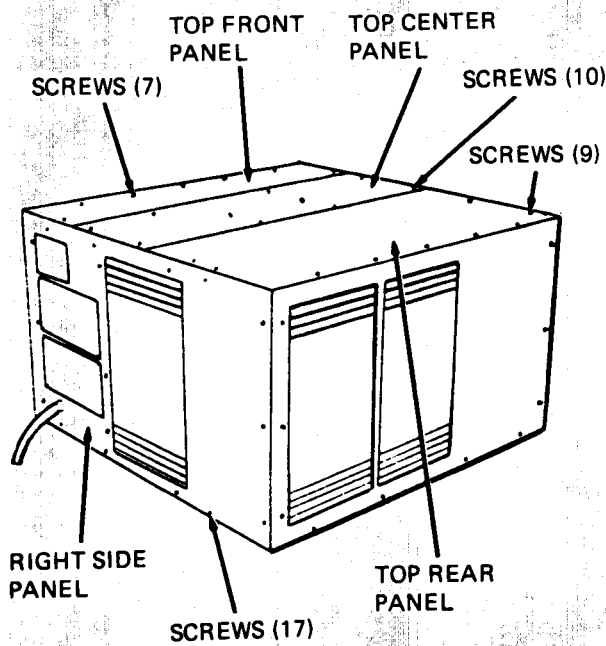
- a. Remove seventeen (17) screws securing right side panel to housing. Remove right side panel.
- b. Inspect condenser fan for cleanliness and damage.
- c. Inspect circulating fan for cleanliness and damage.
- d. Align holes in right side panel with holes in housing.
- e. Secure right side panel with seventeen (17) screws.



W-Weekly

Q-Quarterly

Item No.	Interval		Item To Be Inspected	Procedures: Check For and Have Repaired or Adjusted As Necessary
	W	Q		
4		●	Wiring	<p>a. Remove ten (10) screws securing top center panel to housing. Remove top center panel.</p> <p>b. Remove seven (7) screws securing top front panel to housing. Remove top front panel.</p> <p>c. Remove nine (9) screws securing top rear panel to air conditioner housing. Remove top rear panel.</p> <p>d. Remove seventeen (17) screws securing right side panel to housing. Remove right side panel.</p> <p>e. Remove seventeen (17) screws securing left side panel to housing. Remove left side panel.</p>

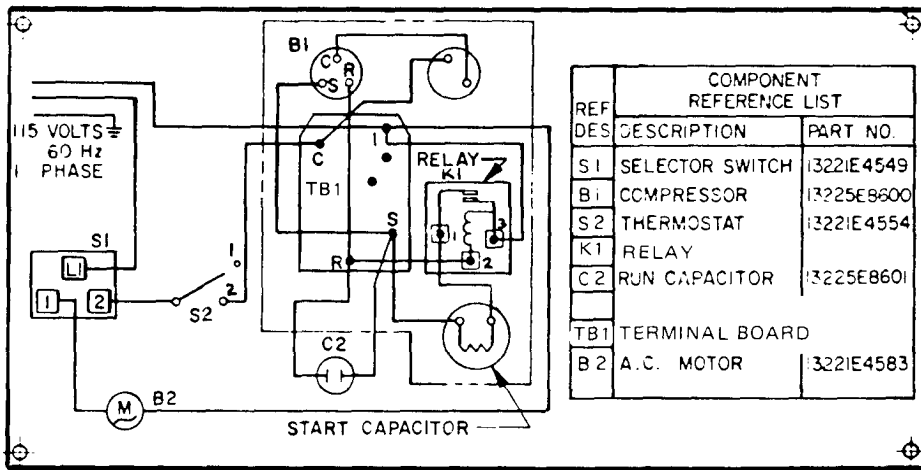


W-Weekly

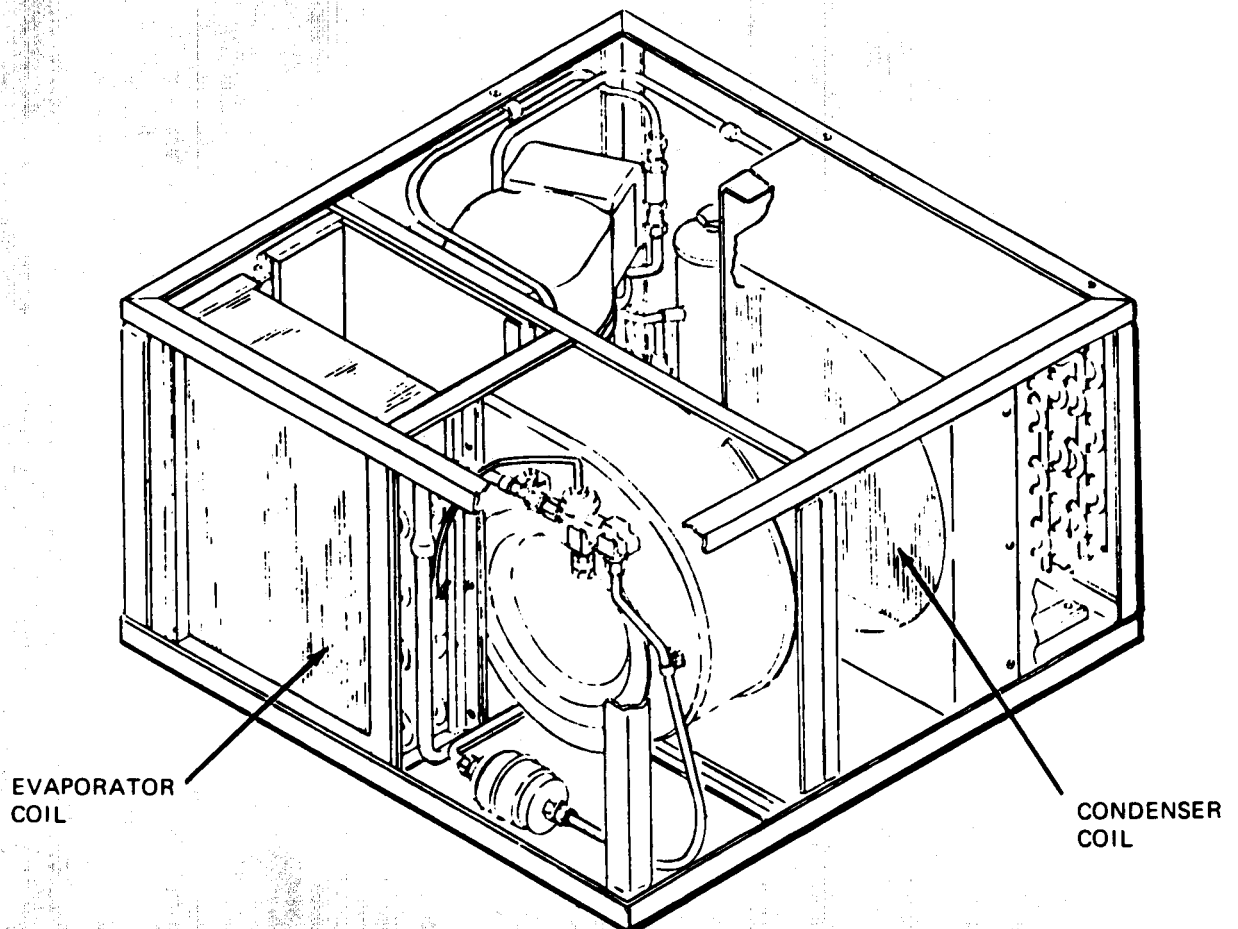
Q-Quarterly

Item Interval Procedures: Check For and Have Repaired Or Adjusted  
 No. W Q Item To Be Inspected As Necessary

- 4 ● Wiring (continued)
- f. Inspect wiring insulation for cracks and frayed material. Pay particular attention to the wires passing through holes in the frame or over rough edges.
  - g. Repair or replace damaged wiring.
  - h. Align holes in left side panel with holes in housing. Secure left side panel with seventeen (17) screws.
  - i. Align holes in right side panel with holes in housing. Secure right side panel with seventeen (17) screws.



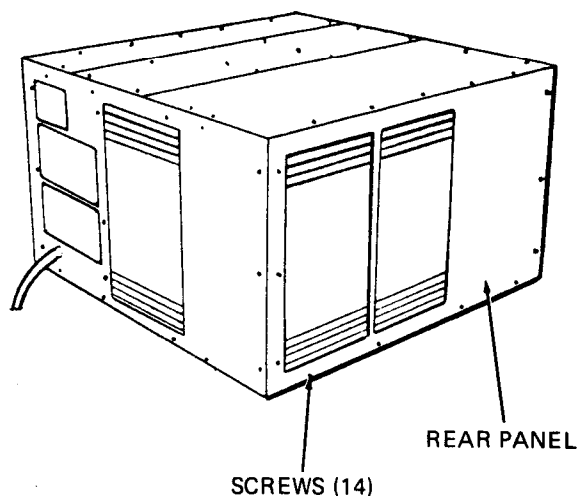
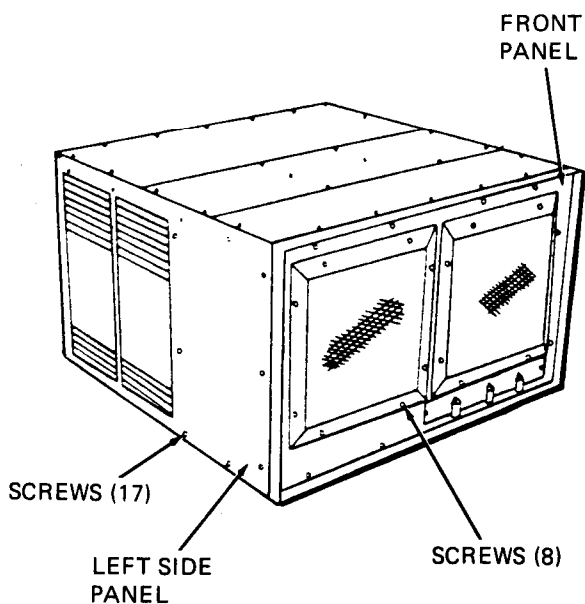
Item No.	Interval		Item To Be Inspected	Procedures: Check For and Have Repaired Or Adjusted As Necessary
	W	Q		
5		●	Evaporator Coil	<p>a. Remove eight (8) screws securing air diffuser grill to front panel. Remove air diffuser grill.</p> <p>b. Remove seventeen (17) screws securing left side panel to housing. Remove left side panel.</p> <p>c. Inspect evaporator coil for cleanliness. Use a stiff bristle brush to remove scale and corrosion from the external portion of the evaporator coil.</p> <p>d. Inspect evaporator coil for leaks. Report damaged condition to direct support maintenance personnel.</p> <p>e. Align holes in left side panel with holes in housing. Secure left side panel with seventeen (17) screws.</p> <p>f. Align holes in air diffuser grill with holes in front panel. Secure air diffuser grill with eight (8) screws.</p>



W-Weekly

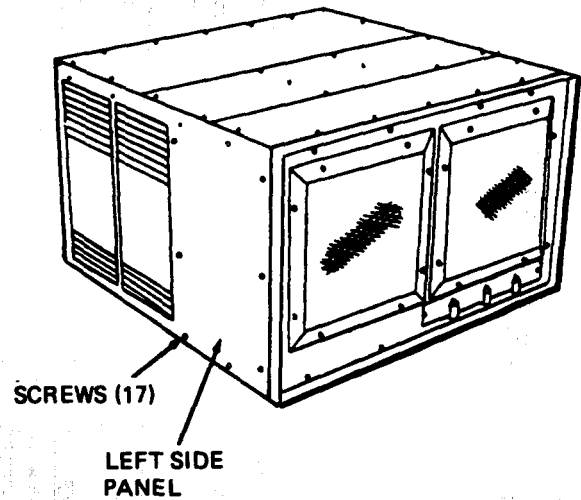
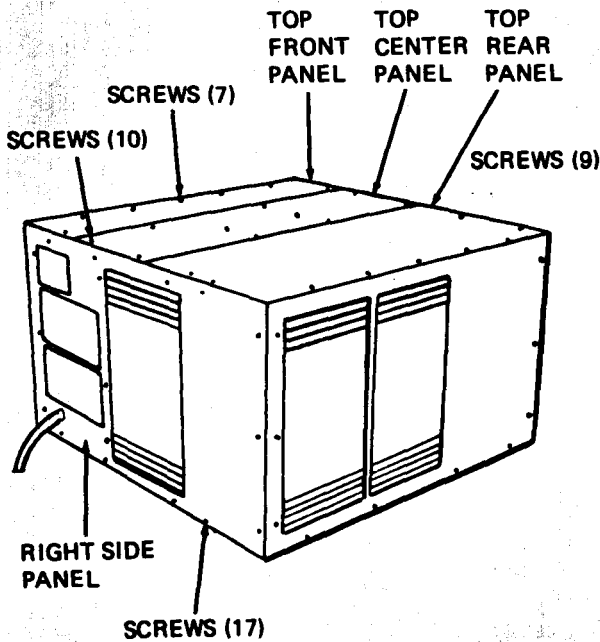
Q-Quarterly

Item No.	Interval		Item To Be Inspected	Procedures: Check For and Have Repaired Or Adjusted As Necessary
	W	Q		
6		●	Condenser Coil	<p>a. Remove fourteen (14) screws securing rear panel to housing. Remove rear panel.</p> <p>b. Inspect condenser coil for cleanliness. Use a stiff bristle brush to remove scale and corrosion from the external portion of the condenser coil.</p> <p>c. Inspect condenser coil for leaks. Report damaged condition to direct support maintenance personnel.</p> <p>d. Align holes in rear panel with holes in housing. Secure rear panel with fourteen (14) screws.</p>





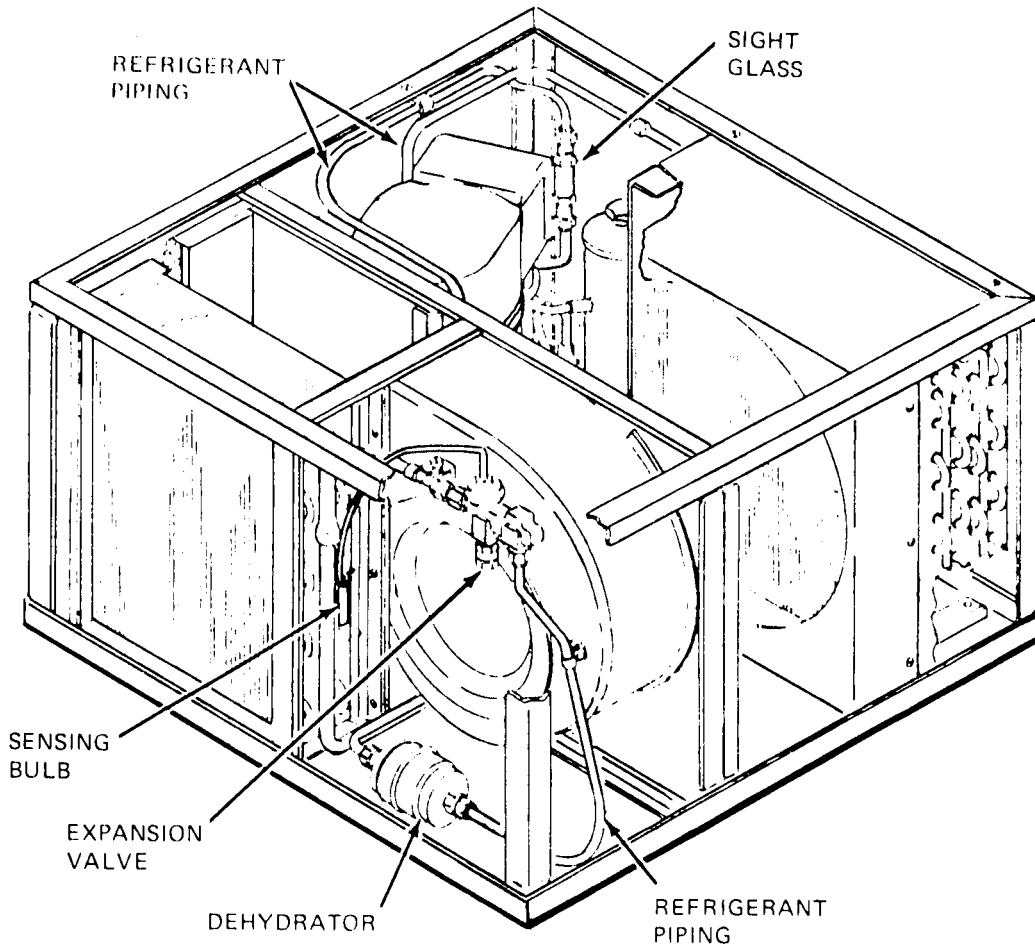
Item No.	Interval		Item To Be Inspected	Procedures: Check For and Have Repaired Or Adjusted As Necessary
	W	Q		
7		●	Expansion Valve and Refrigerant Piping	<p>a. Remove ten (10) screws securing top center panel to housing. Remove top center panel.</p> <p>b. Remove seven (7) screws securing top front panel to housing. Remove top front panel.</p> <p>c. Remove nine (9) screws securing top rear Panel to air conditioner housing. Remove top rear panel.</p> <p>d. Remove seventeen (17) screws securing right side panel to housing. Remove right side panel.</p> <p>e. Remove seventeen (17) screws securing left side panel to housing. Remove left side panel.</p>



W-Weekly

Q-Quarterly

Item No.	Interval		Item To Be Inspected	Procedures: Check For and Have Repaired Or Adjusted As Necessary
	W	Q		
7			<ul style="list-style-type: none"> <li>Expansion Valve and Refrigerant Piping (continued)</li> </ul>	<ul style="list-style-type: none"> <li>f. Inspect refrigerant piping for leaks. Report damage condition to Direct Support maintenance personnel.</li> <li>g. Inspect expansion valve for loose or leaking connections. Tighten connections.</li> <li>h. Check to see that the sensing bulb is securely fastened and is completely covered with insulation tape part number 165 (FSCM77464).</li> <li>i. Align holes in left side panel with holes in housing. Secure left side panel with seventeen (17) screws.</li> <li>j. Align holes in right side panel with holes in housing. Secure top rear panel with nine (9) screws.</li> <li>k. Align holes in top front panel with holes in housing. Secure top front panel with seven (7) screws.</li> <li>l. Align holes in top center panel with holes in top front and top rear panels. Secure top center panel with ten (10) screws.</li> </ul>



W-Weekly

Q-Quarterly

Item No.	Interval		Item To Be Inspected	Procedures: Check For and Have Repaired Or As Necessary	Adjusted
	W	Q			

8

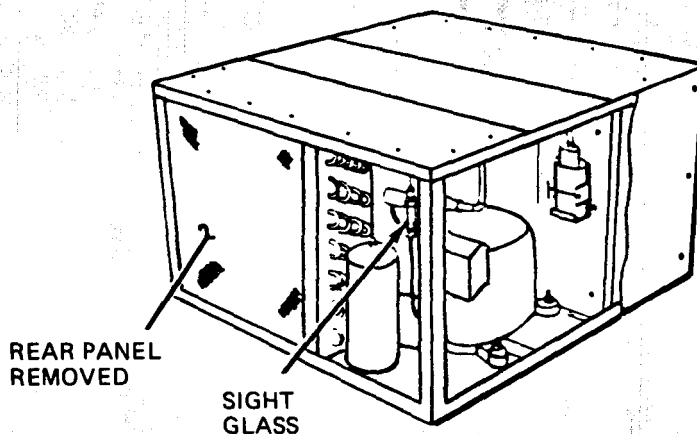


Sight Glass

**NOTE**

The sight glass may be inspected by looking through the louvers in the left side panel. If you cannot see the glass through the left side panel, then remove the rear panel.

- a. Remove fourteen (14) screws securing panel to housing and remove rear panel.
- b. With the air conditioner operating and providing cooling air, inspect sight glass.
- c. Yellow appearance indicates moisture in system and bubbles or milky flow indicate low refrigerant charge.
- d. Report presence of these conditions to Direct Support maintenance personnel.
- e. Align holes in rear panel with holes in housing. Secure rear panel with fourteen (14) screws.



## Section IV. ORGANIZATIONAL TROUBLESHOOTING

### 4-15. GENERAL

a. This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner. Each malfunction is followed by a list of probable causes and actions to take to remedy the malfunction. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur; nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

### 4-16. ORGANIZATIONAL TROUBLESHOOTING TABLE

---

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

---

#### AIR CONDITIONER

#### 1. AIR CONDITIONER FAILS TO OPERATE

Step 1. Check to see if main power cord is plugged in.

Connect power cable to receptacle supplying 115 VAC, single phase, 60 Hz power.

**WARNING**

**Disconnect input power source before performing Step 2.**

Step 2. Check to see if power receptacle connector is defective.

Replace defective power receptacle connector (para. 4-28).

**WARNING**

**Disconnect input power source before internal electrical troubleshooting.**

Step 3. Check for loose electrical connections.

Tighten electrical connections.

Step 4. Inspect for defective wiring.

Replace defective wiring. Use identical type wire, consult Appendix F, and solder all terminal connections (para. 4-28).

Step 5. Check the selector switch.

a. Observe position of the switch. Be sure switch is NOT in the OFF position.

b. Rotate the switch through all operating positions. If the air conditioner will operate in some, but not all, operating positions, check for a defective switch using a multi meter.

Replace defective switch (para. 4-22).

#### 2. INSUFFICIENT COOLING

Step 1. Inspect sight glass for proper amount of refrigerant (para. 4-33).

Report condition to direct support maintenance personnel.

Step 2. Check for dirty air filter.

Clean or replace air filter (para. 4-18).

Step 3. Inspect evaporator coil for cleanliness.

Clean evaporator coil (para. 4-31).

**4-16. ORGANIZATIONAL TROUBLESHOOTING TABLE (CONT)****MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION****2. INSUFFICIENT COOLING (CONT)**

- Step 4. Check compressor for proper operation (para. 4-29).  
Report condition to direct support maintenance personnel.
- Step 5. Inspect for closed, bent or stuck louvers in the return air grill.  
Open louvers; straighten bent louvers or replace damaged return air grill (para. 4-17).
- Step 6. Check to see that circulating fan is securely mounted on motor shaft and that there is no indication of damage to circulating fan.  
Tighten setscrews in hub of circulating fan or replace damaged circulating fan (para. 4-21).

**3. EXCESSIVE NOISE**

- Step 1. Inspect circulating fan for damage and security of attachment.  
Tighten setscrews in hub of circulating fan and any other loose mounting hardware or replace damaged circulating fan (para. 4-21).
- Step 2. Inspect condenser fan for damage and security of attachment.  
Tighten setscrews in hub of condenser fan and any other loose mounting hardware or replace damaged condenser fan (para. 4-20).
- Step 3. Inspect fan motor for wear and damage.  
Replace damaged fan motor (para. 4-19).
- Step 4. Check to see if compressor is knocking or chattering.  
Stop air conditioner and report condition to direct support maintenance personnel.

**FANS****1. CIRCULATING FAN FAILS TO OPERATE**

- Step 1. Check to see if main power cord is plugged in.  
Connect power cord to receptacle supplying 115 VAC, single phase, 60 Hz power.

**WARNING**

**Disconnect input power source before internal electrical troubleshooting.**

- Step 2. Test fan motor for resistance.  
Consult Appendix F and replace fan motor if damage is indicated (para. 4-19).
- Step 3. Check circulating fan for damage or binding.  
Relieve binding or replace damaged circulating fan (para. 4-21).
- Step 4. Test fan motor capacitor for continuity, leakage and capacitance.  
Replace capacitor if damage is indicated (para. 4-24).

**2. CONDENSER FAN FAILS TO OPERATE**

- Step 1. Check to see if main power cord is plugged in.  
Connect power cord to receptacle supplying 115 VAC, single phase, 60 Hz power.

---

MALFUNCTION  
 TEST OR INSPECTION  
 CORRECTIVE ACTION

---

**WARNING**

**Disconnect input power source before internal electrical troubleshooting.**

Step 2. Test fan motor for resistance.

Consult Appendix F and replace fan motor if damage is indicated (para. 4-19).

Step 3. Check condenser fan for damage or binding.

Relieve binding or replace damaged circulating fan (para. 4-20).

Step 4. Test fan motor capacitor for continuity, leakage and capacitance.

Replace capacitor if damage is indicated (para. 4-24).

**COMPRESSOR**

**1. COMPRESSOR WILL NOT START**

Step 1. Check the selector switch.

- a. Observe position of the switch. Be sure switch is NOT in the OFF or FAN positions.
- b. Place the switch in the COOL position. If the air conditioner will not operate in the COOL position, check for a defective switch using a multimeter.

Replace defective switch (para. 4-22).

Step 2. Check the THERMOSTAT.

- a. Observe position of the THERMOSTAT. Be sure THERMOSTAT is in the COOLER position.
- b. Rotate THERMOSTAT to the COOLER position. If the compressor will not start, check for a defective THERMOSTAT using a multimeter.

Replace defective THERMOSTAT (para. 4-23).

**WARNING**

**Disconnect input power source before internal electrical troubleshooting.**

Step 3. Check for loose electrical connections.

Tighten loose electrical connections.

Step 4. Inspect for defective wiring.

Replace defective wiring. Use identical type wire, consult Appendix F, and solder all terminal connections (para. 4-28).

Step 5. Check start relay for continuity.

Replace start relay if continuity is not indicated (para. 4-27).

Step 6. Check compressor for proper operation and damage (para. 4-29)

Report condition to direct support maintenance personnel.

**2. COMPRESSOR STARTS BUT GOES OUT ON OVERLOAD**

Step 1. Test run capacitor for continuity, leakage and capacitance.

Replace capacitor if damage is indicated (para. 4-26).

Step 2. Test fan motor for resistance.

Consult Appendix F and replace fan motor if damage is indicated (para. 4-19).

Step 3. Check expansion valve for proper operation and damage (para. 4-34).

Report condition to direct support maintenance personnel.

Step 4. Check compressor for proper operation and damage (para. 4-29).

Report condition to direct support maintenance personnel.

**4-16. ORGANIZATIONAL TROUBLESHOOTING TABLE (CONT)**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

**AIR OUTPUT****1. EVAPORATOR AIR OUTPUT VOLUME LOW**

Step 1. Inspect return air and air diffuser grills for damage and cleanliness.

Clean, repair, or replace return air and air diffuser grills (para. 4-17).

Step 2. Inspect evaporator coil for damage, ice and cleanliness.

Clean evaporator coil (para. 4-31). Report damaged condition to direct support maintenance personnel.

Step 3. Inspect circulating fan for security of attachment and damage.

Tighten setscrews in hub of circulating fan; replace fan if damage is indicated (para. 4-21).

**WARNING**

Disconnect input power source before internal electrical troubleshooting.

Step 4. Test fan motor for resistance.

Consult Appendix F and replace fan motor if damage is indicated (para. 4-19).

**2. CONDENSER AIR OUTPUT VOLUME LOW**

Step 1. Inspect condenser coil for cleanliness or damage.

Clean condenser coil (para. 4-32). Report damaged condition to direct support maintenance personnel.

Step 2. Test thermostat for resistance.

Replace defective thermostat (para. 4-23).

Step 3. Inspect condenser fan for security of attachment and damage.

Tighten setscrews in hub of condenser fan; replace fan if damage is indicated (para. 4-20).

**WARNING**

Disconnect input power source before performing this maintenance task.

Step 4. Test fan motor for resistance.

Consult Appendix F and replace fan motor if damage is indicated (para. 4-19).

## Section V. ORGANIZATIONAL MAINTENANCE PROCEDURES

### INDEX

	Para	Page
Air Filter	4-18	4-25
Circulating Fan	4-21	4-37
Compressor	4-29	4-62
Condenser Coil	4-32	4-72
Condenser Fan	4-20	4-33
Evaporator Coil	4-31	4-69
Expansion Valve	4-34	4-76
Fan Motor	4-19	4-27
Housing Panels and Grills	4-17	4-20
Motor Capacitor	4-24	4-48
Refrigerant Piping	4-30	4-64
Run Capacitor	4-26	4-53
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Sight Glass	4-33	4-74
Start Capacitor	4-25	4-50
Start Relay	4-27	4-55
Thermostat Switch	4-23	4-44
Wiring	4-28	4-58

### **WARNING**

Disconnect the power source before performing any maintenance function.

### **WARNING**

Do not use compressed air for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

#### 4-17. HOUSING PANELS AND GRILLS

This task covers: a. Removal  
b. Repair  
c. Installation

#### INITIAL SETUP

##### Materials/Parts

Top Center Panel Screws (10)  
Top Front Panel Screws (7)  
Top Rear Panel Screws (9)  
Right Side Panel Screws (17)  
Rear Panel Screws (14)  
Return Air Grill Screws (8)  
Air Diffuser Grill Screws (8)  
Control Panel Plate Screws (2)  
Front Panel Screws (14)  
Adhesive, Appendix E, Item 4

##### References

None

##### Troubleshooting Reference

None

##### Approximate Time Required (in minutes)

Removal	30
Repair	30
Installation	30
<b>TOTAL TIME</b>	<b>90</b>



LOCATION/ITEM	ACTION	REMARKS
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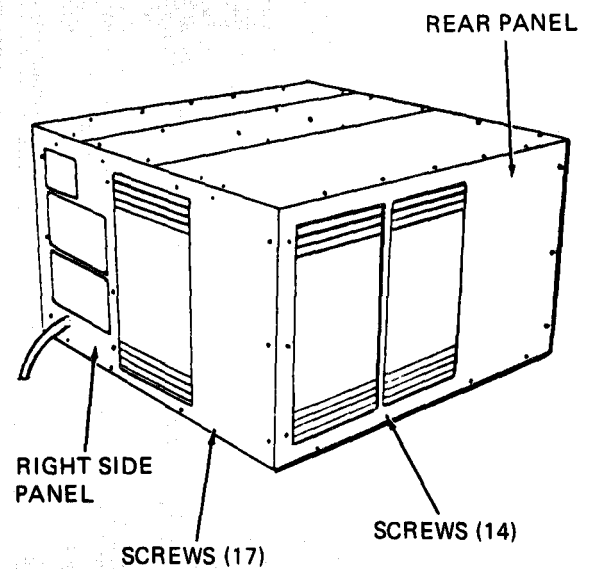
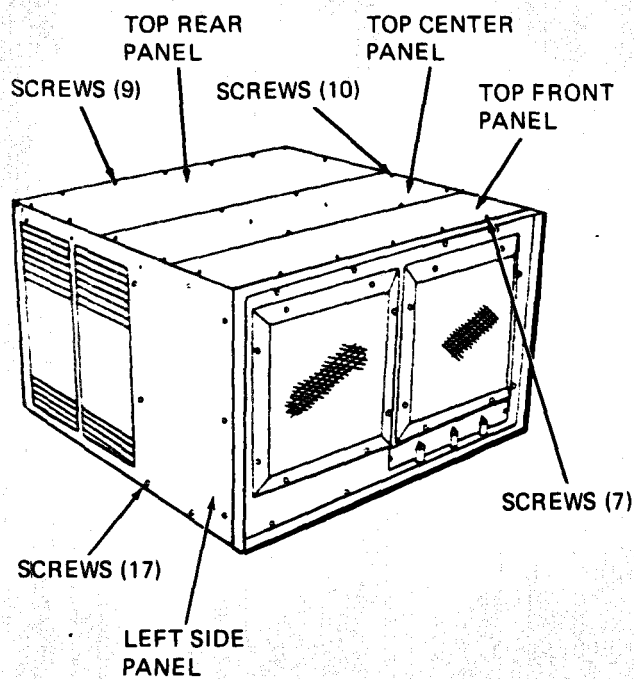
**REMOVAL**

**TOP AND LEFT SIDE OF HOUSING**

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
2. Top Front Panel
  - a. Remove seven (7) screws securing top front panel.
  - b. Remove top front panel.
3. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel.
  - b. Remove top rear panel.
4. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel.
  - b. Remove left side panel.

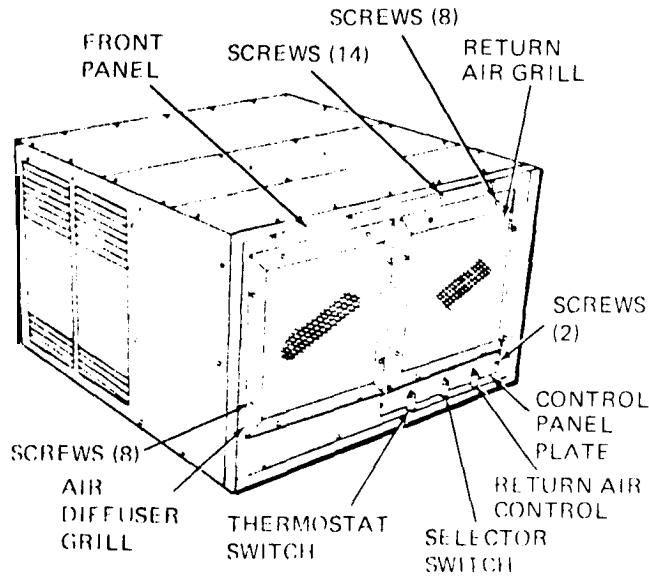
**RIGHT SIDE AND REAR OF HOUSING**

5. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.
6. Rear Panel
  - a. Remove fourteen (14) screws securing rear panel.
  - b. Remove rear panel.



4-17. HOUSING PANELS AND GRILLS (CONT)

LOCATION/ITEM	ACTION	REMARKS
<b>REMOVAL</b>		
<b>FRONT OF HOUSING</b>		
7. Return Air Grill	a. Remove eight (8) screws securing return air grill. b. Remove return air grill.	
8. Air Diffuser Grill	a. Remove eight (8) screws securing air diffuser grill. b. Remove air diffuser grill.	
9. Control Panel Plate	a. Loosen setscrews and remove knobs from return air control, selector switch and thermostat switch. b. Remove two (2) screws securing control panel plate. c. Remove control panel plate.	
10. Front Panel	a. Remove two (2) screws securing thermostat switch to front panel. b. Remove fourteen (14) screws securing front panel. c. Remove front panel.	



LOCATION/ITEM	ACTION	REMARKS
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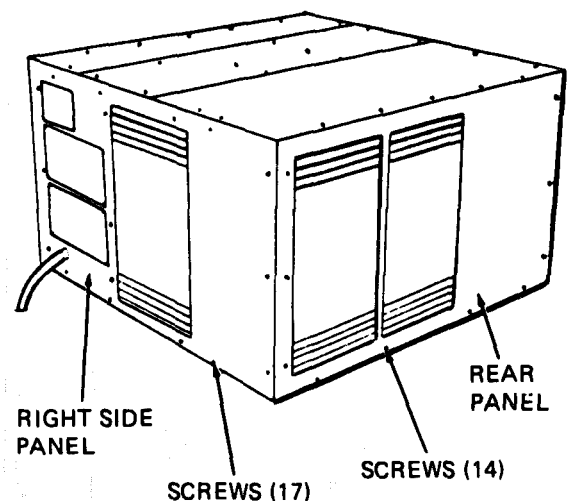
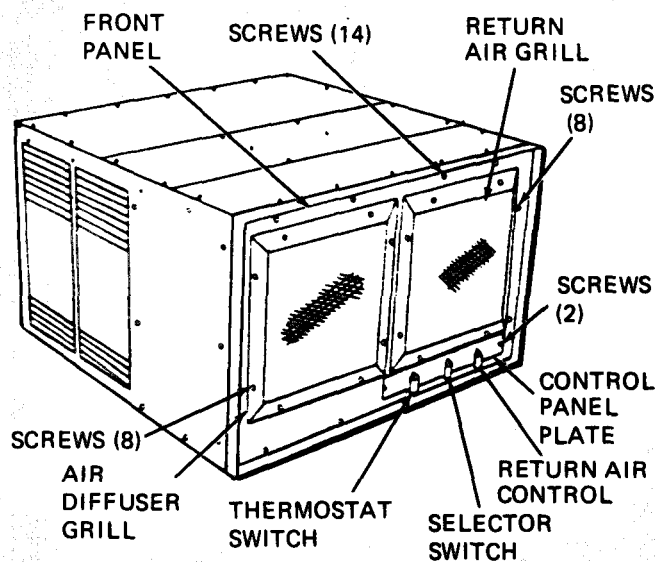
**REPAIR**

- |   |   |
|---|---|
| 11. Front Panel                           | a. Inspect floating self-locking nuts for damage.<br>b. Drill out blind rivets, then rivet new nut to front panel.  |
| 12. Right Side, Left Side and Rear Panels | Repair consists of straightening bent louvers.  |
| 13. Top Front and Rear Panels             | a. Inspect self-locking plate nuts for damage.<br>b. Drill out blind rivets, then rivet new nut to top front panel.<br>c. Inspect panels for distortion or loose gasket.<br>d. Secure loose gasket with adhesive per specification MMM-A-121.<br>e. Replace gasket with .062 inch thick wool felt per specification MIL-G-20241. Secure gasket with adhesive per specification MMM-A-121. |
| 14. Top Center Panel                      | a. Inspect panel for distortion.<br>b. Straighten or replace damaged panel.   |
| 15. Grills                                | Repair consists of straightening bent louvers.  |

**INSTALLATION**

**FRONT OF HOUSING**

- |                         |   |
|-------------------------|---|
| 16. Front Panel         | a. Align holes in thermostat switch with holes in front panel.<br>b. Secure thermostat switch to front panel with two (2) screws.<br>c. Align holes in front panel with holes in housing.<br>d. Secure front panel with fourteen (14) screws. |
| 17. Control Panel Plate | a. Align holes in control panel plate with holes in front panel.<br>b. Secure control panel plate with two (2) screws.<br>c. Install three (3) knobs.   |



**4-17. HOUSING PANELS AND GRILLS (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSTALLATION**

**FRONT OF HOUSING**

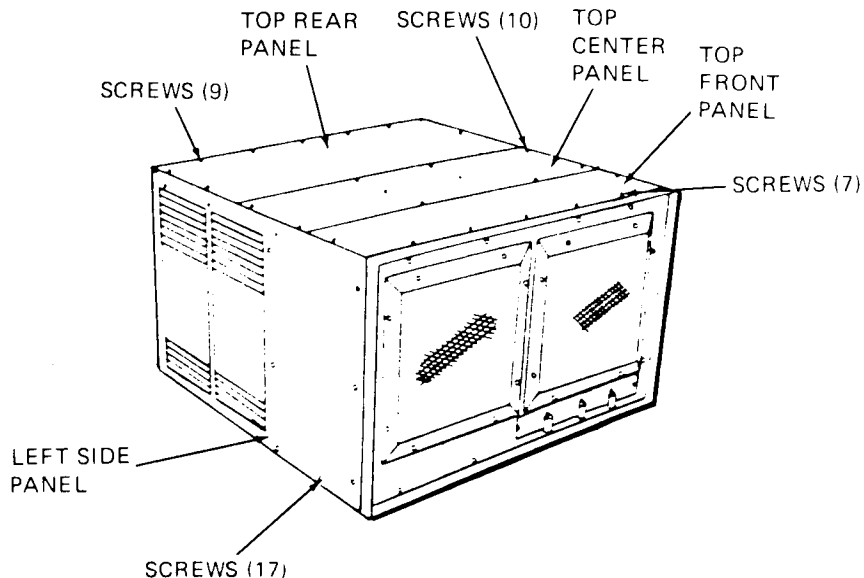
- 18. Air Diffuser Grill
  - a. Align holes in air diffuser grill with holes in front panel.
  - b. Secure air diffuser grill with eight (8) screws.
- 19. Return Air Grill
  - a. Align holes in return air grill with holes in front panel.
  - b. Secure return air grill with eight (8) screws.

**RIGHT SIDE AND REAR OF HOUSING**

- 20. Rear Panel
  - a. Align holes in rear panel with holes in housing.
  - b. Secure rear panel with fourteen (14) screws.
- 21. Right Side Panel
  - a. Align holes in right side panel with holes in housing.
  - b. Secure right side panel with seventeen (17) screws.

**TOP AND LEFT SIDE OF HOUSING**

- 22. Left Side Panel
  - a. Align holes in left side panel with holes in housing.
  - b. Secure left side panel with seventeen (17) screws.
- 23. Top Rear Panel
  - a. Align holes in top rear panel with holes in housing.
  - b. Secure top rear panel with nine (9) screws.
- 24. Top Front Panel
  - a. Align holes in top front panel with holes in housing.
  - b. Secure top front panel with seven (7) screws.
- 25. Top Center Panel
  - a. Align holes in top center panel with holes in top front and top rear panels.
  - b. Secure top center panel with ten (10) screws.



**4-18. AIR FILTER**

This task covers:

- a. Removal
- b. Inspection
- c. Service
- d. Installation

**INITIAL SETUP**

**Material/Parts**

- Air Filter Cover Screws (12)
- Dry Cleaning Solvent, APP. E, Items 2 & 3
- Filterkote or Oil, App. E, Item 1

**References**

None

**Troubleshooting Reference**

AIR CONDITIONER, Malfunction 2, Step 2

**Approximate Time Required (in minutes)**

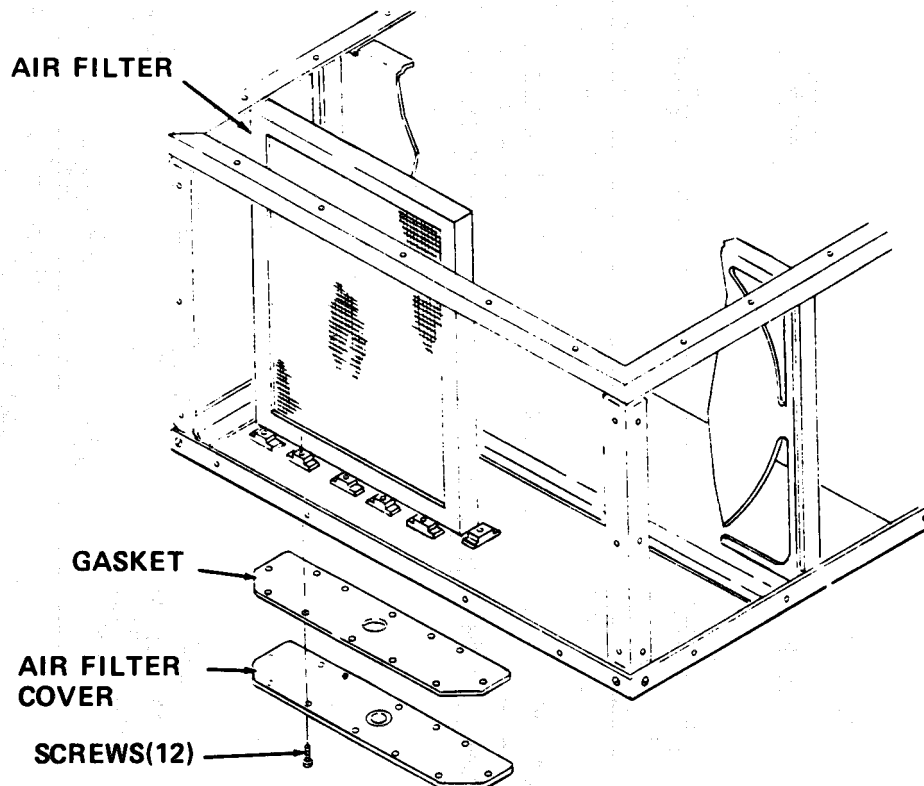
Removal	10
Inspection and Service	10
Installation	10
<b>TOTAL TIME</b>	<b>30</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**BOTTOM OF HOUSING**

1. Air Filter
  - a. Remove twelve (12) screws securing air filter cover to bottom of air conditioner.
  - b. Remove air filter cover and gasket.
  - c. Slide air filter down and out of air conditioner.



**4-18. AIR FILTER (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSPECTION AND SERVICE**

**BOTTOM OF HOUSING**

- 2. Air Filter Cover Gasket
  - a. Inspect gasket for damage or deterioration.
  - b. Replace gasket with rubber per specification ASTM D2000-2BG505F17L14.

**WARNING**

Dry cleaning solvent P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

**WARNING**

Do not use compressed air for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

- 3. Air Filter
  - a. Clean air with P-D-680 or P-S-661 dry cleaning solvent or warm soapy water.
  - b. Dry air filter with low pressure compressed air.
  - c. Inspect air filter for damaged or clogged condition.
  - d. Replace air filter if damage is indicated.
  - e. Inspect two (2) rubber pads on bottom of air filter for damaged condition.
  - f. Replace pads with a 2-inch long piece of rubber in accordance with ASTM D2000-2BG505F17L14.
  - g. Secure pads with adhesive per specification MMM-A-121.
  - h. Dip or spray air filter with filterkote or oil per specification MIL-L-2104 Grade 20, 30 or better.
  - i. Drain off excess oil before installation.

**INSTALLATION**

- 4. Air Filter
  - a. Slide air filter up into air conditioner.
  - b. Install gasket and air filter cover.
  - c. Secure air filter cover with twelve (12) screws.

**4-19. FAN MOTOR**

This task covers:

- a. Removal
- b. Inspection
- c. Test
- d. Installation

**INITIAL SETUP**

**Material/Parts**

- Right Side Panel Screws (17)
- Top Center Panel Screws (10)
- Return Air Grill Screws (8)
- Air Diffuser Grill Screws (8)
- Control Panel Plate Screws (2)
- Front Panel Screws (14)
- Blower Intake Ring Screws (7)
- Fan Motor Capscrews (4)
- Fan Motor Self-Locking Nuts (4)
- Thermostat Switch Screws (2)

**References**

None

**Troubleshooting Reference**

- FANS, Malfunction 1, Step 2
- COMPRESSOR, Malfunction 2, Step 1
- AIR OUTPUT, Malfunction 1, Step 4
- AIR OUTPUT, Malfunction 2, Step 4
- NOISE, Malfunction 1, Step 3

**Approximate Time Required (in minutes)**

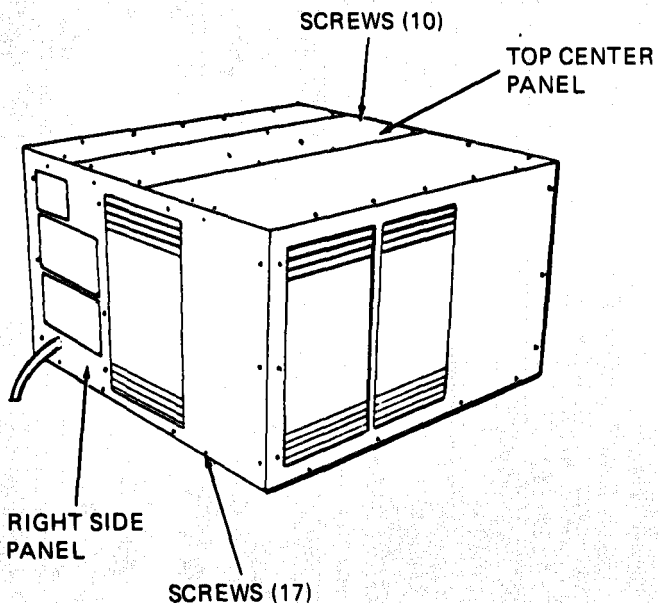
Removal	30
Inspection and Testing	15
Repair	15
Installation	30
<b>TOTAL TIME</b>	<b>90</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**RIGHT SIDE AND TOP OF HOUSING**

1. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.
  
2. Top Center Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.



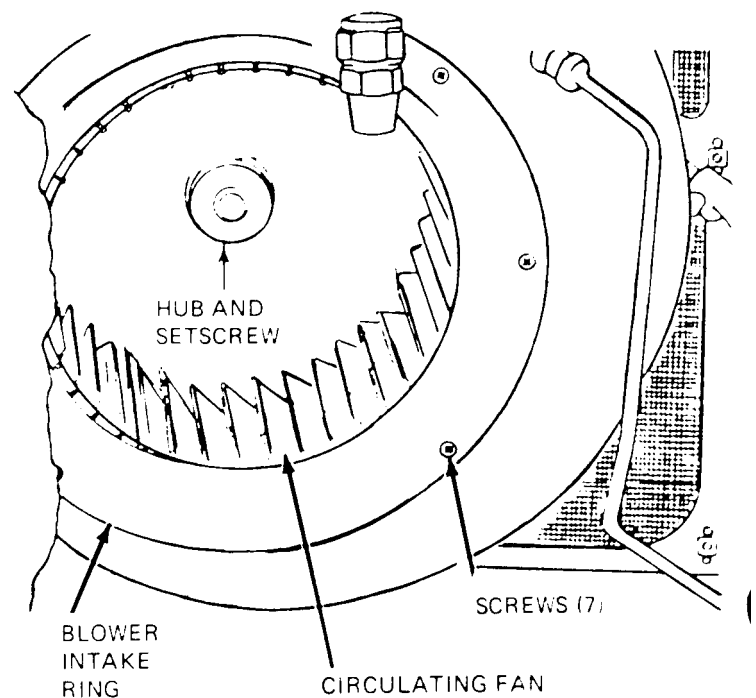
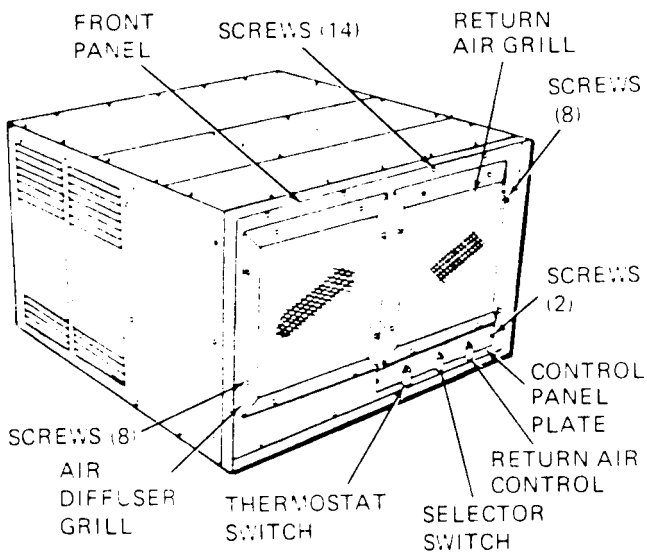
**4-19. FAN MOTOR (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**FRONT OF HOUSING**

- |                        |  |
|------------------------|--|
| 3. Return Air Grill    | a. Remove eight (8) screws securing return air grill.<br>b. Remove return air grill.   |
| 4. Air Diffuser Grill  | a. Remove eight (8) screws securing air diffuser grill.<br>b. Remove air diffuser grill.   |
| 5. Control Panel Plate | a. Loosen setscrews and remove knobs from return air control, selector switch and thermostat switch.<br>b. Remove two (2) screws securing control panel plate.<br>c. Remove control panel plate. |
| 6. Front Panel         | a. Remove two (2) screws securing thermostat switch to front panel.<br>b. Remove fourteen (14) screws securing front panel.<br>c. Remove front panel.  |
| 7. Blower Intake Ring  | a. Remove seven (7) screws securing blower intake ring.<br>b. Remove blower intake ring.   |
| 8. Circulating Fan     | a. Loosen setscrew in hub of circulating fan.<br>b. Carefully remove circulating fan.  |





LOCATION/TITLE	ACTION	REMARKS
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RIGHT SIDE OF HOUSING

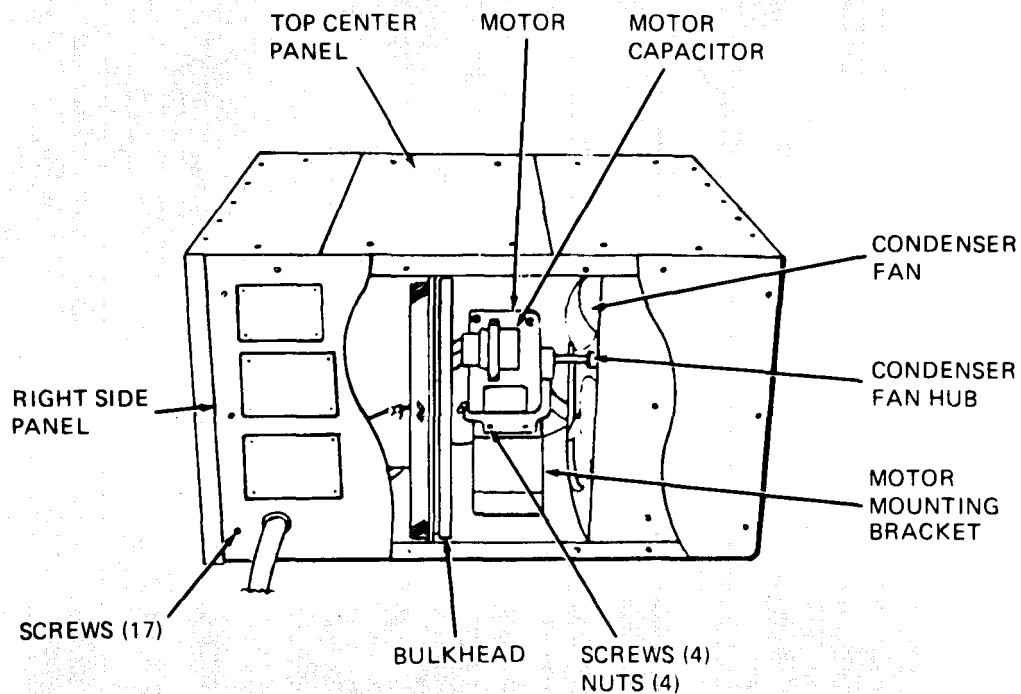
**WARNING**

Death or serious injury may occur if capacitor is not discharged prior to removal.

**WARNING**

Disconnect input power source before performing this maintenance task.

9. Fan Motor
- a. Discharge motor capacitor.
  - b. Remove upper four (4) capscrews and self-locking nuts securing motor to motor mounting bracket.
  - c. Slide motor back against bulkhead.
  - d. Loosen setscrew in hub of condenser fan.
  - e. Remove condenser fan.
  - f. Tag and disconnect electrical leads to motor capacitor.
  - g. Tag and disconnect leads to fan motor.
  - h. Remove fan motor from housing.



**4-19. FAN MOTOR (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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**INSPECTION AND TESTING**

**RIGHT SIDE OF HOUSING**

**WARNING**

**Disconnect input power source before performing this maintenance task.**

- |               |  |
|---------------|--|
| 10. Fan Motor | <ul style="list-style-type: none"> <li>a. Using a multimeter set on low ohms scale, check for continuity.</li> <li>b. Verify multimeter indicates low resistance across each pair of leads.</li> <li>c. Connect one multimeter lead to motor frame and second lead to each of the motor leads.</li> <li>d. Replace motor if there is NO resistance.</li> </ul> |
|---------------|--|

**REPAIR**

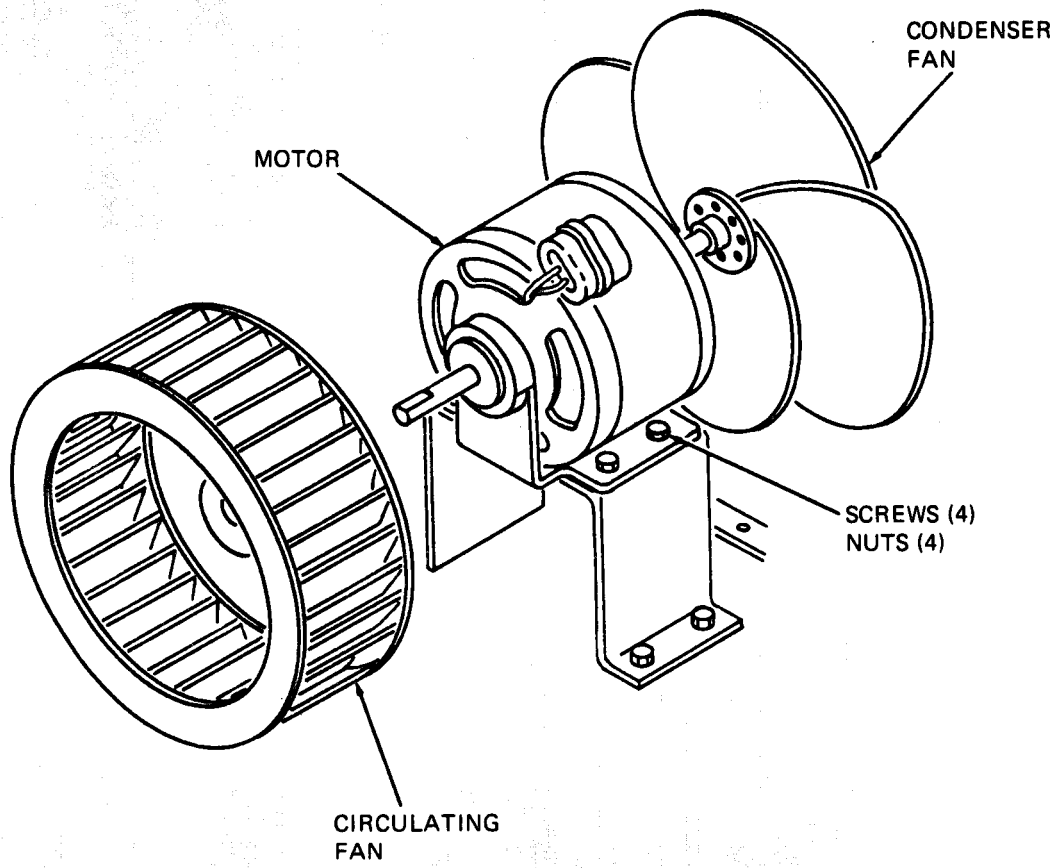
- |               |   |
|---------------|---|
| 11. Fan Motor | <p>Repair electrical wiring as follows:</p> <ul style="list-style-type: none"> <li>(1) Remove insulation to expose 1/2 inch of bare wire on each side of break.</li> <li>(2) Twist the wire ends together and solder the splice.</li> <li>(3) Cover the splice with PVC electrical tape, making certain to cover all repaired areas.</li> </ul> |
|---------------|---|

**INSTALLATION**

- |                   |  |
|-------------------|--|
| 12. Fan Motor     | <ul style="list-style-type: none"> <li>a. Connect electrical leads to motor capacitor and remove tags.</li> <li>b. Connect electrical leads to fan motor and remove tags.</li> <li>c. Place fan motor on motor mounting bracket.</li> <li>d. Slide fan motor back against bulkhead.</li> </ul> |
| 13. Condenser Fan | <ul style="list-style-type: none"> <li>a. Install condenser fan on fan motor shaft.</li> <li>b. Tighten setscrew in condenser fan hub.</li> </ul>  |

**FRONT OF HOUSING**

- |                        |   |
|------------------------|---|
| 14. Circulating Fan    | <ul style="list-style-type: none"> <li>a. Carefully install circulating fan on fan motor shaft.</li> <li>b. Tighten setscrew in circulating fan hub.</li> </ul>   |
| 15. Blower Intake Ring | <ul style="list-style-type: none"> <li>a. Align holes in blower intake ring with holes in circulating fan housing.</li> <li>b. Secure blower intake ring with seven (7) screws.</li> </ul>  |
| 16. Front Panel        | <ul style="list-style-type: none"> <li>a. Align holes in thermostat switch with holes in front panel.</li> <li>b. Secure thermostat switch to front panel with two (2) screws.</li> <li>c. Align holes in front panel with holes in housing.</li> <li>d. Secure front panel with fourteen (14) screws.</li> </ul> |



**4-19. FAN MOTOR (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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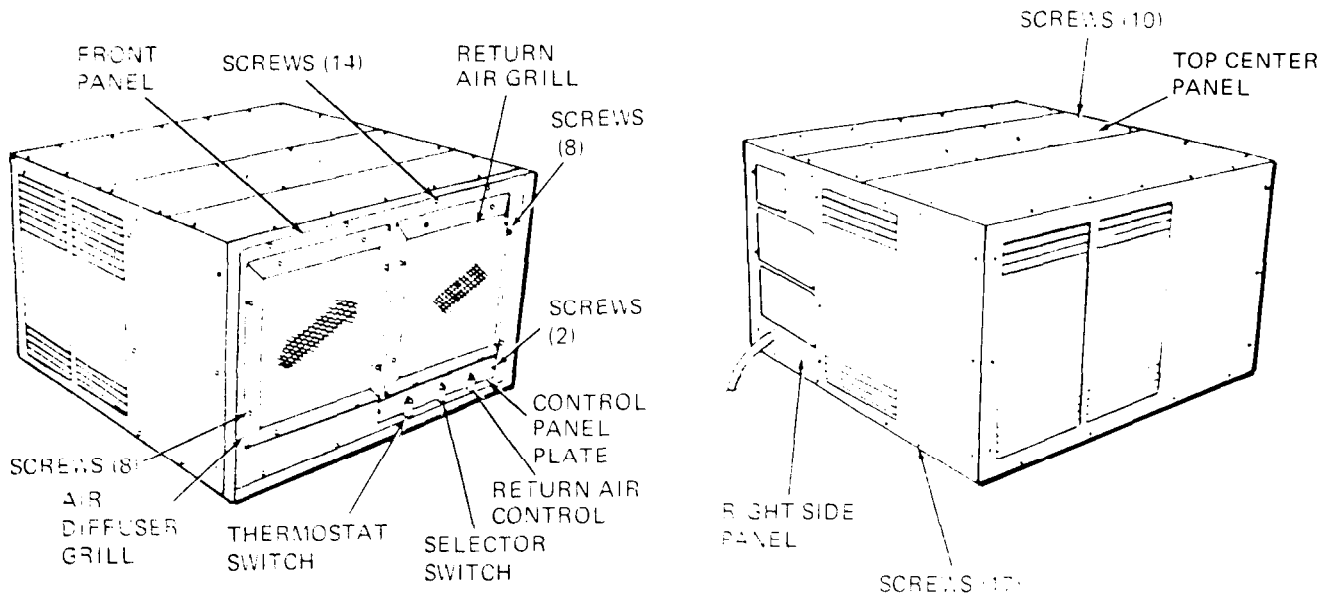
**INSTALLATION**

**FRONT OF HOUSING**

- 17. Control Panel Plate
  - a. Align holes in control panel plate with holes in front panel.
  - b. Secure control panel plate with two (2) screws.
  - c. Install three (3) knobs on return air control, selector switch and thermostat switch.
- 18. Air Diffuser Grill
  - a. Align holes in air diffuser grill with holes in front panel.
  - b. Secure air diffuser grill with eight (8) screws.
- 19. Return Air Grill
  - a. Align holes in return air grill with holes in front panel.
  - b. Secure return air grill with eight (8) screws.

**RIGHT SIDE AND TOP OF HOUSING**

- 20. Top Center Panel
  - a. Align holes in top center panel with holes in top rear and top front panels.
  - b. Secure top center panel with ten (10) screws.
- 21. Right Side Panel
  - a. Align holes in right side panel with holes in housing.
  - b. Secure right side panel with seventeen (17) screws.



### 4-20. CONDENSER FAN

This task covers:

- a. Removal
- b. Inspection
- c. Repair
- d. Installation

#### INITIAL SETUP

##### Material/Parts

- Right Side Panel Screws (17)
- Top Center Panel Screws (10)
- Return Air Grill Screws (8)
- Air Diffuser Grill Screws (8)
- Control Panel Plate Screws (2)
- Front Panel Screws (14)
- Blower Intake Ring Screws (7)
- Fan Motor CapsCrews (4)
- Fan Motor Self-Locking Nuts (4)
- Thermostat Switch Screws (2)

##### Troubleshooting Reference

- FANS, Malfunction 1, Step 3
- AIR OUTPUT, Malfunction 2, Step 3
- NOISE, Malfunction 1, Step 2

##### References

None

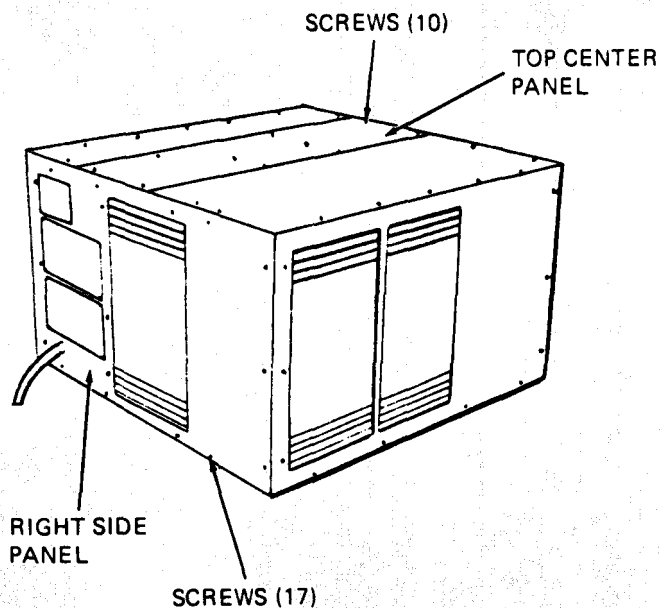
##### Approximate Time Required (in minutes)

Removal	30
Inspection and Repair	20
Installation	30
<b>TOTAL TIME</b>	<b>80</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

#### RIGHT SIDE AND TOP OF HOUSING

1. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.
  
- 2, Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.



**4-20. CONDENSER FAN (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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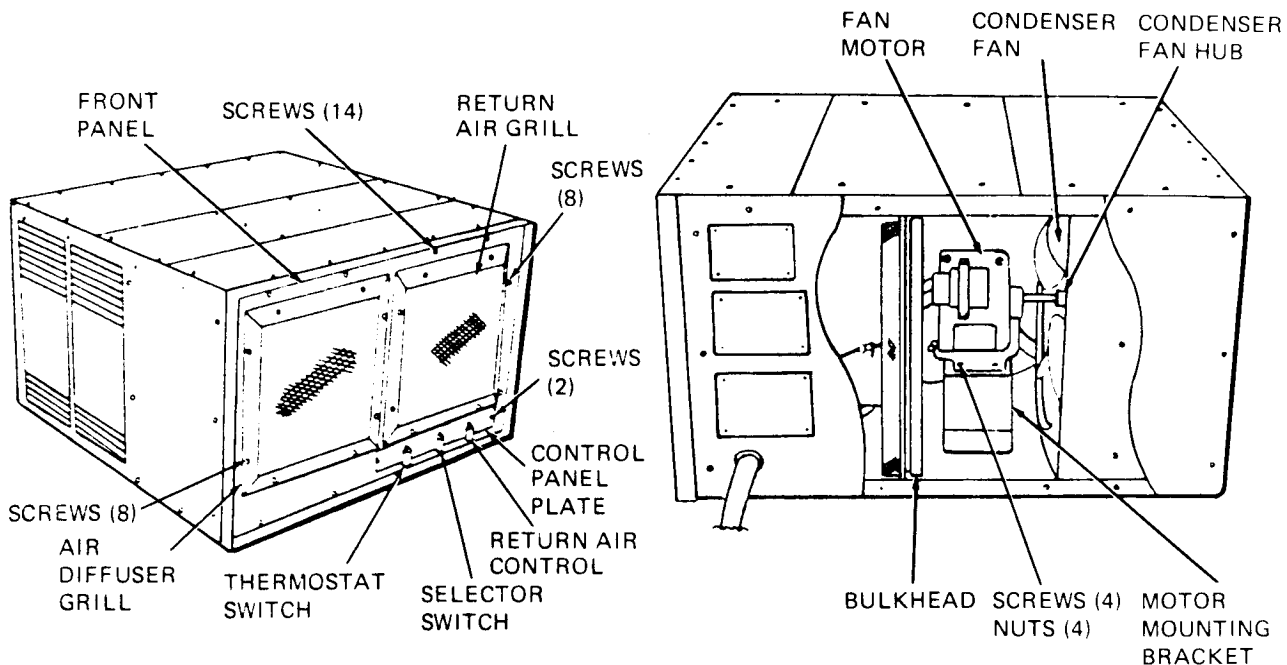
**REMOVAL**

**FRONT OF HOUSING**

- |                        |  |
|------------------------|--|
| 3. Return Air Grill    | a. Remove eight (8) screws securing return air grill.<br>b. Remove return air grill.   |
| 4. Air Diffuser Grill  | a. Remove eight (8) screws securing air diffuser grill.<br>b. Remove air diffuser grill.   |
| 5. Control Panel Plate | a. Loosen setscrews and remove knobs from return air control, selector switch and thermostat switch.<br>b. Remove two (2) screws securing control panel plate.<br>c. Remove control panel plate. |
| 6. Front Panel         | a. Remove two (2) screws securing thermostat switch to front panel.<br>b. Remove fourteen (14) screws securing front panel.<br>c. Remove front panel.  |
| 7. Blower Intake Ring  | a. Remove seven (7) screws securing blower intake ring.<br>b. Remove blower intake ring.   |
| 8. Circulating Fan     | a. Loosen setscrew in hub of circulating fan.<br>b. Carefully remove circulating fan.  |

**RIGHT SIDE OF HOUSING**

- |                  |  |
|------------------|--|
| 9. Condenser Fan | a. Remove upper four (4) capscrews and self-locking nuts securing fan motor to motor mounting bracket.<br>b. Slide fan motor back against bulkhead.<br>c. Loosen setscrew in hub of condenser fan.<br>d. Remove condenser fan. |
|------------------|--|



LOCATION/ITEM	ACTION	REMARKS
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**INSPECTION AND REPAIR**

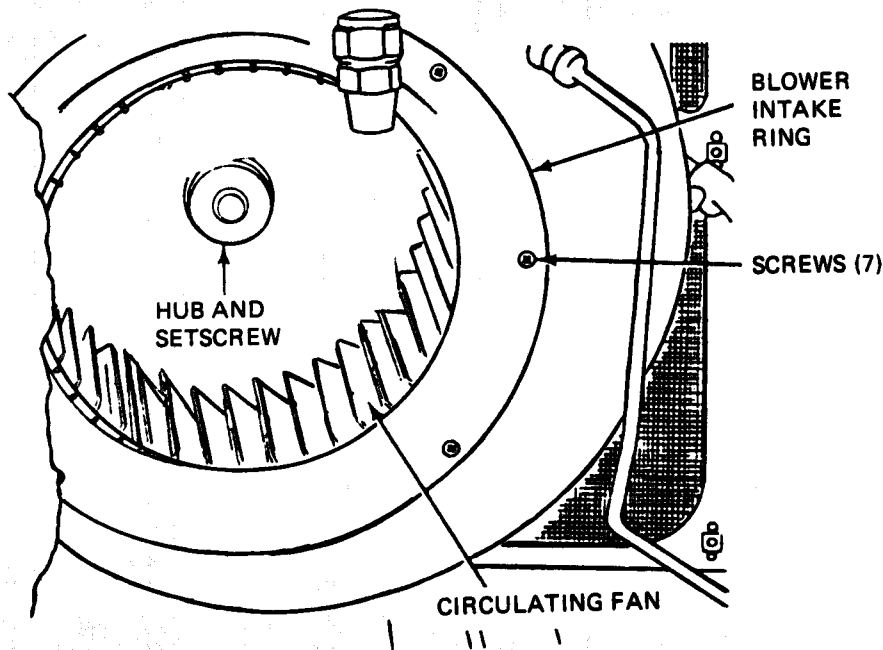
- |                   |   |
|-------------------|---|
| 10. Condenser Fan | <ul style="list-style-type: none"> <li>a. Inspect condenser fan, hub and setscrew for indication of excessive wear or damage.</li> <li>b. Replace condenser fan if damage to hub or condenser fan is indicated.</li> <li>c. Replace setscrew with a 1/4-28UNF-3A X .312 inch long setscrew if damage is indicated.</li> </ul> |
|-------------------|---|

**INSTALLATION**

- |                   |  |
|-------------------|--|
| 11. Condenser Fan | <ul style="list-style-type: none"> <li>a. Install condenser fan on fan motor shaft.</li> <li>b. Tighten setscrew in condenser fan hub.</li> <li>c. Slide fan motor back into place on motor mounting bracket.</li> <li>d. Secure fan motor to motor mounting bracket with four (4) capscrews and self-locking nuts.</li> </ul> |
|-------------------|--|

**FRONT OF HOUSING**

- |                        |  |
|------------------------|--|
| 12. Circulating Fan    | <ul style="list-style-type: none"> <li>a. Carefully install circulating fan on fan motor shaft.</li> <li>b. Tighten setscrew in circulating fan hub.</li> </ul>                            |
| 13. Blower Intake Ring | <ul style="list-style-type: none"> <li>a. Align holes in blower intake ring with holes in circulating fan housing.</li> <li>b. Secure blower intake ring with seven (7) screws.</li> </ul> |



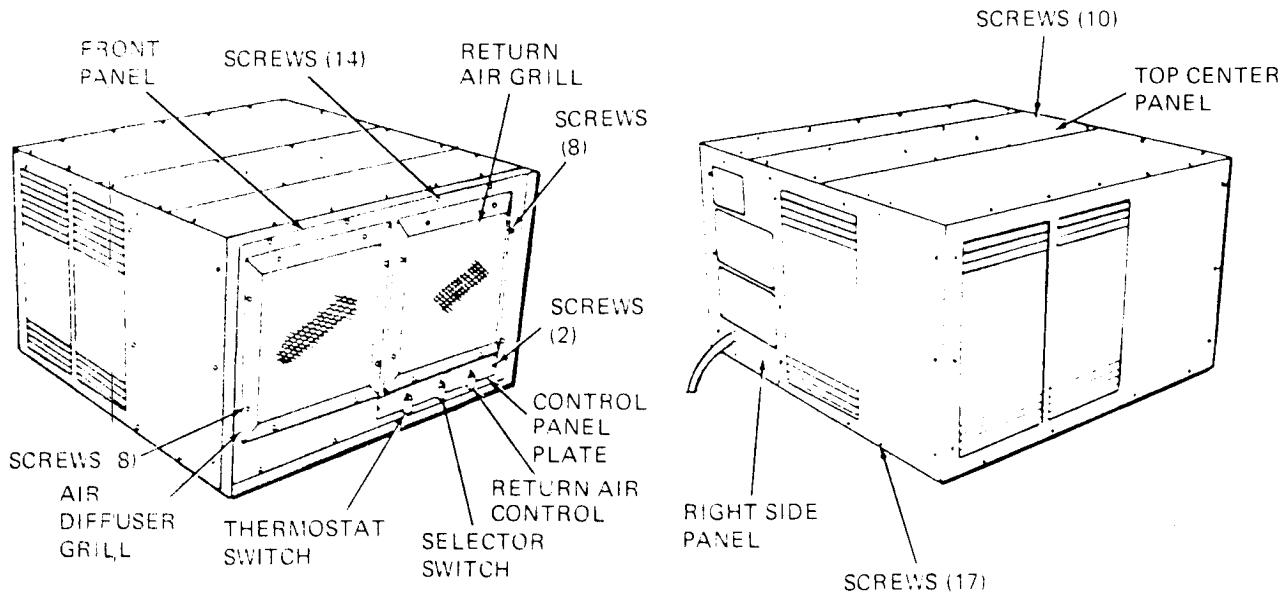
**4-20. CONDENSER FAN (CONT)**

LOCATION / ITEM	ACTION	REMARKS
-----------------	--------	---------

**INSTALLATION**

**FRONT OF HOUSING**

- 14. Front Panel
  - a. Align holes in thermostat switch with holes in front panel.
  - b. Secure thermostat switch to front panel with two (2) screws.
  - c. Align holes in front panel with holes in housing.
  - d. Secure front panel with fourteen (14) screws.
- 15. Control Panel Plate
  - a. Align holes in control panel plate with holes in front panel.
  - b. Secure control panel plate with two (2) screws.
  - c. Install three (3) knobs on return air control, selector switch and thermostat switch.
- 16. Air Diffuser Grill
  - a. Align holes in air diffuser grill with holes in front panel.
  - b. Secure air diffuser grill with eight (8) screws.
- 17. Return Air Grill
  - a. Align holes in return air grill with holes in front panel.
  - b. Secure return air grill with eight (8) screws.
- 18. Top Center Panel
  - a. Align holes in top center panel with holes in top front and top rear panels.
  - b. Secure top center panel with ten (10) screws.
- 19. Right Side Panel
  - a. Align holes in right side panel with holes in housing.
  - b. Secure right side panel with seventeen (17) screws.





## 4-21 CIRCULATING FAN

This task covers:

- a. Removal
- b. Inspection
- c. Repair
- d. Installation

### INITIAL SETUP

#### Material/Parts

- Right Side Panel Screws (17)
- Top Center Panel Screws (10)
- Return Air Grill Screws (8)
- Air Diffuser Grill Screws (8)
- Control Panel Plate Screws (8)
- Front Panel Screws (14)
- Blower Intake Ring Screws (7)
- Fan Motor CapsCrews (4)
- Fan Motor Self-Locking Nuts (4)
- Thermostat Switch Screws (2)

References  
None

#### Troubleshooting Reference

- AIR CONDITIONER, Malfunction 2, Step 6
- FANS, Malfunction 1, Step 3
- AIR OUTPUT, Malfunction 1, Step 3
- NOISE, Malfunction 1, Step 1

#### Approximate Time Required (in minutes)

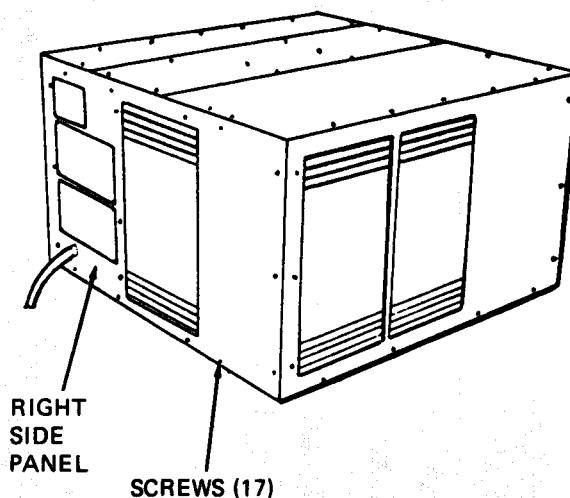
Removal	30
Inspection and Repair	20
Installation	30
<b>TOTAL TIME</b>	<b>80</b>

LOCATION/ITEM	ACTION	REMARKS
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### **REMOVAL**

#### RIGHT SIDE OF HOUSING

1. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.



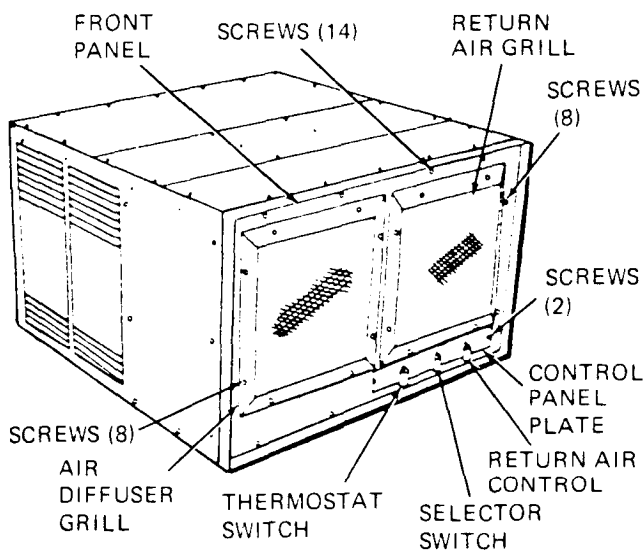
**4-21. CIRCULATING FAN (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**FRONT OF HOUSING**

- |                        |  |
|------------------------|--|
| 2. Return Air Grill    | a. Remove eight (8) screws securing return air grill.<br>b. Remove return air grill.   |
| 3. Air Diffuser Grill  | a. Remove eight (8) screws securing air diffuser grill.<br>b. Remove air diffuser grill.   |
| 4. Control Panel Plate | a. Loosen setscrews and remove knobs from return air control, selector switch and thermostat switch.<br>b. Remove two (2) screws securing control panel plate.<br>c. Remove control panel plate. |
| 5. Front Panel         | a. Remove two (2) screws securing thermostat switch to front panel.<br>b. Remove fourteen (14) screws securing front panel.<br>c. Remove front panel.  |
| 6. Blower Intake Ring  | a. Remove seven (7) screws securing blower intake ring.<br>b. Remove blower intake ring.   |
| 7. Circulating Fan     | a. Loosen setscrew in hub of circulating fan.<br>b. Carefully remove circulating fan.  |



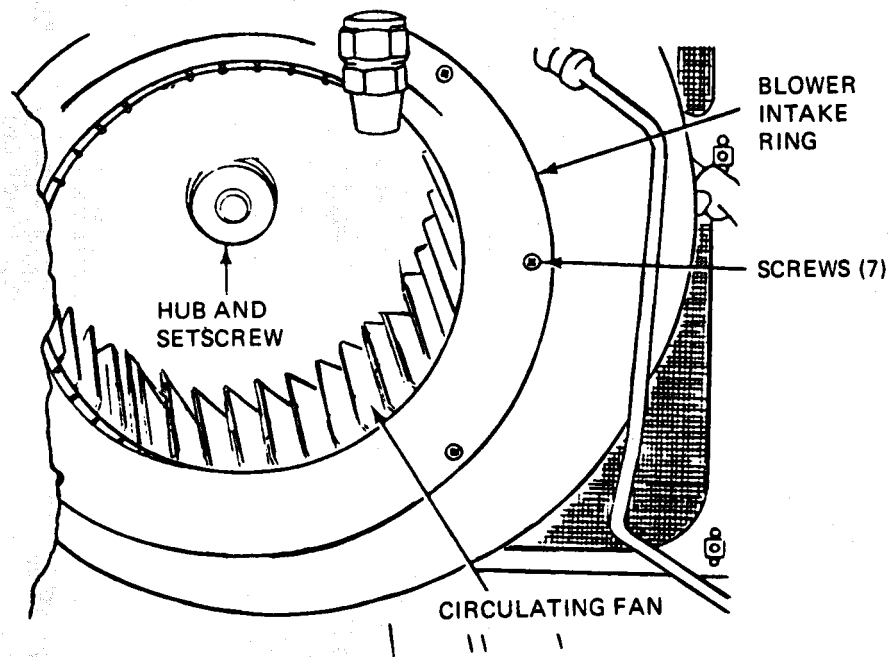
LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSPECTION AND REPAIR**

- 8. Circulating Fan
  - a. Inspect circulating fan, hub and setscrew for indication of excessive wear or damage.
  - b. Replace circulating fan if damage to hub or circulating fan is indicated.
  - c. Replace setscrew with a 2/4-28UNF-3A X .312 inch long set-screw if damage is indicated.

**INSTALLATION**

- 9. Circulating Fan
  - a. Carefully install circulating fan on fan motor shaft.
  - b. Tighten setscrew in circulating fan hub.
- 10. Blower Intake Ring
  - a. Align holes in blower intake ring with holes in circulating fan housing.
  - b. Secure blower intake ring with seven (7) screws.



**4-21. CIRCULATING FAN (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

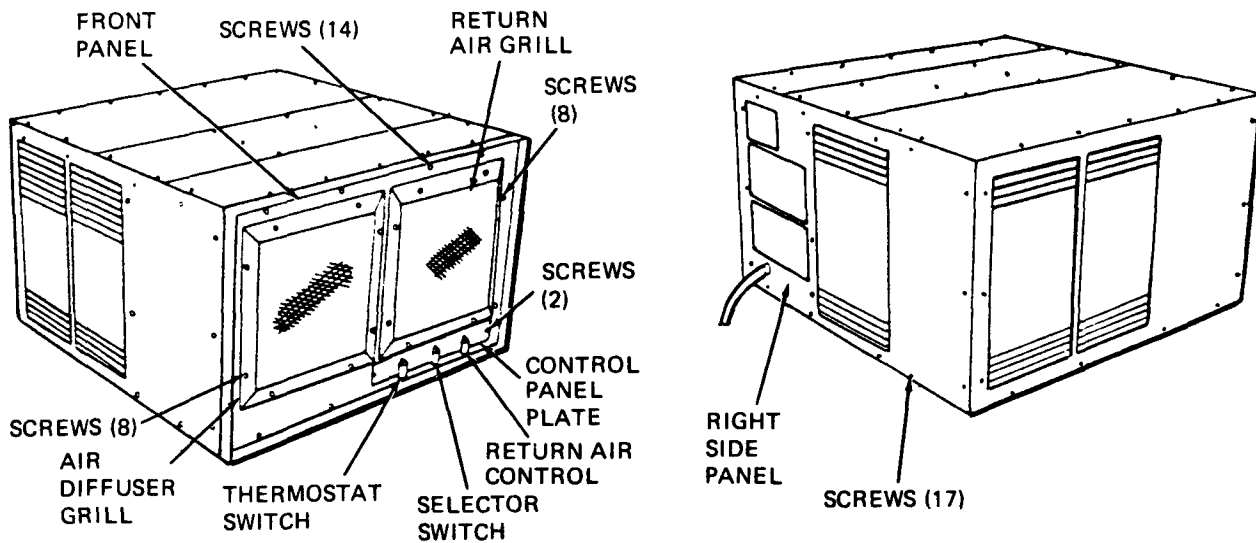
**INSTALLATION**

**FRONT OF HOUSING**

- |                         |   |
|-------------------------|---|
| 11. Front Panel         | <ul style="list-style-type: none"> <li>a. Align holes in thermostat switch with holes in front panel.</li> <li>b. Secure thermostat switch to front panel with two (2) screws.</li> <li>c. Align holes in front panel with holes in housing.</li> <li>d. Secure front panel with fourteen (14) screws.</li> </ul> |
| 12. Control Panel Plate | <ul style="list-style-type: none"> <li>a. Align holes in control panel plate with holes in front panel.</li> <li>b. Secure control panel plate with two (2) screws.</li> <li>c. Install three (3) knobs on return air control, selector switch and thermostat switch.</li> </ul>                                  |
| 13. Air Diffuser Grill  | <ul style="list-style-type: none"> <li>a. Align holes in air diffuser grill with holes in front panel.</li> <li>b. Secure air diffuser grill with eight (8) screws.</li> </ul>  |
| 14. Return Air Grill    | <ul style="list-style-type: none"> <li>a. Align holes in return air grill with holes in front panel.</li> <li>b. Secure return air grill with eight (8) screws.</li> </ul>  |

**RIGHT SIDE OF HOUSING**

- |                      |   |
|----------------------|---|
| 15. Right Side Panel | <ul style="list-style-type: none"> <li>a. Align holes in right side panel with holes in housing.</li> <li>b. Secure right side panel with seventeen (17) screws.</li> </ul> |
|----------------------|---|



**4-22. SELECTOR SWITCH**

This task covers:

- a. Removal
- b. Test
- c. Installation

**INITIAL SETUP**

**Material/Parts**

- Right Side Panel Screws (17)
- Control Panel Plate Screws (2)
- Selector Switch Screws (2)
- Return Air Grill Screws (8)

**References**

Appendix F, Wiring Diagram

**Troubleshooting Reference**

AIR CONDITIONER, Malfunction 1, Step 5

**Approximate Time Required (in minutes)**

Removal	10
Test	10
Installation	10
<b>TOTAL TIME</b>	<b>30</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

RIGHT SIDE OF HOUSING

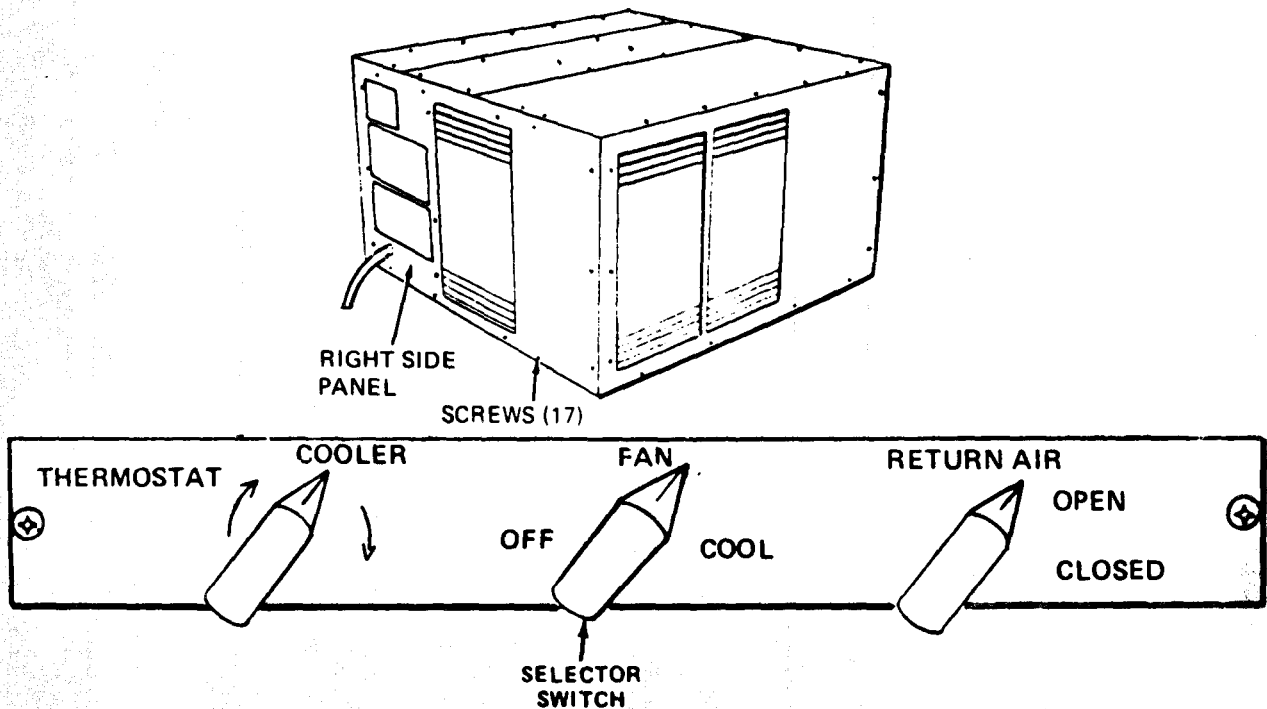
**WARNING**

Disconnect input power source before performing this maintenance task.

1. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.

**NOTE**

The selector switch may be tested while installed in the air conditioner. To gain access to the selector switch, remove the right side panel.



**4-22. SELECTOR SWITCH (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**FRONT OF HOUSING**

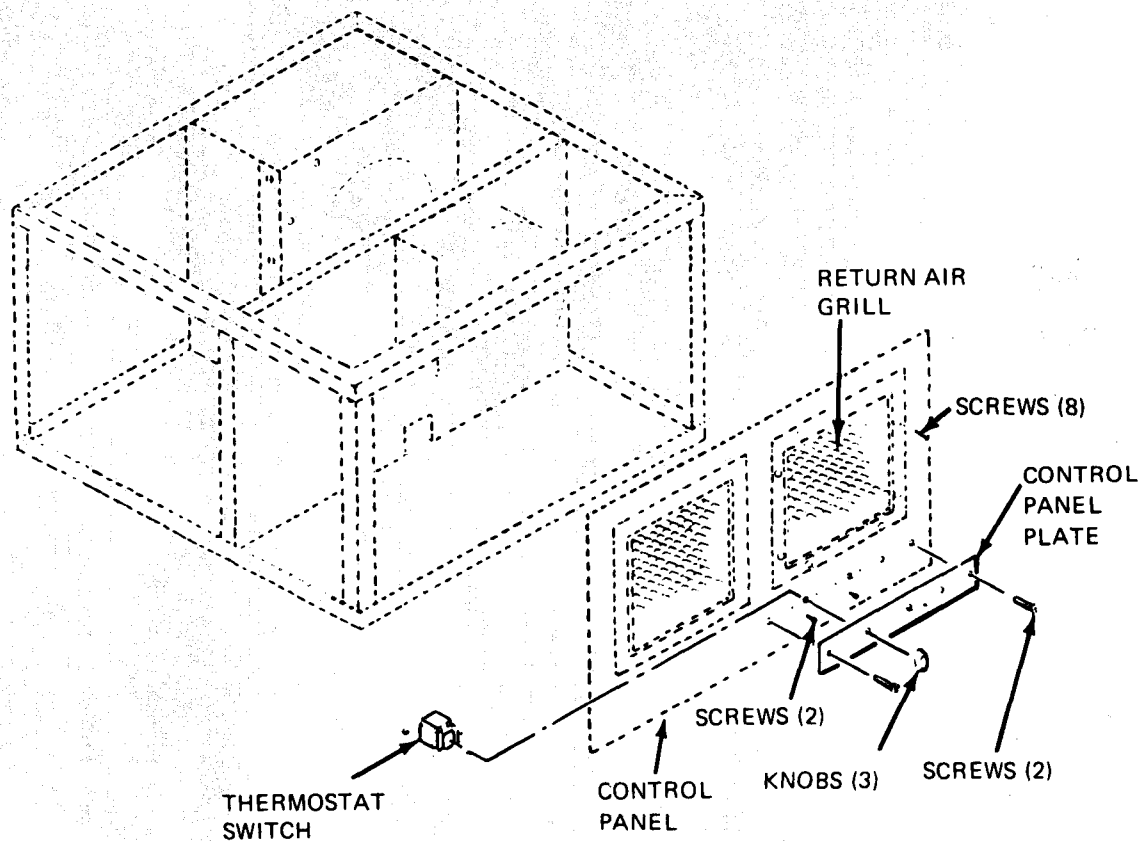
- |                     |   |
|---------------------|---|
| 2. Return Air Grill | <ul style="list-style-type: none"> <li>a. Remove eight (8) screws securing return air grill to front panel.</li> <li>b. Partially remove return air grill from front panel.</li> </ul>  |
| 3. Selector Switch  | <ul style="list-style-type: none"> <li>a. Loosen setscrews and remove three (3) knobs.</li> <li>b. Remove two (2) screws securing control panel plate to front panel.</li> <li>c. Remove control panel plate.</li> <li>d. Tag and disconnect electrical leads from selector switch.</li> <li>e. Remove two (2) screws securing selector switch to front panel.</li> <li>f. Remove selector switch.</li> </ul> |

**TESTING**

- |                    |  |
|--------------------|--|
| 4. Selector Switch | <ul style="list-style-type: none"> <li>a. Tag and disconnect electrical leads from selector switch.</li> <li>b. Using an ohmmeter, measure resistance between the related contacts at each switch setting as follows (see Wiring Diagram, Appendix F):                             <ul style="list-style-type: none"> <li>(1) With selector switch in the OFF position, resistance should be high.</li> <li>(2) With selector switch in the FAN position, high resistance should be indicated at the compressor terminal and low resistance should be indicated at the fan terminal.</li> <li>(3) With selector switch in the COOL position, low resistance should be indicated.</li> </ul> </li> <li>c. Replace selector switch if testing indicates that it is defective.</li> </ul> |
|--------------------|--|

**INSTALLATION**

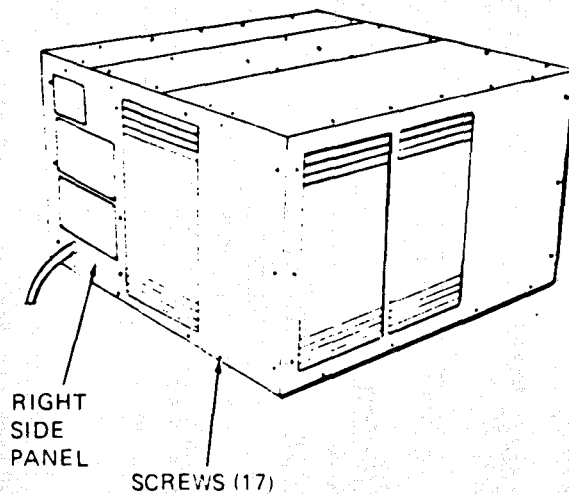
- |                     |   |
|---------------------|---|
| 5. Selector Switch  | <ul style="list-style-type: none"> <li>a. Connect electrical leads to selector switch and remove tags.</li> <li>b. Align holes in selector switch with holes in front panel.</li> <li>c. Secure selector switch with two (2) screws.</li> <li>d. Align holes in control panel plate with holes in front panel.</li> <li>e. Secure control panel plate with two (2) screws.</li> <li>f. Install three (3) knobs and tighten setscrews.</li> </ul>  |
| 6. Return Air Grill | <ul style="list-style-type: none"> <li>a. Align holes in return air grill with holes in front panel.</li> <li>b. Secure return air grill to front panel with eight (8) screws.</li> <li>c. Connect electrical leads to selector switch and remove tags.</li> <li>d. Align holes in selector switch with holes in front panel.</li> <li>e. Secure selector switch with two (2) screws.</li> <li>f. Align holes in control panel plate with holes in front panel.</li> <li>g. Secure control panel plate with two (2) screws.</li> <li>h. Install three (3) knobs and tighten setscrews.</li> </ul> |



**INSTALLATION**

**RIGHT SIDE OF HOUSING**

- 7. Right Side Panel
  - a. Align holes in right side panel with holes in housing.
  - b. Secure right side panel with seventeen (17) screws.



**4-23. THERMOSTAT SWITCH**

This task covers:

- a. Removal
- b. Test
- c. installation

**INITIAL SETUP**

**Material/Parts**

- Right Side Panel Screws (17)
- Control Panel Plate Screws (2)
- Thermostat Switch Screws (2)
- Return Air Grill Screws (8)

**References**

- Appendix F, Wiring Diagram

**Troubleshooting Reference**

AIR OUTPUT, Malfunction 2, Step 2

**Approximate Time Required (in minutes)**

Removal	10
Test	10
Installation	10
<b>TOTAL TIME</b>	<b>30</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**RIGHT SIDE OF HOUSING**

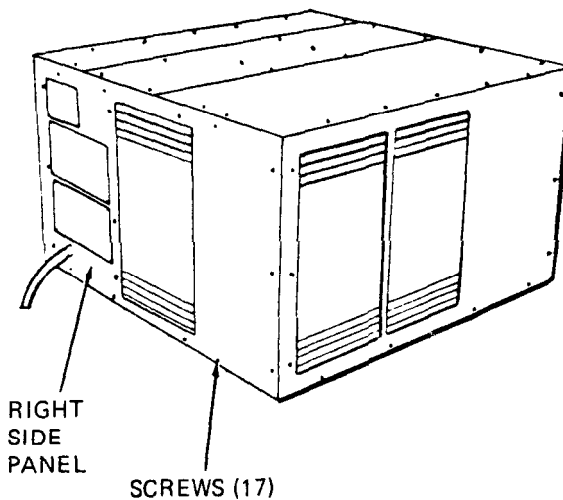
**WARNING**

Disconnect input power source before performing this maintenance task.

- 1. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.

**NOTE**

The thermostat switch may be tested while installed in the air conditioner. To gain access to the selector switch, remove the right side panel.





LOCATION/ITEM	ACTION	REMARKS
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**FRONT OF HOUSING**

2. Return Air Grill
- Remove eight (8) screws securing return air grill to front panel.
  - Partially remove return air grill from front panel.

**CAUTION**

Carefully unwrap thermostat switch sensing bulb from expansion valve sensing line. Use care to prevent damage to sensing bulb.

3. Thermostat Switch
- Loosen setscrews and remove three (3) knobs.
  - Remove two (2) screws securing control panel plate to front panel.
  - Remove control panel plate.
  - Tag and disconnect electrical leads from thermostat switch.
  - Remove two (2) screws securing thermostat switch to front panel.
  - Unwrap thermostat switch sensing bulb and remove thermostat switch.

**TESTING**

4. Thermostat Switch
- Tag and disconnect electrical leads from thermostat switch.
  - With the thermostat switch set below room temperature, use an ohmmeter and measure for continuity across the thermostat switch terminals (see Wiring Diagram, Appendix F).
  - Verify that the resistance indicated is zero ohms.
  - Move thermostat switch setting to a position above room temperature.
  - Verify that the resistance is infinity.
  - Replace thermostat switch if testing indicates that it is defective.

**INSTALLATION**

5. Thermostat Switch
- Connect electrical leads to thermostat switch and remove tags.
  - Align holes in thermostat switch with holes in front panel.
  - Secure thermostat switch with two (2) screws.
  - Carefully wrap thermostat switch sensing bulb around expansion valve sensing line.
  - Align holes in control panel plate with holes in front panel.
  - Secure control panel plate with two (2) screws.
  - Install three (3) knobs and tighten setscrews.

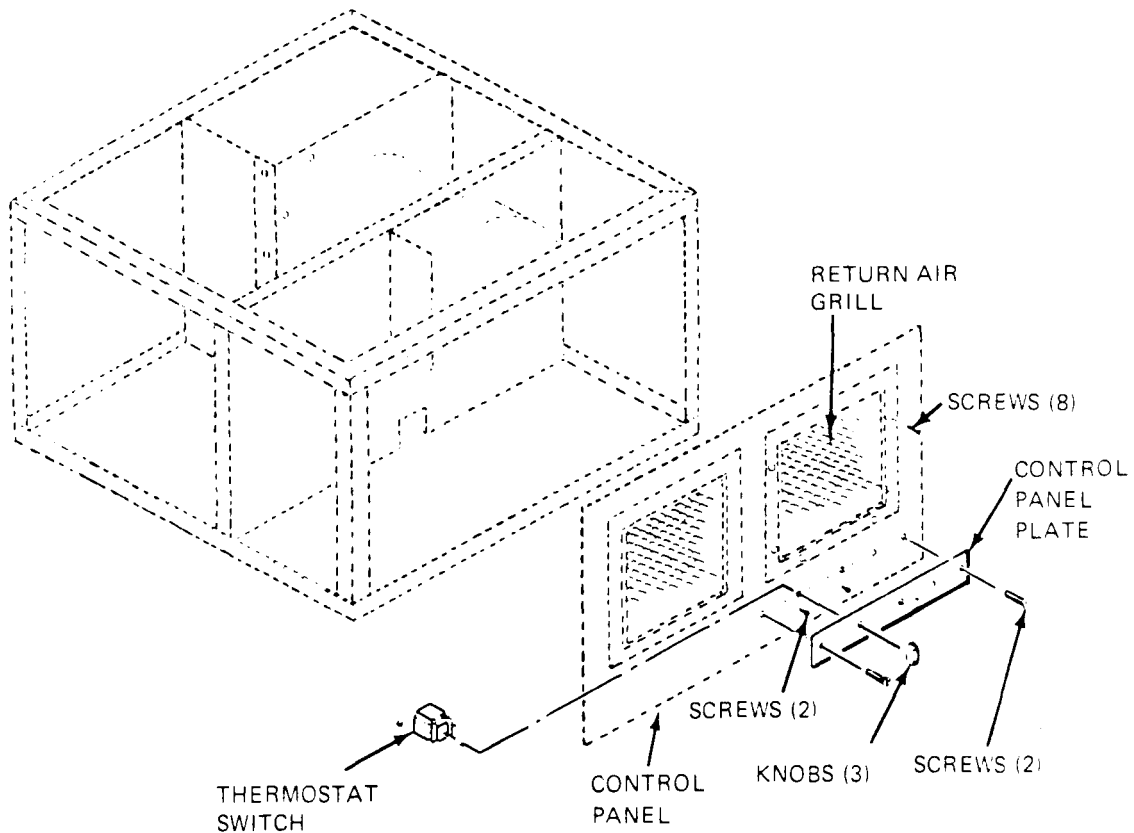
**4-23. THERMOSTAT SWITCH (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSTALLATION**

**FRONT OF HOUSING**

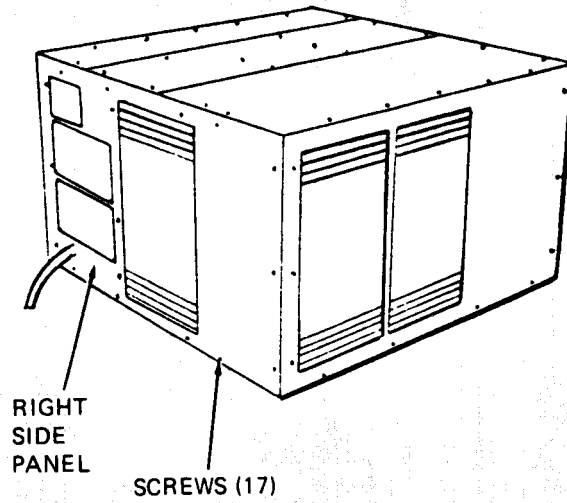
6. Return Air Grill
  - a. Align holes in return air grill with holes in front panel.
  - b. Secure return air grill to front panel with eight (8) screws.
  - c. Connect electrical leads to thermostat switch and remove tags.
  - d. Align holes in thermostat switch with holes in front panel.
  - e. Secure thermostat switch with two (2) screws.
  - f. Align holes in control panel plate with holes in front panel.
  - g. Secure control panel plate with two (2) screws.
  - h. Install three (3) knobs and tighten setscrews.



LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**RIGHT SIDE OF HOUSING**

- |                     |   |
|---------------------|---|
| 7. Right Side Panel | <ul style="list-style-type: none"> <li>a. Align holes in right side panel with holes in housing.</li> <li>b. Secure right side panel with seventeen (17) screws.</li> </ul> |
|---------------------|---|



**4-24. MOTOR CAPACITOR**

This task covers:

- a. Removal
- b. Test
- c. Installation

**INITIAL SETUP**

**Material/Parts**

- Right Side Panel Screws (17)
- Capacitor Bracket Screws (2)

**References**

None

**Troubleshooting Reference**

FANS, Malfunction 1, Step 4

**Approximate Time Required (in minutes)**

Removal	10
Testing	5
Installation	10
<b>TOTAL TIME</b>	<b>25</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**RIGHT SIDE OF HOUSING**

**WARNING**

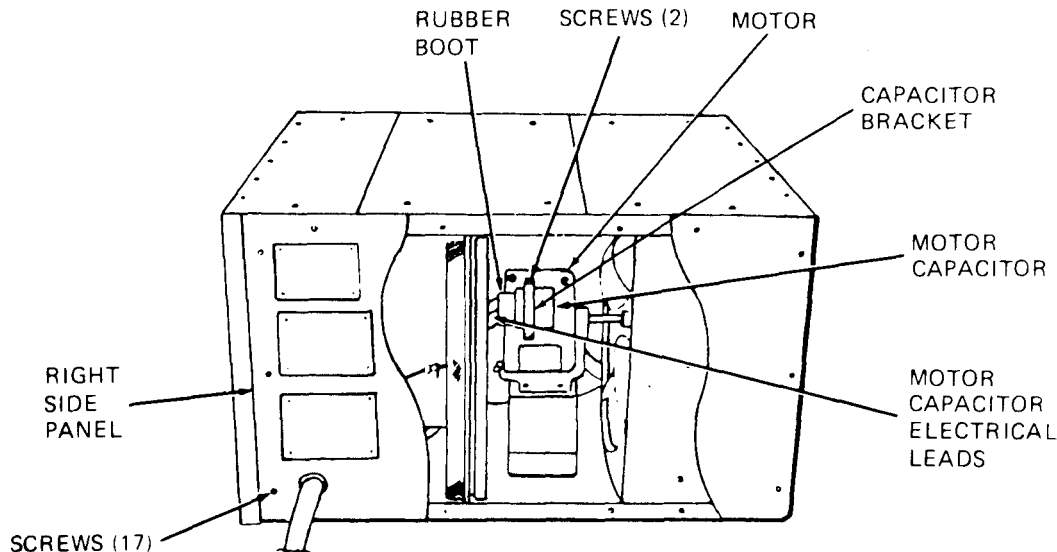
**Disconnect input power source before performing this maintenance task.**

- 1. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.

**WARNING**

**Death or serious injury may occur if capacitor is not discharged prior to removal.**

- 2. Motor Capacitor
  - a. Discharge motor capacitor.
  - b. Slide rubber boot on motor capacitor enough to gain access to terminals.
  - c. Tag and disconnect electrical leads from motor capacitor.
  - d. Remove two (2) screws securing capacitor bracket to motor.
  - e. Remove capacitor bracket and motor capacitor.



LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

### **TESTING**

#### **RIGHT SIDE OF HOUSING**

3. Motor Capacitor
- a. Test motor capacitor with a suitable capacitor tester for continuity, leakage short, and capacitance.
  - b. The motor capacitor is rated at 3 microfarads, 370 volts.
  - c. Replace motor capacitor if testing indicates that it is defective.

### **INSTALLATION**

4. Motor Capacitor
- a. Install motor capacitor in capacitor bracket.
  - b. Align holes in capacitor bracket and motor.
  - c. Secure capacitor bracket with two (2) screws.
  - d. Connect electrical leads to motor capacitor and remove tags.
  - e. Cover electrical leads with rubber boot.
5. Right Side Panel
- a. Align holes in right side panel with holes in housing.
  - b. Secure right side panel with seventeen (17) screws.

**4-25. START CAPACITOR**

This task covers:

- a. Removal
- b. Test
- c. Installation

**INITIAL SETUP**

**Material/Parts**

- Left Side Panel Screws (17)
- Top Rear Panel Screws (9)
- Start Capacitor Cover Screws (2)
- Start Capacitor Hex Nuts (2)

**References**

None

**Troubleshooting Reference**

None

**Approximate Time Required (in minutes)**

Removal	10
Testing	10
Installation	10
<b>TOTAL TIME</b>	<b>30</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

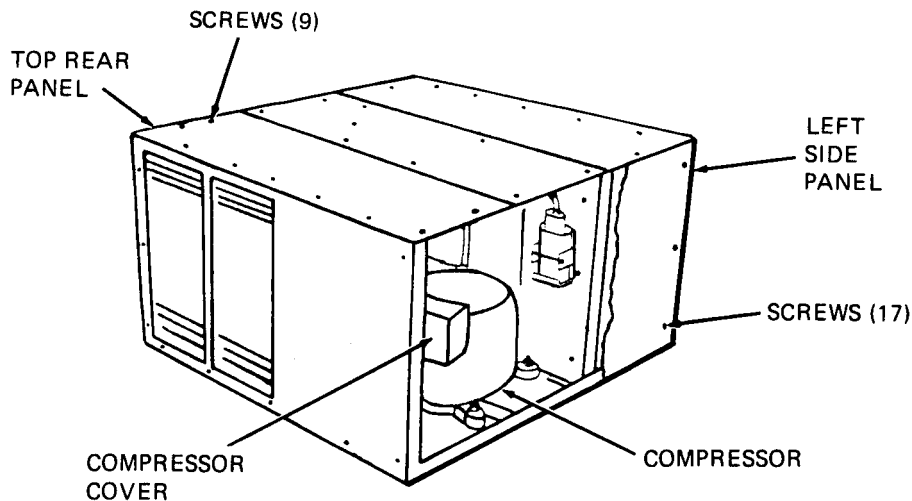
**REMOVAL**

**LEFT SIDE OF HOUSING**

**WARNING**

**Disconnect input power source before performing this maintenance task.**

1. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel to housing.
  - b. Remove left side panel.
2. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel.
  - b. Remove top rear panel.



LOCATION/ITEM	ACTION	REMARKS
3. Cover Compressor	a. Remove two (2) screws securing compressor cover to compressor. b. Remove cover from compressor to expose start capacitor and start relay.	
<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;"><b>WARNING</b></div> <p>Death or serious injury may occur if capacitor is not discharged prior to removal.</p>		
4. Start Capacitor	a. Remove two (2) hex nuts to loosen capacitor from bracket. b. Remove cap from start capacitor. c. Discharge start capacitor. d. Tag and disconnect electrical leads from start capacitor.	

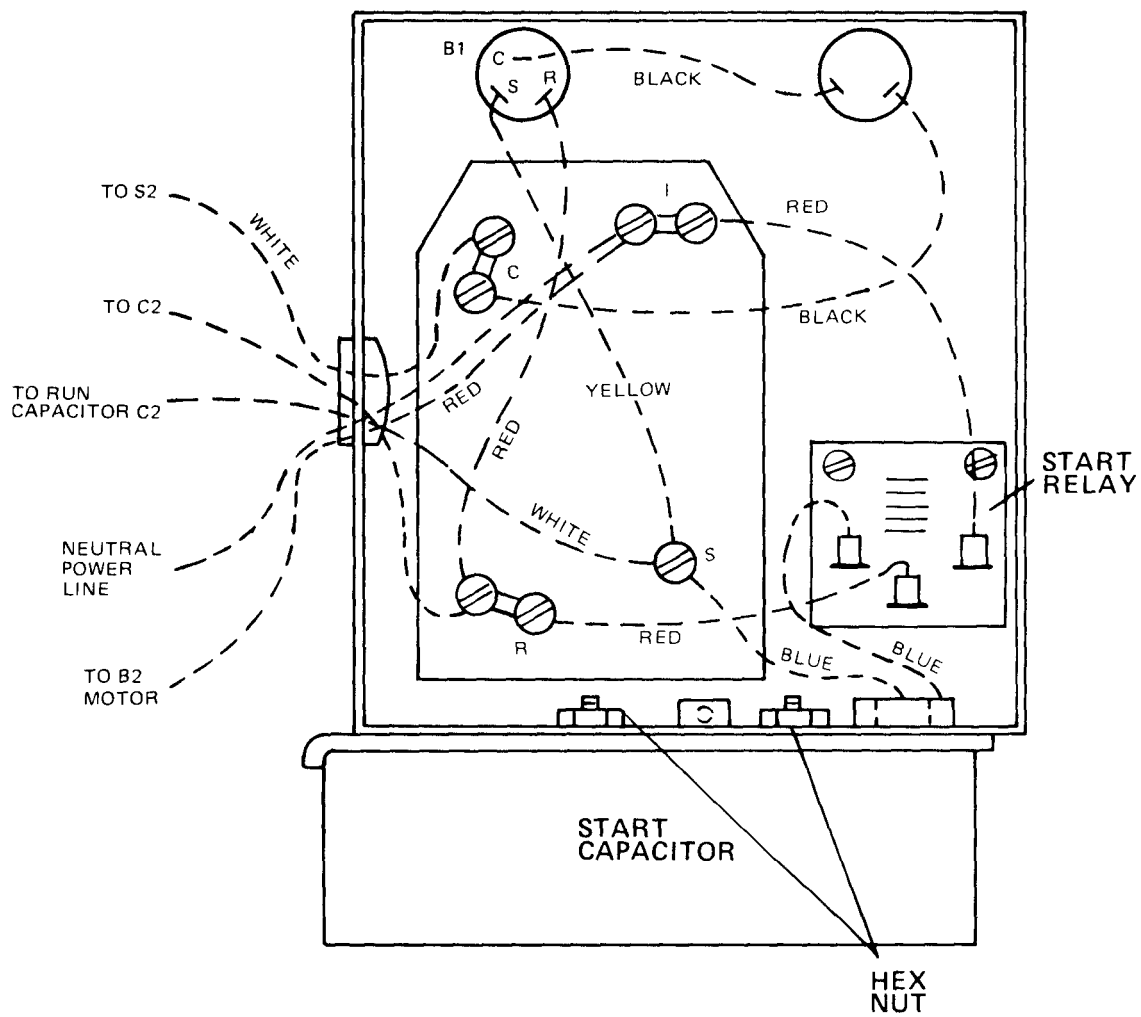
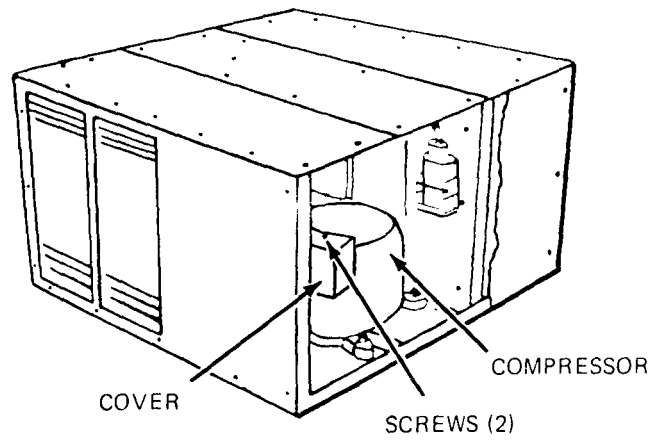
### **TESTING**

#### LEFT SIDE OF HOUSING

- |                    |   |
|--------------------|---|
| 5. Start Capacitor | a. Test start capacitor with a suitable capacitor tester for continuity, leakage short, and capacitance.<br>b. The start capacitor is rated at 189 to 227 microfarads, 220 volts AC.<br>c. Replace start capacitor if testing indicates that it is defective. |
|--------------------|---|

### **INSTALLATION**

- |                          |   |
|--------------------------|---|
| 6. Start Capacitor       | a. Connect electrical leads to start capacitor and remove tags.<br>b. Cover electrical leads with cap.<br>c. Install start capacitor in bracket using two hex nuts. |
| 7. Start Capacitor Cover | a. Align two holes on compressor cover with holes on compressor.<br>b. Secure cover with two screws.  |
| 8. Left Side Panel       | a. Align holes in left side panel with holes in housing.<br>b. Secure left side panel with seventeen (17) screws.   |





### 4-26. RUN CAPACITOR

This task covers:

- a. Removal
- b. Test
- c. Installation

#### INITIAL SETUP

**Material/Parts**

Left Side Panel Screws (17)

**References**

None

**Troubleshooting Reference**

None

**Approximate Time Required (in minutes)**

Removal	10
Testing	10
Installation	10
<b>TOTAL TIME</b>	<b>30</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

### REMOVAL

#### LEFT SIDE OF HOUSING

**WARNING**

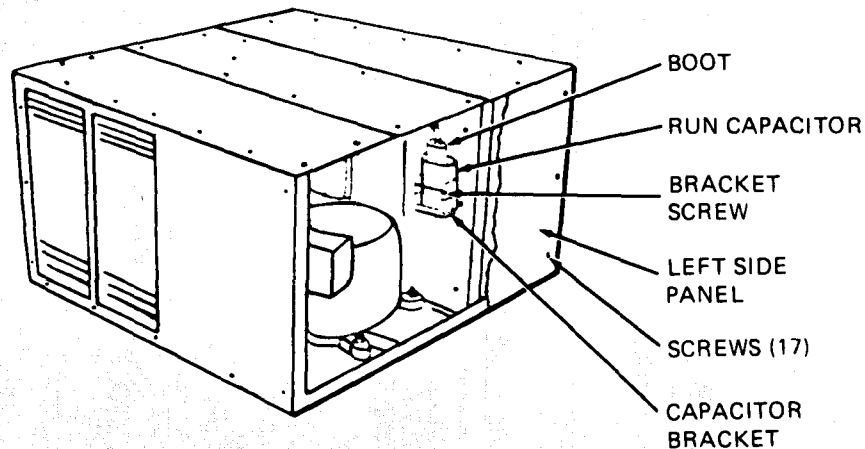
Disconnect input power source before performing this maintenance task.

1. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel to housing.
  - b. Remove left side panel.

**WARNING**

Death or serious injury may occur if capacitor is not discharged prior to removal.

2. Run Capacitor
  - a. Discharge run capacitor.
  - b. Remove cap from run capacitor.
  - c. Tag and disconnect electrical leads from run capacitor.
  - d. Loosen capacitor bracket screw.
  - e. Remove run capacitor from capacitor bracket.



**4-26. RUN CAPACITOR (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

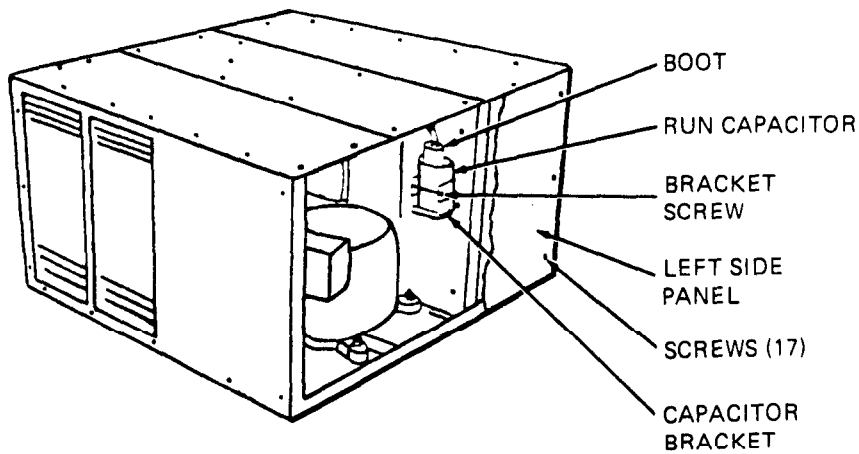
**TESTING**

**LEFT SIDE OF HOUSING**

- 3. Run Capacitor
  - a. Test run capacitor with a suitable capacitor tester for continuity, leakage short, and capacitance.
  - b. The run capacitor is rated at 35 microfarads, 370 volts.
  - c. Replace run capacitor if testing indicates that it is defective.

**INSTALLATION**

- 4. Run Capacitor
  - a. Install run capacitor in capacitor bracket.
  - b. Tighten capacitor bracket screw.
  - c. Connect electrical leads to run capacitor and remove tags.
  - d. Cover electrical leads with cap.
- 5. Left Side Panel
  - a. Align holes in left side panel with holes in housing.
  - b. Secure left side panel with seventeen (17) screws.



## 4-27 START RELAY

This task covers:

- a. Removal
- b. Test
- c. Installation

### INITIAL SETUP

**Material/Parts**

- Left Side Panel Screws (17)
- Top Rear Panel Screws (9)
- Compressor Cover Screws (2)
- Start Relay Screw (2)

**References**

None

**Troubleshooting Reference**

COMPRESSOR, Malfunction 1, Step 1

**Approximate Time Required (in minutes)**

Removal	15
Testing	10
Installation	15
<b>TOTAL TIME</b>	<b>40</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

### REMOVAL

#### TOP OF HOUSING

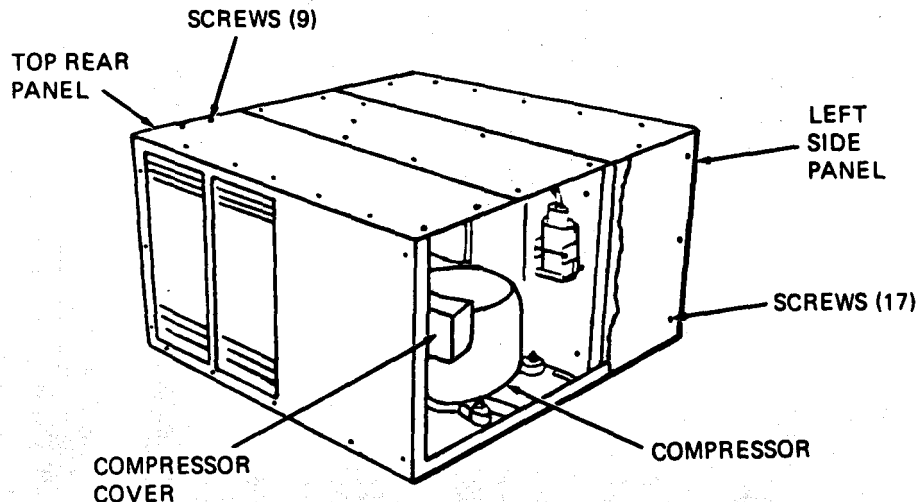
**WARNING**

Disconnect input power source before performing this maintenance task.

1. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel to housing.
  - b. Remove left side panel.
  
2. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel to housing.
  - b. Remove top rear panel.

**NOTE**

The start relay may be tested while installed in the air conditioner. To gain access to the start relay, remove the left side panel and top rear panel, and remove cover on compressor to expose start relay.



**4-27. START RELAY (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**TOP OF HOUSING**

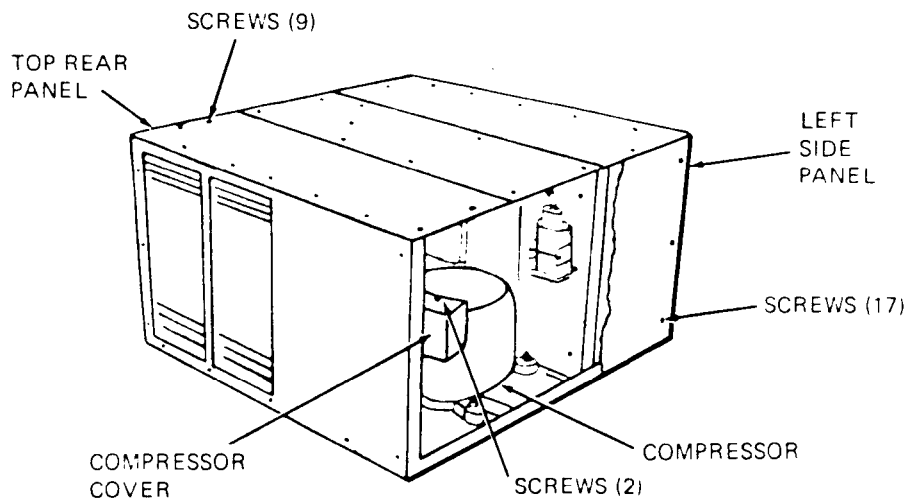
- |                     |  |  |
|---------------------|--|--|
| 3. Compressor Cover | <ul style="list-style-type: none"> <li>a. Remove two (2) screws securing cover to compressor.</li> <li>b. Remove cover.</li> </ul>   |  |
| 4. Start Relay      | <ul style="list-style-type: none"> <li>a. Tag and disconnect electrical leads from start relay.</li> <li>b. Remove two (2) screws securing start relay to compressor.</li> <li>c. Remove start relay.</li> </ul> |  |

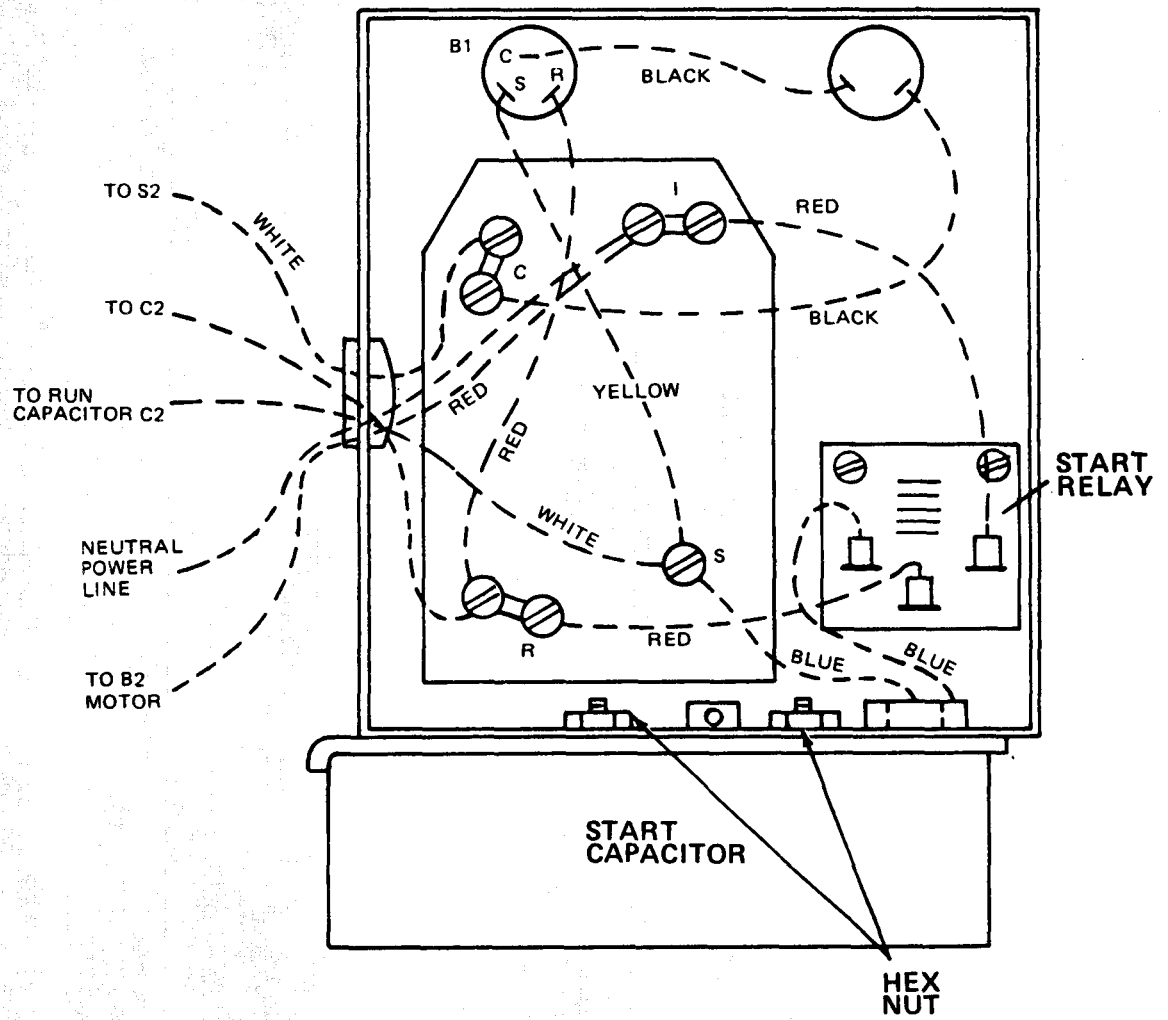
**TESTING**

- |                |   |  |
|----------------|---|--|
| 5. Start Relay | <ul style="list-style-type: none"> <li>a. Tag and disconnect electrical leads from start relay.</li> <li>b. Using an ohmmeter, measure continuity across start relay terminals.</li> <li>c. Replace start relay if there is NO continuity.</li> </ul> |  |
|----------------|---|--|

**INSTALLATION**

- |                    |   |  |
|--------------------|---|--|
| 6. Start Relay     | <ul style="list-style-type: none"> <li>a. Connect electrical leads to start relay and remove tags.</li> <li>b. Align holes in start relay with holes in compressor.</li> <li>c. Secure start relay with two (2) screws.</li> <li>d. Replace compressor cover and secure with two (2) screws.</li> </ul> |  |
| 7. Top Rear Panel  | <ul style="list-style-type: none"> <li>a. Align holes in top rear panel and housing.</li> <li>b. Secure top rear panel with nine (9) screws.</li> </ul>   |  |
| 8. Left Side Panel | <ul style="list-style-type: none"> <li>a. Align holes in left side panel with holes in frame.</li> <li>b. Secure left side panel with seventeen (17) screws.</li> </ul>   |  |





**4-28. WIRING**

This task covers:

- a. Removal
- b. Inspection
- c. Test
- d. Repair
- e. Installation

**INITIAL SETUP**

**Material/Parts**

- Top Center Panel Screws (10)
- Top Front Panel Screws (7)
- Top Rear Panel Screws (9)
- Right Side Panel Screws (17)
- Left Side Panel Screws (17)

**References**

- Appendix F, Wiring Diagram

**Troubleshooting Reference**

COMPRESSOR, Malfunction 1, Step 2

**Approximate Time Required (in minutes)**

Removal	30
Inspection and Testing	30
Repair	30
Installation	30
<b>TOTAL TIME</b>	<b>120</b>

LOCATION/ITEM	ACTION	REMARKS
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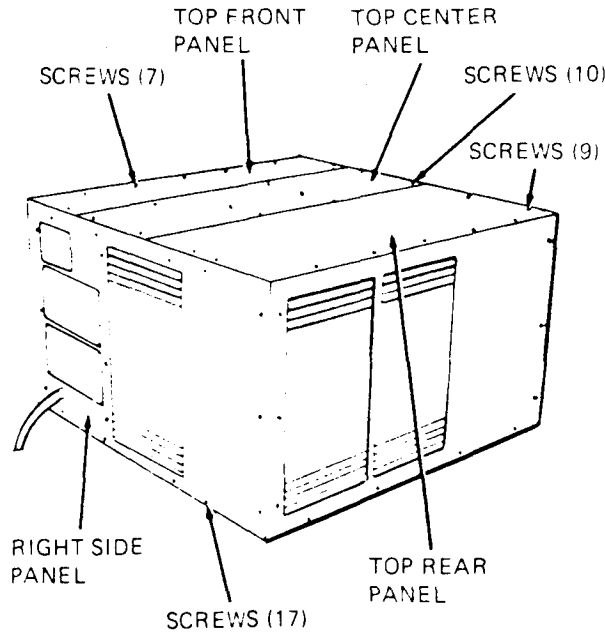
**REMOVAL**

**TOP AND RIGHT SIDE OF HOUSING**



**Disconnect input power source before performing this maintenance task.**

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
2. Top Front Panel
  - a. Remove seven (7) screws securing top front panel.
  - b. Remove top front panel.
3. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel.
  - b. Remove top rear panel.
4. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.



LOCATION/ITEM	ACTION	REMARKS
<b>LEFT SIDE OF HOUSING</b>		
5. Left Side Panel	a. Remove seventeen (17) screws securing left side panel to housing. b. Remove left side panel.	
6. Wiring	Remove only those electrical leads or wires that show signs of damage.	

**INSPECTION AND TESTING**

**HOUSING INTERIOR**



**Disconnect input power source before performing maintenance task on any electrical component.**

- |                     |   |                  |      |           |    |        |      |          |      |          |       |                 |       |
|---------------------|---|------------------|------|-----------|----|--------|------|----------|------|----------|-------|-----------------|-------|
| 7. Electrical Leads | a. Inspect all electrical leads for cracked or frayed insulation material.<br>b. Inspect all terminals for damaged condition.   |                  |      |           |    |        |      |          |      |          |       |                 |       |
|                     | c. Disconnect each end of the following electrical leads and using a multimeter, set on low ohms scale, touch probes to ends of each electrical lead and verify that there is continuity (see Wiring Diagram, Appendix F):  |                  |      |           |    |        |      |          |      |          |       |                 |       |
|                     | <table border="0"> <tr> <td>(1) L2 (NEUTRAL)</td> <td>K1-3</td> </tr> <tr> <td>(2) TB1-1</td> <td>B2</td> </tr> <tr> <td>(3) B2</td> <td>S1-1</td> </tr> <tr> <td>(4) S1-2</td> <td>S2-1</td> </tr> <tr> <td>(5) S2-2</td> <td>TB1-C</td> </tr> <tr> <td>(6) L1 (COMMON)</td> <td>S1-L1</td> </tr> </table> | (1) L2 (NEUTRAL) | K1-3 | (2) TB1-1 | B2 | (3) B2 | S1-1 | (4) S1-2 | S2-1 | (5) S2-2 | TB1-C | (6) L1 (COMMON) | S1-L1 |
| (1) L2 (NEUTRAL)    | K1-3  |                  |      |           |    |        |      |          |      |          |       |                 |       |
| (2) TB1-1           | B2  |                  |      |           |    |        |      |          |      |          |       |                 |       |
| (3) B2              | S1-1  |                  |      |           |    |        |      |          |      |          |       |                 |       |
| (4) S1-2            | S2-1  |                  |      |           |    |        |      |          |      |          |       |                 |       |
| (5) S2-2            | TB1-C   |                  |      |           |    |        |      |          |      |          |       |                 |       |
| (6) L1 (COMMON)     | S1-L1   |                  |      |           |    |        |      |          |      |          |       |                 |       |
|                     | d. Repair or replace any electrical lead if there is NO continuity.   |                  |      |           |    |        |      |          |      |          |       |                 |       |

4-28. WIRING (CONT)

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSPECTION AND TESTING**

**HOUSING INTERIOR**

- |                             |   |                             |       |                            |       |                            |        |
|-----------------------------|---|-----------------------------|-------|----------------------------|-------|----------------------------|--------|
| 8. Power Cable              | <ul style="list-style-type: none"> <li>a. Inspect power cable for cracked or frayed insulation material.</li> <li>b. Inspect all terminals for damaged condition.</li> <li>c. Disconnect each of the power cable terminations and using a multimeter, set on low ohms scale, touch probes to each termination and their corresponding connector pin and verify that there is continuity (see Wiring Diagram, Appendix F):                             <table border="0" style="margin-left: 20px;"> <tr> <td>(1) Connector Pin (NEUTRAL)</td> <td>TB1-1</td> </tr> <tr> <td>(2) Connector Pin (COMMON)</td> <td>S1-L1</td> </tr> <tr> <td>(3) Connector Pin (GROUND)</td> <td>GROUND</td> </tr> </table> </li> <li>d. Repair or replace power cable if there is NO continuity.</li> </ul> | (1) Connector Pin (NEUTRAL) | TB1-1 | (2) Connector Pin (COMMON) | S1-L1 | (3) Connector Pin (GROUND) | GROUND |
| (1) Connector Pin (NEUTRAL) | TB1-1   |                             |       |                            |       |                            |        |
| (2) Connector Pin (COMMON)  | S1-L1   |                             |       |                            |       |                            |        |
| (3) Connector Pin (GROUND)  | GROUND  |                             |       |                            |       |                            |        |

**REPAIR**

- |           |  |
|-----------|--|
| 9. Wiring | <ul style="list-style-type: none"> <li>a. Remove insulation to expose 1/2 inch of bare wire on each side of break.</li> <li>b. Twist the wire ends together and solder the splice.</li> <li>c. Cover the splice with PVC electrical tape, making certain to cover all repaired areas.</li> <li>d. Replace broken terminal lugs with exact duplicates.</li> </ul> |
|-----------|--|

**INSTALLATION**

**TOP AND RIGHT SIDE OF HOUSING**

- |                      |   |
|----------------------|---|
| 10. Right Side Panel | <ul style="list-style-type: none"> <li>a. Align holes in right side panel with holes in housing.</li> <li>b. Secure right side panel with seventeen (17) screws.</li> </ul>                 |
| 11. Top Rear Panel   | <ul style="list-style-type: none"> <li>a. Align holes in top rear panel with holes in housing.</li> <li>b. Secure top rear panel with nine (9) screws.</li> </ul>                           |
| 12. Top Front Panel  | <ul style="list-style-type: none"> <li>a. Align holes in top front panel with holes in housing.</li> <li>b. Secure top front panel with seven (7) screws.</li> </ul>                        |
| 13. Top Center Panel | <ul style="list-style-type: none"> <li>a. Align holes in top center panel with holes in top front and top rear panels.</li> <li>b. Secure top center panel with ten (10) screws.</li> </ul> |



**4-29. COMPRESSOR**

This task covers:

- a. Removal
- b. Inspection
- c. Installation

**INITIAL SETUP**

<p><b>Material/Parts</b> Left Side Panel Screws (17)</p> <p><b>References</b> None</p> <p><b>Troubleshooting Reference</b> AIR CONDITIONER, Malfunction 2, Step 4</p>	<p><b>Approximate Time Required (in minutes)</b></p> <p>Removal 10</p> <p>Inspection 5</p> <p>Installation 10</p> <p><b>TOTAL TIME 25</b></p>
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LOCATION/ITEM	ACTION	REMARKS
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**REMOVAL**

**LEFT SIDE OF HOUSING**

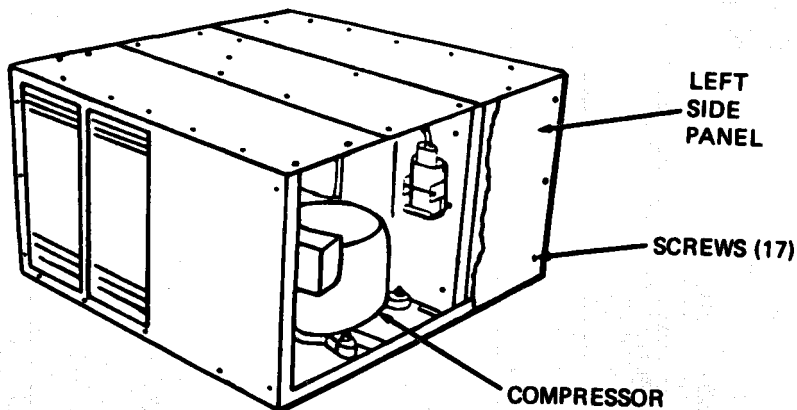
- 1. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel to housing.
  - b. Remove left side panel.

**INSPECTION**

- 2. Compressor
  - a. Visually inspect compressor for damage.
  - b. Inspect compressor tubing and fittings for leaks.
  - c. Tighten fittings and report damaged condition to direct support maintenance personnel.

**INSTALLATION**

- 3. Left Side Panel
  - a. Align holes in left side panel with holes in housing.
  - b. Secure left side panel with seventeen (17) screws.



**4-30. REFRIGERANT PIPING**

This task covers:

- a. Removal
- b. Inspection
- c. Installation

**INITIAL SETUP**

**Material/Parts**

- Air Diffuser Grill Screws (8)
- Control Panel Plate Screws (2)
- Front Panel Screws (14)
- Top Center Panel Screws (10)
- Top Front Panel Screws (7)
- Top Rear Panel Screws (9)
- Right Side Panel Screws (17)
- Rear Panel Screws (14)
- Return Air Grill Screws (8)

**References**

None

**Troubleshooting Reference**

None

**Approximate Time Required (in minutes)**

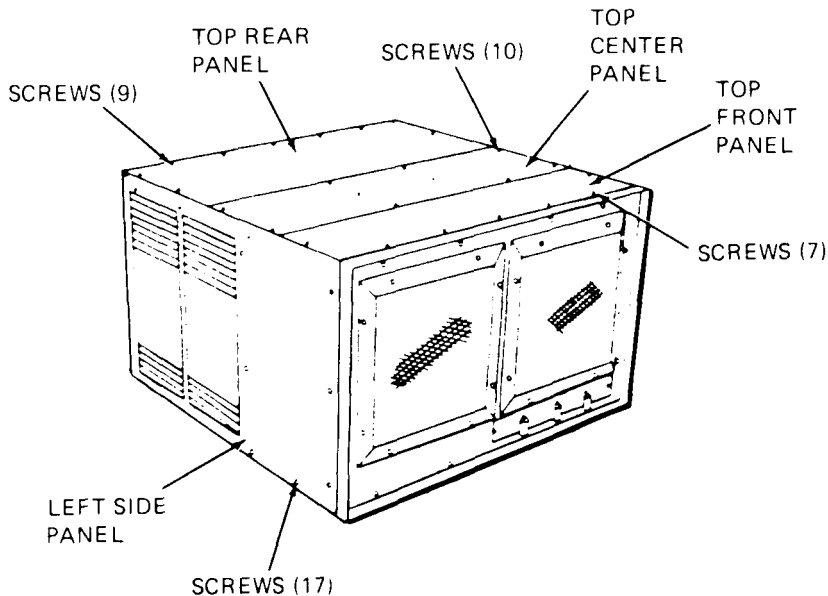
Removal	30
Inspection	15
Installation	30
<b>TOTAL TIME</b>	<b>75</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

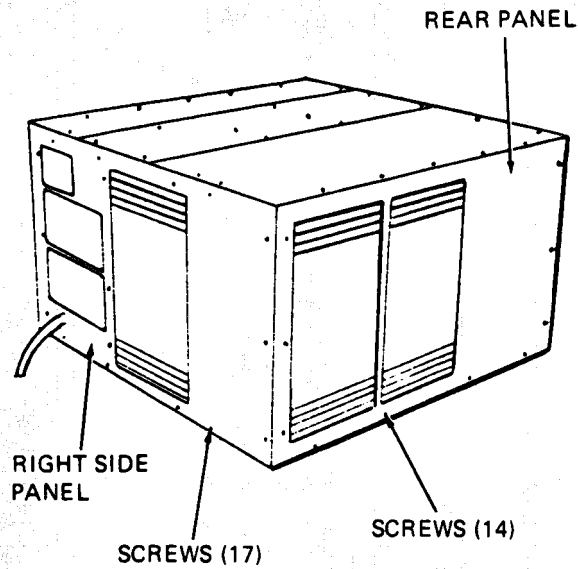
**REMOVAL**

**TOP AND LEFT SIDE OF HOUSING**

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
2. Top Front Panel
  - a. Remove seven (7) screws securing top front panel.
  - b. Remove top front panel.
3. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel.
  - b. Remove top rear panel.
4. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel.
  - b. Remove left side panel.



LOCATION/ITEM	ACTION	REMARKS
<b>RIGHT SIDE AND REAR OF HOUSING</b>		
5. Right Side Panel	a. Remove seventeen (17) screws securing right side panel. b. Remove right side panel.	
6. Rear Panel	a. Remove fourteen (14) screws securing rear panel. b. Remove rear panel.	



**4-30. REFRIGERANT PIPING (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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**REMOVAL**

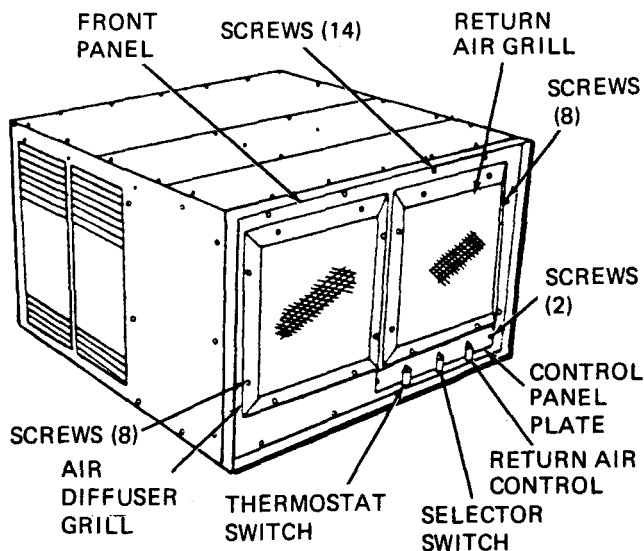
**FRONT OF HOUSING**

- |                        |  |
|------------------------|--|
| 7. Return Air Grill    | <ul style="list-style-type: none"> <li>a. Remove eight (8) screws securing return air grill.</li> <li>b. Remove return air grill.</li> </ul>   |
| 8. Air Diffuser Grill  | <ul style="list-style-type: none"> <li>a. Remove eight (8) screws securing air diffuser grill.</li> <li>b. Remove air diffuser grill.</li> </ul>   |
| 9. Control Panel Plate | <ul style="list-style-type: none"> <li>a. Loosen setscrews and remove knobs from return air control, selector switch and thermostat switch.</li> <li>b. Remove two (2) screws securing control panel plate.</li> <li>c. Remove control panel plate.</li> </ul> |
| 10. Front Panel        | <ul style="list-style-type: none"> <li>a. Remove two (2) screws securing thermostat switch to front panel.</li> <li>b. Remove fourteen (14) screws securing front panel.</li> <li>c. Remove front panel.</li> </ul>  |

**INSPECTION**

**HOUSING INTERIOR**

- |                        |  |
|------------------------|--|
| 11. Refrigerant Piping | <ul style="list-style-type: none"> <li>a. Visually inspect all piping for damaged condition.</li> <li>b. Inspect all fittings for leaks.</li> <li>c. Tighten fittings and report damaged condition to direct support maintenance personnel.</li> </ul> |
|------------------------|--|

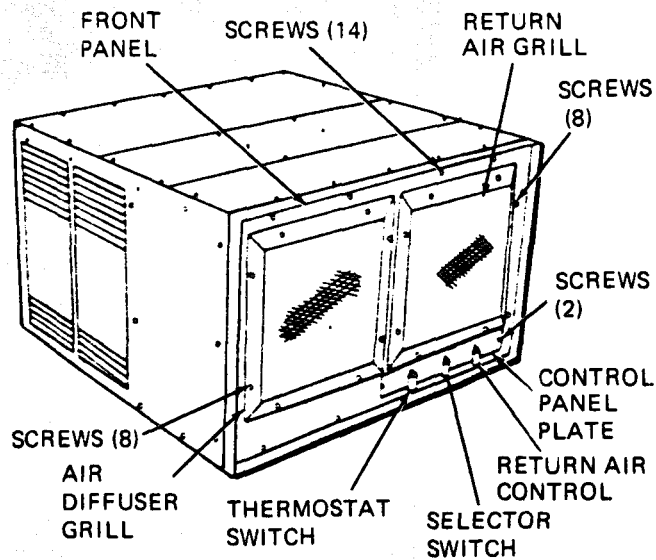


LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSTALLATION**

**FRONT OF HOUSING**

- |                         |   |
|-------------------------|---|
| 12. Front Panel         | <ul style="list-style-type: none"> <li>a. Align holes in thermostat switch with holes in front panel.</li> <li>b. Secure thermostat switch to front panel with two (2) screws.</li> <li>c. Align holes in front panel with holes in housing.</li> <li>d. Secure front panel with fourteen (14) screws.</li> </ul> |
| 13. Control Panel Plate | <ul style="list-style-type: none"> <li>a. Align holes in control panel plate with holes in front panel.</li> <li>b. Secure control panel plate with two (2) screws.</li> <li>c. Install three (3) knobs.</li> </ul>   |
| 14. Air Diffuser Grill  | <ul style="list-style-type: none"> <li>a. Align holes in air diffuser grill with holes in front panel.</li> <li>b. Secure air diffuser grill with eight (8) screws.</li> </ul>  |
| 15. Return Air Grill    | <ul style="list-style-type: none"> <li>a. Align holes in return air grill with holes in front panel.</li> <li>b. Secure return air grill with eight (8) screws.</li> </ul>  |



**4-30. REFRIGERANT PIPING (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

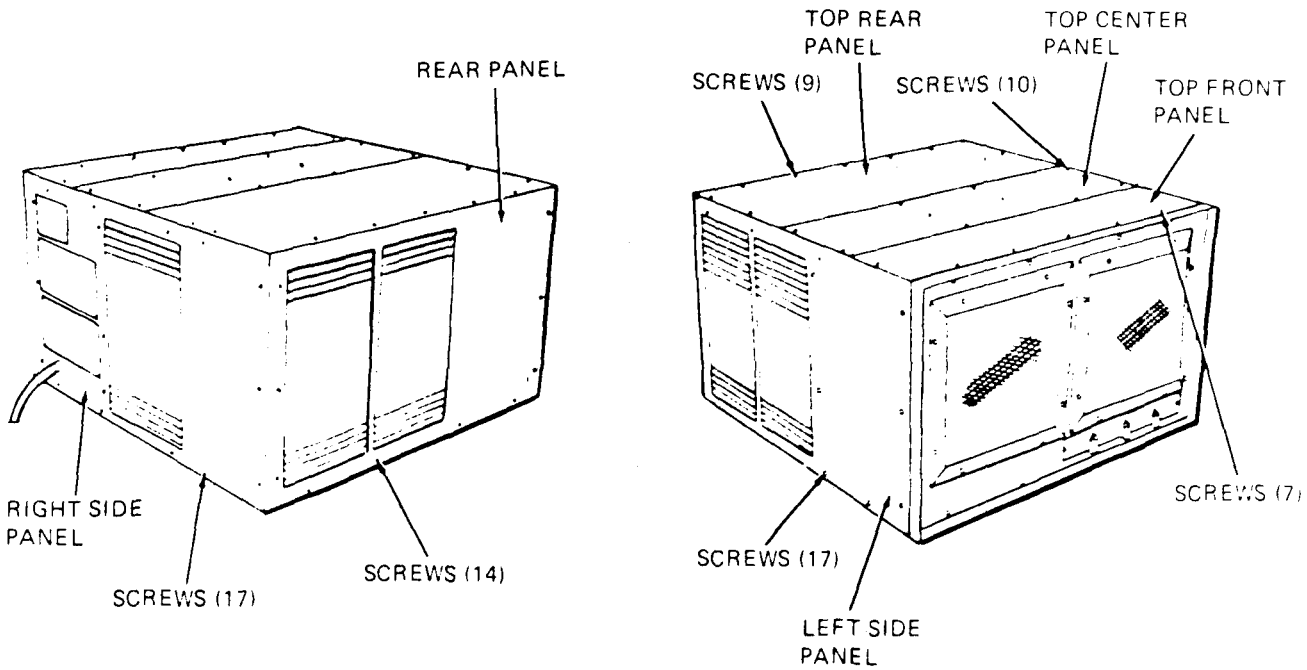
**INSTALLATION**

**RIGHT SIDE AND REAR OF HOUSING**

- 16. Rear Panel
  - a. Align holes in rear panel with holes in housing.
  - b. Secure rear panel with fourteen (14) screws.
- 17. Right Side Panel
  - a. Align holes in right side panel with holes in housing.
  - b. Secure right side panel with seventeen (17) screws.

**TOP AND LEFT SIDE OF HOUSING**

- 18. Left Side Panel
  - a. Align holes in left side panel with holes in housing.
  - b. Secure left side panel with seventeen (17) screws.
- 19. Top Rear Panel
  - a. Align holes in top rear panel with holes in housing.
  - b. Secure top rear panel with nine (9) screws.
- 20. Top Front Panel
  - a. Align holes in top front panel with holes in housing.
  - b. Secure top front panel with seven (7) screws.
- 21. Top Center Panel
  - a. Align holes in top center panel with holes in top front and top rear panels.
  - b. Secure top center panel with ten (10) screws.



**4-31. EVAPORATOR COIL**

This task covers:

- a. Removal
- b. Inspection
- c. Service
- d. Installation

**INITIAL SETUP**

**Material/Parts**

- Air Diffuser Grill Screws (8)
- Left Side Panel Screws (17)
- Dry Cleaning Solvent , App. E, Items 2 & 3

**References**

None

**Troubleshooting Reference**

AIR OUTPUT, Malfunction 1, Step 2

**Approximate Time Required (in minutes)**

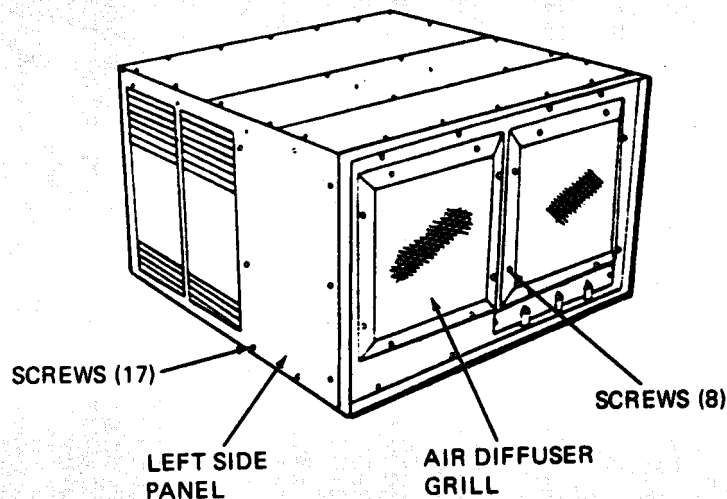
Removal	10
Inspection and Service	10
Installation	10
<b>TOTAL TIME</b>	<b>30</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**FRONT AND LEFT SIDE OF HOUSING**

1. Air Diffuser Grill
  - a. Remove eight (8) screws securing air diffuser grill to front panel.
  - b. Remove air diffuser grill,
  
2. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel to housing .
  - b. Remove left side panel.



**4-31. EVAPORATOR COIL (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSPECTION AND SERVICE**

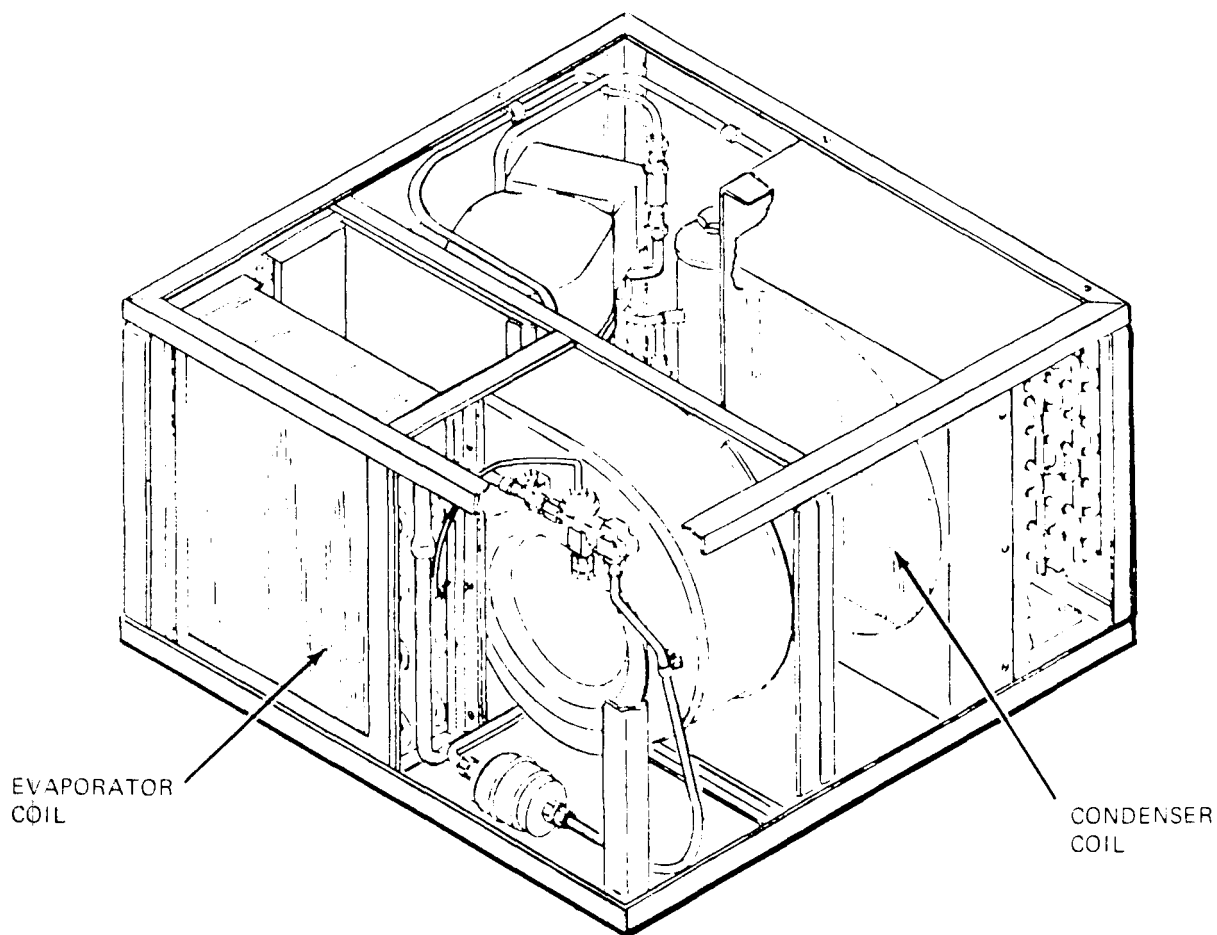
**HOUSING INTERIOR**

**WARNING**

Dry cleaning solvent P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F (38°C).

**WARNING**

Do not use compressed air for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.



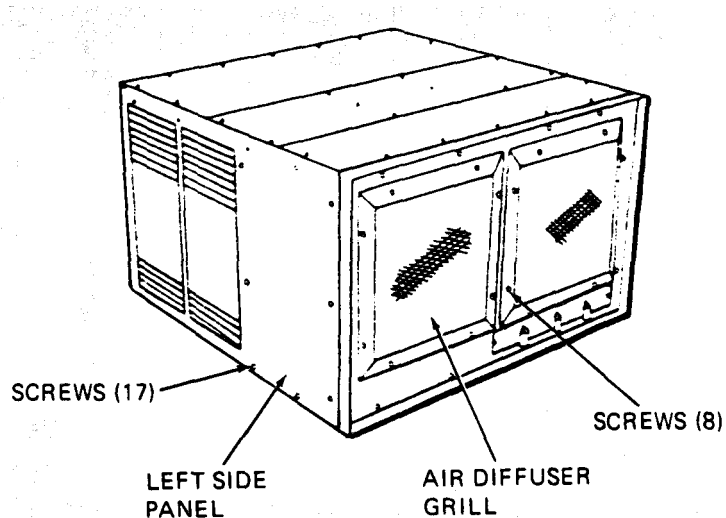


LOCATION/ITEM	ACTION	REMARKS
3. Evaporator Coil	<ul style="list-style-type: none"> <li>a. Inspect evaporator coil for cleanliness.</li> <li>b. Scrub the external portion of evaporator coil with a stiff bristle brush to remove scale and corrosion.</li> <li>c. Use low pressure compressed air to blow out loose material.</li> <li>d. Wipe evaporator coil with a cloth moistened with dry cleaning solvent, specification P-D-680 or P-S-661.</li> <li>e. Inspect evaporator coil for leaks.</li> <li>f. Straighten bent fins.</li> <li>g. Report damaged condition to direct support maintenance personnel.</li> </ul>	

**INSTALLATION**

**FRONT AND LEFT SIDES OF HOUSING**

- 4. Air Diffuser Grill
  - a. Align holes in air diffuser grill with holes in front panel.
  - b. Secure air diffuser grill with eight (8) screws.
- 5. Left Side Panel
  - a. Align holes in left side panel with holes in housing.
  - b. Secure left side panel with seventeen (17) screws.



**4-32. CONDENSER COIL**

This task covers:

- a. Removal
- b. Inspection
- c. Service
- d. Installation

**INITIAL SETUP**

**Material/Parts**

- Rear Panel Screws (14)
- Dry Cleaning Solvent, App.E, Items 2, 3

**References**

None

**Troubleshooting Reference**

- AIR CONDITIONER, Malfunction 2, Step 3
- AIR OUTPUT, Malfunction 2, Step 1

**Approximate Time Required (in minutes)**

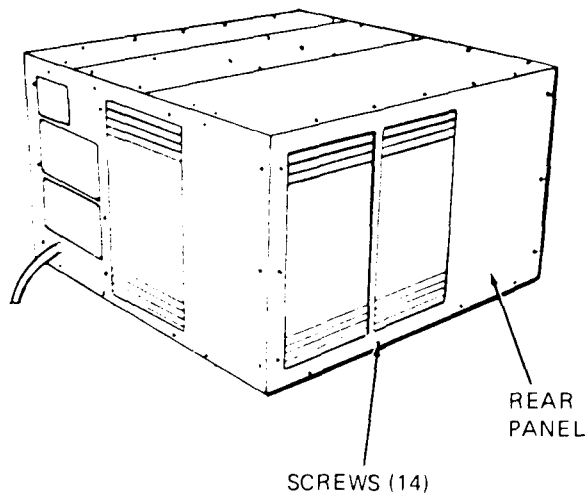
Removal	10
Inspection and Service	10
Installation	10
<b>TOTAL TIME</b>	<b>30</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**REAR OF HOUSING**

1. Rear Panel
  - a. Remove fourteen (14) screws securing rear panel to housing.
  - b. Remove rear panel.



LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSPECTION AND SERVICE**

**HOUSING INTERIOR**

**WARNING**

Dry cleaning solvent P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

**WARNING**

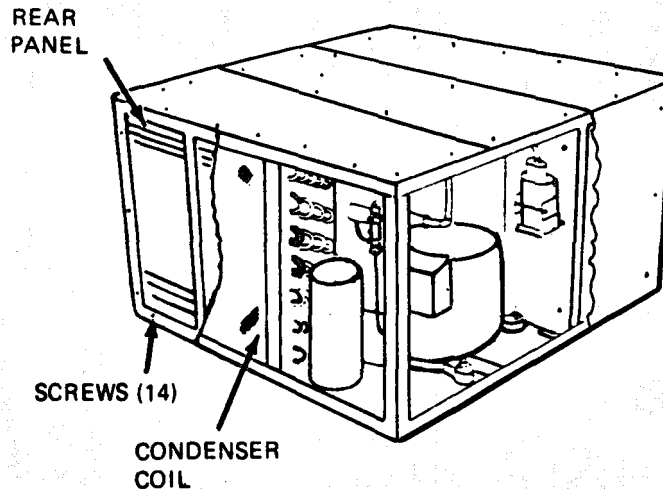
Do not use compressed air for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

- 2. Condenser Coil
  - a. Inspect condenser coil for cleanliness.
  - b. Scrub the external portion of condenser coil with a stiff bristle brush to remove scale and corrosion.
  - c. Use low pressure compressed air to blow out loose material.
  - d. Wipe condenser coil with a cloth moistened with dry cleaning solvent, specification P-D-680 or P-S-661.
  - e. Inspect condenser coil for leaks.
  - f. Straighten bent fins.
  - g. Report damaged condition to direct support maintenance personnel.

**INSTALLATION**

**REAR OF HOUSING**

- 3. Rear Panel
  - a. Align holes in rear panel with holes in housing.
  - b. Secure rear panel with fourteen (14) screws.



**4-33. SIGHT GLASS**

This task covers:

- a. Removal
- b. Inspection
- c. Installation

**INITIAL SETUP**

**Material/Parts**

Rear Panel Screws (14)

**References**

None

**Troubleshooting Reference**

None

**Approximate Time Required (in minutes)**

Removal	10
Inspection	5
Installation	10
<b>TOTAL TIME</b>	<b>25</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**NOTE**

The sight glass may be inspected by looking through the louvers in the left side panel. If you cannot see the sight glass through the left side panel, then remove the rear panel.

**REMOVAL**

**REAR OF HOUSING**

- 1. Rear Panel
  - a. Remove fourteen (14) screws securing rear panel to housing.
  - b. Remove rear panel.

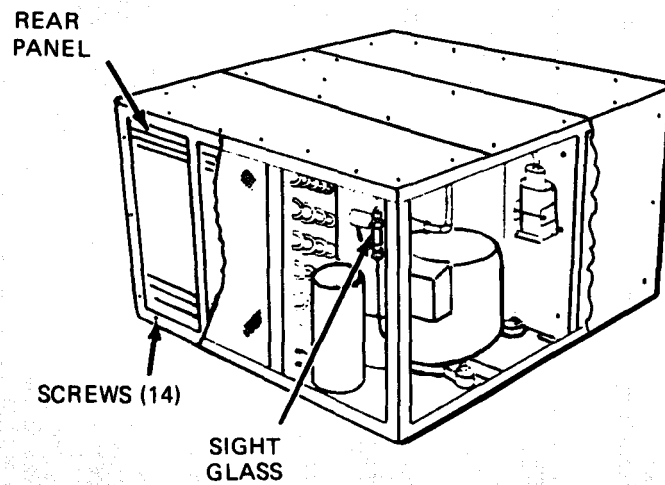
**INSPECTION**

- 2. Sight Glass
  - a. With air conditioner operating and providing cooling air, inspect sight glass.
  - b. Yellow appearance of humidity indicator indicates moisture in system. Bubbles or milky flow in refrigerant indicate low refrigerant charge.
  - c. Report presence of these conditions to direct support maintenance personnel.

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSTALLATION**

- 3. Rear Panel
  - a. Align holes in rear panel with holes in housing.
  - b. Secure rear panel with fourteen (14) screws.



**4-34. EXPANSION VALVE**

This task covers:

- a. Removal
- b. Inspection
- c. Installation

**INITIAL SETUP**

**Material/Parts**

- Top Center Panel Screws (10)
- Top Front Panel Screws (7)
- Right Side Panel Screws (17)

**References**

None

**Troubleshooting Reference**

None

**Approximate Time Required (in minutes)**

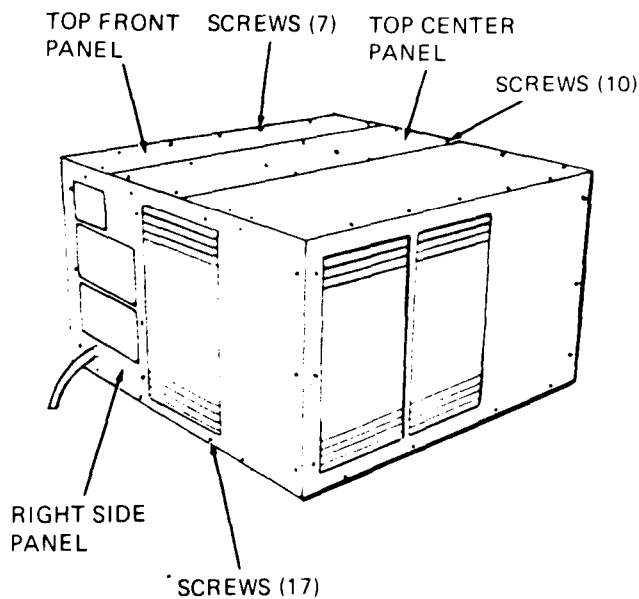
Removal	10
Inspection	10
Installation	10
<b>TOTAL TIME</b>	<b>30</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**TOP AND RIGHT SIDE OF HOUSING**

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
2. Top Front Panel
  - a. Remove seven (7) screws securing top front panel.
  - b. Remove top front panel.
3. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.

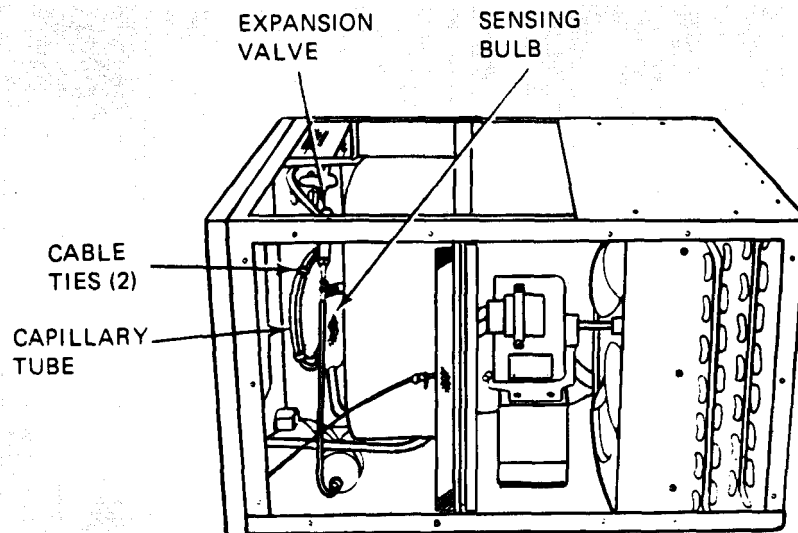


LOCATION/ITEM	ACTION	REMARKS
<b>INSPECTION</b>		
<b>HOUSING INTERIOR</b>		
4. Expansion Valve	<ul style="list-style-type: none"> <li>a. Inspect expansion valve for cracked or damaged condition.</li> <li>b. Inspect capillary tube for kinks or breaks.</li> <li>c. Inspect sensing bulb for security of attachment and be sure it is completely covered with insulation tape.</li> <li>d. Report damaged condition to direct support maintenance personnel.</li> </ul>	

**INSTALLATION**

**TOP AND RIGHT SIDE OF HOUSING**

- 5. Right Side Panel
  - a. Align holes in right side panel with holes in housing.
  - b. Secure right side panel with seventeen (17) screws.
- 6. Top Front Panel
  - a. Align holes in top front panel with holes in housing.
  - b. Secure top front panel with seven (7) screws.
- 7. Top Center Panel
  - a. Align holes in top center panel with holes in top front and top rear panels.
  - b. Secure top center panel with ten (10) screws.



#### **4-35. PREPARATION FOR STORAGE OR SHIPMENT**

Disconnect the power cable. Unbolt the air conditioner from mounting brackets. It will be desirable to cover the air conditioner during transit. Crate the air conditioner for long-distance movement.

- a. No special preservation, packaging, packing, marking, or shipping requirements are associated with the storage or shipment of the unit.
- b. The use of corrosion-preventive compounds, moisture barriers, and dessicant materials is not required.
- c. Before placing the unit in storage, the next scheduled preventive maintenance checks and services should be performed, and all known deficiencies corrected.



# CHAPTER 5

## DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

### CHAPTER OVERVIEW

This chapter contains all the necessary maintenance instructions for direct support maintenance personnel to keep your air conditioner in good repair.

### INDEX

	Para	Page
Common Tools and Equipment	5-2	5-1
Consumable Materials	5-4	5-1
Direct Support Maintenance Procedures	5-7	5-4
Direct Support Troubleshooting	5-5	5-2
Direct Support Troubleshooting Table	5-6	5-2
Maintenance Repair Parts	5-1	5-1
Special Tools and Test Equipment	5-3	5-1

## Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

### 5-1. MAINTENANCE REPAIR PARTS

Repair parts for the air conditioner are listed and illustrated in TM 5-4120-374-24P.

### 5-2. COMMON TOOLS AND EQUIPMENT

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

### 5-3. SPECIAL TOOLS AND TEST EQUIPMENT

No special tools or test equipment are required.

### 5-4. CONSUMABLE MATERIALS

Item No.	N a m e	Specification
1	Refrigerant	R-12

## Section II. DIRECT SUPPORT TROUBLESHOOTING

### 5-5. GENERAL

a. This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner. Each malfunction is followed by a list of probable causes and actions to take to remedy the malfunction. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur; nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

### 5-6. DIRECT SUPPORT TROUBLESHOOTING TABLE

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

#### COMPRESSOR

##### 1. COMPRESSOR WILL NOT START

- Step 1. Check compressor for proper operation and damage.  
 Replace defective compressor (para. 5-8).

##### 2. COMPRESSOR CYCLES INTERMITTENTLY

- Step 1. Inspect sight glass for proper amount of refrigerant.  
 Add refrigerant as required (para. 5-7).
- Step 2. Check for high discharge pressure.  
 Discharge refrigerant from system (para. 5-7).
- Step 3. Check for air in refrigerant system.  
 Purge refrigerant system (para. 5-7).

#### AIR CONDITIONER

##### 1. HIGH DISCHARGE PRESSURE

- Step 1. Check for excessive refrigerant in system.  
 Discharge refrigerant from system (para. 5-7).
- Step 2. Check for air in refrigerant system.  
 Purge refrigerant system (para. 5-7).

##### 2. LOW DISCHARGE PRESSURE

- Step 1. Check to see if compressor is pumping.  
 Replace defective compressor (para. 5-8).
- Step 2. Inspect sight glass for proper amount of refrigerant.  
 Add refrigerant as required (para. 5-7).

---

<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
--------------------	---------------------------	--------------------------

---

### **3. INSUFFICIENT COOLING**

Step 1. Inspect sight glass for proper amount of refrigerant.

Add refrigerant as required (para. 5-7).

Step 2. Check to see if dehydrator is clogged or defective.

Remove restriction or replace dehydrator (para. 5-12).

Step 3. Check for air in refrigerant system.

Purge refrigerant system (para. 5-7).

Step 4. Inspect expansion valve for proper operation and damage.

Replace defective expansion valve (para. 5-14).

### **4. LOW SUCTION PRESSURE**

Step 1. Inspect expansion valve for proper operation.

Replace defective expansion valve (para. 5-14).

Step 2. Check to see if dehydrator is clogged or defective.

Remove restriction or replace dehydrator (para. 5-12).

### **5. LOW SUCTION AND DISCHARGE PRESSURE**

Step 1. Inspect sight glass for proper amount of refrigerant.

Add refrigerant as required (para. 5-7).

Step 2. Inspect refrigerant piping for leaks.

Repair leaks or replace piping (para. 5-9).

Step 3. Inspect expansion valve for proper operation and damage.

Replace defective expansion valve (para. 5-14).

## Section III. DIRECT SUPPORT MAINTENANCE PROCEDURES

### INDEX

	Para	Page
Compressor	5-8	5-10
Condenser Coil	5-11	5-28
Dehydrator	5-12	5-32
Evaporator Coil	5-10	5-22
Expansion Valve	5-14	5-35
Refrigerant Piping	5-9	5-15
Refrigerant Servicing	5-7	5-4
Sight Glass	5-13	5-34

**WARNING**

Disconnect the power source before performing any maintenance function.

**WARNING**

Do not use compressed air for cleaning purposes except where reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

### 5-7. REFRIGERANT SERVICING

This task covers:

- |            |                 |
|------------|-----------------|
| a. Removal | c. Service      |
| b. Test    | d. Installation |

#### INITIAL SETUP

##### Material/Parts

- Top Center Panel Screws (10)
- Dry Nitrogen
- Refrigerant R-12
- Rear Panel Screws (14)

##### References

- Paragraph 5-12

#### Troubleshooting Reference

- COMPRESSOR, Malfunction 2, Step 1
- COMPRESSOR, Malfunction 2, Step 2
- COMPRESSOR, Malfunction 2, Step 3
- AIR CONDITIONER, Malfunction 1, Step 1
- AIR CONDITIONER, Malfunction 1, Step 2
- AIR CONDITIONER, Malfunction 3, Step 1
- AIR CONDITIONER, Malfunction 3, Step 3
- AIR CONDITIONER, Malfunction 5, Step 1

#### Approximate Time Required (in minutes)

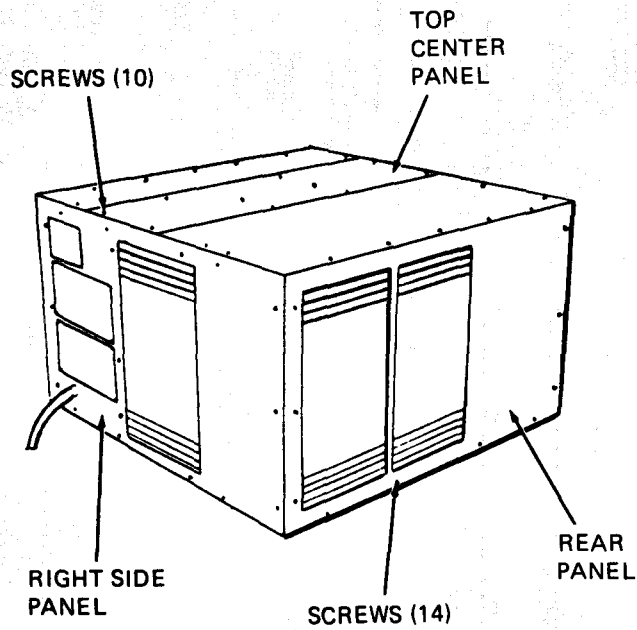
Removal	10
Test	30
Service	720
Installation	10
<b>TOTAL TIME</b>	<b>770</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**TOP AND REAR OF HOUSING**

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
  
2. Rear Panel
  - a. Remove fourteen (14) screws securing rear panel.
  - b. Remove rear panel.



**5-7. REFRIGERANT SERVICING (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

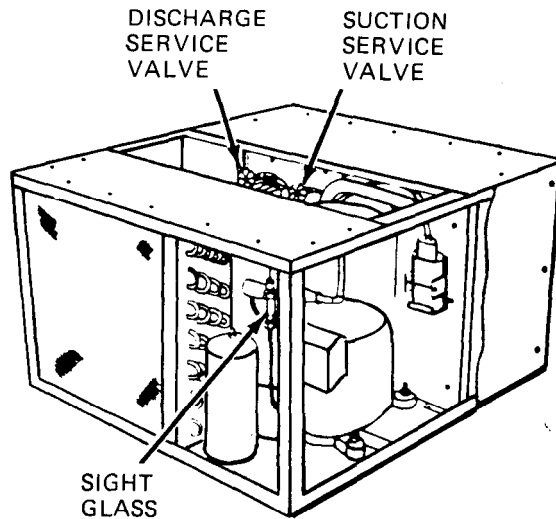
**TESTING**

**TOP OF HOUSING**

3. Refrigerant System
- a. Remove caps from discharge and suction service valves.
  - b. Pressure check the refrigerant system as follows:
    - (1) Connect suction pressure gauge to suction service valve.
    - (2) Start air conditioner.
    - (3) Connect discharge pressure gauge to discharge service valve.
    - (4) Open discharge and suction service valves.
    - (5) Compare gauge readings with the normal range of system pressure as shown in the following table.
    - (6) Close discharge and discharge service valves.
    - (7) Remove gauges and install valve caps.

**Normal Operating Pressures**

		Outdoor Ambient Temperature	
		120°F/125°F (48.9°C/57.7°C)	95°F (35°C)
		At 90°F/80°F (32.2°C/26.7°C) DB/WB return air to unit	
Suction Pressure	61–71 PSI		
Discharge Pressure	230–260 PSI		
		At 80°F/67°F (26.7°C/19.4°C) DB/WB return air to unit	
Suction Pressure		44–54 PSI	
Discharge Pressure		150–175 PSI	



LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**SERVICE**

TOP OF HOUSING

**WARNING**

Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that Refrigerant 12 does not come in contact with eyes. In case of refrigerant leaks, ventilate area immediately.

- 4. Discharge Refrigerant System.
  - a. Remove valve caps from service valves.
  - b. Attach charging manifold hoses to service valves.

**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.

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

- c. Connect and operate a recovery/recycling unit in accordance with the manufacturer's instructions.
- 5. Dehydrator
  - Refer to paragraph 5-12 and replace dehydrator.
- 6. Purge Refrigerant system
  - a. Remove valve cap from discharge and suction service valves.
  - b. Using proper nitrogen regulator, connect a cylinder of dry nitrogen to suction service valve.
  - c. Attach suitable hose to discharge service valve.
  - d. Open both suction and discharge service valves.
  - e. Open valve on nitrogen cylinder and allow nitrogen to flow through refrigerant system until all moisture is forced out. Do not exceed 5 psig.
  - f. Close nitrogen cylinder valve.
  - g. Close suction and discharge service valves.
  - h. Remove nitrogen cylinder and discharge hose.
  - i. Using bar manifold, connect vacuum pump to center hose. Using proper hoses, connect suction service valve to suction pressure gage.
  - j. Turn on vacuum pump, open service valves and hold a 29.0 inch Hg vacuum for eight (8) hours.
  - k. Close suction and discharge service valves.
  - l. Turn off vacuum pump.
  - m. Remove hoses from suction and discharge valves.
  - n. Remove vacuum pump and install valve caps.

5-7. REFRIGERANT SERVICING (CONT)

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**SERVICE**

TOP OF HOUSING

7. Soldering Procedure

- a. Solder all copper-to-copper joints with silver solder type 3, 4 or 6A per specification QQ-S-561.
- b. Solder all copper-to-brass or copper-to-steel with type 4 or 6A per specification QQ-S-561.
- c. Solder melting point is 1160° F (625 °C).
- d. Make all solder joints with an atmosphere of inert gas to prevent internal oxidation.

**WARNING**

Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that Refrigerant 12 does not come in contact with eyes. In case of refrigerant leaks, ventilate area immediately.

8. Charging a Completely Evacuated System

**CAUTION**

Always charge the air conditioning system with Refrigerant 12 vapor. NEVER introduce LIQUID refrigerant into the service valves.

NOTE

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

- a. Place refrigerant drum on a scale in an upright position. Monitor weight until three pounds of R12 refrigerant have entered the system.
- b. Remove valve cap from suction service valve.
- c. Loosely connect charging line to suction service valve.
- d. Partially open refrigerant drum valve and purge air from charging line.
- e. Close refrigerant drum valve and tighten connection at suction service valve.
- f. With air conditioner operating in the cooling mode, open suction service valve and refrigerant drum valve, and add approximately one (1) ounce of refrigerant per minute. Constantly observe sight glass and when bubbles disappear, close suction service valve.
- g. Close refrigerant drum valve.
- h. Carefully loosen charging line to release trapped pressure.
- i. Disconnect charging line and install valve cap on suction service valve.
- j. Check sight glass for gas bubbles. If gas bubbles are present, add additional refrigerant.

9. Low Charged System

In the event the air conditioner requires additional refrigerant, perform steps b through j above.

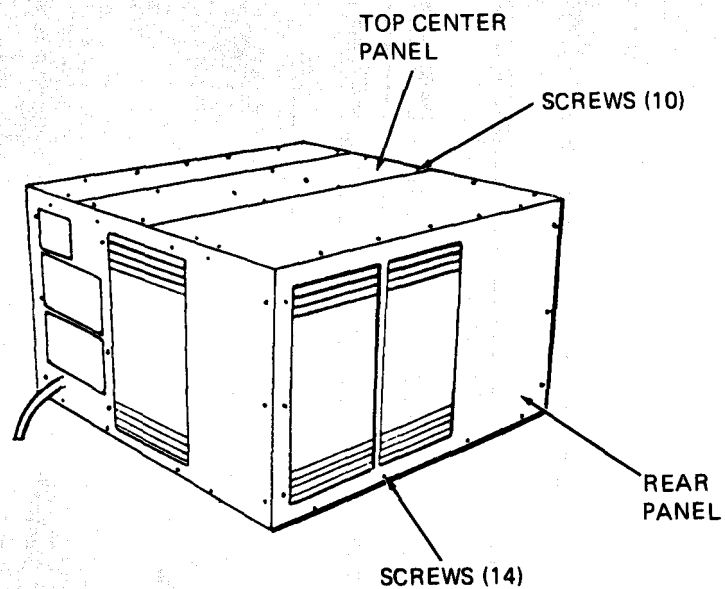


LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

### **INSTALLATION**

#### **TOP AND REAR OF HOUSING**

10. Rear Panel
- Align holes in rear panel with holes in housing.
  - Secure rear panel with fourteen (14) screws.
11. Top Center Panel
- Align holes in top center panel with holes in top front panel and top rear panel.
  - Secure top center panel with ten (10) screws.



**5-8. COMPRESSOR**

This task covers:

- a. Panel Removal
- b. Compressor Wiring Repair
- c. Compressor Testing
- d. Compressor Service
- e. Compressor Installation
- f. Panel Installation

**INITIAL SETUP**

**Material/Parts**

- Top Center Panel Screws (10)
- Top Rear Panel Screws (9)
- Rear Panel Screws (14)
- Nuts (4)
- Capscrews (4)
- Flat Washers (8)

**References**

- Paragraph 5-7
- Paragraph 5-12

**Troubleshooting Reference**

- COMPRESSOR, Malfunction 1, Step 1
- AIR CONDITIONER, Malfunction 1, Step 1

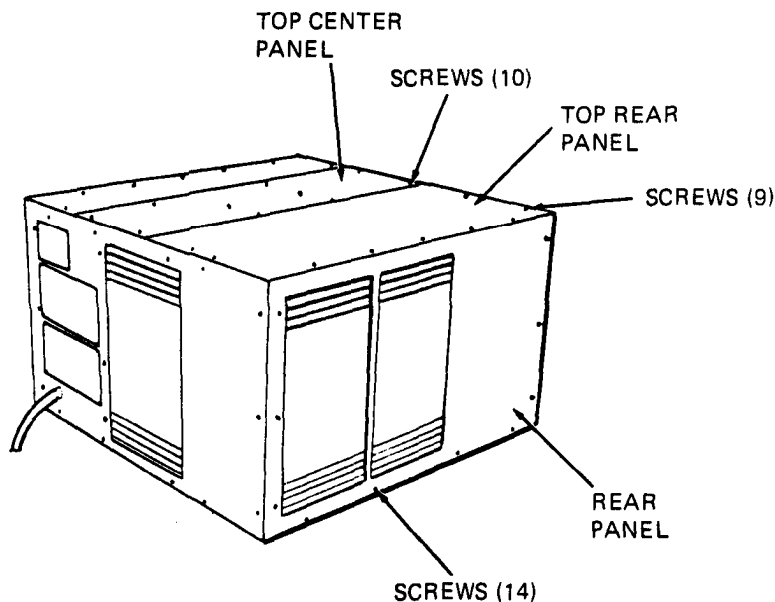
**Approximate Time Required (in minutes)**

Removal	30
Test	30
Service	720
Repair	60
Installation	30
<b>TOTAL TIME</b>	<b>870</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**PANEL REMOVAL**

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel to top front and top rear panels.
  - b. Remove top center panel.
2. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel to housing.
  - b. Remove top rear panel.
3. Rear Panel
  - a. Remove fourteen (14) screws securing rear panel to housing.
  - b. Remove rear panel.



**5-8. COMPRESSOR (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**PANEL REMOVAL**

**LEFT SIDE OF HOUSING**

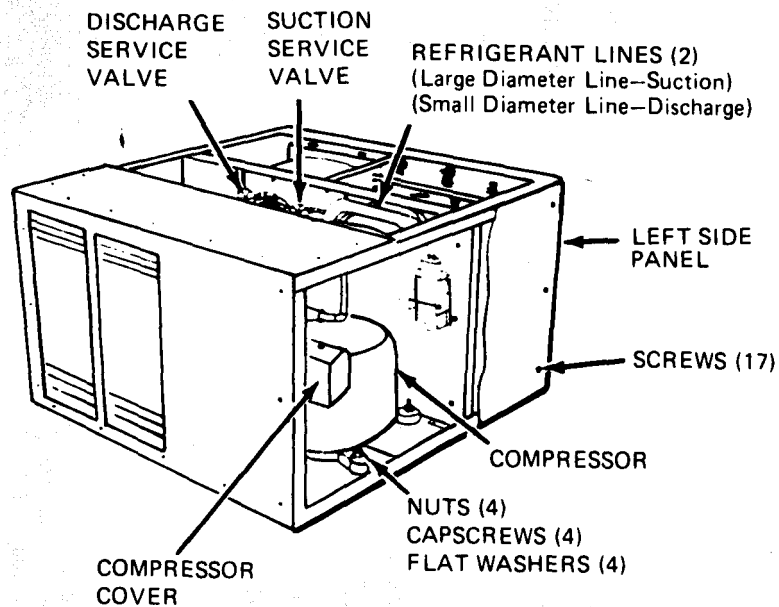
- |                    |  |
|--------------------|--|
| 4. Left Side Panel | a. Remove seventeen (17) screws securing left side panel to housing housing.<br>b. Remove left side panel. |
|--------------------|--|

**REPAIR OF COMPRESSOR WIRING**

**WARNING**

**Disconnect input power source before performing this maintenance task.**

- |                      |  |
|----------------------|--|
| 5. Compressor Wiring | a. Tighten loose connections.<br>b. Repair damaged wiring by removing insulation to expose 1/2 inch of bare wire on each side of break.<br>c. Twist the wire ends together and solder the splice.<br>d. Cover the splice with PVC electrical tape, making certain to cover all repaired areas. |
|----------------------|--|



**5-8. COMPRESSOR (CONT)**

LOCATION/TESTING	ACTION	REMARKS
------------------	--------	---------

**TESTING**

**TOP OF HOUSING**

6. Compressor
- a. Connect suction and discharge pressure gauges to the suction and discharge service valves.
  - b. Open suction and discharge service valves.
  - c. Operate the air conditioner in the cooling mode and verify that the normal operating pressures are as follows:

**Normal Operating Pressures**

	Outdoor Ambient Temperature	
	120°F/125°F(48.9°C/57.7°C)	95°F(35°C)
	At 90°F/80°F(32.2°C/26.7°C)DB/WB	<b>return air to unit</b>
Suction Pressure	61–71 PSI	
Discharge Pressure	230–260 PSI	
	At 80°F/67°F(26.7°C/19.4°C)DB/WB	<b>return air to unit</b>
Suction Pressure		44–54 PSI
Discharge Pressure		150–175 PSI

- d. Stop air conditioner.
- e. Close suction and discharge service valves.
- f. Remove gauges.

**WARNING**

**Disconnect input power source before performing this maintenance task.**

- g. Operate the air conditioner in the cooling mode and using a multimeter, measure the insulation resistance of the compressor internal motor windings at the start relay and selector switch.
- h. Verify that the insulation resistance between the windings and compressor frame is NOT less than 60 megohms.
- i. Verify that the insulation resistance of the main winding (terminal pin A to C) is between .6 and .8 ohms.
- j. Verify that the insulation resistance of the auxiliary winding (terminal pin A to B) is between 5 and 7 ohms.
- k. If testing indicates that the compressor is defective, remove or repair compressor.

LOCATION/ITEM	ACTION	REMARKS
<b>SERVICE</b>		
7. Compressor Burnout Procedure	<ul style="list-style-type: none"> <li>a. If the compressor is mechanically frozen or has sustained a motor burnout, replace the compressor.</li> <li>b. Flush out the entire refrigeration system as follows or repeated burnouts will occur.               <ul style="list-style-type: none"> <li>(1) Refer to paragraph 5-7 and discharge refrigerant system.</li> <li>(2) Purge refrigerant system with dry nitrogen (paragraph 5-7).</li> <li>(3) Remove defective compressor.                   <ul style="list-style-type: none"> <li>(a) Unscrew and remove flare nut connecting suction refrigerant line to compressor.</li> <li>(b) Remove suction refrigerant line from compressor.</li> <li>(c) Unsolder and remove discharge line from compressor.</li> <li>(d) Remove four (4) nuts, capscrews and eight (8) flat washers securing compressor to housing.</li> <li>(e) Tag and disconnect electrical leads from compressor.</li> <li>(f) Remove compressor from housing through left side.</li> </ul> </li> <li>(4) With compressor removed, purge refrigerant system with dry nitrogen (paragraph 5-7).</li> <li>(5) Install new compressor.</li> <li>(6) Install new dehydrator (paragraph 5-12).</li> <li>(7) Discharge refrigerant system three (3) times (para. 5-7).</li> <li>(8) Start and operate air conditioner for twenty-four hours (paragraph 2-3).</li> <li>(9) Stop air conditioner (paragraph 2-5).</li> <li>(10) Discharge refrigerant system and purge with dry nitrogen (paragraph 5-7).</li> <li>(11) Remove dehydrator and install a new one (para. 5-12).</li> <li>(12) Discharge refrigerant system and recharge with refrigerant (paragraph 5-7).</li> <li>(13) Operate air conditioner.</li> </ul> </li> </ul>	

**5-8. COMPRESSOR (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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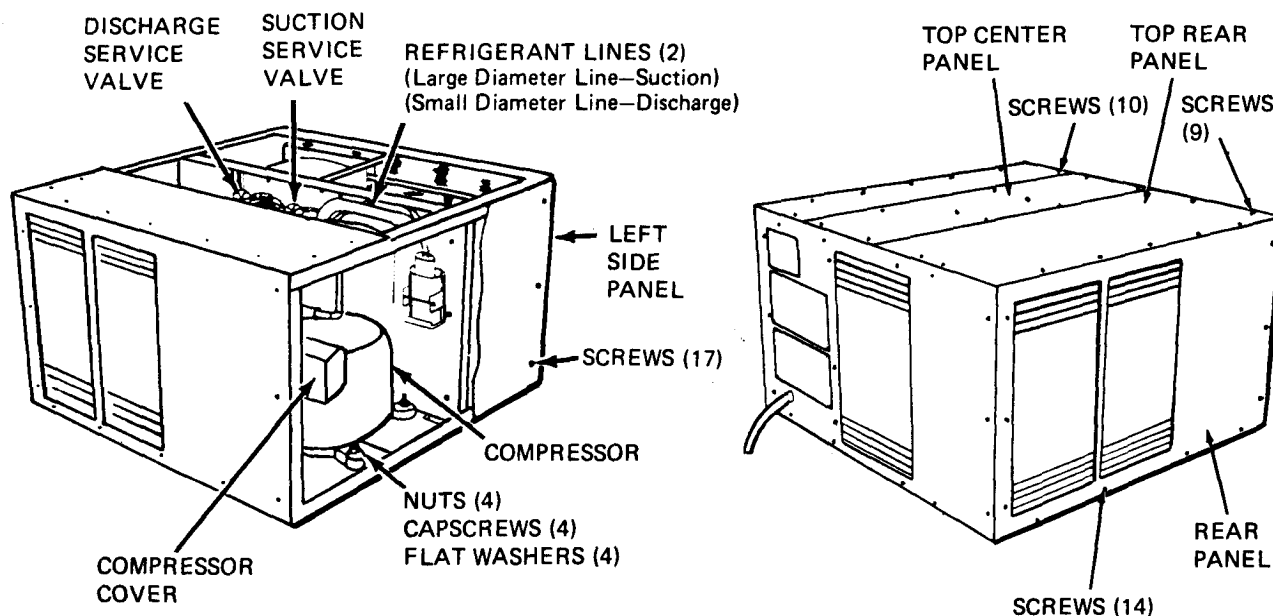
**INSTALLATION**

**TOP AND LEFT SIDE OF HOUSING**

8. Compressor
- a. Install compressor through left side of housing.
  - b. Align holes in compressor mounting feet with holes in housing.
  - c. Secure compressor with eight (8) flatwashers, four (4) cap-screws and four (4) nuts.
  - d. Install two (2) refrigerant lines on compressor and tighten flare nut on suction refrigerant line.
  - e. Refer to paragraph 5-7 and solder discharge refrigerant line.

**TOP AND REAR OF HOUSING**

9. Rear Panel
- a. Align holes in rear panel with holes in housing.
  - b. Secure rear panel with fourteen (14) screws.
10. Top Rear Panel
- a. Align holes in top rear panel with holes in housing.
  - b. Secure top rear panel with nine (9) screws.
11. Refrigerant System Refer to paragraph 5-7 and charge refrigerant system. Refer to burnout procedure if a burnout has been detected.
12. Top Center Panel
- a. Align holes in top center panel with holes in top rear panel and top front panel.
  - b. Secure top center panel with ten (10) screws.



**5-9. REFRIGERANT PIPING AND SERVICE VALVES**

This task covers:

- a. Removal
- b. Test
- c. Repair
- d. Installation

**INITIAL SETUP**

**Material/Parts**

- Top Center Panel Screws (10)
- Top Front Panel Screws (7)
- Top Rear Panel Screws (9)
- Right Side Panel Screws (17)
- Rear Panel Screws (14)
- Left Side Panel Screws (17)
- Return Air Grill Screws (8)
- Air Diffuser Grill Screws (8)
- Control Panel Plate Screws (2)
- Front Panel Screws (14)

**References**

Paragraph 5-7

**Troubleshooting Reference**

AIR CONDITIONER, Malfunction 5, Step 2

**Approximate Time Required (in minutes)**

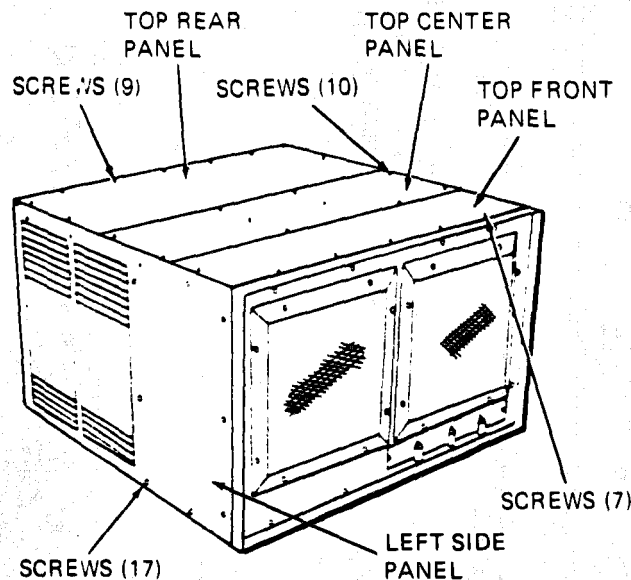
Removal	20
Testing and Repair	30
Installation	750
<b>TOTAL TIME</b>	<b>800</b>

LOCATION/ITEM	ACTION	REMARKS
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**REMOVAL**

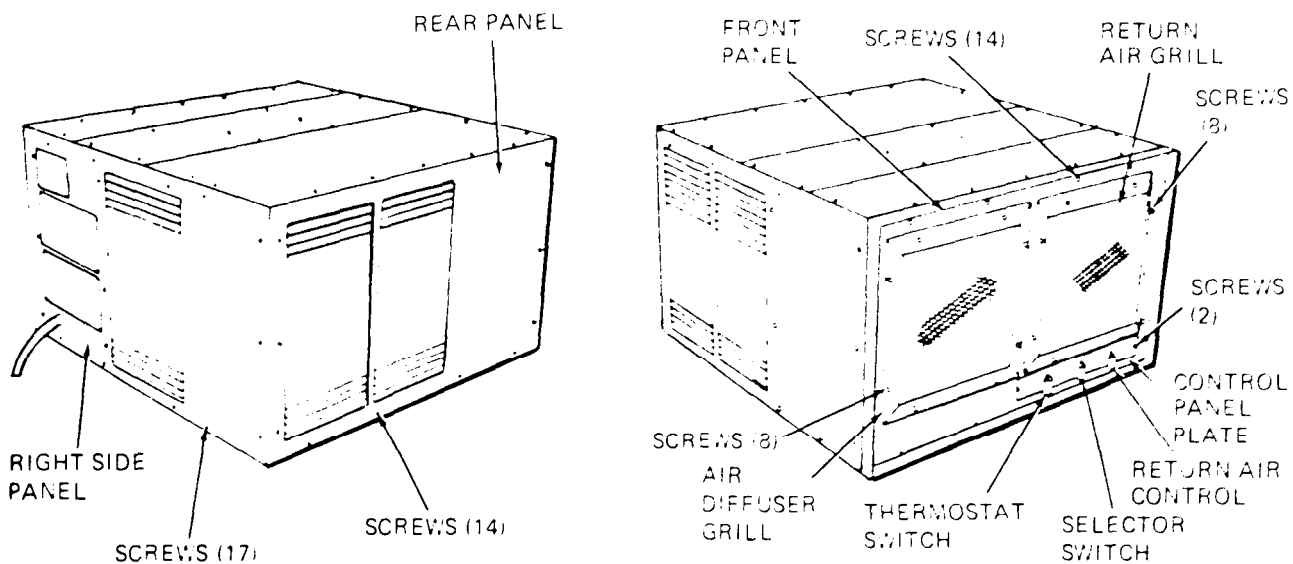
**TOP AND LEFT SIDE OF HOUSING**

- 1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
- 2. Top Front Panel
  - a. Remove seven (7) screws securing top front panel.
  - b. Remove top front panel.
- 3. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel.
  - b. Remove top rear panel.
- 4. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel.
  - b. Remove left side panel.



**5-9. REFRIGERANT PIPING AND SERVICE VALVES (CONT)**

LOCATION/ITEM	ACTION	REMARKS
<b>REMOVAL</b>		
<b>RIGHT SIDE AND REAR OF HOUSING</b>		
5. Right Side Panel	a. Remove seventeen (17) screws securing right side panel. b. Remove right side panel.	
6. Rear Panel	a. Remove fourteen (14) screws securing rear panel. b. Remove rear panel.	
<b>FRONT OF HOUSING</b>		
7. Control Panel Plate	a. Loosen setscrews and remove knobs from fresh air control selector switch and thermostat switch. b. Remove two (2) screws securing control panel plate. c. Remove control panel plate.	
8. Return Air Grill	a. Loosen clamp on evaporator shroud and remove wire. b. Remove eight (8) screws securing return air grill. c. Remove return air grill.	
9. Air Diffuser Grill	a. Remove eight (8) screws securing air diffuser grill. b. Remove air diffuser grill.	
10. Front Panel	a. Remove two (2) screws securing thermostat switch to front panel. b. Remove fourteen (14) screws securing front panel. c. Remove front panel.	
11. Refrigerant System	Refer to para. 5-7 and discharge refrigerant system.	





LOCATION/ITEM	ACTION	REMARKS
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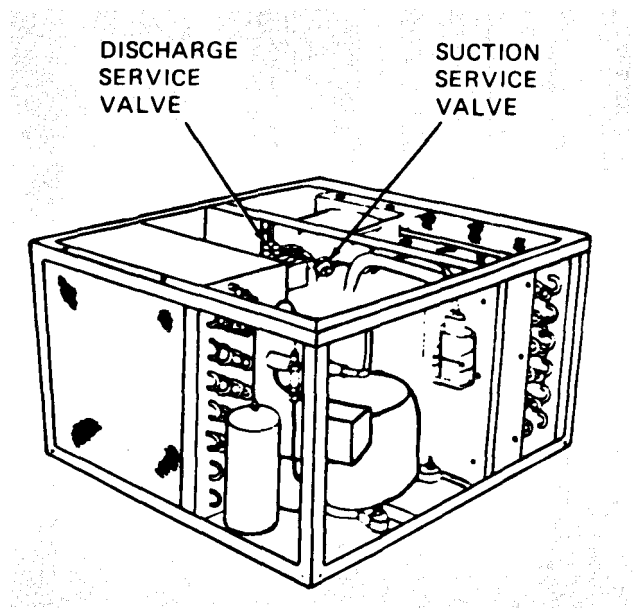
**INTERIOR OF HOUSING**

- |                        |   |
|------------------------|---|
| 12. Service Valves     | <ul style="list-style-type: none"> <li>a. Unscrew and remove flare nuts from suction and discharge service valves.</li> <li>b. Remove refrigerant lines from suction and discharge service valves.</li> <li>c. Remove two (2) screws from each service valve.</li> <li>d. Remove suction and discharge service valves.</li> </ul> |
| 13. Refrigerant Piping | <ul style="list-style-type: none"> <li>a. Unsolder and remove tubing only when necessary to remove a defective part.</li> <li>b. When soldering, constantly purge the refrigerant system with dry nitrogen to prevent scale formation within the refrigerant system (paragraph 5-7).</li> </ul>                                   |

**INSPECTION**

**INTERIOR OF HOUSING**

- |                        |   |
|------------------------|---|
| 14. Refrigerant Piping | <ul style="list-style-type: none"> <li>a. Visually inspect all piping for kinks, cracks or splits.</li> <li>b. Inspect all fittings for leaks.</li> </ul> |
| 15. Valves             | <ul style="list-style-type: none"> <li>a. Visually inspect all valves for signs of damage.</li> <li>b. Inspect valve fittings for leaks.</li> </ul>       |



**5-9. REFRIGERANT PIPING AND SERVICE VALVES (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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**TESTING AND REPAIR**



**Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with eyes. In case of refrigerant leaks, ventilate area immediately.**

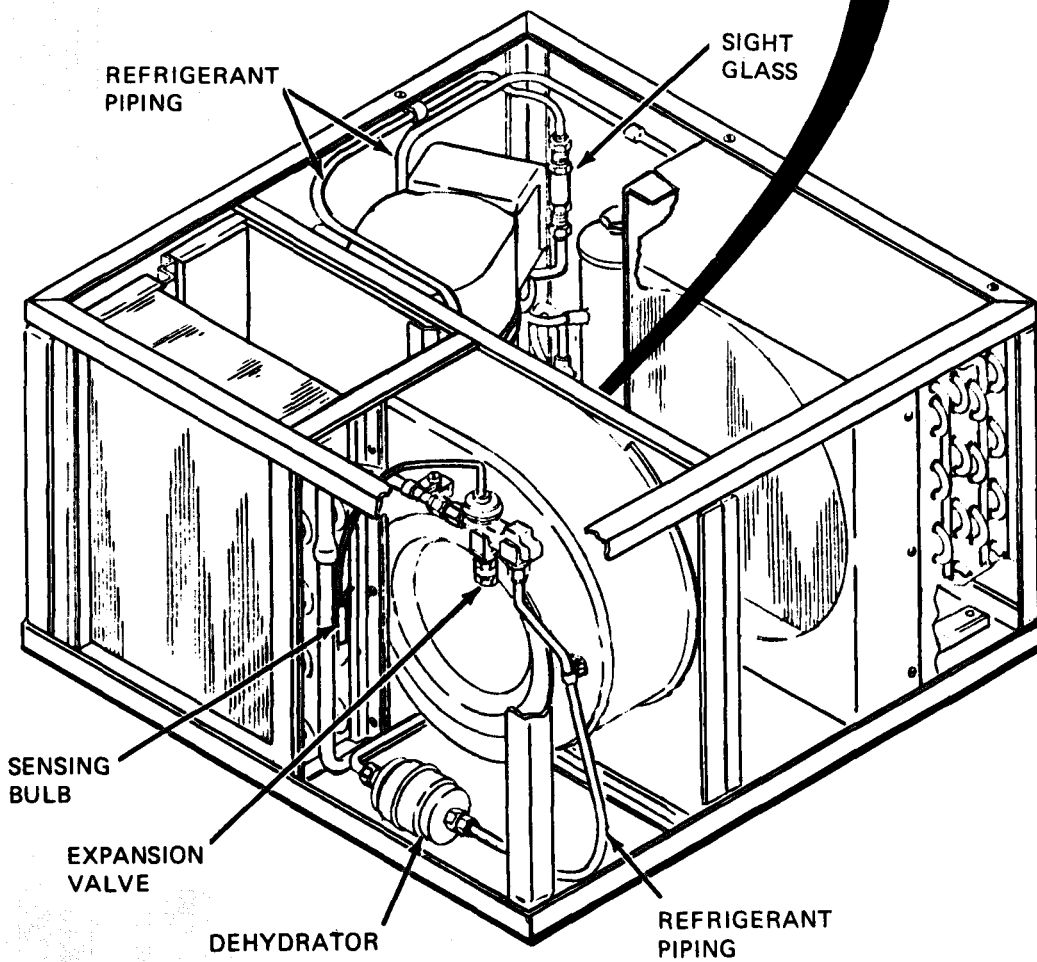
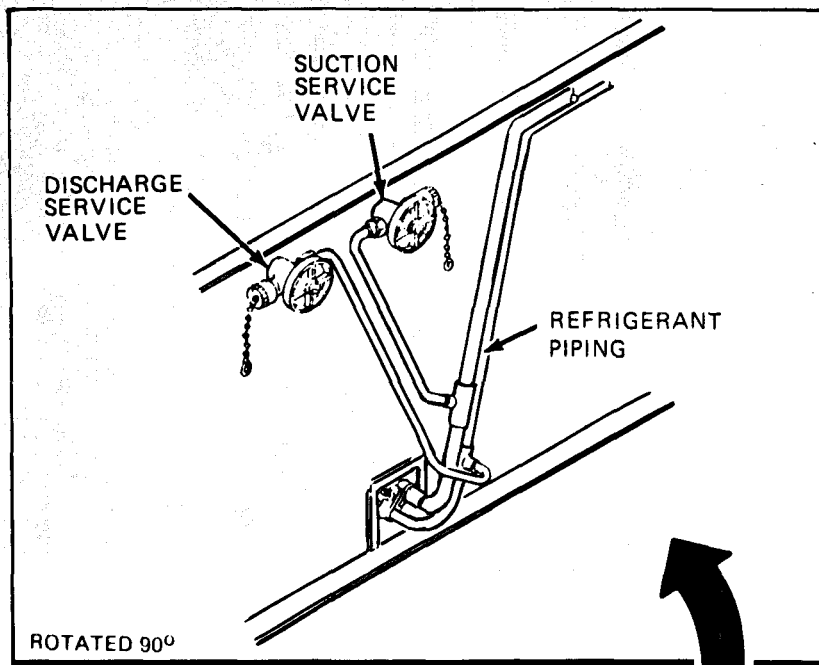
16. Refrigerant Piping
- a. Check all piping and connections with a General Electric Type H-2 Halogen Test Detector (or approved equal).
  - b. Calibrate the detector with a General Electric LS-20 leak standard (or approved equal) for a pure refrigerant leak rate of 0.1 ounce per year.
  - c. Replace any piping or connection that is leaking.

**INSTALLATION**

17. Refrigerant Piping
- a. Solder all copper-to-copper joints with silver solder type 3, 4 or 6A per specification QQ-S-561.
  - b. Solder all copper-to-brass or copper-to-steel with type 4 or 6A per specification QQ-S-561.
  - c. Solder melting point is 1160°F(625°C).
  - d. Make all solder joints with an atmosphere of inert gas to prevent internal oxidation.
18. Service Valves
- a. Connect suction and discharge service valves to refrigerant piping.
  - b. Tighten flare nuts at suction and discharge service valves.
  - c. Secure suction and discharge service valves to bulkhead with four (4) screws.

**FRONT OF HOUSING**

19. Front Panel
- a. Align holes in thermostat switch with holes in front panel.
  - b. Secure thermostat to front panel with two (2) screws.
  - c. Align holes in front panel with holes in housing.
  - d. Secure front panel with fourteen (14) screws.



**5-9. REFRIGERANT PIPING AND SERVICE VALVES (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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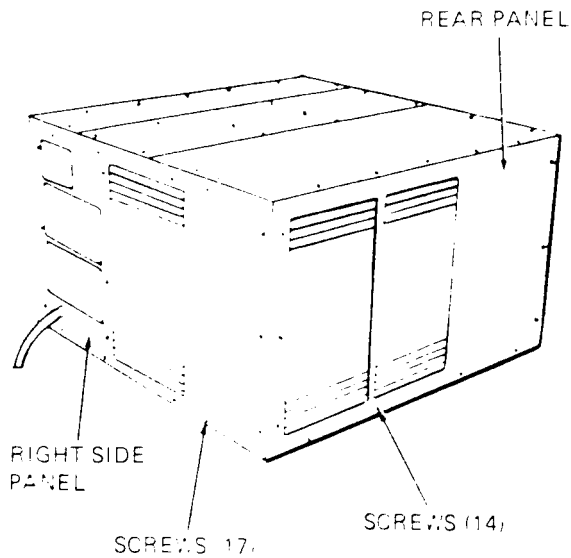
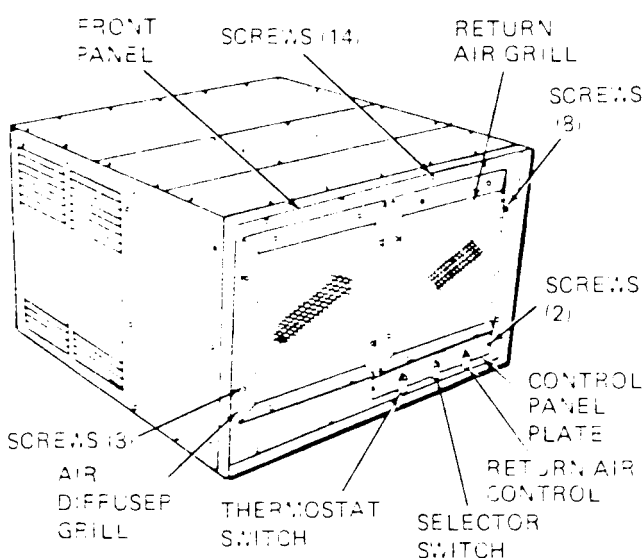
**INSTALLATION**

**FRONT OF HOUSING**

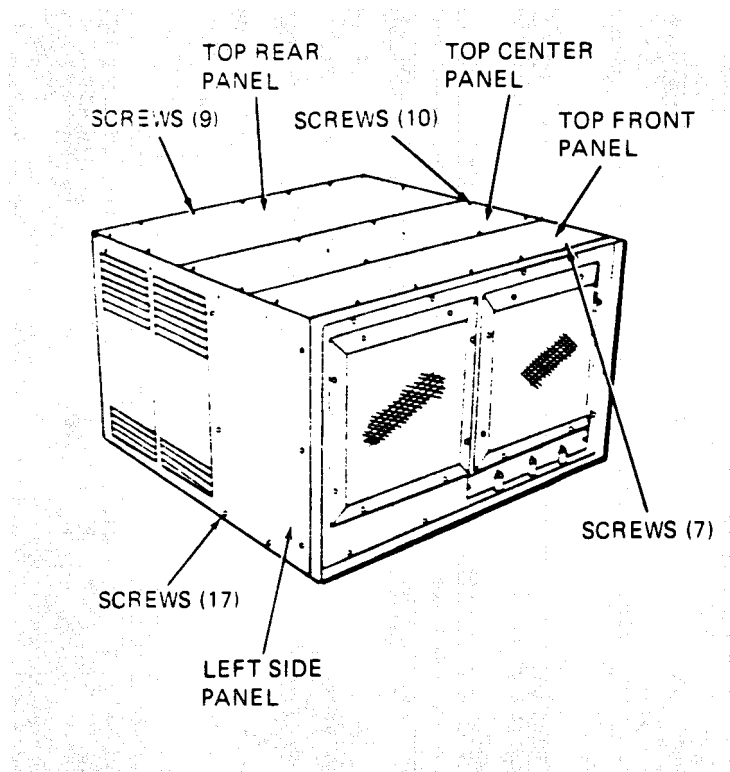
- 20. Air Diffuser Grill
  - a. Align holes in air diffuser grill with holes in front panel.
  - b. Secure air diffuser grill with eight (8) screws.
- 21. Return Air Grill
  - a. Align holes in return air grill with holes in front panel.
  - b. Secure return air grill with eight (8) screws.
  - c. Install wire through clamp on evaporator shroud and tighten clamp.
- 22. Control Panel Plate
  - a. Align holes in control panel plate with holes in front panel.
  - b. Secure control panel plate with two (2) screws.
  - c. Install three (3) knobs.

**RIGHT SIDE AND REAR OF HOUSING**

- 23. Rear Panel
  - a. Align holes in rear panel with holes in housing.
  - b. Secure rear panel with fourteen (14) screws.
- 24. Right Side Panel
  - a. Align holes in right side panel with holes in housing.
  - b. Secure right side panel with seventeen (17) screws.



LOCATION/ITEM	ACTION	REMARKS
<b>TOP AND LEFT SIDE OF HOUSING</b>		
25. Left Side Panel	a. Align holes in left side panel with holes in housing. b. Secure left side panel with seventeen (17) screws.	
26. Top Rear Panel	a. Align holes in top rear panel with holes in housing. b. Secure top rear panel with nine (9) screws.	
27. Top Front Panel	a. Align holes in top front panel with holes in housing. b. Secure top front panel with seven (7) screws.	
28. Refrigerant Servicing	Refer to paragraph 5-7 and charge refrigerant system.	
29. Top Center Panel	a. Align holes in top center panel with holes in top front and top rear panels. b. Secure top center panel with ten (10) screws.	



### 5-10. EVAPORATOR COIL

This task covers:

- a. Removal
- b. Test
- d. Installation

#### INITIAL SETUP

##### Material/Parts

- Top Center Panel Screws (10)
- Top Front Panel Screws (7)
- Top Rear Panel Screws (9)
- Right Side Panel Screws (17)
- Rear Panel Screws (14)
- Left Side Panel Screws (17)
- Thermostat Switch Screws (2)
- Selector Switch Screws (2)
- Control Panel Plate Screws (2)
- Front Panel Screws (14)
- Condenser Shroud Screws (2)
- Frame Screws (8)
- Evaporator Coil Screws (6)
- Evaporator Coil Screws (4)

##### References

Paragraph 5-7

##### Troubleshooting Reference

None

##### Approximate Time Required (in minutes)

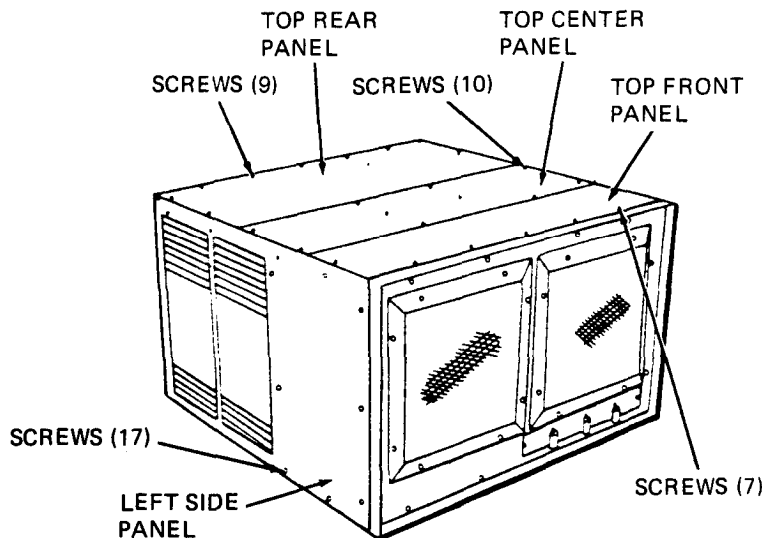
Removal	30
Test	20
Repair	20
Installation	720
<b>TOTAL TIME</b>	<b>790</b>

LOCATION/ITEM	ACTION	REMARKS
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#### **REMOVAL**

##### TOP AND LEFT SIDE OF HOUSING

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
2. Top Front Panel
  - a. Remove seven (7) screws securing top front panel.
  - b. Remove top front panel.
3. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel.
  - b. Remove top rear panel.
4. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel.
  - b. Remove left side panel.



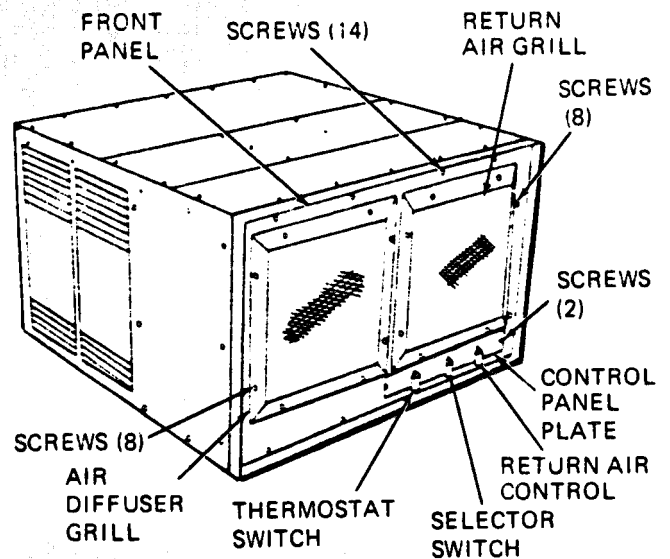
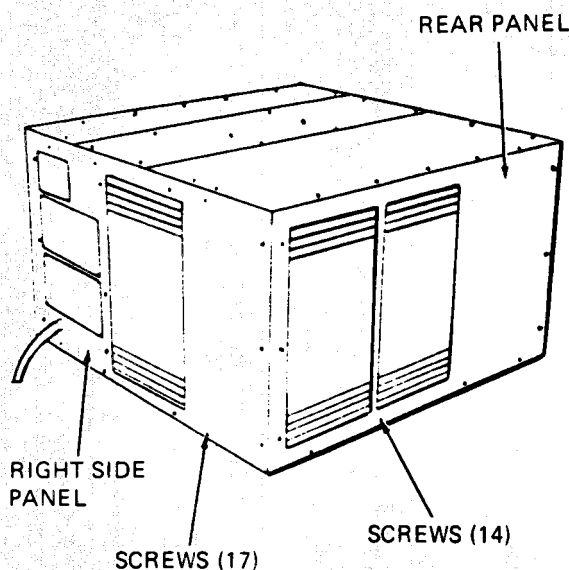
LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**RIGHT SIDE AND REAR OF HOUSING**

- |                     |   |
|---------------------|---|
| 5. Right Side Panel | <ul style="list-style-type: none"> <li>a. Remove seventeen (17) screws securing right side panel.</li> <li>b. Remove right side panel.</li> </ul> |
| 6. Rear Panel       | <ul style="list-style-type: none"> <li>a. Remove fourteen (14) screws securing rear panel.</li> <li>b. Remove rear panel.</li> </ul>              |

**FRONT OF HOUSING**

- |                        |   |
|------------------------|---|
| 7. Control Panel Plate | <ul style="list-style-type: none"> <li>a. Loosen setscrews and remove knobs from air control, selector switch and thermostat switch.</li> <li>b. Remove two (2) screws securing control panel plate.</li> <li>c. Remove control panel plate.</li> </ul>   |
| 8. Front Panel         | <ul style="list-style-type: none"> <li>a. Loosen clamp on evaporator shroud and remove wire.</li> <li>b. Remove two (2) screws securing thermostat switch to front panel.</li> <li>c. Remove two (2) screws securing selector switch to front panel.</li> <li>d. Remove fourteen (14) screws securing front panel.</li> <li>e. Remove front panel.</li> </ul> |



**5-10. EVAPORATOR COIL (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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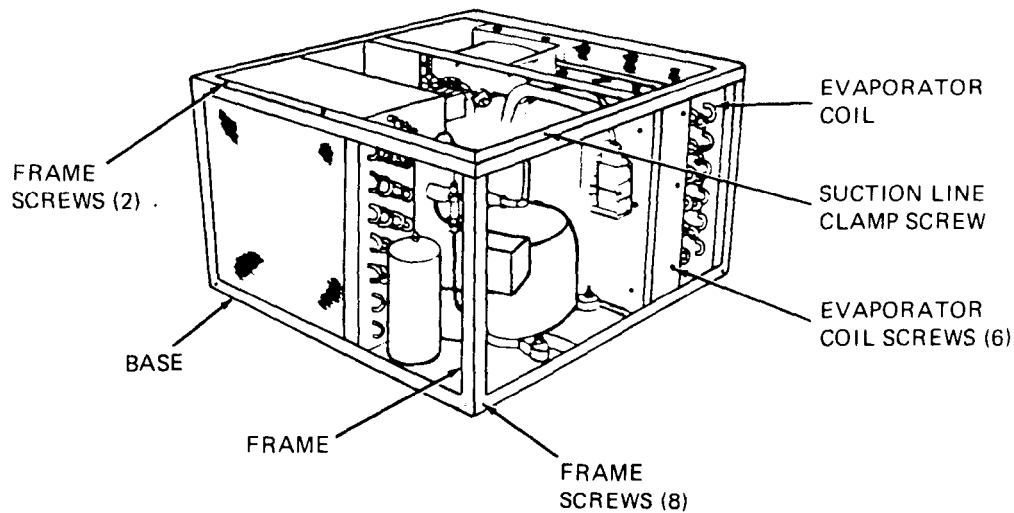
**REMOVAL**

**HOUSING INTERIOR**

**NOTE**

**Test evaporator coil for leaks prior to discharging refrigerant system and removing evaporator coil.**

- |                    |  |
|--------------------|--|
| 9. Evaporator Coil | <ul style="list-style-type: none"> <li>a. Remove two (2) screws at top of frame securing condenser shroud to frame.</li> <li>b. Remove screw on top of frame securing suction line clamp.</li> <li>c. Remove eight (8) screws securing frame to base.</li> <li>d. Remove frame from base.</li> <li>e. Remove air filter.</li> <li>f. Unsolder suction line approximately two (2) inches below header and remove suction line from evaporator coil.</li> <li>g. Unscrew and remove flare nut between expansion valve and evaporator coil.</li> <li>h. Remove six (6) screws securing evaporator coil to bulkhead.</li> <li>i. Remove four (4) screws from underside of base that secure evaporator coil to base.</li> <li>j. Remove evaporator coil.</li> </ul> |
|--------------------|--|





LOCATION/ITEM	ACTION	REMARKS
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**TESTING**

10. Evaporator Coil
- Check all evaporator coil tubing and sweat fittings with a General Electric Type H-2 Halogen Test Detector (or approved equal).
  - Calibrate the detector with a General Electric LS-20 leak standard (or approved equal) for a pure refrigerant leak rate of 0.1 ounce per year.
  - Mark all spots where leaks are noticed.
  - Repair leaks or replace evaporator coil.

**WARNING**

Purge system with dry nitrogen prior to soldering. Refrigerant heated to 1200°F creates phosgene gas.

**REPAIR**

11. Evaporator Coil
- Repair minor leaks or holes by soldering.
  - Use a silver solder with a 50% silver capacity and a melting point of approximately 1160°F (634.8°C).
  - Straighten bent fins prior to installation.

**INSTALLATION****HOUSING INTERIOR**

12. Evaporator Coil
- Align holes in evaporator coil with holes in base.
  - Secure evaporator coil to base from the underside using four (4) screws.
  - Secure evaporator coil to bulkhead with six (6) screws.
  - Connect and solder two (2) refrigerant lines to evaporator coil.
  - Align holes in frame with holes in base.
  - Secure frame to base with eight (8) screws.
  - Secure frame to condenser coil with two (2) screws.
  - Connect suction line to evaporator coil approximately two (2) inches below header.
  - Refer to paragraph 5-7 and solder suction line.
  - Connect refrigerant line between evaporator coil and expansion valve and tighten flare nut.

**5-10. EVAPORATOR COIL (CONT)**

LOCATION/ITEM	ACTION	REMARKS
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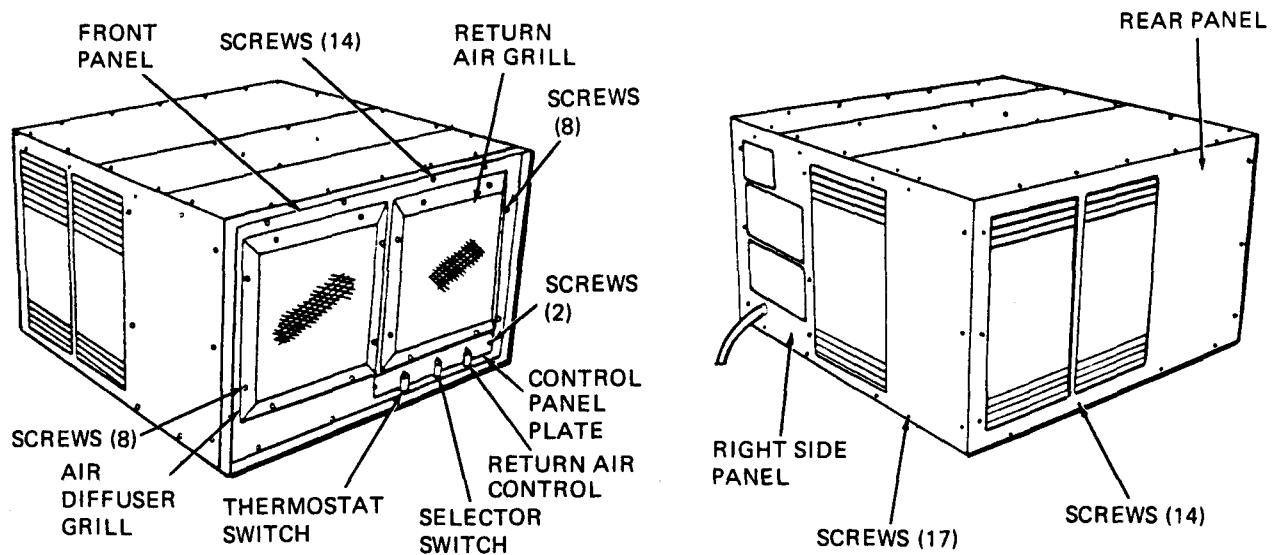
**INSTALLATION**

**FRONT OF HOUSING**

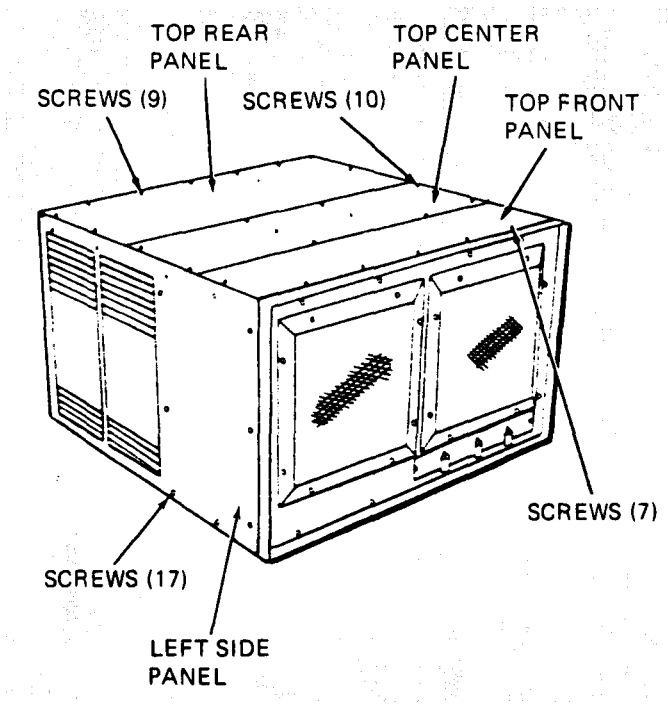
- |                         |  |
|-------------------------|--|
| 13. Front Panel         | <ul style="list-style-type: none"> <li>a. Align holes in thermostat switch with holes in front panel.</li> <li>b. Secure thermostat switch to front panel with two (2) screws.</li> <li>c. Align holes in selector switch with holes in front panel.</li> <li>d. Secure selector switch to front panel with two (2) screws.</li> <li>e. Align holes in front panel with holes in housing.</li> <li>f. Secure front panel with fourteen (14) screws.</li> <li>g. Install wire in mechanical screw post on door and tighten mechanical screw post.</li> <li>h. Install wire through clamp on evaporator shroud and tighten clamp.</li> </ul> |
| 14. Control Panel Plate | <ul style="list-style-type: none"> <li>a. Align holes in control panel plate with holes in front panel.</li> <li>b. Secure control panel plate with two (2) screws.</li> <li>c. Install three (3) knobs.</li> </ul>  |

**RIGHT SIDE AND REAR OF HOUSING**

- |                      |   |
|----------------------|---|
| 15. Rear Panel       | <ul style="list-style-type: none"> <li>a. Align holes in rear panel with holes in housing.</li> <li>b. Secure rear panel with fourteen (14) screws.</li> </ul>              |
| 16. Right Side Panel | <ul style="list-style-type: none"> <li>a. Align holes in right side panel with holes in housing.</li> <li>b. Secure right side panel with seventeen (17) screws.</li> </ul> |



LOCATION/ITEM	ACTION	REMARKS
<b>TOP AND LEFT SIDE OF HOUSING</b>		
17. Left Side Panel	a. Align holes in left side panel with holes in housing. b. Secure left side panel with seventeen (17) screws.	
18. Top Rear Panel	a. Align holes in top rear panel with holes in housing. b. Secure top rear panel with nine (9) screws.	
19. Top Front Panel	a. Align holes in top front panel with holes in housing. b. Secure top front panel with seven (7) screws.	
20. Refrigerant Servicing	Refer to paragraph 5-7 and charge refrigerant system.	
21. Top Center Panel	a. Align holes in top center panel with holes in top front and top rear panels. b. Secure top center panel with ten (10) screws.	



**5-11. CONDENSER COIL**

This task covers:

- a. Removal
- b. Test
- c. Repair
- d. Installation

**INITIAL SETUP**

**Material/Parts**

- Top Center Panel Screws (10)
- Top Rear Panel Screws (9)
- Left Side Panel Screws (17)
- Rear Panel Screws (14)
- Condenser Shroud Screws (2)
- Condenser Shroud Screws (6)
- Condenser Coil Screws (4)

**References**

Paragraph 5-7

**Troubleshooting Reference**

None

**Approximate Time Required (in minutes)**

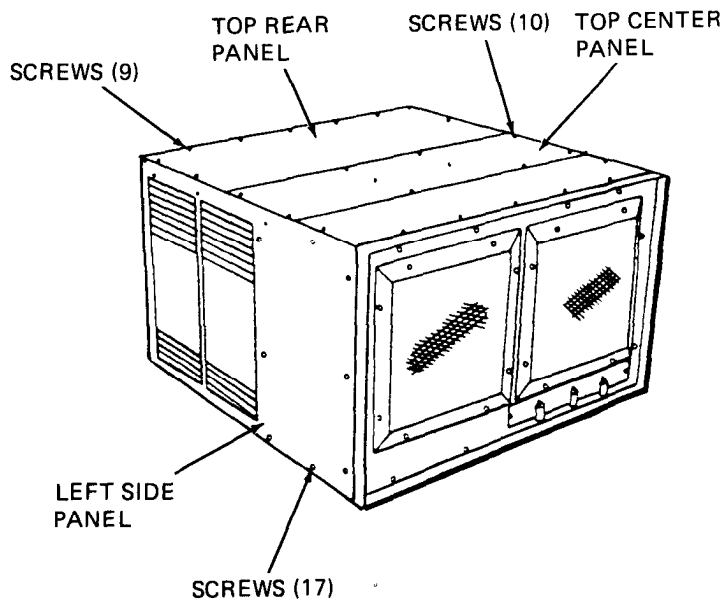
Removal	30
Test	20
Repair	20
Installation	720
<b>TOTAL TIME</b>	<b>790</b>

LOCATION/ITEM	ACTION	REMARKS
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**REMOVAL**

**TOP AND LEFT SIDE OF HOUSING**

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
2. Top Rear Panel
  - a. Remove nine (9) screws securing top rear panel.
  - b. Remove top rear panel.
3. Left Side Panel
  - a. Remove seventeen (17) screws securing left side panel.
  - b. Remove left side panel.



LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REAR OF HOUSING**

- |               |  |  |
|---------------|--|--|
| 4. Rear Panel | a. Remove fourteen (14) screws securing rear panel.<br>b. Remove rear panel. |  |
|---------------|--|--|

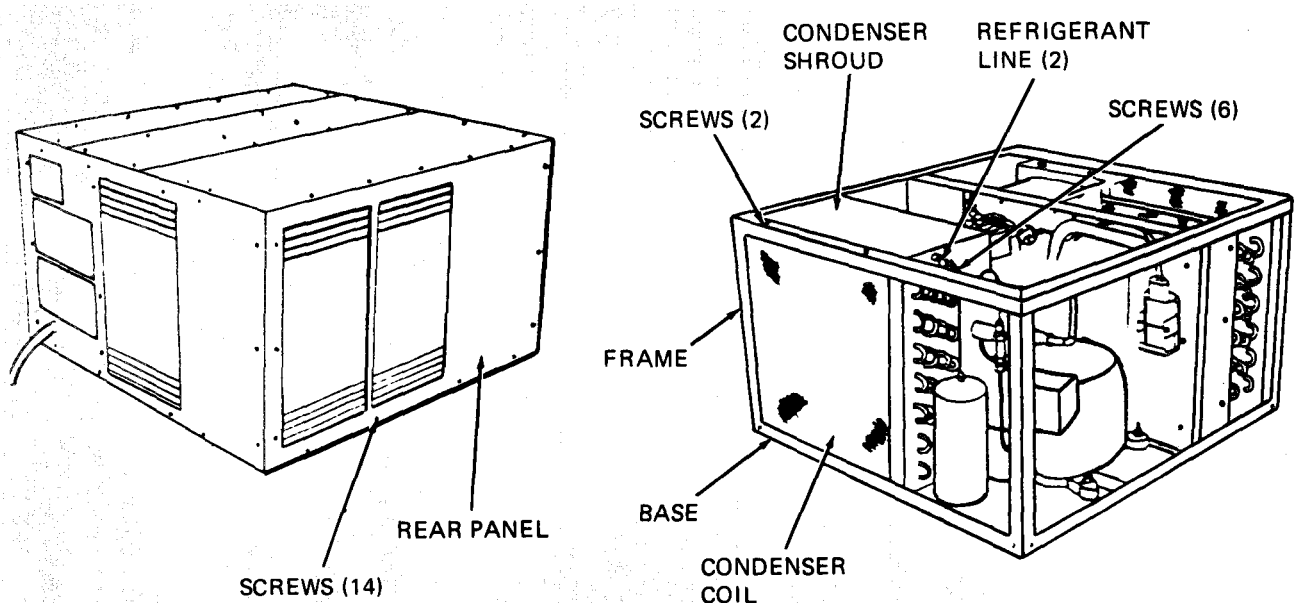
**NOTE**

**Test condenser coil for leaks prior to discharging refrigerant system and removing condenser coil.**

- |                       |  |  |
|-----------------------|--|--|
| 5. Refrigerant System | Refer to paragraph 5-7 and discharge refrigerant system. |  |
|-----------------------|--|--|

**HOUSING INTERIOR**

- |                   |  |  |
|-------------------|--|--|
| 6. Condenser Coil | a. Loosen setscrew in hub of condenser fan and slide condenser fan towards bulkhead.<br>b. Remove two (2) screws securing frame to condenser shroud.<br>c. Remove six (6) screws securing condenser shroud to condenser coil.<br>d. Slide condenser shroud back against bulkhead.<br>e. Unsolder and remove two (2) refrigerant lines from condenser coil.<br>f. Remove four (4) screws from underside of base that secures condenser coil to base.<br>g. Remove condenser coil. |  |
|-------------------|--|--|



**5-11. CONDENSER COIL (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**TESTING**

**HOUSING INTERIOR**

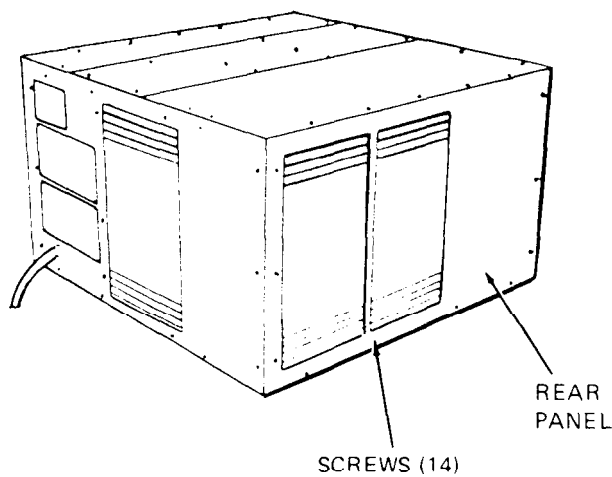
- |                   |  |
|-------------------|--|
| 7. Condenser Coil | <ul style="list-style-type: none"> <li>a. Check all condenser coil tubing and sweat fittings with a General Electric Type H-2 Halogen Test Detector (or approved equal).</li> <li>b. Calibrate the detector with a General Electric LS-20 leak standard (or approved equal) for a pure refrigerant leak rate of 0.1 ounce per year.</li> <li>c. Mark all spots where leaks are noticed.</li> <li>d. Repair leaks or replace condenser coil.</li> </ul> |
|-------------------|--|

**REPAIR**

**WARNING**

**Purge system with dry nitrogen prior to soldering. Refrigerant heated to 1200°F creates phosgene gas.**

- |                   |  |
|-------------------|--|
| 8. Condenser Coil | <ul style="list-style-type: none"> <li>a. Repair minor leaks or holes by soldering.</li> <li>b. Use a silver solder with a 50% silver capacity and a melting point of approximately 1160°F (634.8°C).</li> <li>c. Straighten bent fins prior to installation.</li> </ul> |
|-------------------|--|



LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSTALLATION**

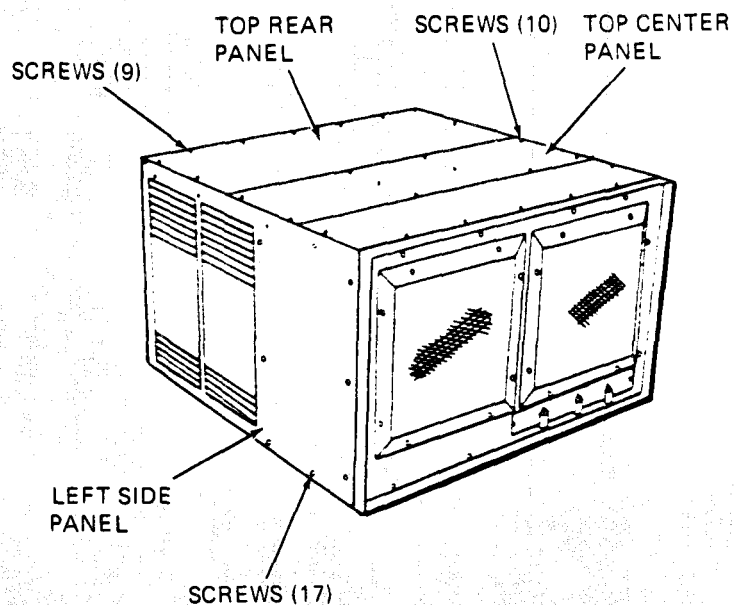
- |                   |   |
|-------------------|---|
| 9. Condenser Coil | <ul style="list-style-type: none"> <li>a. Align holes in condenser coil with holes in base.</li> <li>b. Secure condenser coil to base from the underside with four (4) screws.</li> <li>c. Align holes in condenser shroud with holes in condenser coil.</li> <li>d. Secure condenser shroud with six (6) screws.</li> <li>e. Secure condenser shroud to frame with two (2) screws.</li> <li>f. Reposition condenser fan on motor shaft until hub is flush with end of shaft and tighten setscrew in hub.</li> <li>g. Refer to paragraph 5-7 and solder two (2) refrigerant lines to condenser coil.</li> </ul> |
|-------------------|---|

**REAR OF HOUSING**

- |                |  |
|----------------|--|
| 10. Rear Panel | <ul style="list-style-type: none"> <li>a. Align holes in rear panel with holes in housing.</li> <li>b. Secure rear panel with fourteen (14) screws.</li> </ul> |
|----------------|--|

**TOP AND LEFT SIDE OF HOUSING**

- |                           |   |
|---------------------------|---|
| 11. Left Side Panel       | <ul style="list-style-type: none"> <li>a. Align holes in left side panel with holes in housing.</li> <li>b. Secure left side panel with seventeen (17) screws.</li> </ul>               |
| 12. Top Rear Panel        | <ul style="list-style-type: none"> <li>a. Align holes in top rear panel with holes in housing.</li> <li>b. Secure top rear panel with nine (9) screws.</li> </ul>                       |
| 13. Refrigerant Servicing | Refer to paragraph 5-7 and charge refrigerant system.   |
| 14. Top Center Panel      | <ul style="list-style-type: none"> <li>a. Align holes in top center panel with holes in top front and rear panels.</li> <li>b. Secure top center panel with ten (10) screws.</li> </ul> |



**5-12. DEHYDRATOR**

This task covers:

- a. Removal
- b. Installation

**INITIAL SETUP**

**Material/Parts**

- Right Side Panel Screws (17)
- Return Air Grill Screws (8)

**References**

- Paragraph 5-7

**Troubleshooting Reference**

- AIR CONDITIONER, Malfunction 3, Step 2
- AIR CONDITIONER, Malfunction 4, Step 2

**Approximate Time Required (in minutes)**

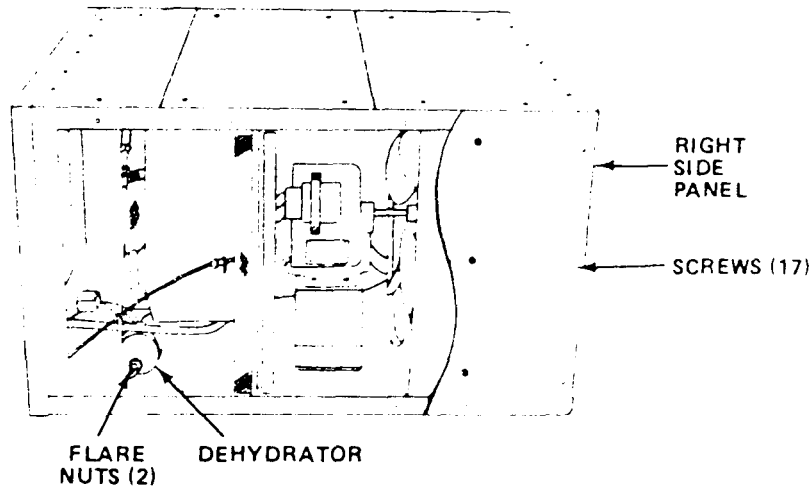
Removal	10
Installation	740
<b>TOTAL TIME</b>	<b>750</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**RIGHT SIDE OF HOUSING**

1. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel to housing.
  - b. Remove right side panel.
2. Return Air Grill
  - a. Loosen setscrew and remove fresh air control knob.
  - b. Remove eight (8) screws securing return air grill to front panel.
3. Refrigerant System
  - a. Refer to paragraph 5-7 and discharge refrigerant system.
4. Dehydrator
  - a. Unscrew two (2) flare nuts and remove two (2) refrigerant lines from dehydrator.
  - b. Remove dehydrator from air conditioner.





LOCATION/ITEM	ACTION	REMARKS
<b>INSTALLATION</b>		
5. Dehydrator	<ul style="list-style-type: none"> <li>a. Connect dehydrator to two (2) refrigerant lines.</li> <li>b. Tighten two (2) flare nuts at dehydrator.</li> </ul>	
6. Right Side Panel	<ul style="list-style-type: none"> <li>a. Align holes in right side panel with holes in housing.</li> <li>b. Secure right side panel with seventeen (17) screws.</li> </ul>	
7. Return Air Grill	<ul style="list-style-type: none"> <li>a. Align holes in return air grill with holes in front panel.</li> <li>b. Secure return air grill with eight (8) screws.</li> <li>c. Install knob on fresh air control and tighten setscrew.</li> </ul>	
8. Refrigerant Servicing	Refer to paragraph 5-7 and charge refrigerant system.	

**5-13. SIGHT GLASS**

This task covers:

a. Removal

b. Installation

**INITIAL SETUP**

**Material/Parts**

Rear Panel Screws (14)

**References**

Paragraph 5-7

**Troubleshooting Reference**

None

**Approximate Time Required (in minutes)**

Removal	10
Installation	740
<b>TOTAL TIME</b>	<b>750</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

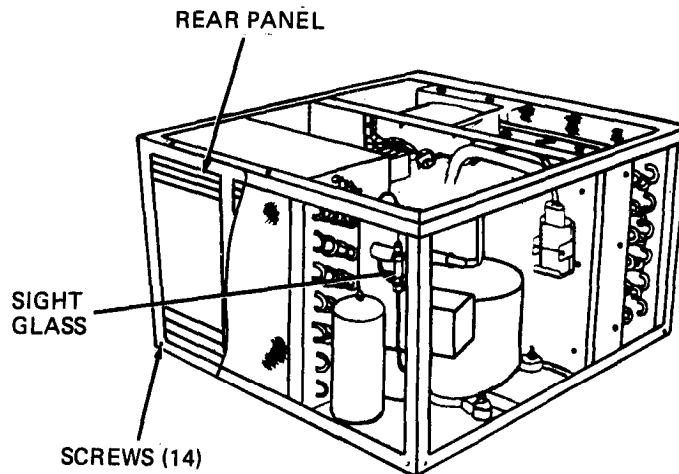
**REMOVAL**

**REAR OF HOUSING**

- |                       |   |
|-----------------------|---|
| 1. Rear Panel         | a. Remove fourteen (14) screws securing rear panel to housing.<br>b. Remove rear panel.   |
| 2. Refrigerant System | Refer to paragraph 5-7 and discharge refrigerant system.  |
| 3. Sight Glass        | a. Unscrew two (2) flare nuts and remove two (2) refrigerant lines from sight glass.<br>b. Remove sight glass from air conditioner. |

**INSTALLATION**

- |                       |  |
|-----------------------|--|
| 4. Sight Glass        | a. Connect sight glass to two (2) refrigerant lines.<br>b. Tighten two (2) flare nuts at sight glass.  |
| 5. Rear Panel         | a. Align holes in rear panel with holes in housing.<br>b. Secure rear panel with fourteen (14) screws. |
| 6. Refrigerant System | Refer to paragraph 5-7 and charge refrigerant system.  |



**5-14. EXPANSION VALVE**

This task covers:

- a. Removal
- b. Test
- c. Installation

**INITIAL SETUP**

**Material/Parts**

- Top Center Panel Screws (10)
- Top Front Panel Screws (7)
- Right Side Panel Screws (17)
- Insulation Tape, App. E, Item 6

**References**

- Paragraph 5-7

**Troubleshooting Reference**

- AIR CONDITIONER, Malfunction 3, Step 4
- AIR CONDITIONER, Malfunction 4, Step 1
- AIR CONDITIONER, Malfunction 5, Step 3

**Approximate Time Required (in minutes)**

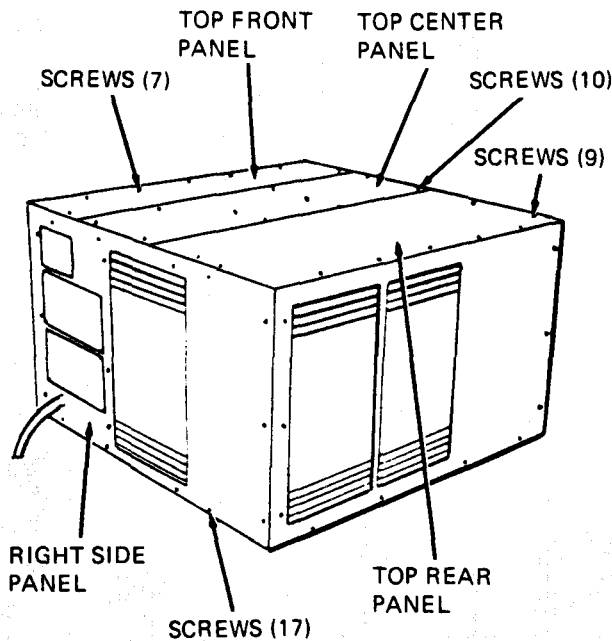
Removal	10
Test	10
Installation	730
<b>TOTAL TIME</b>	<b>750</b>

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**TOP AND RIGHT SIDE OF HOUSING**

1. Top Center Panel
  - a. Remove ten (10) screws securing top center panel.
  - b. Remove top center panel.
2. Top Front Panel
  - a. Remove seven (7) screws securing top front panel.
  - b. Remove top front panel.
3. Right Side Panel
  - a. Remove seventeen (17) screws securing right side panel.
  - b. Remove right side panel.
4. Return Air Grill
  - a. Loosen setscrew and remove return air control knob.
  - b. Remove eight (8) screws securing return air grill to front panel.
  - c. Partially remove return air grill.



**5-14. EXPANSION VALVE (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**REMOVAL**

**TOP AND RIGHT SIDE OF HOUSING**

5. Refrigerant System Refer to paragraph 5-7 and discharge refrigerant system.



**Carefully unwrap thermostat switch sensing bulb from expansion valve sensing line. Use care to prevent damage to sensing bulb.**

6. Expansion Valve
- a. Unwrap insulation tape from sensing bulb.
  - b. Mark location and remove two (2) metal straps securing sensing bulb.
  - c. Carefully unwrap thermostat switch sensing bulb from expansion valve sensing line.
  - d. Unscrew and remove two (2) flare nuts and remove refrigerant lines from expansion valve.
  - e. Remove expansion valve.



**Testing of expansion valve is to be done while the air conditioner is operating and supplying cooling air. Exercise Extreme Caution.**

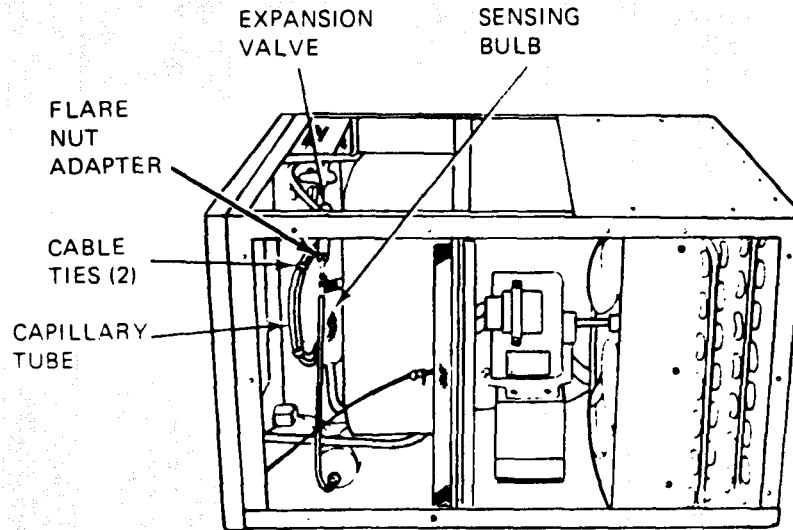
**TESTING**

7. Expansion Valve
- a. Using a General Electric Type H-2 Halogen Test Detector (or approved equal), check expansion valve for leaks.
  - b. Calibrate the detector with a General Electric LS-20 leak standard (or approved equal) for a pure refrigerant leak rate of 0.1 ounce per year.
  - c. Verify that there is NO leakage or damage.
  - d. Replace expansion valve if testing indicates that it is defective.

LOCATION / ITEM	ACTION	REMARKS
-----------------	--------	---------

**INSTALLATION**

8. Expansion Valve
- a. Connect expansion valve to refrigerant lines.
  - b. Tighten two (2) flare nuts.
  - c. Secure sensing bulb to refrigerant line with two (2) metal straps.
  - d. Carefully wrap insulation tape No. 165 manufactured by Pressite Division, Inmont Inc., St. Louis, Mo., around sensing bulb and refrigerant line. Completely cover sensing bulb with tape.
  - e. Carefully wrap thermostat switch sensing bulb around expansion valve sensing line in the same location that it was removed from.



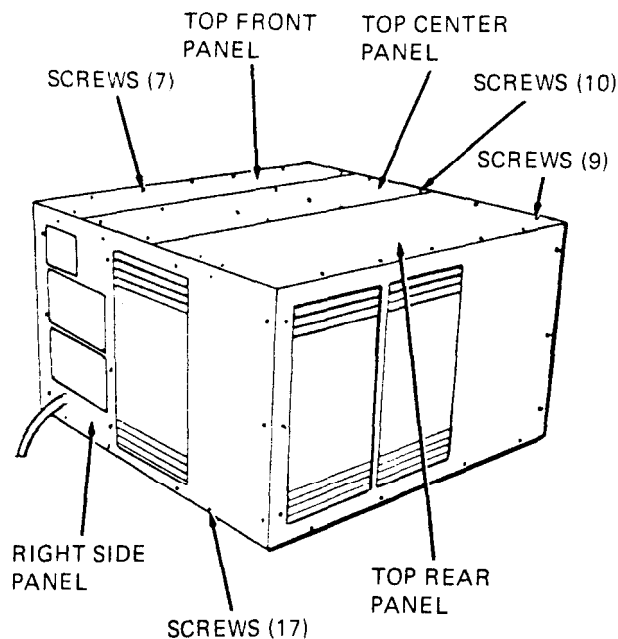
**5-14. EXPANSION VALVE (CONT)**

LOCATION/ITEM	ACTION	REMARKS
---------------	--------	---------

**INSTALLATION**

**TOP AND RIGHT SIDE OF HOUSING**

- |                           |   |
|---------------------------|---|
| 9. Return Air Grill       | a. Align holes in return air grill with holes in front panel.<br>b. Secure return air grill to front panel with eight (8) screws.   |
| 10. Right Side Panel      | a. Align holes in right side panel with holes in housing.<br>b. Secure right side panel with seventeen (17) screws.                 |
| 11. Top Front Panel       | a. Align holes in top front panel with holes in housing.<br>b. Secure top front panel with seven (7) screws.                        |
| 12. Refrigerant Servicing | Refer to paragraph 5-7 and charge refrigerant system.   |
| 13. Top Center Panel      | a. Align holes in top center panel with holes in top front and top rear panels.<br>b. Secure top center panel with ten (10) screws. |



## **APPENDIX A REFERENCES**

### **A-1. FIRE PROTECTION**

TB 5-4200-200-10 Hand Portable Fire Extinguishers Approved for Army Users

### **A-2. LUBRICATION**

C91001L Fuels, Lubricants, Oil and Waxes

### **A-3. PAINTING**

TM 43-0139 Painting Instructions for Field Use

### **A-4. MAINTENANCE**

TM 38-750 The Army Maintenance Management System (TAMMS)  
 TM 5-4120-374-13P Organizational, Direct Support and General Support Maintenance  
 Repair Parts and Special Tools List

### **A-5. CLEANING**

Fed Spec P-S-661 Dry Cleaning Solvent  
 Fed Spec P-D-680 Dry Cleaning Solvent

### **A-6. DESTRUCTION**

TM 750-244-3 Procedures for Destruction of Equipment to Prevent Enemy Use

### **A-7. SHIPMENT AND STORAGE**

TM 740-90-1 Administrative Storage of Equipment

### **A-8. RADIO SUPPRESSION**

FM 11-65 Radio Interference Suppression

### **A-9. TESTING**

TM 9-4940-435-14 Leak Detector, Refrigerant Gas





## 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 levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of the maintenance functions upon the end item or components will be consistent with the assigned maintenance functions.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II (Not Applicable).

##### B-2. EXPLANATION OF COLUMNS IN SECTION II

a. Column (1), Group Number. Column 1 lists group numbers to identify related components, assemblies, subassemblies, and modules with their next higher assembly. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

b. Column (2), Component/Assembly. This column contains the noun names of components, assemblies, subassemblies and modules for which maintenance is authorized.

c. Column (3), Maintenance Functions. This column lists the functions to be performed on the item listed in column 2. The maintenance functions are defined as follows:

(1) Inspect. To determine serviceability of an item by comparing its physical, mechanical, or electrical characteristics with established standards through examination.

(2) Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item, and comparing those characteristics with prescribed standards.

(3) Service. Operations required periodically to keep an item in proper operating condition, i.e, to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

(4) Adjust. To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to psecified parameters.

(5) Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

(6) 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. Consist of comparison 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.

(7) Install. The act of emplacing, seating or fixing into position an item, part or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

(8) Replace. The act of substituting a serviceable like type part, subassembly or module (component or assembly) for an unserviceable counterpart.

(9) Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, sub-assembly, module (component or assembly), end item, or system.

10) Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards in appropriate technical manuals. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to a like new condition.

(11) 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 material 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 equipments/components.

d. Column (4), Maintenance Level. This column is made up of sub-columns for each category of maintenance. Work time figures are listed in these sub-columns for the lowest level of maintenance authorized to perform the function listed in column 3. These figures indicate the average active time required to perform the maintenance function at the indicated category of maintenance under typical field operating conditions.

e. Column (5), Tools and Equipment. This column is provided for referencing by code, the common tool sets (not individual tools) special tools, test and support equipment required to perform the designated functions (Not Applicable).

f. Column 6, Remarks. Column 6 contains a numerical code which shall be keyed to the remarks contained in Section IV.

## Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP- MENT	(6) REMARKS
			C	O	F	H	D		
0 1	<b>HOUSING</b>								
	Panels, Grills	Inspect Repair Replace Adjust	0.1	1.0 0.5					
	Drains	Inspect Clean	0.2 0.1 0.2						
02	<b>FILTER</b>								
	Air Filter	Inspect		0.1 0.2 0.2					
03	<b>ELECTRIC MOTOR AND FANS</b>								
	Motor	Inspect Test Repair Replace		0.1 0.1 0.5 1.0					
	Fans	Inspect Repair Replace		0.1 0.5 1.0					
04	<b>STARTING AND PROTECTIVE DEVICE</b>								
	Switches	Inspect Test Replace	0.1	0.1 0.5					
	Capacitors	Test Replace		0.1 0.2					
	Start Relay	Test Replace		0.1 0.5					
05	<b>WIRING</b>								
	Misc. Wiring	Inspect Test Repair Replace		0.2 0.1 1.0 2.0					

## Section II. MAINTENANCE ALLOCATION CHART (CONT)

(1) GROUP NUMBER	(2) COMPONENT ASSY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS & EQUIP- MENT	(6) REMARKS	
			C	O	F	H	D			
06	GAS COMPRESSOR, PIPING AND COMPONENTS  Compressor	Inspect		0.1					1	
		Test			0.2					
		Service			1.0					
		Repair			0.5					
		Replace			2.0					
	Refrigerant Piping and Service Valves	Inspect		0.1						1
		Test			0.2					
		Repair			1.0					
		Replace			3.0					
	Evaporator Coil	Inspect		0.1						
		Service		0.2						
		Test			0.2					
		Repair			2.0					
		Replace			3.0					
	Condenser Coil	Inspect		0.1					1	
		Service		0.2						
		Test			0.2					
		Repair			2.0					
		Replace			3.0					
Dehydrator Sight Glass	Replace			2.0				1		
	Inspect		0.1							
	Replace			2.0						
Expansion Valve	Inspect		0.1							1
	Test			0.2						
	Replace			3.0						

Note: Subcolumns are as follows: C—Operator/Crew    O—Organizational    F—Direct Support  
H—General Support    D—Depot

Section III. **Tools and Test Equipment Requirements**

(1) TOOL OR TEST EQUIPMENT REF CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER	(5) TOOL NUMBER
1	F-H	Recovery and Recycling Unit, Refrigerant	4130-01-338-2707	17500B (07295)

### Section IV. REMARKS

REFERENCE CODE	REMARKS
Note 1	Inspect components externally only.

**APPENDIX C**  
**COMPONENTS OF END ITEMS LIST**

NOT APPLICABLE





## APPENDIX D ADDITIONAL AUTHORIZATION LIST

### D-1. SCOPE

This appendix lists additional items you are authorized for the support of the air conditioner.

### D-2. GENERAL

This list identifies items that do not have to accompany the air conditioner and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

### D-3. EXPLANATION OF LISTING

National stock number, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. "USABLE ON" codes are identified as follows:

C o d e

Used On

NOT APPLICABLE



# APPENDIX E

## EXPENDABLE SUPPLIES AND MATERIAL LIST

### Section I. INTRODUCTION

#### E-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the air condition conditioner.

#### E-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. E).
- 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 part number followed by the Federal Supply Code for Manufacturer (FSCM) in parenthesis, if applicable.
- 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

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	0		Coater, Air Filter MI ( 8 1 3 4 9 )	
2	0		Dry Cleaning Solvent PD-680 (81348)	
3	0		Dry Cleaning Solvent PS-661 (81348)	
4	0		Adhesive MMM-A-121 (81348)	
5	F		Refrigerant BB-F-142 Type R12 (81348)	
6	0		Tape, Insulation Part No. 165 (77464)	

# APPENDIX F DIAGRAMS

## F-1. WIRING DIAGRAM

The wiring diagram for the air conditioner is shown in figure F-1.

## F-2. REFRIGERANT SYSTEM DIAGRAM

The refrigerant system diagram for the air conditioner is shown in figure F-2.

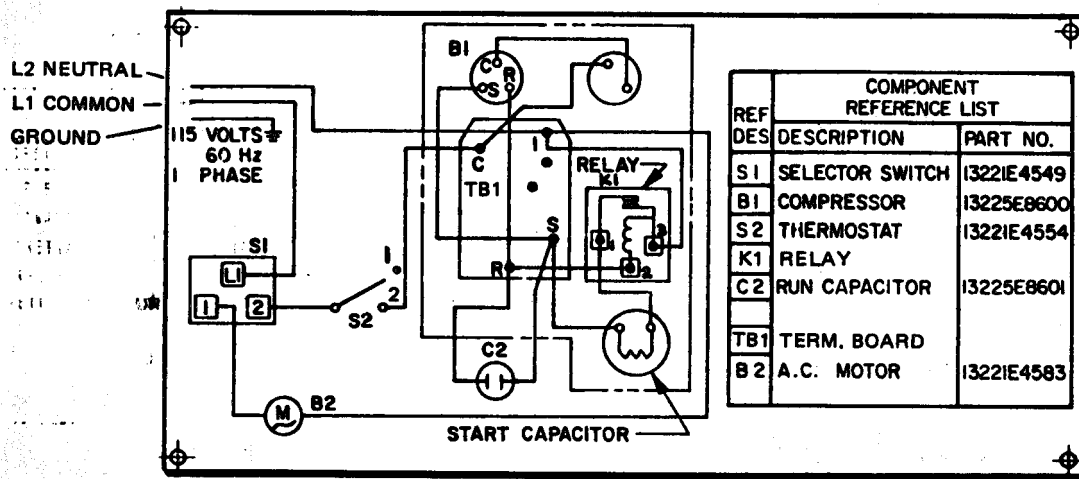


Figure F-1. Wiring Diagram

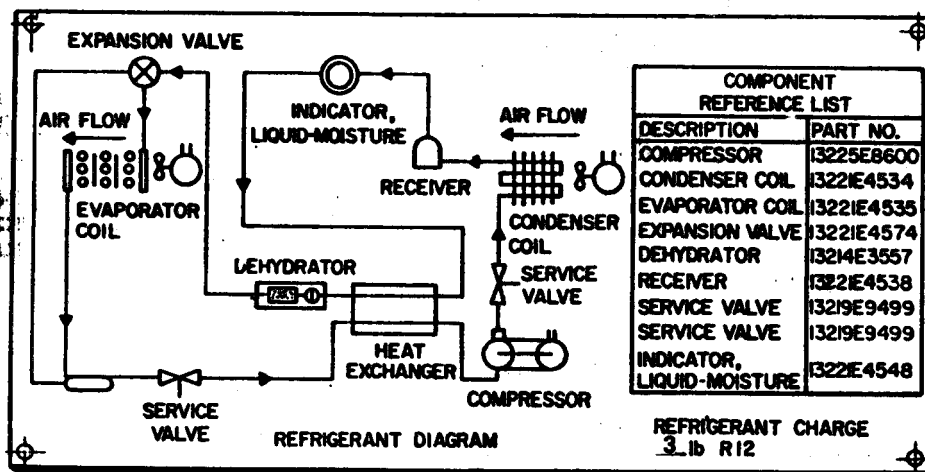


Figure F-2. Schematic Diagram



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**By Order of the Secretary of the Army:**

**Official:**

**JOHN A. WICKHAM, JR.**  
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FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)  
**PFC JOHN DOE**  
**COA, 3d ENGINEER BN**  
**FT. LEONARD WOOD, MD 63108**  
 DATE SENT

PUBLICATION NUMBER TM 5-4120-374-13	PUBLICATION DATE 7 Oct 83	PUBLICATION TITLE Air Conditioner, Horizontal, 9,000 BTU/HR
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BE EXACT. . . PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has <u>6</u> cylinders. The engine on my set only has <u>4</u> cylinders. Change the manual to show <u>4</u> cylinders.
B1		4-3		Callout 16 on figure 4-3 is pointing at a <u>bolt</u> . In key to figure 4-3, item 16 is called a <u>shim</u> - Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2 910-05-762-3001. 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 <b>JOHN DOE, PFC (268) 319.7111</b>	SIGN HERE <b>JOHN DOE</b>
---	------------------------------

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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 decigrams = .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	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

# Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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DA FORM 4-294, 1 SEP 78 PREVIOUS EDITION OF THIS FORM IS OBSOLETE

DA PUBLICATION/FORM NUMBER		IM 5-4130-274-13		CHG OR DATE	
LOCATION	QUANTITY	UNIT OF ISSUE	ACTION	ISSN DATE	
B1	3	INITIAL-DIST.			
PKG SIZE	ITEM NO.	DUK/HQPT DATE	SLGPG CONTROL NO.	ID-3292-64327	

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