TM 5-4120-259-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT

AND GENERAL SUPPORT, AND DEPOT

MAINTENANCE MANUAL

AIR CONDITIONER: BASE MOUNTED, AIR COOLED, 208 VOLT, 3-PHASE, 60 CYCLE, AC, SINGLE PACKAGE 36,000 BTU/HR (YORK CORP MODEL MA 3-F23A) FSN 4120-926-1116

This reprint includes all changes in effect at the time of publication; Changes 1 through 7.

HEADQUARTERS, DEPARTMENT OF THE ARMY

17 OCTOBER 1967

CHANGE

NO. 7

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

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

AIR CONDITIONER, FLOOR MOUNTING, 208 VOLT, 3 PHASE,
60 HERTZ, AC, 36,000 BTU/HR
YORK CORPORATION MODEL MA3-F23A, NSN 4120-00-926-1116
THERM-AIR MFG. CO., MODEL CB-36-08-3-60
NSN 4120-00-935-5348

Approved for public release; distribution is unlimited

TM 5-4120-259-15, 17 October 1967, is changed as follows:

Page 1, paragraph 1.(d). is superseded as follows:

d. You can help improve this manual. If you find any mistake or if you know of a way to improve the procedure, 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 Command, ATTN: AMSTR-MMTS, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished to you.

Page 53 is changed as follows:

• Preceding paragraph 94 *a. General,* insert the following note:

NOTE

In accordance with Environmental Protection Agency regulations, refrigerants cannot be discharged into the atmosphere. A recovery/recycling unit must be used whenever discharging the unit.

• Paragraph 94a. General is superseded as follows:

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

a. General. Prior to opening the refrigerant system for maintenance, the system must be discharged. Connect and operate recovery/recycle unit in accordance with the manufacturer's instructions.

Page 54 is changed as follows:

• Delete paragraph 94c. *Discharging the Refrigerant to Atmosphere* including steps (1) through (4).

Page 56 is changed as follows:

• Preceding paragraph 97insert the following note:

NOTE

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

Page 63 is changed as follows:

• Following Section II. MAINTENANCE ASSIGNMENT, delete the words (Not Applicable), and add Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS as shown:

Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
	F-H	Recovery and Recycling Unit, Refrigerant	4130-01-338-2707	17500B (07295)

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the Secretary of the Army
01659

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25E, qty rqr block no. 0067.

CHANGE

NO. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 20 November 1990

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

AIR CONDITIONER, FLOOR MOUNTING, 208 VOLT, 3 PHASE, 60 HERTZ, AC,
36,000 BTU/HR
YORK CORPORATION MODEL MA3–F23A, NSN 4120–00–926–1116
THERM–AIR MFG. CO., MODEL CB–36–08–3–60
NSN 4120–00–935–5348

Approved for public release; distribution is unlimited

TM 5–4120–259–15, 17 October 1967 is changed as follows:

Title is changed as shown above.

Page 9, paragraph 19 is superseded as follows:

19. 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 ca 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 tigh 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 fc 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.

Page 9, paragraph 20 is superseded as follows:

20. 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.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

THOMAS F. SIKORA
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
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Changes in force: C1 thru C5

TM 5-4120-259-15
C 5

CHANGE
No. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 30 April 1982

Operator's Organizational, Direct Support,
General Support and Depot Maintenance Manual
AIR CONDITIONER, FLOOR MOUNTING, 208 VOLT,
3 PHASE, 60 HERTZ, AC, 36,000 BTU/HR
YORK CORPORATION MODEL MA3-F23A, NSN 4120-00-926-1116
NSN 4120-00-935-5348

TM 5-4120-259-15, 17 October 1967, is changed as follows:

Page 8. Paragraph 15a(3) is superseded as follows:

(3) Connect power and remove left side access panel. Apply power to unit to energize compressor crankcase heater at least 4 hours before starting compressor.

Page 10. Step 2 under "Cooling" is superseded as follows:

STEP 2. TURN ROTARY CONTROL SWITCH TO COOL AFTER POWER HAS BEEN APPLIED TO UNIT FOR AT LEAST 4 HOURS.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25C, Operator requirements for AIR CONDITIONERS, 36,000 BTU, Floor Mounting.

CHANGE
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *11 March 1975*

Operator's Organizational, Direct Support, General Support and Depot Maintenance Manual AIR CONDITIONER, FLOOR MOUNTING, 208 VOLT, 3 PHASE, 60 HERTZ, AC, 36,000 BTU/HR YORK CORPORATION MODEL MA3-F23A, NSN 4120-00-926-1116, THERM-AIR MFG CO., MODEL CB-36-08-3-60 NSN 4120-00-935-5348

TM 5-4120-259-15, 17 October 1967, is changed as follows:

The title is changed as shown above.

Page 2 of cover. Add the following warning to the list of safety precautions.

WARNING

The burning of polyurethane foams is dangerous. Due to the chemical composition of a polyurethane foam, toxic fumes are released when it is burned or heated. If it is burned or heated indoors, such as during a welding operation in its proximity, precautions should be taken to adequately ventilate the area. An exhaust system equivalent to that of a paint spray booth should be used. Air supplied respirators, approved by the National Institute for Occupational Safety & Health or the U.S. Bureau of Mines, should be used for all welding in confined spaces and when ventilation is inadequate. Individuals who have chronic or recurrent respiratory conditions, including allergies and asthma, should not be employed in this type of environment.

Page 55, paragraph 96 *d.*, add the following warning:

WARNING

The burning of polyurethane foams is dangerous. Due to the chemical composition of a polyurethane foam, toxic fumes are released when it is burned or heated. If it is burned or heated indoors, such as during a welding operation in its proximity, precautions should be taken to adequately ventilate the area. An exhaust system equivalent to that of a paint spray booth should be used. Air supplied respirators, approved by the National Institute for Occupational Safety & Health or the U.S. Bureau of Mines, should be used for all welding in confined spaces and when ventilation is inadequate. Individuals who have chronic or recurrent respiratory conditions, including allergies and asthma, should not be employed in this type of environment.

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Arm
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25C, (qty rqr block no. 553) Operator maintenance requirements for Environmental Equipment, Air Conditioners, 36,000 BTU, Floor Mounting.

TM 5-4120-259-15
C 3

CHANGE No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. *25 May 1972*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual

AIR CONDITIONER, FLOOR MOUNTING, 208-V, 3-PHASE, 60 HZ, AC; 36,000 BTU/HR; YORK CORPORATION MODEL MA 3-F23A, FSN 4120-926-1116; THERM-AIR MFG. CO. MODEL CB-36-08-3-60, FSN4120-935-5348

TM 5-4120-259-15, 17 October 1967, is changed as follows:

Cover is changed as shown above.

Page 65. Appendix III is superseded as follows:

APPENDIX III

BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section 1. INTRODUCTION

B-1. Scope

This appendix lists items required by the operator for operation of the air conditioner.

B-2. General

This list is divided into the following sections:

a. Basic Issue Items List—Section II. Not applicable.

b. Items Troop Installed or Authorized List —Section III. A list of items in alphabetical sequence which, at the discretion of the unit commander, may accompany the air conditioner. These items are not subject to turn-in with the air conditioner when evacuated.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Items Troop Installed or Authorized, Section III.

a. Source, Maintenance, and Recoverability Code(s) (SMR).

(1) *Source Code.* This code indicates the source for the listed item. Source codes are:

Code	Explanation
P	Repair parts, special tools, and test equipment supplied from GSA/DSA or Army supply system and authorized for use at indicated maintenance levels.
P2	Repair parts, special tools, and test equipment which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.

(2) *Maintenance Code.* This code indicates the lowest level of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Crew/Operator

(3) *Recoverability Code.* This code indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverable. Recoverability codes are:

Code	Explanation
R	Applied to repair parts (assemblies and components), special tools, and test equipment which are considered economically reparable at direct support and general support maintenance levels.

Code	Explanation
S	Repair parts, special tools, test equipment and assemblies which are economically reparable at DSU and GSU activities and which normally are furnished by supply on an exchange basis.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount of quantity of the item upon which the allowances are based; e.g., ft, ea, pr; etc.

e. Quantity Authorized. This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock number	(3) Description: Ref No. & Mfr Code	(3) Description: Usable on Code	(4) Unit of meas	(5) Qty auth
PC	7520-559-9618	CASE, maintenance and operation manuals.		EA	1

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25C (qty rqr block No. 553), Operator Requirements for Air Conditioners 36,000 BTU, Floor Mounting.

TM 5-4120-259-15
C 2

Change No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. *1 June 1970*

Operator, Organizational, Direct and General Support and Depot Maintenance Manual

AIR CONDITIONER; BASE MOUNTED; AIR COOLED; 208-VOLT, 3-PHASE, 60-HERTZ, AC; SINGLE PACKAGE; 36,000 BTU/HR (YORK CORPORATION MODEL MA 3-F23A) FSN 4120-926-1116; THERM AIR MFG. CO. MODEL CB-36-08-3-60 FSN 4120-935-5348

TM 5-4120-259-15, 17 October 1967, is changed as follows:

Throughout the manual "cycle" is changed to read "hertz".

Pages 14 and 15. Paragraphs 34, 35, 36, 37, 38, and 39, add to *Probable Cause:* Defective motor contactors. Add to *Possible Remedy:* Test, clean, or replace motor contactors (para 63).

Page 16. Paragraph 48. The first line in *Probable Cause* and *Possible Remedy* columns is superseded as follows:

Heavy accumulation of rust on armature or coil.	Clean motor contactors (para 63).

Page 26. Paragraph 63c is superseded as follows:

c. Contactor Disassembly and Cleaning. Remove electrical junction box (fig. 19). Disassemble contactor as shown in figures 21 and 22. Remove rust from armature and stator with an abrasive cloth or paper.

NOTE

Do not bur or deform armature and stator metal mating surfaces. Total metal abutment of these surfaces is necessary for proper contactor operation.

Page 33. Figure 21, the figure title is changed to read: *Motor contactor disassembly.*

Below the figure add the following note:

NOTE

Contactor can be disassembled without disconnecting the wiring as follows:

(1) Remove contactor cover.

(2) Remove contactor mounting plate.

(3) Lift out stator and coil. Separate stator from coil and remove two springs.

(4) Remove four securing rings, springs, and movable contacts.

(5) Lift out armature and movable contact carriers. Separate armature from frame.

Page 62. Section II after group 4000 add:

4006—Master Control Assembly

Motor Contactors, Column A, add O; Column G, add O.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:
KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution
To be distributed in accordance with DA Form 12-25, Sec III (qty rqr Block No. 553), Operator requirements for Air Conditioners, 36,000 BTU.

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *18 March 1969*

Operator, Organizational, Direct and General Support, and Depot Maintenance Manual

AIR CONDITIONER: BASE MOUNTED, AIR COOLED, 208 VOLT, 3 PHASE, 60 CYCLE, AC, SINGLE PACKAGE, 36,000 BTU/HR
YORK CORPORATION MODEL MA 3-F23A
FSN 4120-926-1116
THERM AIR MFG. CO. MODEL CB-36-08-3-60
FSN 4120-935-5348

TM 5-4120-259-15, 17 October 1967, is changed as follows:

Cover is changed as shown above.

Page 1. Paragraph 3*a* is superseded as follows:

a. General. The York Model MA 3-F23A and Therm-Air Model CB-36-08-3-60 air conditioners (fig. 1, 2, 3, and 4) are single package, base mounting units designed primarily for use in van-type enclosures for providing filtered, conditioned air for efficient operation of electronic equipment and the comfort of personnel. The units are designed for continuous operation with varying loads.

Page 3. Paragraph title 4*b*, is changed as follows:

b. Tabulated Data (York Model MA 3-F23A).

Page 4. Paragraph 4*b.1* is added after paragraph 4*b*.

b.1 Tabulated Data (Therm-Air Model CB-36-08-3-60).

(1) *Corps of Engineers Identification Plate A.*

Nomenclature	Air Conditioner: Van Type, 36,000 BTU/HR, standard weight, 60 cycles, 3 phase, 208 volts.
Manufacturer	Therm-Air Mfg. Co., Inc.
Model	CB-36-08-3-60
Type	Vapor-Compression
Refrigerant	Refrigerant — 22
Capacity	36,000 BTU/HR

(2) *Compressor — motor assembly.*

Manufacturer	Carrier Corporation
Model	6A38M-109
Type	6A
Lubrication	VV-L-825, Type IV
RPM	1750
Maximum Discharge	700 PSIG

Volts	208
Amperage	22.2 Amps
Phase	3
Cycles	50/60

(3) *Evaporator fan motor.*

Manufacturer	Welco Industries
Model	6315-4
Volts	208
Phase	3
Temp. Rise	55°C.
RPM	1725
Duty	Continuous
Cycles	60
Amps (amperes)	1.6
Horsepower	1/3
Code	Z

(4) *Condenser fan motor.*

Manufacturer	Welco Industries
Model	8020-3
Frame	182
Class	H Insulation
Phase	3
Horsepower	1.5
Volts	208
RPM	1740
Cycles	60
Amps	4.7
Code	Z
Temp. Rise	85°C
Duty	Continuous

(5) *Thermostat.*

Manufacturer	Honeywell
Model	T473C1050

(6) *Capacities.*

Refrigerant 22 Charge	13 lb 8 oz
Compressor Oil Charge	5 pt VV-L-825, Type IV

(7) *Dimensions and weight (fig. 1).*

Length (depth)	36.75
Height	27.88
Width	42.19
Shipping Weight (Crated)	632 lbs.

(8) *Base plan.* See figure 6.

(9) *Wiring diagram.* See figure 5.1.

(10) *Refrigerant flow diagram.* See figure 27.1.

Page 5. Paragraph 5 is superseded as follows:

5. Differences in Models

This manual covers the York Model MA 3-F23A and Therm-Air Model CB-36-08-3-60 air conditioners. Differences exists between the models in respect to location of various refrigerant components such as the expansion valve and filter drier. In addition, various electrical components, such as the thermal delay relay, are of a different manufacture. Wiring diagrams and piping schematics are included for both models as shown by figures 5, 5.1, 27, and 27.1. Those differences that exist will be so indicated in this manual.

After paragraph 5 change figure caption to read as follows:

Figure 5. Wiring diagram (York Model MA 3-F23A).

After figure 5 add figure 5.1.

Figure 5.1. Wiring diagram (Therm-Air Mdl CB-36-08-3-60).

(Located in back of manual)

Page 14. Paragraph 34 is superseded as follows:

34. Compressor Starts but Fan Motor(s) Will Not Run

Probable cause	*Possible remedy*
Control switch or motor defective	Check fans to make sure they turn freely by hand. Check wiring and terminals for loose connections. Check control switch continuity with multimeter (York Model MA 3-F23A fig. 5) (Therm-Air Model CB-36-08-3-60 fig. 5.1). If switch is not defective check motor (para 57 and 58) and remove and service if necessary.

Paragraph 35 is superseded as follows:

35. Both Fan Motors Run — Compressor Motor Will Not Start (Selector Switch on COOL)

Probable cause	*Possible remedy*
High pressure cut-out or compressor thermal protector open.	If both fan motors operate but the compressor motor does not run, check the high pressure cut-out. This cut-out is a manual reset type. Check the compressor thermal protector for continuity (York Model MA 3-F23A fig. 5) (Therm-Air Model CB-36-08-3-60 fig. 5.1). If the motor has cut-out on the above safety devices, determine and correct the cause.
Open circuit....	Apply multimeter to compressor motor terminals (wiring diagram York Model MA 3-F23A fig. 5). (Wiring Diagram Therm-Air Model CB-36-08-3-60 fig. 5.1).

Page 15. Paragraph 38 is superseded as follows:

38. Fan Motor and Compressor Will Not Run

Probable cause	*Possible remedy*
Defective power outlets, broken wire or loose terminal connection, or faulty power switch.	Check the power switch circuits (York Model MA 3-F23A fig. 5) (Therm-Air Model CB-36-08-3-60 fig. 5.1) and make necessary repairs.

Page 17. In figure 10, at top center of illustration delete the following:

YORK CORPORATION
MODEL MA 3-F23A

Page 19. In figure 11, at tip center of illustration delete the following:

YORK CORPORATION
MODEL MA 3-F23A

Page 26. In paragraph 62, subparagraph *b* is superseded as follows:

b. Removal and Installation (York Model MA 3-F23A). Remove and install the circuit breaker as shown by figure 20.

In paragraph 62, subparagraph *c* is added after subparagraph *b*.

c. Removal and installation (Therm-Air Model CB-36-08-3-60). Remove and install the circuit breaker as shown by figure 20.1.

In paragraph 63, subparagraph *b* is superseded as follows:

b. Removal and Installation (York Model MA 3-F23A). Remove and install the contactors and relay as shown by figure 20.

In paragraph 63, paragraph *b.1* is added after paragraph *b*.

b.1. Removal and Installation (Therm-Air Model CB-36-08-3-60). Remove and install the contactors and relay as shown by figure 20.1.

In paragraph 63, paragraph *d* is superseded as follows:

d. Thermal Delay Switch Adjustment. Make timing adjustment (York Model MA 3-F23A) as shown by figure 23, (Therm-Air model CB-36-08-3-60) as shown by figure 23.1.

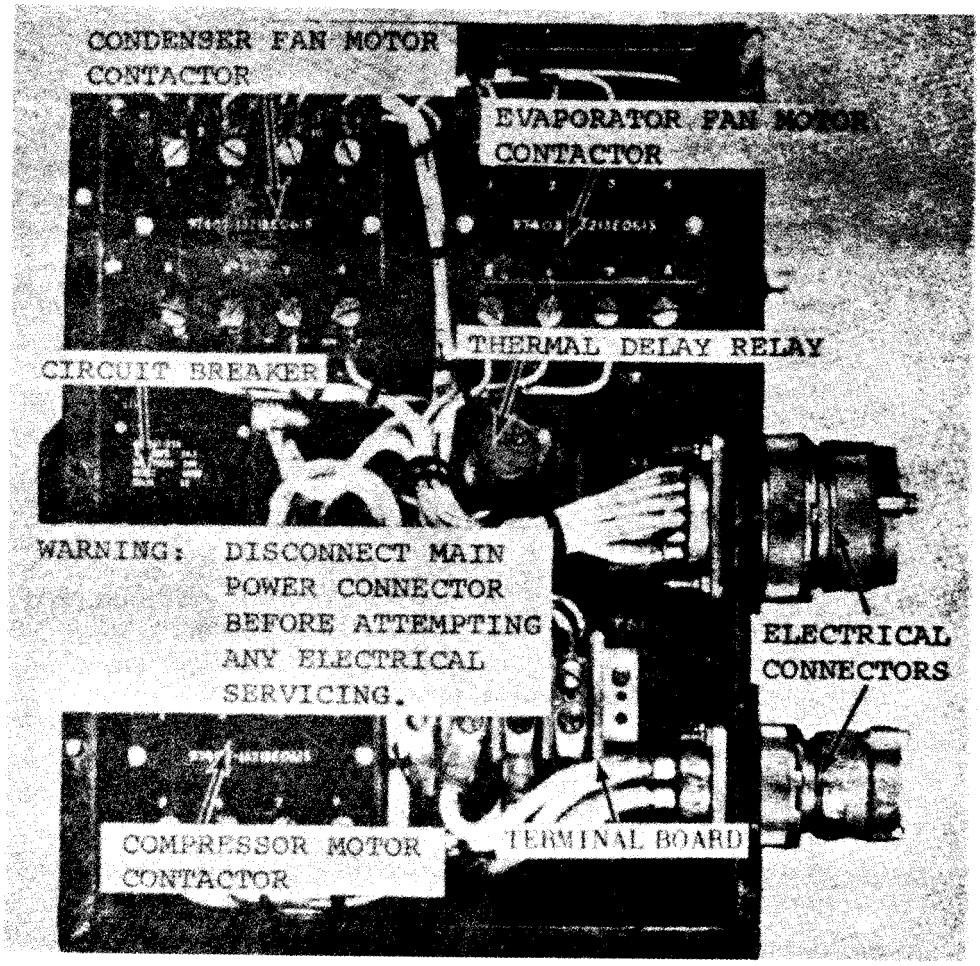
Paragraph 64 is superseded as follows:

64. Terminal Board

a. Removal and Installation (York Model MA 3-F23A). Remove and install the terminal board as shown by figure 20.

b. Removal and Installation (Therm-Air Model CB-36-08-3-60). Remove and install the terminal board as shown by figure 20.1.

Page 32. **After figure 20 add figure 20.1 as follows:**

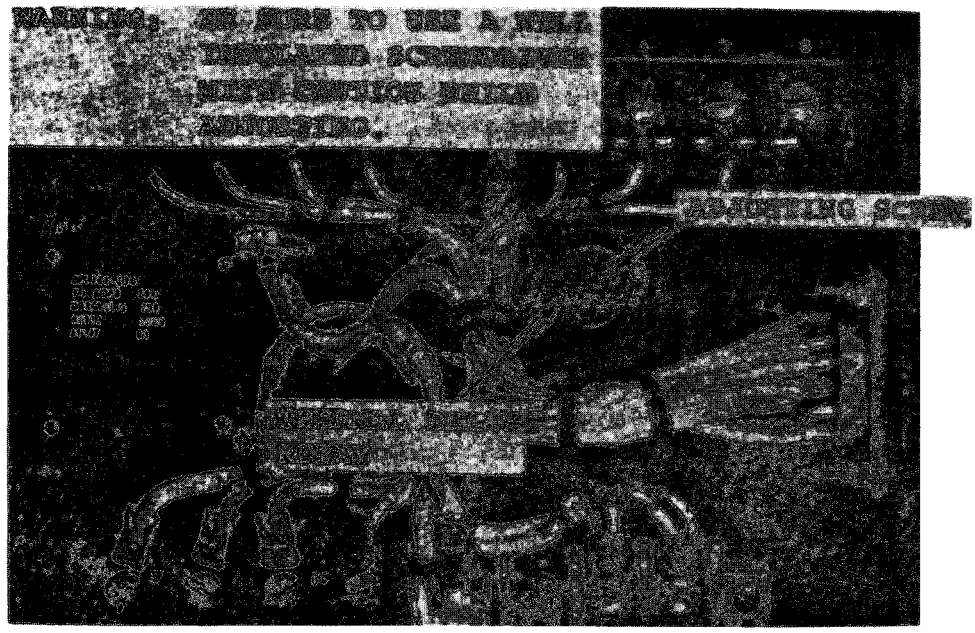


STEP 1. REMOVE JUNCTION BOX (FIG. 19).
STEP 2. DISCONNECT 2 ELECTRICAL CONNECTORS.
STEP 3. TAG AND DISCONNECT ELECTRICAL LEADS AND REMOVE MOUNTING HARDWARE AS NECESSARY.

ME 4120-259-15/20.1 C1

Fig 20.1. Junction box components, removal and installation. (Therm-Air Model CB-36-08-3-60).

Page 35. **After figure 23 add figure 23.1 as follows:**



STEP 1. REMOVE ELECTRICAL JUNCTION BOX(FIG. 19).
STEP 2. CONNECT MAIN POWER CONNECTOR.
STEP 3. TURN ROTARY CONTROL SWITCH TO COOL AND NOTE TIME LAPSE BETWEEN STARTING OF CONDENSER FAN AND STARTING OF COMPRESSOR. (PROPER TIME LAPSE IS FROM 5 TO 15 SECONDS.)
STEP 4. IF TIME LAPSE IS LESS THAN 5 SECONDS, TURN TIME DELAY ADJUSTING SCREW COUNTERCLOCKWISE 2 OR 3 TURNS, PRESS HEAD OF SCREW FIRMLY DOWNWARD FORCING ADJUSTING LEVER CLOSE TO DIAPHRAGM WHICH SETS TIMING AT EXTREME HIGH END OF THE RANGE. THEN TURN TIMING FOR DESIRED POINT.
NOTE: SLIGHT READJUSTMENT. TO INCREASE TIME LAPSE SLIGHTLY, TURN ADJUSTING SCREW COUNTERCLOCKWISE A LITTLE.
STEP 5. WAIT 3 MINUTES AND REPEAT STEP 3. IF TIME LAPSE IS MORE THAN 15 SECONDS, TURN ADJUSTING SCREW ONE TURN CLOCKWISE.
STEP 6. WAIT 3 MINUTES AND REPEAT STEP 3. CONTINUE ADJUSTING UNTIL PROPER TIME LAPSE IS REACHED.
STEP 7. UNPLUG CONNECTOR AND INSTALL ELECTRICAL JUNCTION BOX(FIG. 19).

ME 4120-259-15/23.1 C1

Figure 23.1. Thermal Delay Switch Adjustment (Therm-Air Model CB-36-08-3-60).

Page 39. Paragraph 72 is superseded as follows:

72. Tabulated Data

This paragraph contains all the overhaul data pertinent to direct and general support and depot maintnenance personnel. Refer to (York Model MA 3-F23A) figure 5, (Therm-Air Model CB-36-08-3-60) figure 5.1 for wiring diagram of the air conditioning unit, and to (York Model MA 3-F23A) figure 27 of (Therm-Air Model CB-36-08-3-60) figure 27.1 for the unit flow diagram.

After figure 27 add figure 27.1 as follows:

Figure 27.1. Refrigerant flow diagram (Therm-Air Mdl CB-36-08-3-60)

(Located in back of manual)

Page 42. Paragraph 89 is superseded as follows:

89. Dehydrator

a. Removal and Installation (York Model MA 3-F23A). Remove and install the dehydrator as shown by figure 34.

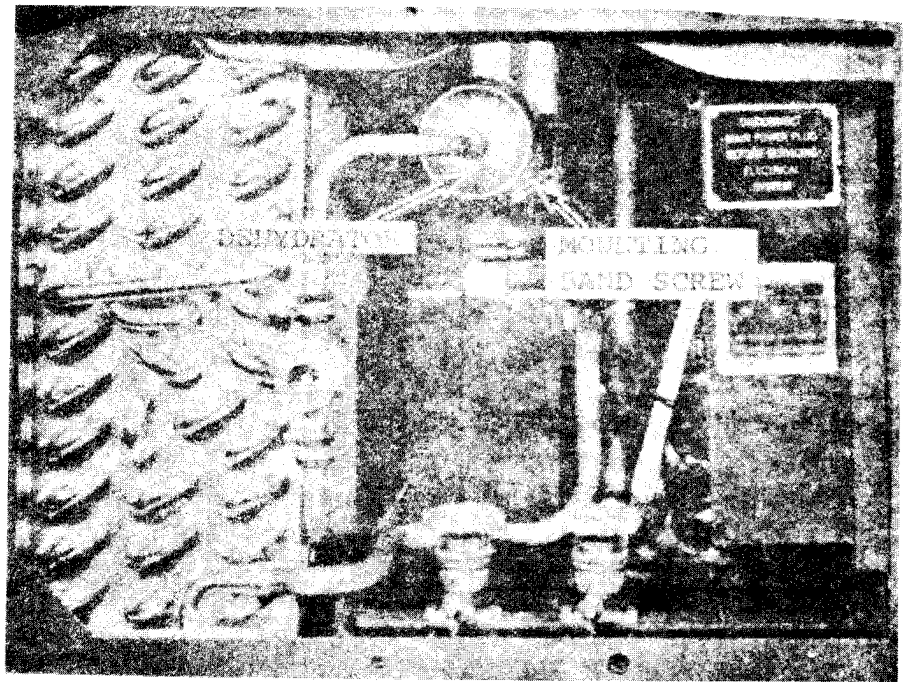
b. Removal and Installation (Therm-Air Model CB-36-08-3-60). Remove and install the dehydrator as shown by figure 34.1.

After paragraph 91, add paragraph 91.1.

91.1. Suction Pressure Regulating Valve

The suction presure regulating valve limits pressure at the compressor motor when the unit is operating in the hot gas bypass cycle. For removal, installation and adjustment see figure 36.1.

Page 49. After figure 34 add figure 34.1 as follows:



STEP 1. REMOVE ACCESS PANEL (LEFT SIDE) AS SHOWN BY FIGURE 13.
STEP 2. DISCHARGE THE SYSTEM AS DESCRIBED IN PARAGRAPH 94.
STEP 3. OBSERVING INSTRUCTIONS IN PARAGRAPH 96, UNBRAZE TUBING CONNECTIONS.
STEP 4. REMOVE MOUNTING BAND FROM DEHYDRATOR AND REMOVE DEHYDRATOR FROM UNIT.

INSTALL DEHYDRATOR IN REVERSE ORDER OF REMOVAL.

ME 4120-259-15/34.1 C1

Figure 34.1. Dehydrator removal and installation.

Page 51. After figure 36, add figure 36.1 as follows:

STEP 1. REMOVE LEFT SIDE PANEL OF UNIT (FIG. 13).
STEP 2. DISCHARGE REFRIGERANT (PAR. 94).
STEP 3. OBSERVE PARAGRAPH 96, UNBRAZE JOINTS OF VALVE AND REMOVE.
INSTALL VALVE IN REVERSE ORDER AND CHARGE SYSTEM (PAR. 97).
ADJUST VALVE BY THE FOLLOWING STEPS:

STEP 1. CONNECT CHARGING LINE FROM SUCTION SERVICE VALVE TO SUCTION PRESSURE GAUGE AFTER FIRST EXPELLING ANY TRAPPED AIR IN THE LINE.
STEP 2. ADJUST THERMOSTAT (FIG. 18) TO SETTING HIGHER THAN AMBIENT TEMPERATURE. (THIS WILL CLOSE THE SOLENOID VALVE CAUSING UNIT TO OPERATE IN HOT GAS BYPASS CYCLE.)
STEP 3. OPERATE UNIT IN COOLING POSITION AND OBSERVE SUCTION PRESSURE GAUGE. (AFTER A SHORT PERIOD OF OPERATION THE SUCTION PRESSURE WILL DECREASE TO INDICATE A CONSTANT PRESSURE OF 55 PSIG FOR A PROPERLY ADJUSTED VALVE. IF THIS PRESSURE IS NOT INDICATED, CONTINUE WITH THE FOLLOWING STEPS.)
STEP 4. REMOVE ADJUSTING STEM CAP ON VALVE.
STEP 5. TURN ADJUSTING STEM CLOCKWISE TO INCREASE PRESSURE OR COUNTER CLOCKWISE TO DECREASE PRESSURE UNTIL 55 PSIG IS INDICATED ON THE SUCTION PRESSURE GAUGE. (ALLOW SYSTEM ADEQUATE OPERATING TIME TO ESTABLISH AND MAINTAIN PROPER VALVE SETTING.)
STEP 6. STOP UNIT, CLOSE SUCTION SERVICE VALVE, AND DISCONNECT CHARGING LINE.
STEP 7. READJUST THERMOSTAT (FIG. 18) TO DESIRED POSITION.

ME 4120-259-15/36.1 C1

Figure 36.1. *Suction pressure regulating valve, removal and installation (Therm-Air Model CB-36-08-3-60).*

Page 53. Paragraph 92, first sentence is changed as follows:

Refer to refrigerant flow diagram (York Model MA 3-F23A) figure 27, (Therm-Air Model CB-36-08-3-60), figure 27.1.

Page 62. Section II delete the following:

For: Model MA 3-F23A

Page 63. Section II (cont.) delete the following:

For: Model MA 3-F23A

Page 66. Basic Issue Items Section II is changed as follows:

Under Maintenance column, change "O" to "C", delete lines 3 and 4.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Section III, (qty rqr block No. 554) organizational maintenance requirements for Air Conditioners, 36,000 BTU, Floor Mounting.

TECHNICAL MANUAL
No. 5-4120-259-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *17 October 1967*

Operator, Organizational, Direct and General Support and Depot Maintenance Manual

AIR CONDITIONER: BASE MOUNTED, AIR COOLED, 208 VOLT 3-PHASE, 60 CYCLES, AC, SINGLE PACKAGE, 36,000 BTU/HR (YORK CORP MODEL MA 3-F23A) FSN 4120-926-1116

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of the personel to whom air conditioner is issued. Chapters 1 through 5 provide information on the operation, preventive maintenance services, and organizational maintenance of the equipment, accessories, components, and attachments. Chapter 4 provides information for direct and general support and depot maintenance. Also included are descriptions of main units and their functions in relation to other components.

b. Appendix I contains a list of publications applicable to this manual, Appendix II contains the Maintenance Allocation Chart. Appendix III contains the list of Basic Issue Items authorized the operator of this equipment and the list of Maintenance and operating supplies required for initial operation.

c. Numbers in parentheses on illustrations indicate quantity. Numbers preceding nomenclature callouts on illustrations indicate the preferred maintenance sequence.

d. Reporting of Equipment Publication Improvements. DA Form 2028 (Recommended Changas to DA publications) shall be used for reporting discrepancies and recommendations for improving this equipment publication. The form shall be completed by the individual using the manual and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN.: AMSME-MP, 4300 Goodfellow Blvd. St. Louis, Mo. 63120.

2. Record and Report Forms

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. For other record and report forms applicable to operator, organizational, direct and general support and depot maintenance, refer to TM 38-750.

Note. Applicable forms, excluding Standard Form 46 (United States Government Motor Vehicles Operator's Identifications Card) which is carried by the operator shall be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

3. Description

a. *General.* The York Model MA3-F23A air conditioner (figures 1, 2, 3 and 4) is a single package, base mounting unit designed primarily for use in van-type enclosures for providing filtered, conditioned air for the effioient operation of electronic equipment and the comfort of personnel. The unit is designed for continuous operation with varying loads.

b. Evaporator Section. The evaporator section, located in the top portion of the unit, contains the evaporator coil, evaporator fan, drip pan, air filters, expansion valve, and dfipers to regulate the amount of fresh and return air entering the air conditioner.

c. Condenser Section. The condenser section is located in the bottom portion of the unit. It contains the hermetically sealed compressor, condenser coil, condenser air inlet and outlet openings, control box, condenser fan,

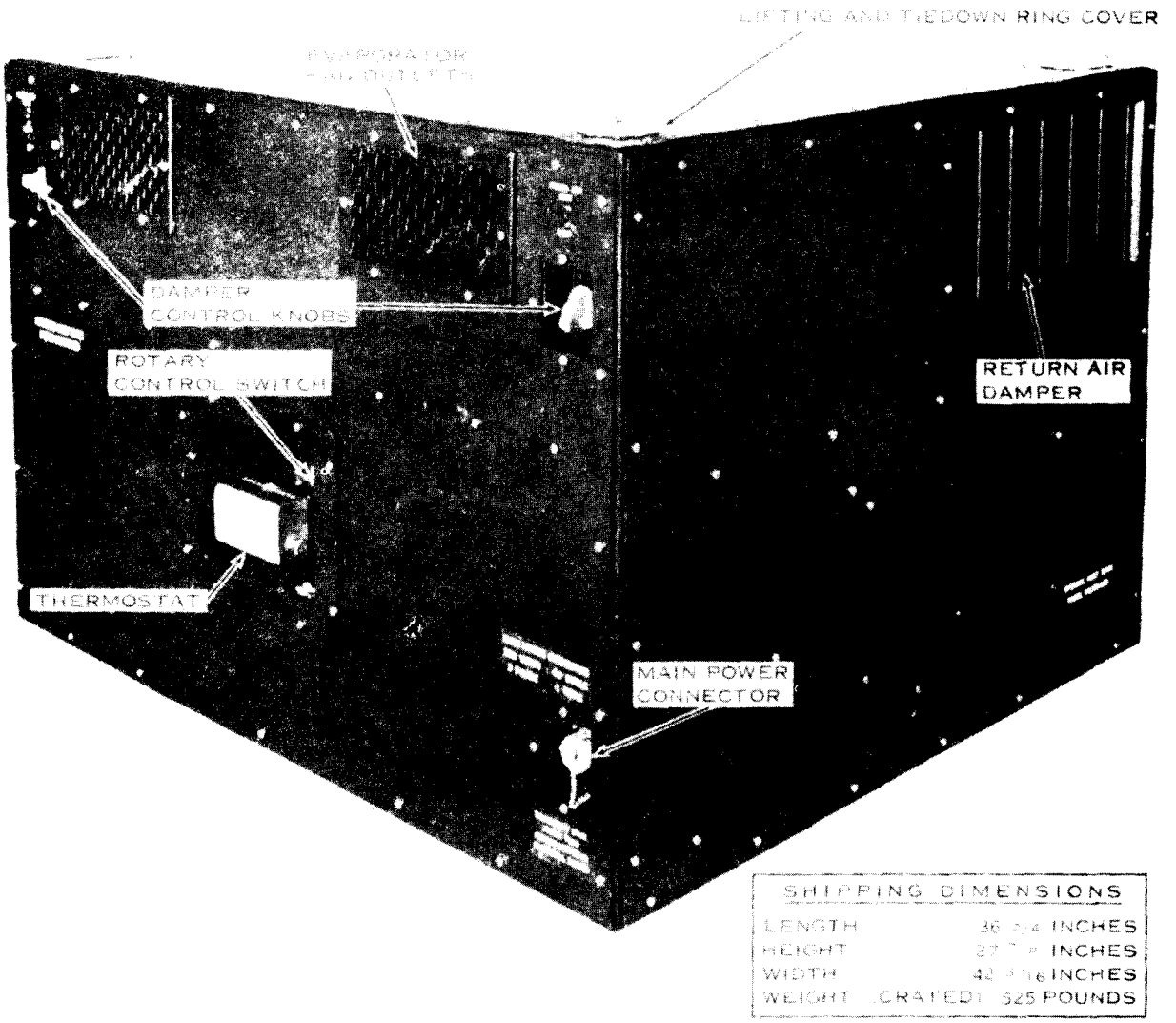


Figure 1. Air Conditioner, Right Front View, With Shipping Dimensions.

high-pressure cutout switch, motor starters, and the service valves.

4. Identification and Tabulated Data

a. Identification. There are three major identification plates on the air conditioner.

(1) *Corps of Engineers identification plate.* Located on the lower right corner of the front panel. Indicates nomenclature, manufacturer, model, serial number, contract number, and date manufactured.

(2) *Evaporator fan motor identification plate.* Located on the side of the motor. Specifies manufacturer, model, voltage, amperage, frame, phase, cycles, rpm, and horsepower.

(3) Condenser fan motor identification plate. Located on the motor. Specifies manufacturer, model, frame, serial number, class, phase, voltage, amperage, horsepower, cycles, service factor, and rpm.

b. Tabulated Data.

(1) *Corps of Engineers identification plate A.*

Nomenclature---------- Air Conditioner: Van Type, 36,000 btu/hr, Standard Weight, 60 cycles, 3 phase 208 volts
Manufacturer----------York
Model----------MA 3-F23A
Type----------Vapor-compression
Refrigerant----------Refrigerant-22
Capacity----------36,000btu/hr

(2) *Compression-Motor assembly.*

Manufacturer---------- ------Carrier Corporation
Model----------6A38M-109
Type----------Hermetically sealed
Lubrication----------VV-L-825, Type IV
RPM---------- 1725
Maximum Discharge----------675 psig
Volts----------208
Amperage----------27.0
Phase----------3
Cycles----------60

(3) *Evaporator Fan Motor.*

Manufacturer----------General Electric
Model----------5K42FG2504X
Serial----------ABL
Volts----------208
Phase----------3
Temp. rise----------55° C (Centigrade)
RPM (revolutions per minute). 1725

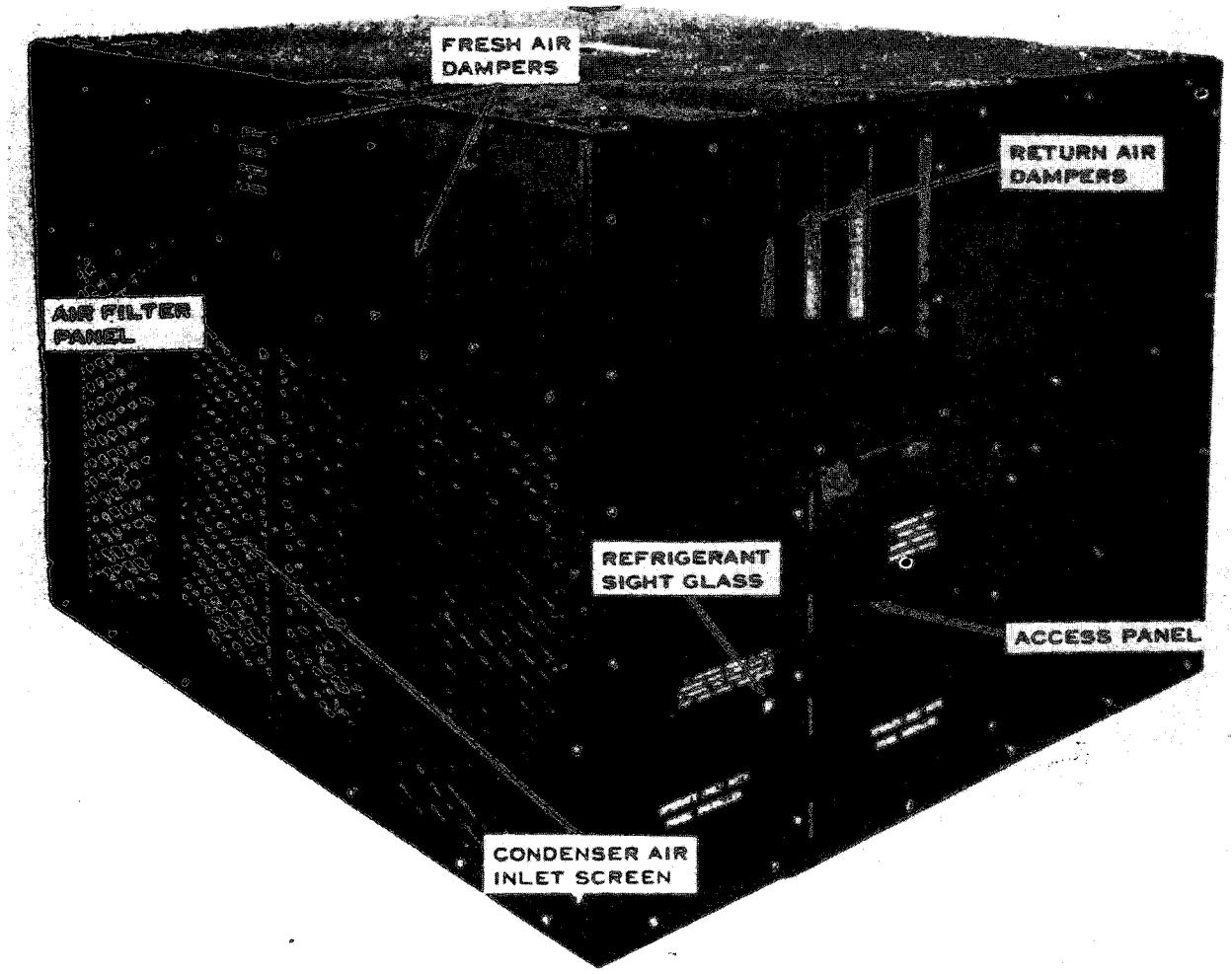


Figure 2. Air Conditioner, Left Rear View.

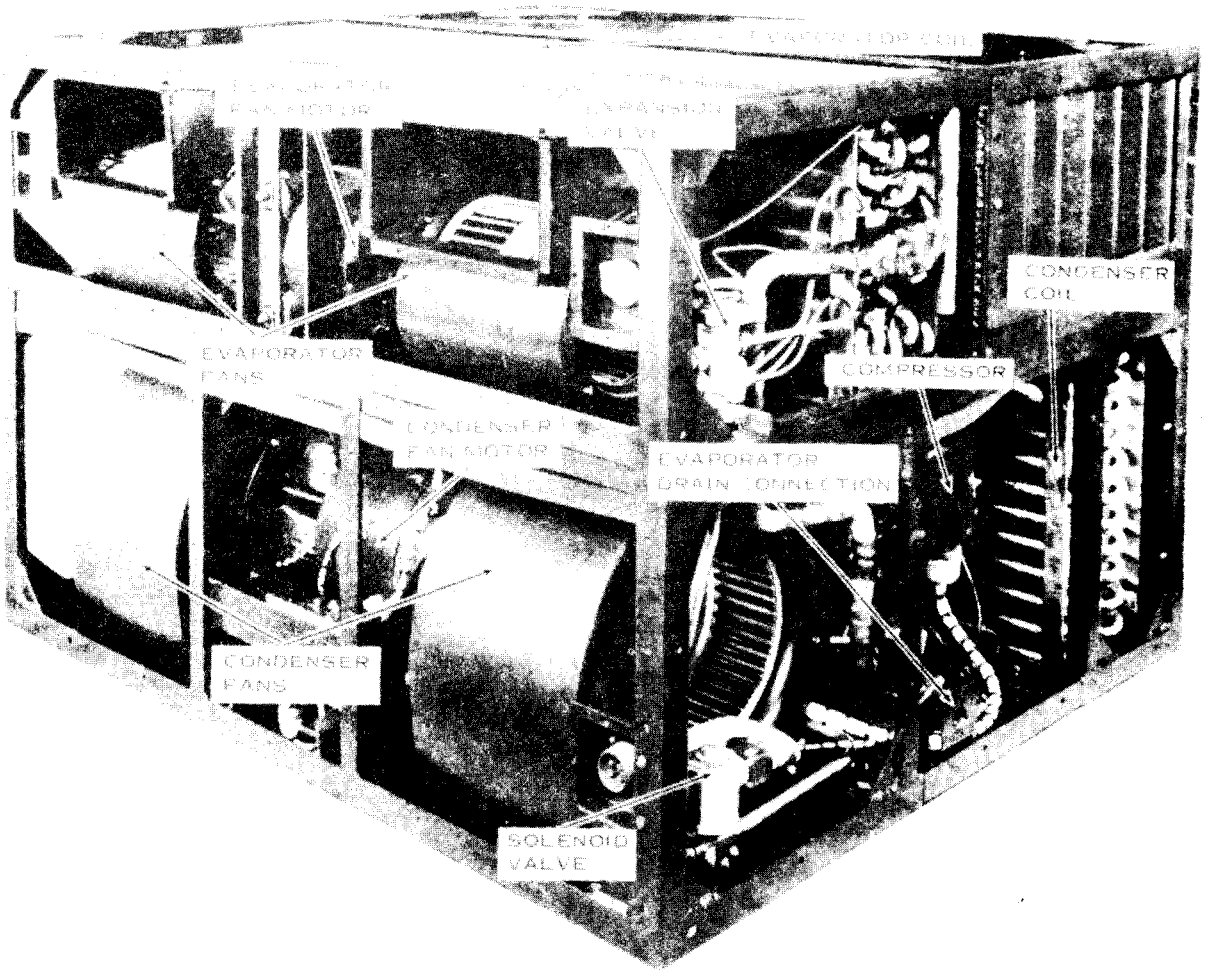


Figure 3. Air Conditioner, Right Front View, Panels Removed.

Duty----------Continuous
Cycles----------60
Amps (amperes) ----------1.6
Horsepower----------1/3
Code----------M

(4) *Condensor fan motor.*

Manufacturer----------General Electric
Model----------5K182HG4580T
Frame----------182K
Class----------H Insulation
Phase----------3
Horsepower----------1.5
Volts----------208
RPM----------1730
Cycles----------60
Amps----------4.7
Code_____M
Temp. rise----------75°C
Duty----------Continuous

(5) *Thermostat.*

Manufacturer----------Honeywell
Model----------T473C

(6) *Capacities.*

Refrigerant 22 charge----------13 lbs (pounds)
Compressor oil charge----5 pts (pints) VV-L-825, Type IV. (FSN 9150-823-7905)

(7) *Dimensions and Weight. See figure* 1.

Length (depth) ----------26-3/4 in. (inches)
Height----------27-7/8 in.
Width----------42-3/16 in.
Shipping weight (crated). 525 lb.

(8) *Base Plan.* See figure 6.

(9) *Wiring Diagram.* See figure 5.

(10) *Refrigerant Flow Diagram.* See figure 27.

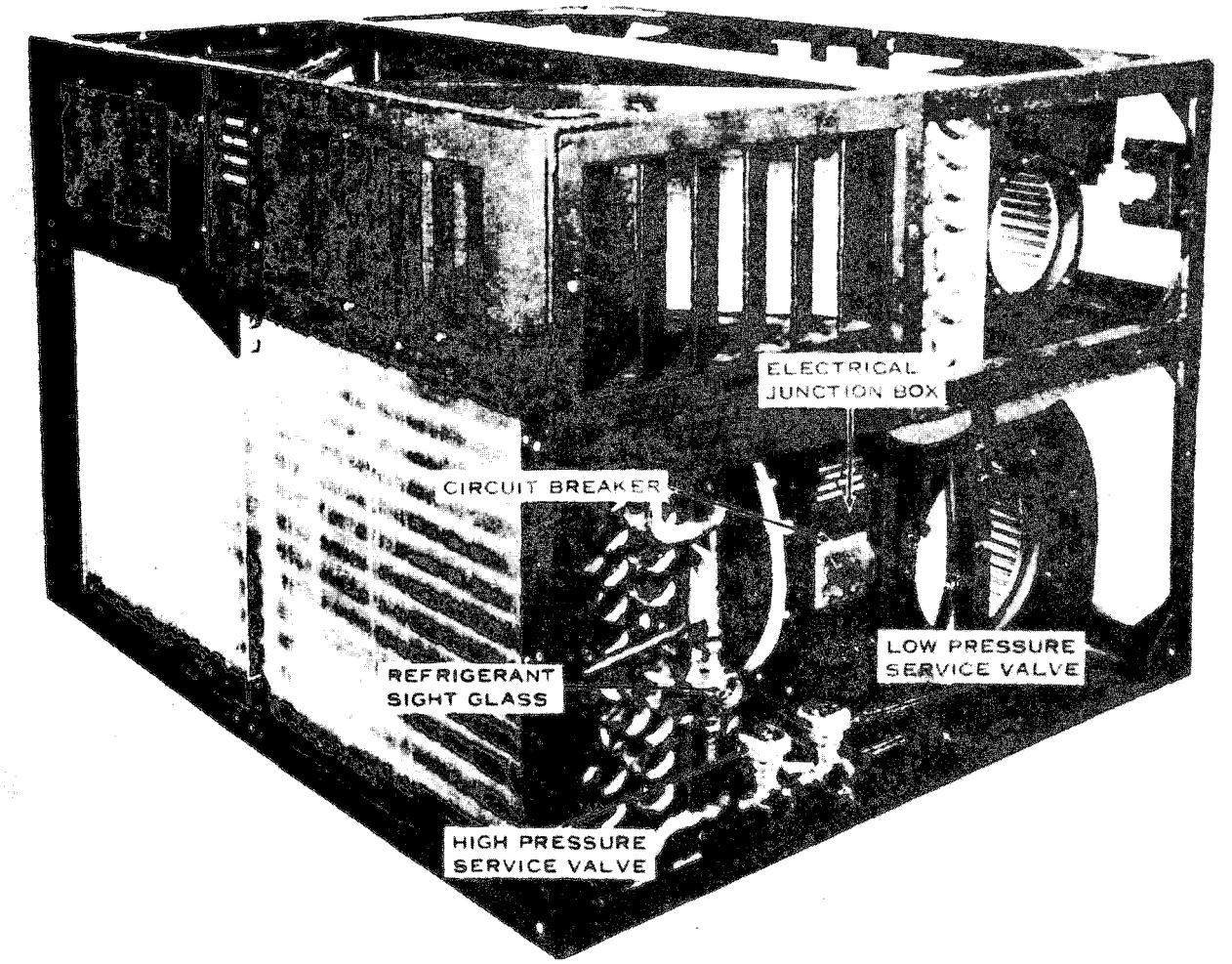


Figure 4. Air Conditioner, *Left Rear View, Panels Removed.*

5. Differences in Models

This manual covers only the York Model MA 3-F23A Conditioner. No known differences exist for the model covered by this manual.

Figure 5. Wiring diagram.
(Located in back of manual)

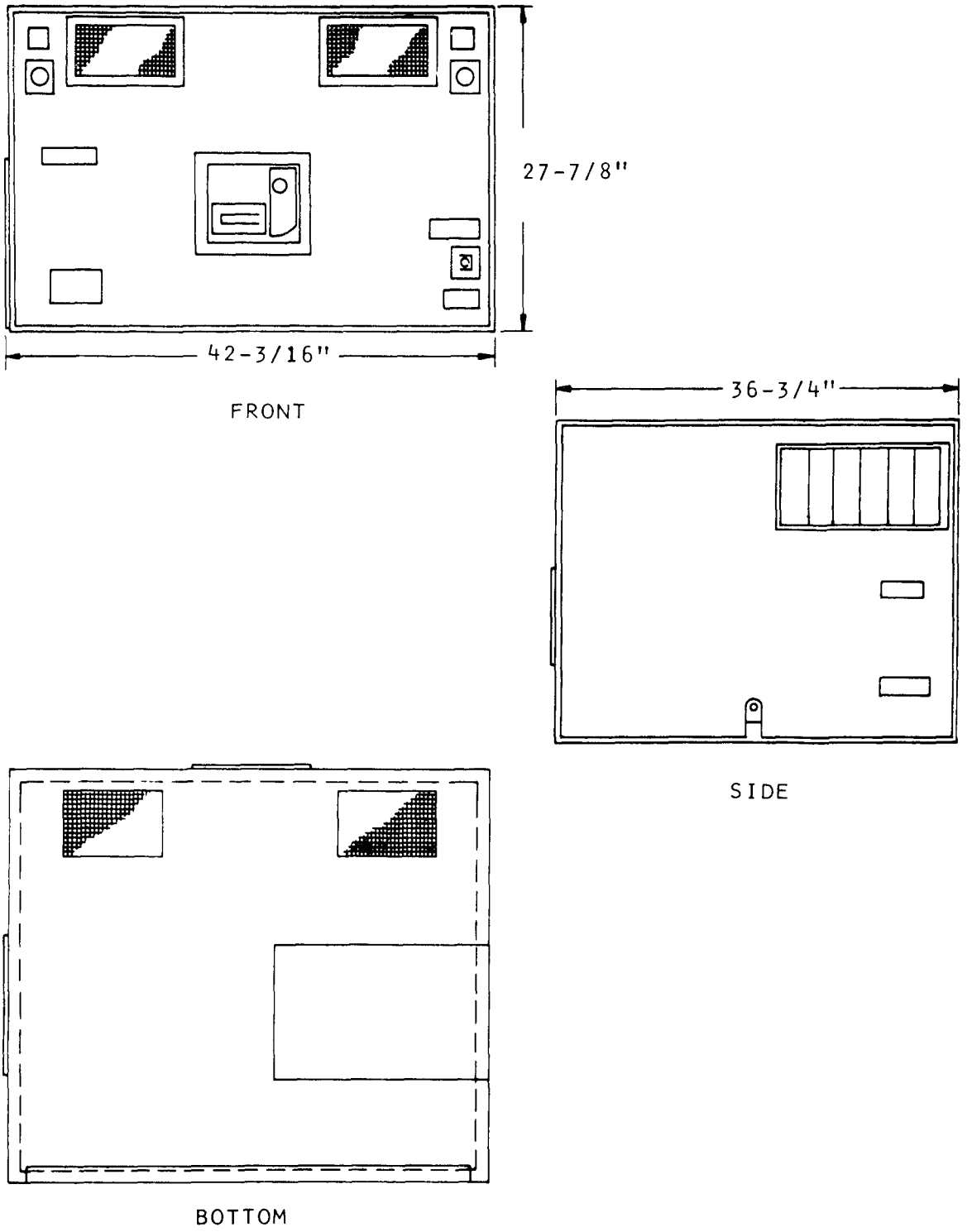


Figure 6. Base Plan.

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Unloading the Equipment

The crated air conditioner may be unloaded and moved by any means, provided the unit weight is supported by the base platform.

7. Unpacking the Equipment

Caution: **So that the unit is protected, it should be left crated until moved to the location where it is to be installed.**

a. General. To uncrate the unit, remove the nails from the top panel and lift off the top. Remove sides in a similar manner. The unit is then neady for inspection.

b. Depreservation. Prepare the air conditioner for inspection and operation as outlined on DA Form 2258, (Depreservation Guide for Vehicles and Equipment) attached to the equipment.

8. Inspecting and Servicing Equipment

a. Inspect the entire air conditioning unit, including motors, fans, controls, etc., to be certain that all parts have been received and without damage. Report any deficiencies to the proper maintenance echelon.

Caution: **Do not remove tags from equipment until the instructions have been followed. Failure to follow these instructions can result in serious damage to the equipment.**

b. Test the joints in the refrigerant circuit for leaks as described in paragraph 93.

9. Installation Instructions

a. The unit may be supported by, or suspended from, any convenient part of the van or trailer capable of withstanding a concentrated load of approximately 550 pounds.

b. If the unit is to be mounted near a wall or partition, allow clearance to permit removal of panels.

c. Follow the base plan in figure 6 in selecting a suitable location or in constructing an installation base. Lift unit by lifting rings (fig. 1).

d. Connect a 1/2 inch pipe to the drain connections on the bottm right side of the unit to remove condensate water. Extend piping or hose to deposit water in a suitable location or container.

e. Be sure the main rotary switch on the control box is in the OFF position, and connect a 208 volt, 60 cycle, 3 phase power source to the main power connector at the lower right front corner of the unit.

Warning: **The air conditioner must be grounded prior to operation. Connect one end of a number 6AWG (American Wire Gage) copper wire ground lead to an underground metallic water piping system or a driven metal ground rod or buried metal ground plate. Connect the other end of the ground lead to the grounding bolt on the unit.**

f. The new unit should not require servicing, as, it is shipped completely assembled and ready to operate when power is applied. However, if any defects have been found during the inspection of the equipment they should be corrected as necessary before the unit is placed into operation.

Section II. MOVEMENT TO A NEW WORKSITE

10. Dismantling for movement

In general, no special preparation is neceswary for moving the unit. External power cables should be disconnected and wcurwd b the unit so they will not become lost.

Warning: **Make sure the power supply is off at the source before disconnecting the power supply line.**

The unit should be moved and stored in its normal or flat position.

a. *Short Move.* For a short distance nmve, the unit need not be crated. However, it should be handled carefully, covered if necessary, and protected sufficiently to prevent external damage in transit. Paticular attention should be given to the protection of controls, dampers and screens locatd on the panels of the unit.

b. Long Distance Move. For long distance moves it is recommended that the unit be crated, and protected in a manner duplicating as nearly as possible the original crating.

11. Reinstallation after Movement

Refer to paragraphs 8 and 9.

Section III. CONTROLS AND INSTRUMENTS

12. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance pensonnel sufficient information about the vanious controls and instruments for proper operation of the air conditioning unit.

13. Controls and Instruments

The location and purpose of the controls is illustrated in figure 7.

Section IV. OPERATION OF EQUIPMENT

14. General

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

b. The operator must know how to perform every operation of which the air conditioner is capable. This section gives the starting and stipping instructions, basic functions of the air conditioner, and coordination of the functions to perform the specific tasks for which the equipment is designed. Sitnoe nearly every job presents a dif f went problem, the operator may have to vary given procedures to fit the individual job.

15. Starting the Equipment

a. Preparation for Starting.

(1) The equipment shall have been initially checked out and installed according to paragraphs 8 and 9.

(2) Perform the daily preventive maintenance services (para 29).

(3) Connect power and remove left side access panel.

(4) Turn rotary control switxh to COOL, then to OFF, and check to see that both fans are rotating in the right direction.

Note. Backward rotation of one or both motors indicates incorrect wiring or power connection

(5) Replace all panels before operating.

b. Starting and Operation. Refer to figure 8 for starting and operating instructions.

16. Stopping the Equipment

Refer to figure 9 for stopping instructions.

17. Operation Under Usual Conditions

There are no special controls necessary to adapt the air conditioning unit to extreme conditions. Refer to paragraphs 18 through 23 for information on precautions which may be necessary for efficient operation in extreme conditions.

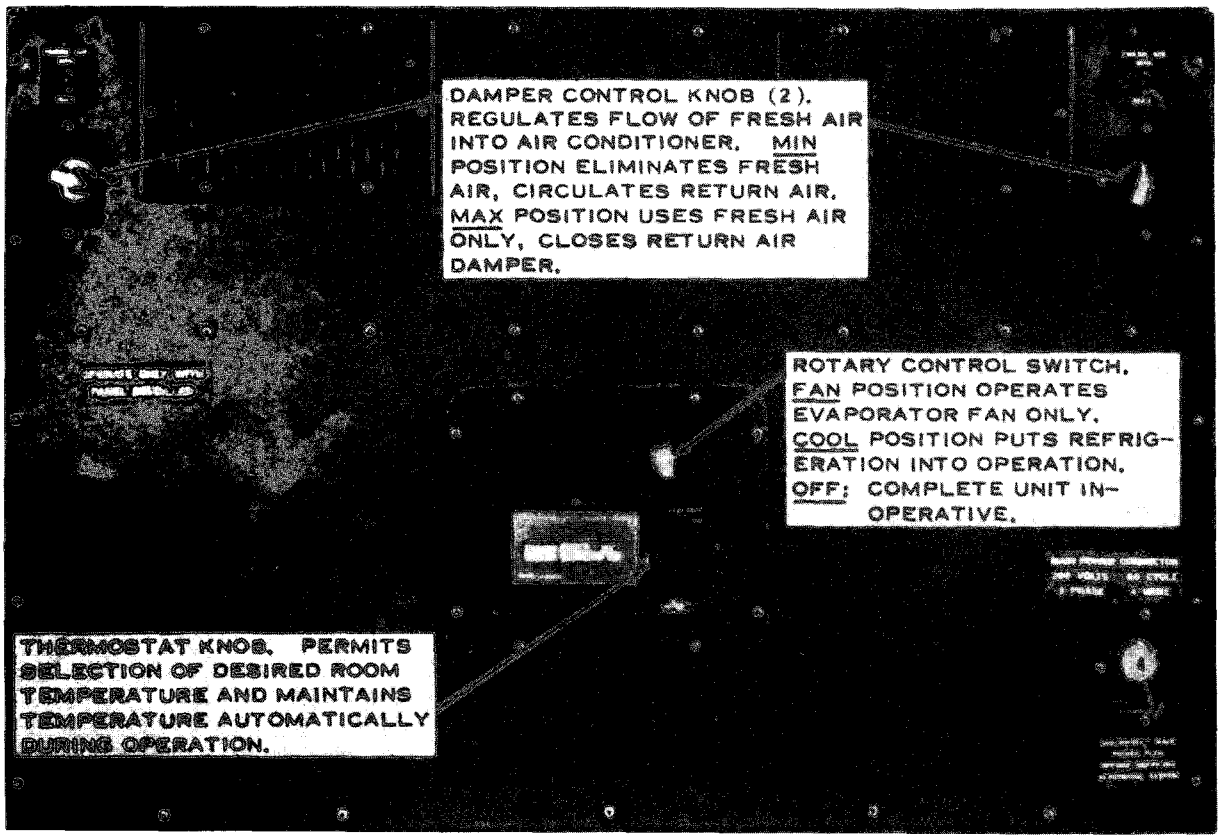


Figure 7. Controls And Instruments.

18. Operation in Extreme Cold

Take all necessary precautions to protect the air conditioner from snow and ice. Clean loose snow from around intake area. Use a canvas cover for protection when the unit is not operating.

19. Operation in Extreme Heat

Keep condenser and evaporator coils and fans clean at all times. Keep filters well cleaned and see that there are no obstructions which could obstruct the flow of cooling air.

20. Operation in Dusty or Sandy Areas

a. Every effort should be made to keep dust or sand from the interior of the air conditioning unit. After exposure to dust or sand, the air filters should be thoroughly cleaned as owned in paragraph 55. Also, all other parts in the unit should be checked and all dust and sand removed.

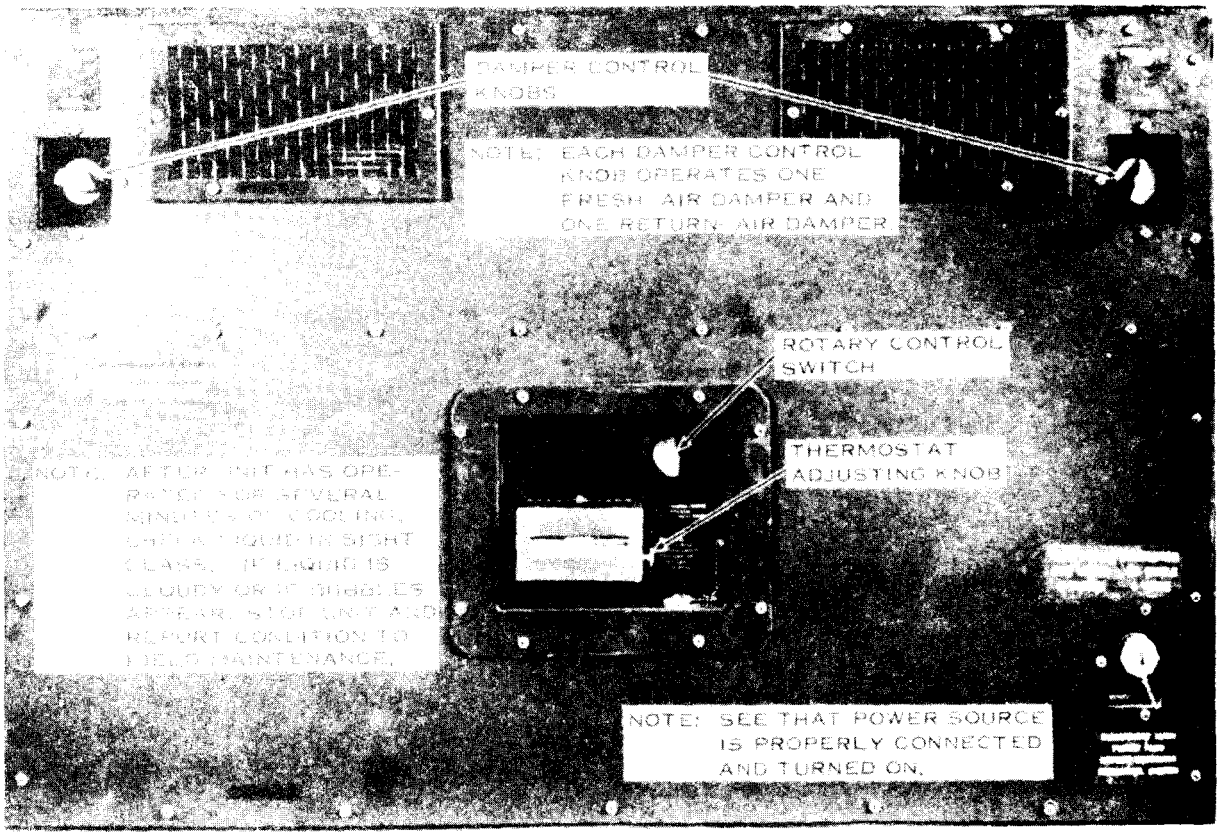
b. When it is necessary to operate the air conditioner for extended periods of time in dusty or sandy areas, a checking and cleaning procedure should be followed at regular intervals to prevent accumulation which could impair the operating efficiency of the cooling system.

21. Operation Under Rainy or Humid Conditions

Take special precautions to keep the air conditioner clean and dry. Use a canvas cover for protection when the unit is not in operation. Remove cover during dry periods and allow equipment to dry.

22. Operation in Salt Water Areas

If the equipment is exposed to high humidity in salt water areas, all accessible parts of



COOLING

STEP 1. SET THERMOSTAT FOR DESIRED ROOM TEMPERATURE.

STEP 2. TURN ROTAR CONTROL SWITCH TO COOL.

STEP 3. TURN DAMPER CONTROL KNOBS TO DESIRED POSITION FROM MIN (100% RETURN-AIR) TO MAX (100% FRESH-AIR).

NOTE: FOR MAXIMUM COOLING CAPACITY WHEN OUTSIDE TEMPERATURE IS HIGH, SET DAMPER CONTROLS AT FULL MIN POSITION.

VENTILATION

STEP 1. TURN ROTARY CONTROL SWITCH TO FAN POSITION FOR VENTILATION ONLY.

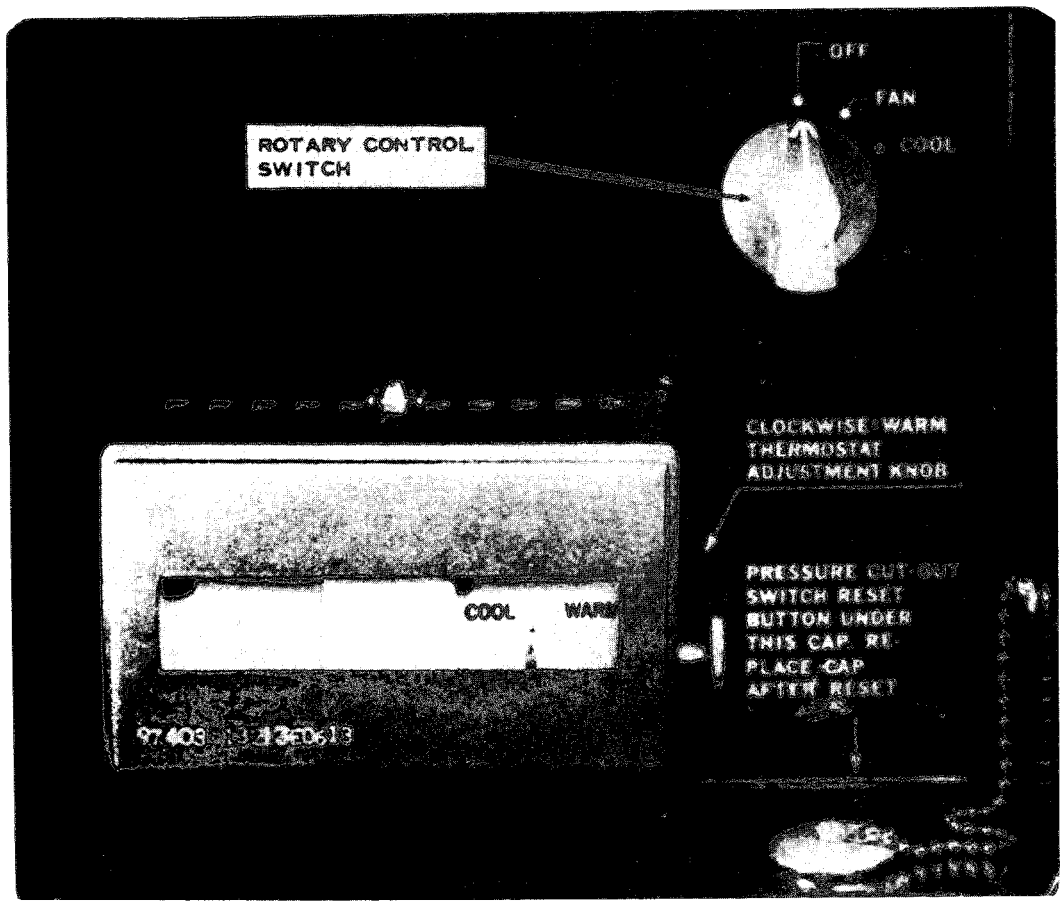
STEP 2. ADJUST DAMPER TO ADMIT FRESH AIR AS DESIRED.

Figure 8. Starting And Operating Instructions.

the unit, including controls, control box, panels, fans, motors, and filters should be thoroughly wiped dry to prevent corrosive effects. Remove rust immediately and coat exposed metal surfaces with an approved protective material.

23. Operation in High Altitudes

The unit is designed to operate in altitudes up to 5000 ft. At high altitudes, the output of the fans will be reduced. This is a normal condition which can not be prevented. Keep inlet screens, filters and fans-free of dirt and obstructions at all times.



STEP 1. TURN ROTARY CONTROL SWITCH TO OFF POSITION.

WARNING: ALWAYS DISCONNECT MAIN POWER SOURCE BEFORE SERVICING ANY OF THE AIR CONDITIONER COMPONENTS.

STEP 2. PERFORM PREVENTIVE MAINTENANCE SERVICES (PAR. 28).

Figure 9. Stopping Instructions.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND EQUIPMENT

24. Special Tools and Equipment

No special tools or equipment are required by the operator or organizational maintenance personnel for maintenance of the air conditioner.

25. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for the air conditioner are listed in the Basic Issue Items List, Appendix III of this manual.

26. Organizational Maintenance Repair Parts

This paragraph is not applicable.

Section II. LUBRICATION

27. General Lubrication Information

There are no lubrication responsibillities for organizational maintenance personnel on this air conditioner.

Section III. PREVENTIVE MAINTENANCE SERVICES

28. General

To insure that the air conditioner is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary Preventive Maintenance Services to be performed are listed and described in paragraphs 29 and 30. The item numbers indicate the sequence or minimum inspection requirernentw Defeots discovered during operation of t unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the esrliest possible opportunity.

29. Daily Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item number are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 10 for the Daily Maintenance Services.

30. Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by Organizational Maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 11 for the Quarterly Preventive Maintenance Services.

Section IV. OPERATOR MAINTENANCE

31. General

The instructions in this section are published for the information and guidance of the operator to maintain the air conditioner. In addition to the maintenance responsibilities listed in paragraph 29, the operator will also perform the service procedures covered in the section.

32. Cleaning Air Filters

Refer to figure 12 and service the air filter.

Section V. TROUBLESHOOTING

33. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable causee. Any trouble beyond the scope of organizational maintenance shall be reported to direct support maintenance.

34. Compressor Starts but Fan Motor(s) will not Run

Probable Cause	Possible Remedy
Control switch or motor defective.	Check fans to make sure they turn freely by hand. Check wiring and terminals for loose connections. Check control switch continuity with multimeter (fig. 5). If switch is not defective check motor (para 57 and 58) and remove and service if necessary.

35. Both Fan Motors Run-Compressor Motor will not Start (Selector Switch on COOL)

Probable Cause	Possible Remedy
Circuit breaker open.	Determine and correct cause of overload.
High pressure cut-out or compressor thermal protector open.	If both fan motors operate but the compressor motor does not run, check the high pressure cut-out. This cubout is a manual reset type. Check the compressor thermal protector for continuity (fig. 5). If the motor has cut-out on the above safety devices, determine and correct the cause.
Open circuit.	Apply multimeter to compressor motor terminals (wiring Diagram, fig. 5).

36. Condenser Fan Motor Runs-Compressor will not Start (Selector Switch on COOL)

Probable Cause	Possible Ramedy
Circuit breaker open.	Determine and correct cawe of overload.
Thermal delay switch defective.	Repair or replace (para 63).

37. Evaporator Fan Motor Runs-Condenser Fan Motor and Compressor Motor will not Run (Selector Switch on COOL)

Probable Cause	Possible Remedy
Circuit breaker open.	Determine and correct cause of overload.
High pressure cutout.	If the evaporator fan motor runs and the thermostat is calling for cooling, but the condenser fan and compressor motors do not run, the high pressure cutout has probably opened and should be reset at the dual preassure switch.

38. Fan Motor and Compressor Motor will not Run

Probable Cause	Posible Remedy
Blown fuse at power source.	Test for voltage at the power outlet. No voltage indication usually means that the line fuses are defective. If common fuses have been used, thay should be replaced with 30 amp time lag fuses such as Fustats or Fusetrons or 40 amp regular fuse.
Defective power outlets, broken wire or loose terminal connection or faulty power switch.	Check the power switch circuits (fig. 5) and make necessary repairs.

39. Compressor Noisy

Probable Cause	Possible Remedy
Loose mounting bolts.	Tighten all mounting belts.
Internal noise in compressor.	Replace compressor if' necessary (para 98).
Unit vibrating against nearby tubing or objects.	Provide clearance for unit.

40. Compressor Will Not Run Steadily

Probable Cause	Possible Remedy
Stopping on high pressure cut-out.	May be dirty condenser, faulty high pressure cut-out, or excessive heat. Locate trouble and correct.

41. Air Output Volume Insufficient

Probable Cause	Possible Remedy
Filters dirty.	Clean filters (para 55).
Evaporator coils dirty.	Clean coils.
Dirty fan blades.	Clean fan blades.
Fan(s) running too slow.	Check motor. Replace if necessary (para 57 and 58).

42. Insufficient Cooling

Probable Cause	Possible Remedy
Insufficient refrigerant charge or faulty compressor operation.	Check refrigerant charge, Replace compressor if defective (para 98).
Filters dirty.	Clean filters (para 55).
Improper adjustment of damper control.	Adjust damper control.

43. Excessive Cooling

Probable Cause	Possible Remedy
Thermostat set too low.	Adjust as necessary (para 60).
defective thermostat.	Replace thermostat (para 60).

44. Faulty Blower

Probable Cause	Possible Remedy
Unbalanced or corroded fans.	Replace (para 57 and 58).
Defective fan motor.	Replace motor (para 57 and 58).

45. Faulty Receiver

Probable Cause	Possible Remedy
Receiver develops leaks.	Repair leaks or replace receiver (fig. 31).
Relief valve defective.	Replace valve (fig. 31).

46. Suction Pressure Below Normal

Probable Cause	Possible Remedy
Restricted liquid line or expansion valve.	Pump down, examine, and correct. Replace expansion valve if necessary (para 84).
Insufficient refrigerant charge.	Check for refrigerant shortage. Recharge if necessary (para 97).

47. Suction Pressure too High

Probable Cause	Possible Remedy
Overfeeding of expansion valve.	Regulate expansion valve, and check bulb attachment. Replace if necessary (para 84).

48. Defective Motor Contactor

Probable Cause	Possible Remedy
Circuit breaker defective.	Replace circuit breaker (para 62).
Holding coil defective.	Replace Motor Contactor (para 63).

49. Dampers Fail

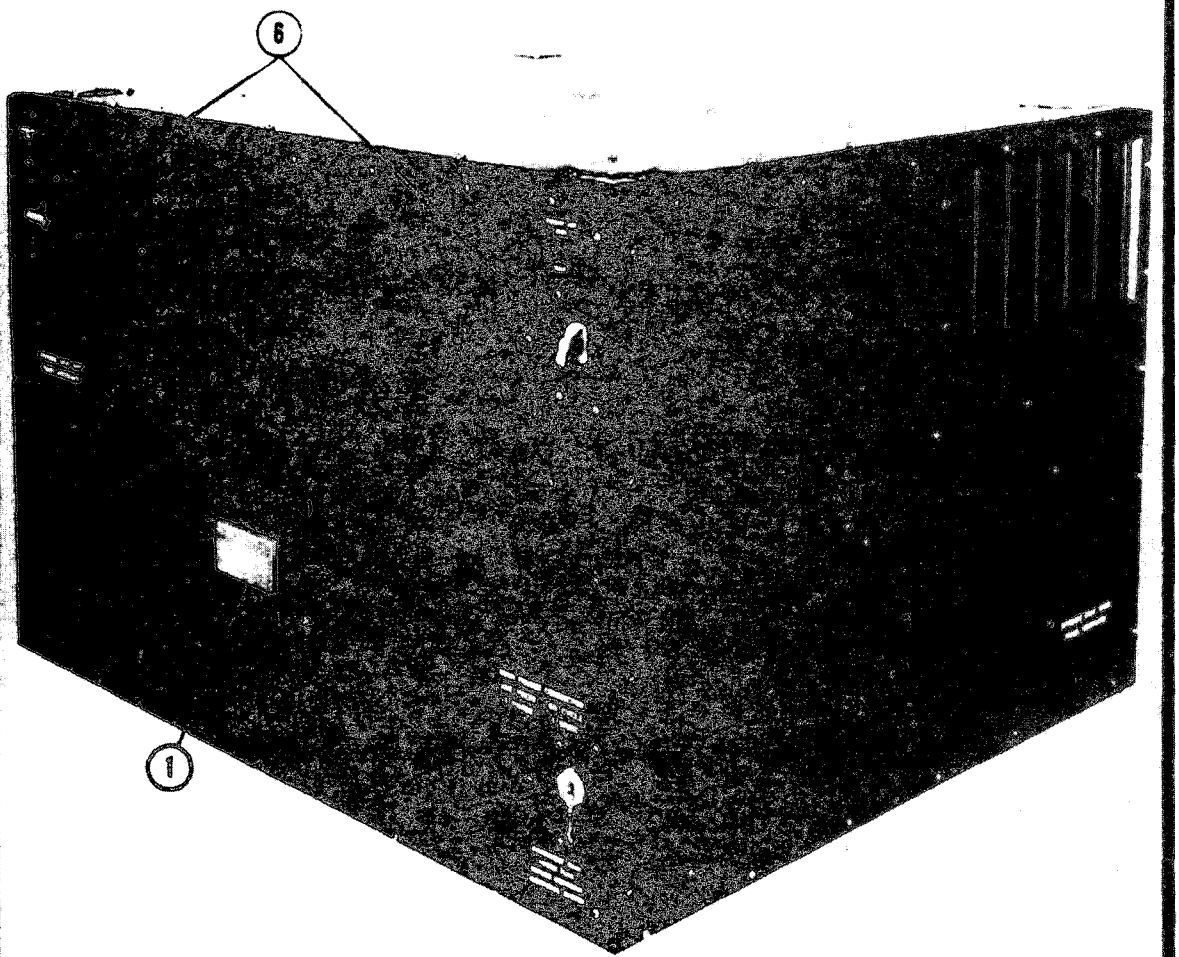
Probable Cause	Possible Remedy
Damper control cable defective.	Replace cable (para 54).
Control linkage binder defective.	Check damper control linkage. Repair or replace as needed.
Damper blades binding in frame.	Free blades or replace (para 53).

PREVENTIVE MAINTENANCE SERVICES

DAILY

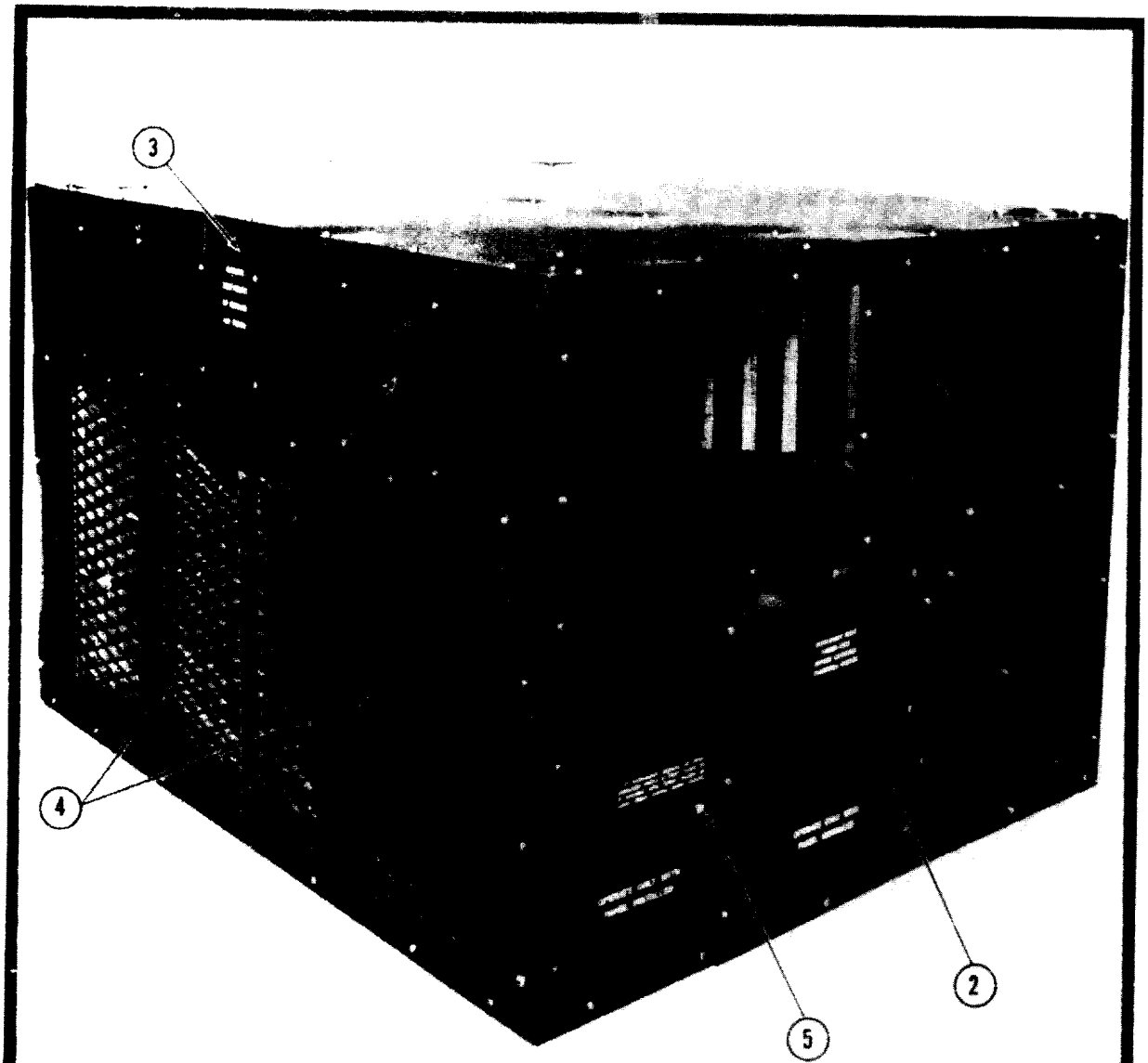
TM 5-4120-259-15 YORK CORPORATION AIR CONDITIONER

MODEL [illegible]



ITEM		PAR. REF.
1.	AIR CONDITIONING UNIT. INSPECT CONTROLS AND FITTINGS FOR DEFECTIVE OR LOOSE PARTS.	13
2.	REFRIGERANT CONTAINING COMPONENTS. INSPECT FOR VISIBLE OR AUDIBLE LEAKAGE.	
3.	FILTERS. CLEAN DIRTY FILTER. (CHECK WEEKLY)	55
4.	SCREENS AND GRILLES. CLEAN DAILY. (CHECK WEEKLY)	51

Figure 10. Daily Preventive Maintenance Services (Cont'd next page).

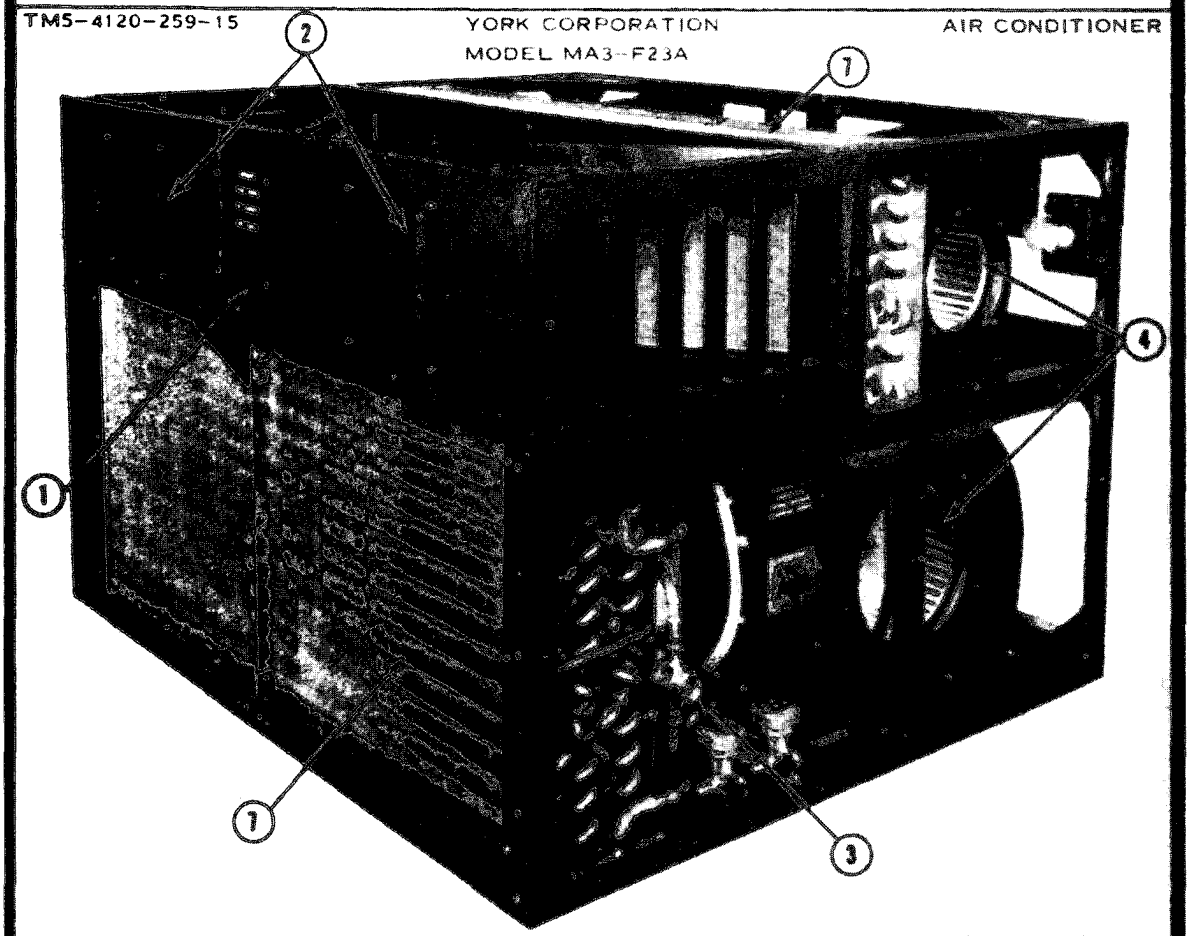


ITEM		PAR. REF.
5.	SIGHT GLASS. CHECK FOR BUBBLES OR CLOUDY CONDITION WHICH INDICATES AIR IN SYSTEM OR LOW REFRIGERANT CHARGE.	
6.	DAMPER CONTROL. CHECK FOR FREEDOM OF MOVEMENT. TIGHTEN LOOSE MOUNTING.	54
	NOTE 1. OPERATION. DURING OPERATION OBSERVE FOR ANY UNUSUAL NOISE OR VIBRATION.	

Figure 10. Daily Preventive Maintenance Services (Cont'd).

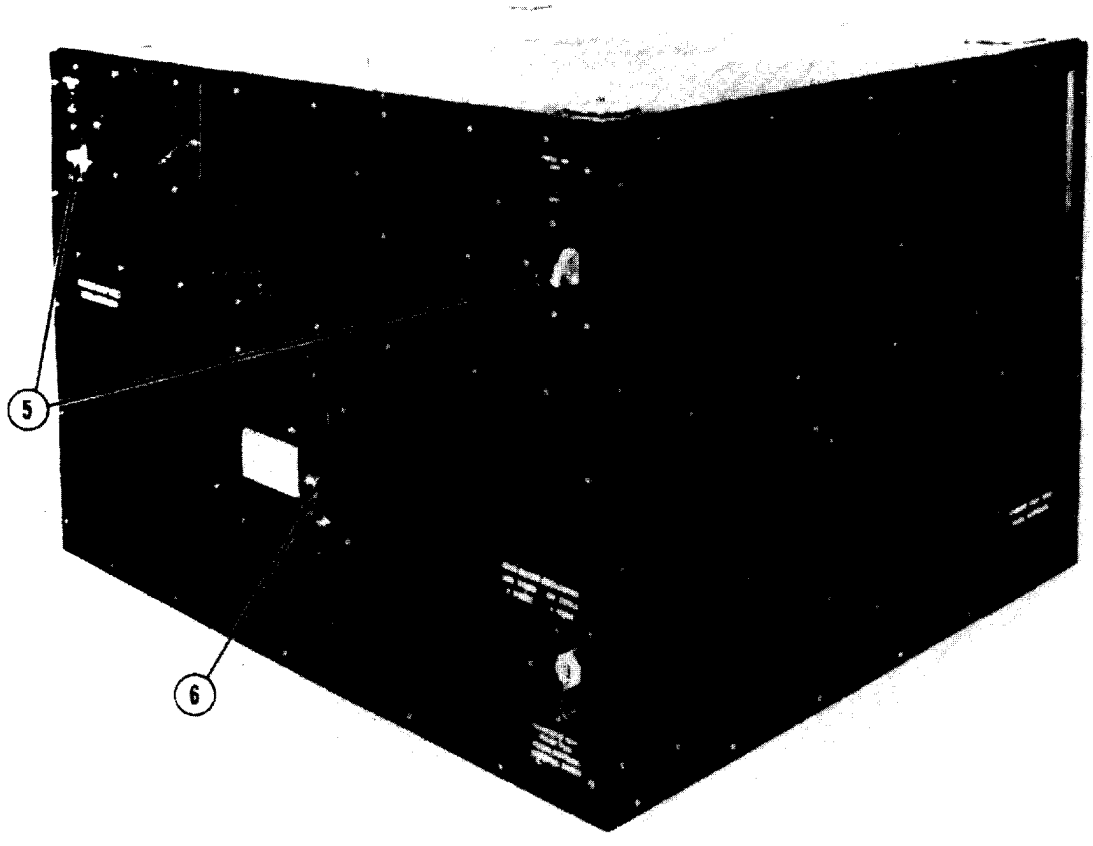
PREVENTIVE MAINTENANCE SERVICES
QUARTERLY

TM5-4120-259-15 YORK CORPORATION AIR CONDITIONER
MODEL MA3--F23A



ITEM		PAR. REF.
1.	FILTERS. CLEAN DIRTY FILTER. REPLACE DAMAGED FILTER.	55
2.	SCREENS. CLEAN DIRTY SCREENS. REPLACE DEFECTIVE SCREENS.	51
3.	SIGHTGLASS. CHECK FOR BUBBLES OR CLOUDY CONDITION, WHICH INDICATES AIR IN SYSTEM OR LOW REFRIGERANT CHARGE.	
4.	FANS. TIGHTEN LOOSE MOUNTING. REPLACE DEFECTIVE FAN.	57, 58
5.	DAMPER CONTROL. CHECK FOR FREEDOM OF MOVEMENT. TIGHTEN LOOSE MOUNTING. REPLACE DEFECTIVE CONTROL.	54

Figure 11. Quarterly Preventive Miantenance Services (Cont'd next page).

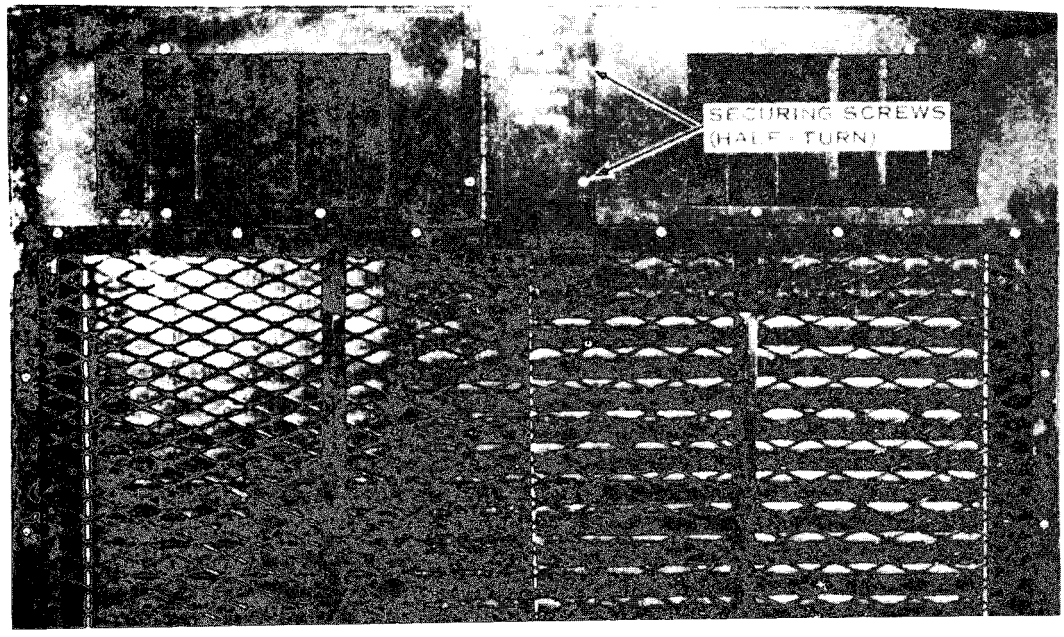


ITEM		PAR. REF.
6.	THERMOSTAT AND SWITCH. CHECK FOR PROPER OPERATION. TIGHTEN LOOSE MOUNTING. REPLACE DEFECTIVE THERMOSTAT OR SWITCH.	60
7.	EVAPORATOR AND CONDENSER. CLEAN DIRTY COILS. CHECK FOR DAMAGE.	

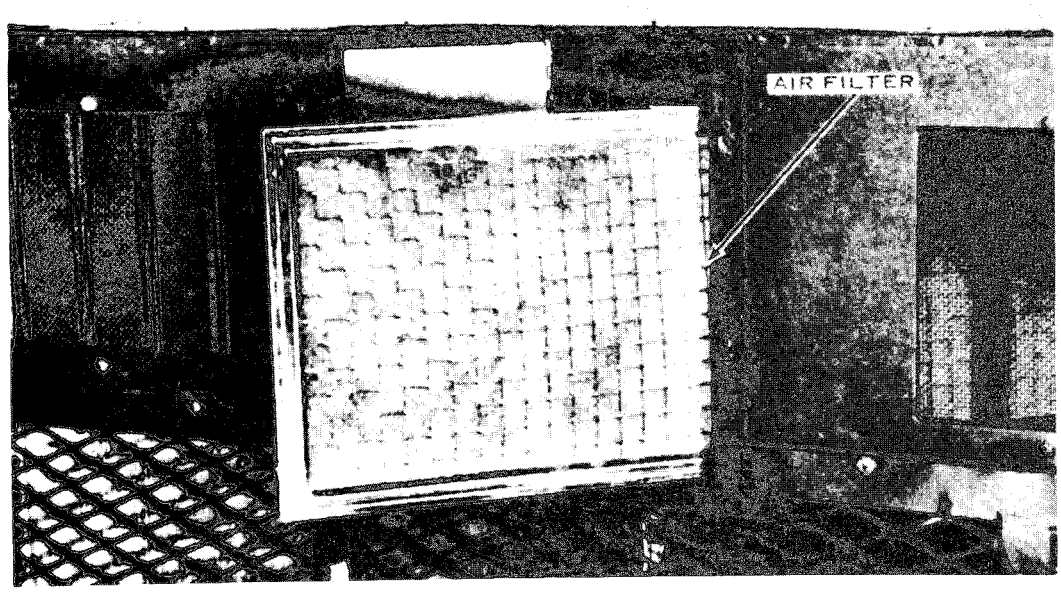
NOTE 1. OPERATIONAL TEST. DURING OPERATION OBSERVE FOR ANY UNUSUAL NOISE OR VIBRATION.

NOTE 2. ADJUSTMENTS. MAKE ALL NECESSARY ADJUSTMENTS DURING OPERATIONAL TEST.

Figure 11. Quarterly Preventive Maintenace Services (Cont'd).



STEP 1. OPEN AIR FILTER PANEL BY TURNING SECURING SCREWS (2) ONE–HALF–TURN COUNTER–CLOCKWISE.



STEP 2. SLIDE AIR FILTERS OUT OF UNIT.
STEP 3. SPRAY FILTERS WITH A HOSE IN OPPOSITE DIRECTION OF AIR FLOW (SEE ARROW ON FILTER FRAME). THEN SPRAY OTHER SIDE.
STEP 4. SHAKE WATER FROM FILTERS AND SLIDE BACK INTO UNIT.
CAUTION: DO NOT USE OIL ON AIR FILTERS.
STEP 5. INSTALL AIR FILTER PANEL (PAR. 51)

Figure 12. Air Filters, Removal, Installation And Servicing.

Section VI. HOUSING PANELS AND GRILLES

50. General

The air conditioner is enclosed by sheet aluminum panels mounted on a rigid aluminum frame and secured with machine screws. The inside surfaces of the panels are insulaeed with sponge rubber and all contact edges are sealed with gasket material. Air inlets and outlets are protected by metal grilles.

51. Housing Panels and Grilles

Remove and instill the housing pads and grilles as shown by figure 13.

Section VII. DAMPERS, DAMPER CONTROLS, AND AIR FILTERS

52. General

The air conditioner has two return air dampers located on the upper right side and upper left side of the unit, and two fresh air dampers on the rear of the unit. These dampers are operated by control knobs on the front of the unit (fig. 7). Each of the two damper control knobs operates one fresh air damper and one return air damper to control the flow of fresh or return air into the unit as desired. The fresh air dampers are protected by insect screens. Two permanent, washable type air filters add further protection against obstruction of the air cumulation system.

53. Dampers

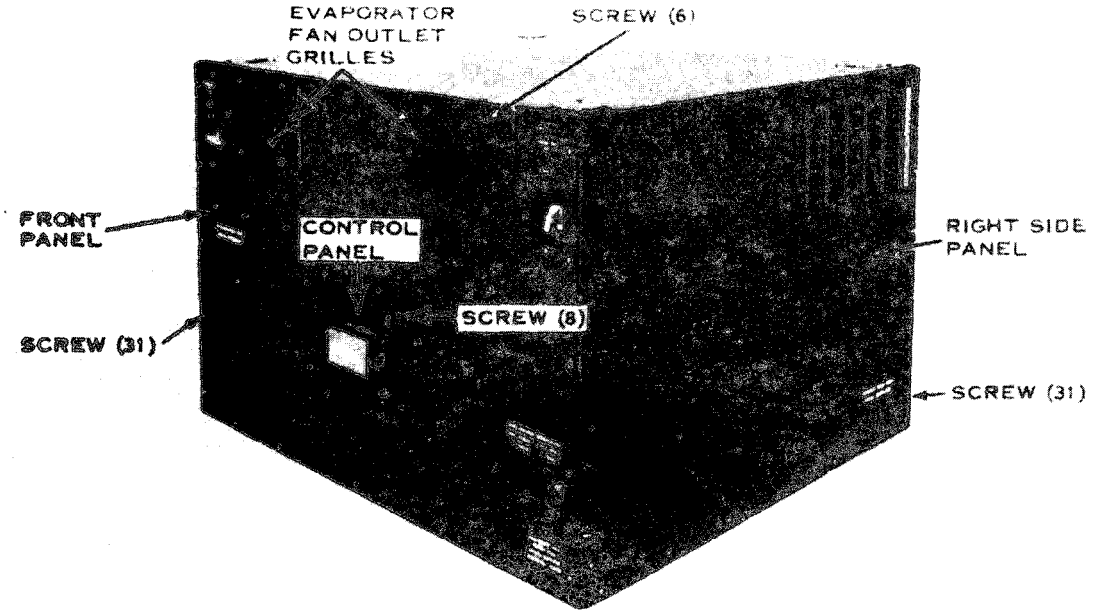
Remove and install the dampers as shown by figure 14.

54. Damper Controls

Remove and install the damper controls as shown by figure 15.

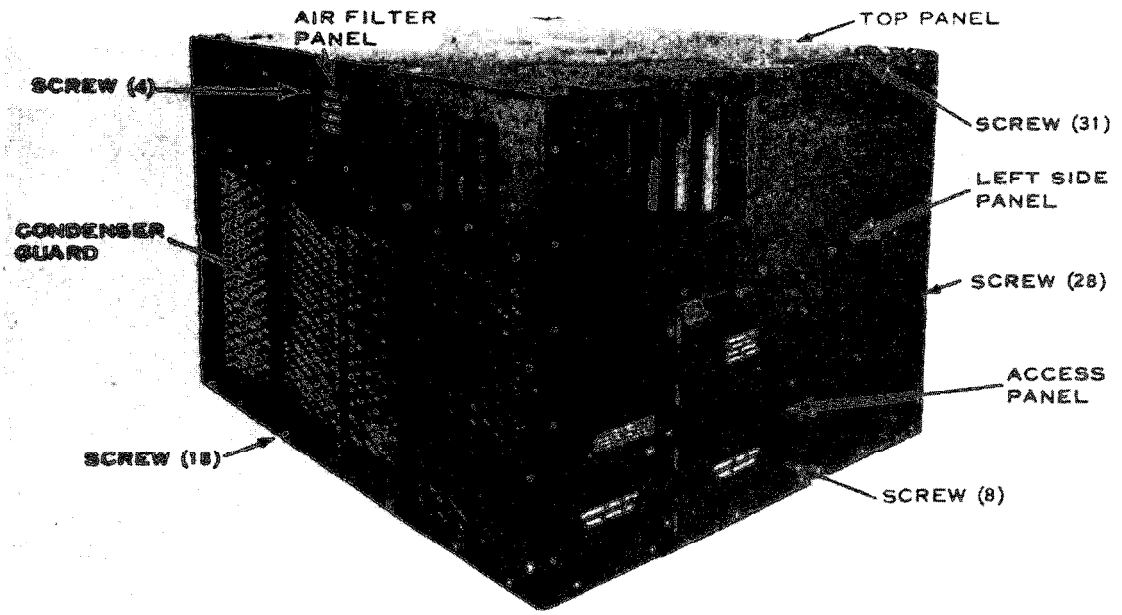
55. Air Filters

Remove and install the air filters as shown by figure 12.



STEP 1. REMOVE 8 SCREWS AND REMOVE CONTROL PANEL
STEP 2. REMOVE 12 SCREWS AND REMOVE THE TWO OUTLET GRILLES.
STEP 3. REMOVE 31 SCREWS AND REMOVE FRONT PANEL.
STEP 4. REMOVE 31 SCREWS AND REMOVE RIGHT SIDE PANEL.

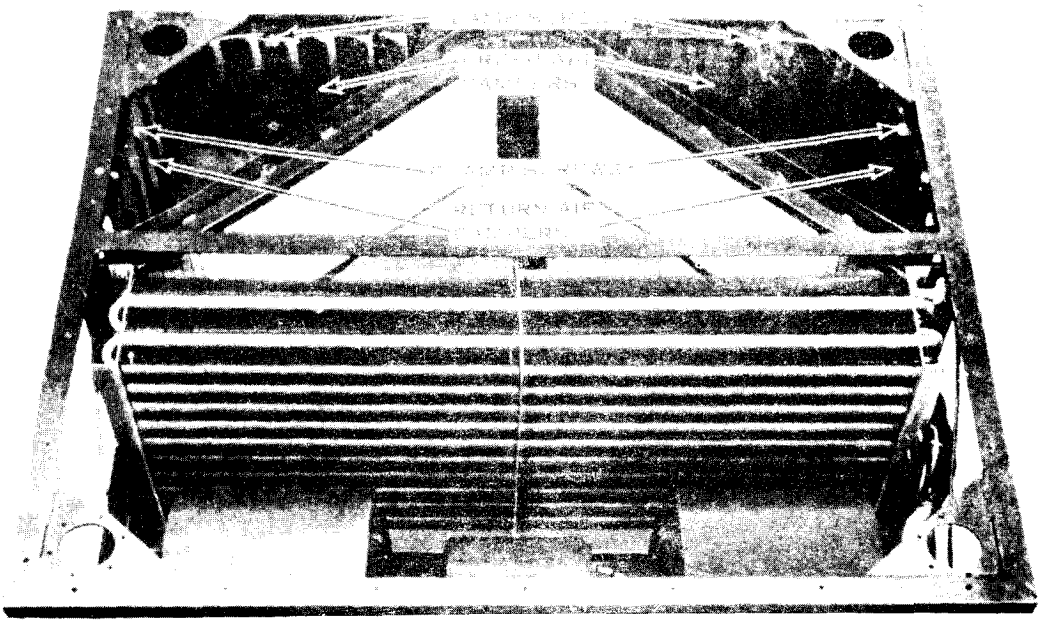
NOTE: REVERSE SEQUENCE OF ABOVE STEPS FOR INSTALLATION.



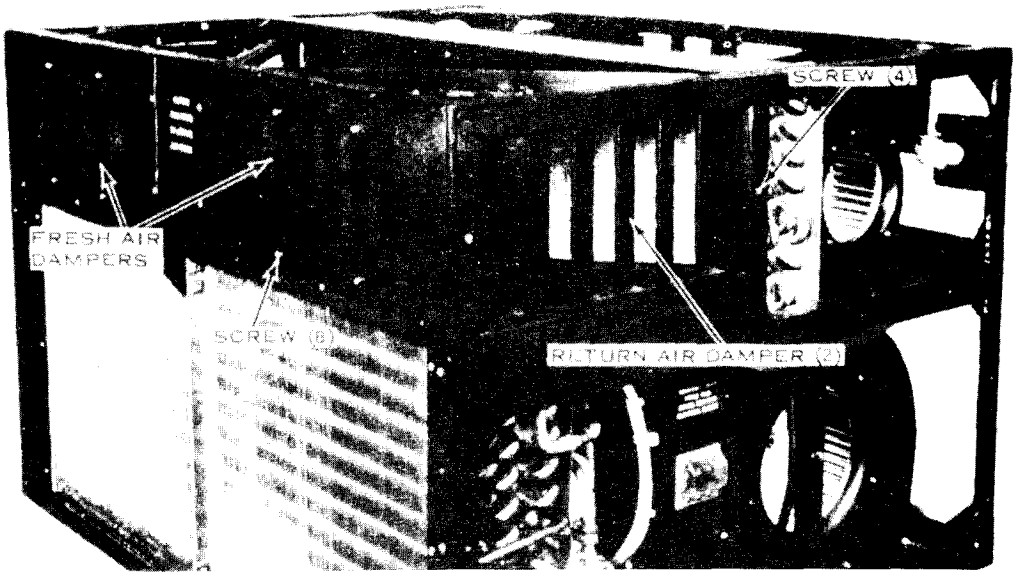
STEP 5. REMOVE 4 SCREWS AND REMOVE AIR FILTER PANEL.
STEP 6. REMOVE 18 SCREWS AND REMOVE CONDENSER GUARD
STEP 7. REMOVE 8 SCREWS AND REMOVE ACCESS PANEL.
STEP 8. REMOVE 28 SCREWS AND REMOVE LEFT SIDE PANEL.
STEP 9. REMOVE 31 SCREWS AND REMOVE TOP PANEL.

NOTE: REVERSE SEQUENCE OF ABOVE STEPS FOR INSTALLATION.

Figure 13. Housing Panels And Grilles, Removal And Installation.

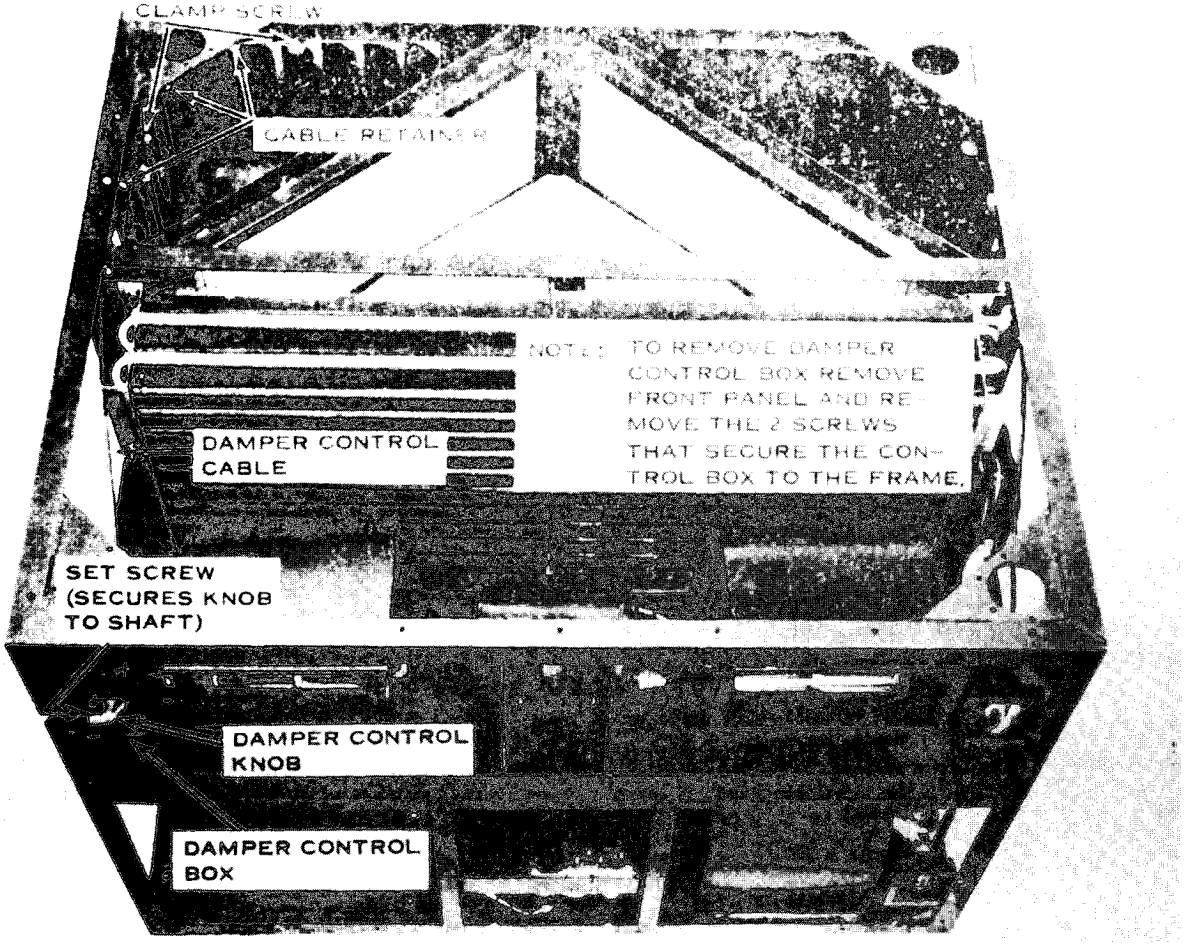


STEP 1. REMOVE TOP AND SIDE PANELS AS NECESSARY (FIG. 13).
STEP 2. LOOSEN CLAMP SCREWS THAT SECURE CONTROL WIRES TO DAMPERS.



STEP 3. REMOVE THE 4 SCREWS THAT SECURE THE 2 RETURN AIR DAMPERS TO THE FRAME.
STEP 4. PULL BOTTOM OF DAMPER OUT ABOUT 1-1/2 INCH AND SLIDE DAMPER DOWN AND OUT.
STEP 5. REMOVE THE 8 SCREWS FROM FRESH AIR DAMPERS AND REMOVE DAMPERS AND INSECT SCREENS FROM INSIDE OF UNIT.
NOTE: INSTALL DAMPERS IN REVERSE ORDER OF STEPS ABOVE.

Figure 14. Dampers, Removal And Installation.



STEP 1. REMOVE TOP PANEL (FIG. 13).

STEP 2. REMOVE SET SCREW FROM DAMPER CONTROL KNOB AND REMOVE KNOB AND RETAINER NUT FROM THE CONTROL MECHANISM.

STEP 3. PUSH CONTROL MECHANISM THROUGH HOLE IN DAMPER CONTROL BOX.

STEP 4. LOOSEN THE 3 CABLE RETAINERS AND 2 CLAMP SCREWS. AND REMOVE DAMPER CONTROL CABLE FROM UNIT.

NOTE: INSTALL DAMPER CONTROLS IN REVERSE ORDER OF STEPS ABOVE. REMOVE AND INSTALL OTHER DAMPER CONTROL IN SAME MANNER.

NOTE: ON INSTALLATION, CONNECT CABLE SO THAT, WITH CONTROL-KNOB AT MINIMUM, FRESH AIR DAMPER IS FULLY CLOSED AND RETURN-AIR DAMPER IS FULLY OPEN. (VICE-VERSA WHEN CONTROL KNOB IS AT MAXIMUM.)

Figure 15. Damper Controls, Removal And Installation.

Section VIII. EVAPORATOR AND CONDENSER FANS AND MOTORS

56. General

This section contains the maintenance instructions for the evaporator fans and motor and the condenser fans and motor.

57. Evaporator Fans and Motor

a. Removal and Installation. Remove and install the evaporator fans and motor as shown by figure 16.

b. Testing. Test the motor for continuity and shorts with a multimeter. Replace a defective motor.

58. Condenser Fans and Motor

a. *Removal and Installation.* Remove and install the condenser fans and nmtor as shown by figure 17.

b. Testing. Test the motor for continuity and shorts with a multimeter. Replace a defective motor.

Section IX. ELECTRICAL SYSTEM

59. General

This section contains the maintenance information for the main control box, rotary control switch, thermostat, junction box, circuit breaker, motar contractors, thermal delay relay, terminal board, solenoid valve coil, main power connector, and wiring harnesses.

Caution: **All testing and other work to the electrical system must be done with power plug disconnected.**

60. Control Box, Rotary Control Switch, and Thermostat

a. Adjust thermostat by turning adjusting knob as shown by figure 18.

b. Remove and install the control box, rotary control switch, and thermostat as shown by figure 18.

61. Electrical Junction Box

Remove and install the electrical junction box as shown by figure 19.

62. Circuit Breaker

a. *Testing.* Use a multimeter and test between terminals 1 and 4, 2 and 5, and 3 and 6 with the circuit breaker in the ON position. If continuity does not exist in any of the three test positions the circuit breaker is defective.

b. Removal and Installation. Remove and install the circuit breaker as shown by figure 20.

63. Motor Contractors and Thermal Delay Switch

a. *Testing.* Test across each of the three motor contractors with a multimeter set on ohms. Continuity should not be inidicated in any of the test positions except between terminals 4 and 8 of the compressor motor contactor. If continuity does not exist acrow terminals 4 and 8 of the compressor motor comtracts, the thermal delay switch is defective and must be replaced. Check motor contactor coil continuity. Replace motor contactor if defective.

b. Removal and Installation. Remove and install the contractors and relay as shown by figures 20, 21 and 22.

c. Contacts Replacement. Replace the contacts and coil as shown by figures 21 and 22

d. Thermal Delay Switch Adjustment. Make timing adjustment as shown by figure 23.

64. Terminal Board

Remove and install the terminal board as shown by figure 20.

65. Solenoid Valve Coil

a. *Testing.* Test the solenoid coil for continuity and shorts with a multimeter. Replace defective coil.

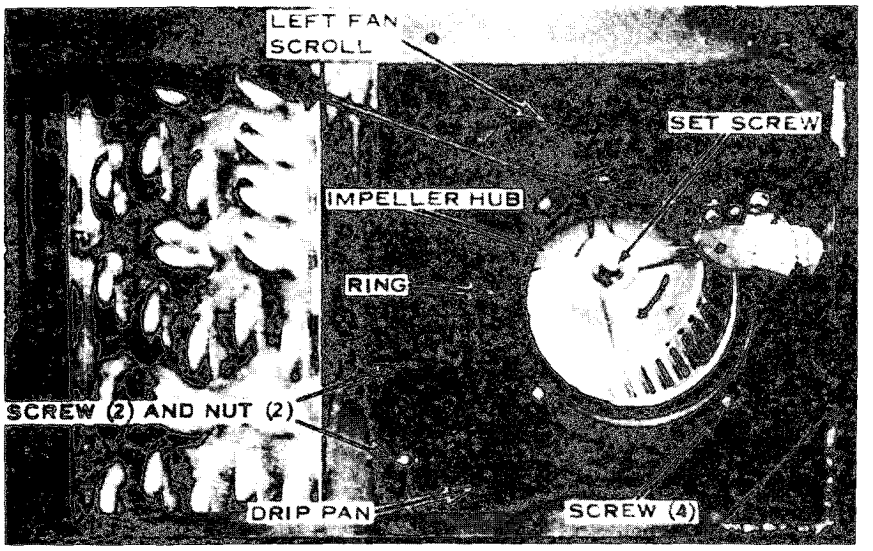
b. Removal and Installation. Remove and install the solenoid valve coil as shown by figure 24.

66. Main Power Connector and Box

Remove and install the main power connector and box as shown by figure 25.

67. Wiring Harnesses

a. *General.* Except for connecting wires attached to miscellaneous components, the complete wiring system is composed of two main harnesses. Each harness is individually replaceable.



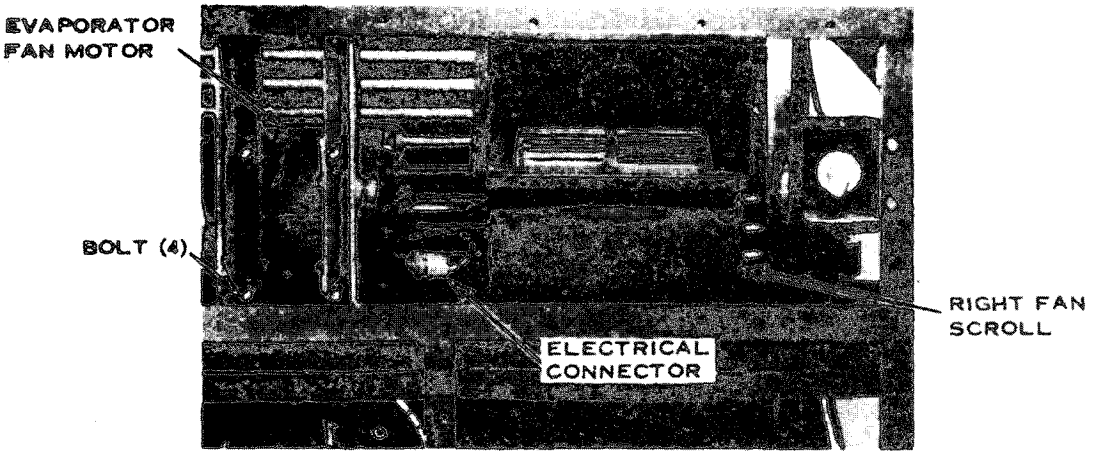
STEP 1. REMOVE TOP PANEL AND EVAPORATOR FAN OUTLET SCREENS (FIG. 13).

STEP 2. LOOSEN SET SCREW IN HUBS OF BOTH IMPELLERS.

STEP 3. REMOVE 4 SCREWS THAT SECURE THE OUTER LEFT RING TO THE SCROLL AND REMOVE THE RING.

STEP 4. SLIDE LEFT IMPELLER OFF MOTOR SHAFT.

STEP 5. REMOVE THE 2 SCREWS AND NUTS THAT SECURE THE LEFT FAN SCROLL BRACKETS TO THE DRIP FAN AND REMOVE LEFT SCROLL AND IMPELLER.



STEP 6. DISCONNECT ELECTRICAL CONNECTOR, REMOVE 4 MOTOR MOUNTING BOLTS, AND REMOVE MOTOR.

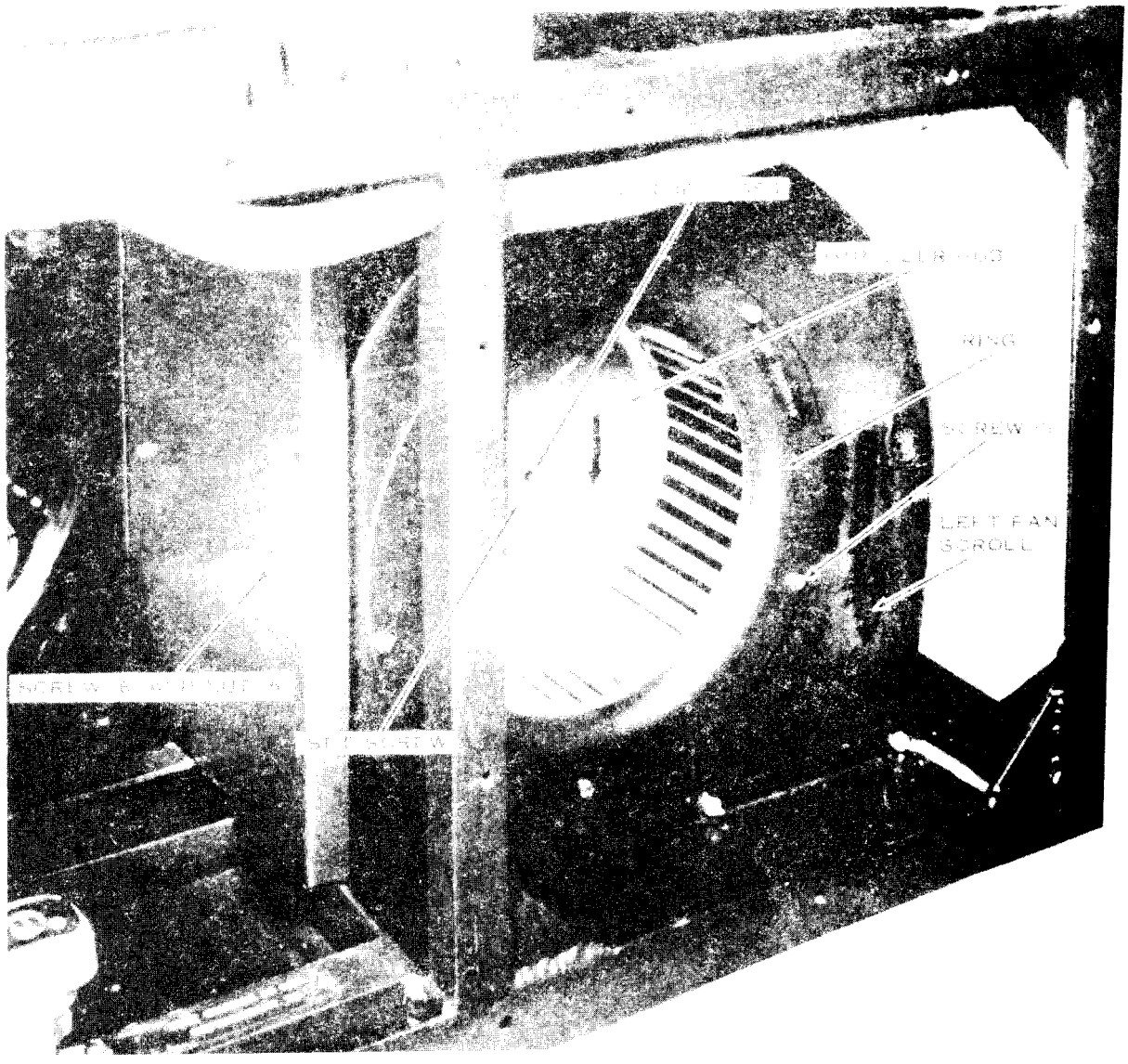
CAUTION: BE CAREFUL TO SUPPORT MOTOR DURING REMOVAL TO AVOID DAMAGING FANS.

STEP 7. REMOVE THE 2 SCREWS AND NUTS THAT SECURE THE RIGHT FAN SCROLL TO DRIP PAN AND REMOVE THE RIGHT FAN SCROLL AND IMPELLER.

NOTE: REVERSE THE REMOVAL PROCEDURE FOR INSTALLATION. INSTALL MOTOR SO ROTATION IS TOWARD FRONT OF UNIT AND BE SURE ARROWS ON FANS INDICATE THE SAME DIRECTION AS MOTOR ROTATES.

NOTE: INSTALL IMPELLERS SO HUBS ARE EVEN WITH ENDS OF MOTOR SHAFT. CENTER IMPELLERS IN SCROLLS AND SPIN SHAFT TO BE SURE NO PARTS ARE RUBBING.

Figure 16. Evaporator Fans And Motor, Removal And Installation.



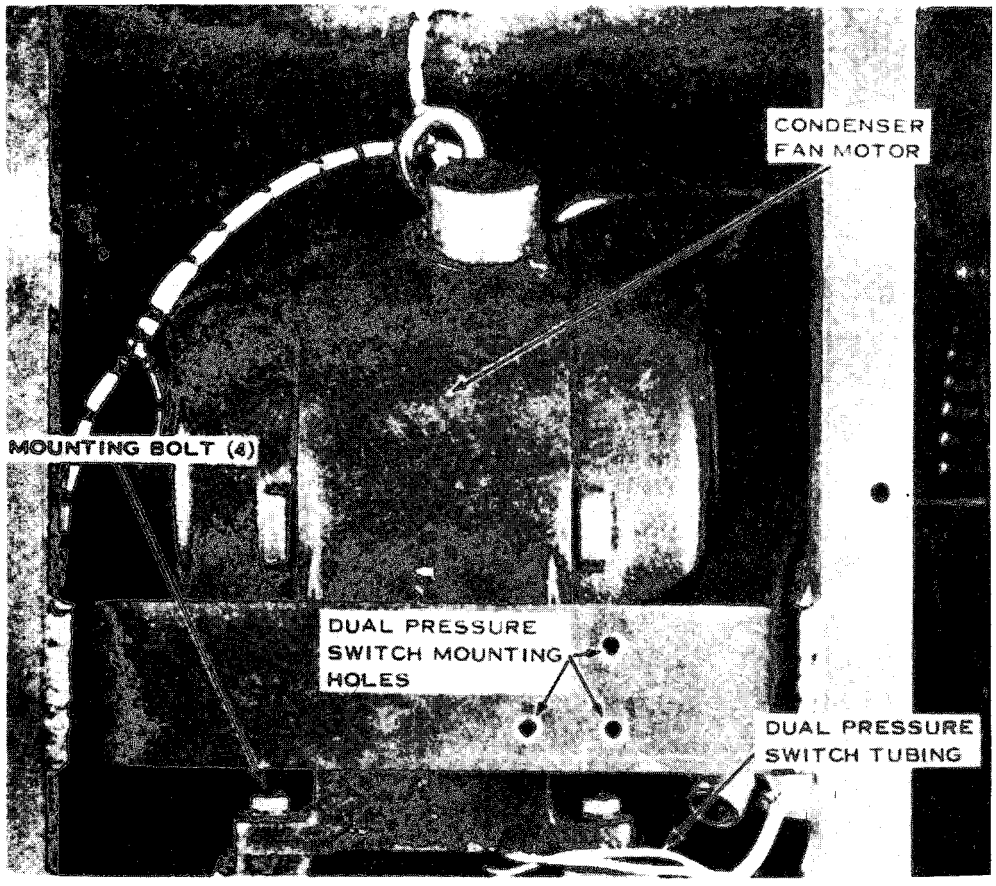
STEP 1. REMOVE CONTROL BOX (FIG. 18), FRONT PANEL, AND SIDE PANELS (FIG. 13), AND JNCTION BOX (FIG. 19).

STEP 2. REMOVE 5 SCREWS THAT SECURE OUTER RING TO LEFT SCROLL AND REMOVE RING. REMOVE OUTER RING FROM RIGHT SCROLL IN SAME MANNER.

STEP 3. LOOSEN SET SCREWS IN BOTH IMPELLER HUBS RIGHT AND LEFT) AND REMOVE BOTH IMPELLERS FROM SHAFT.

STEP 4. DISCONNECT ELECTRICAL CONNECTORS FROM FAN MOTOR AND DUAL PRESSURE SWITCH.

Figure 17. Condenser Fans And Motor, Removal And Installation (Cont'd Next Page).



STEP 5. REMOVE THE 6 SCREWS AND NUTS THAT SECURE THE REAR AND BOTTOM OF LEFT SCROLL TO THE UNIT, AND ROTATE SCROLL SO OUTLET POINTS TOWARD FRONT.

STEP 6. REMOVE DUAL PRESSURE SWITCH MOUNTING SCREWS AND, BEING CAREFUL NOT TO BEND OR KINK TUBING, PLACE THE SWITCH TO ONE SIDE WHILE REMOVING MOTOR MOUNTING.

STEP 7. REMOVE 4 MOTOR MOUNTING BOLTS.

STEP 8. SLIDE MOTOR TOWARD FRONT SO THAT SCROLL CAN BE ROATATED FOR–WARD AND REMOVE LEFT SCROLL.

STEP 9. REMOVE CONDENSER FAN MOTOR FROM LEFT SIDE OF UNIT.

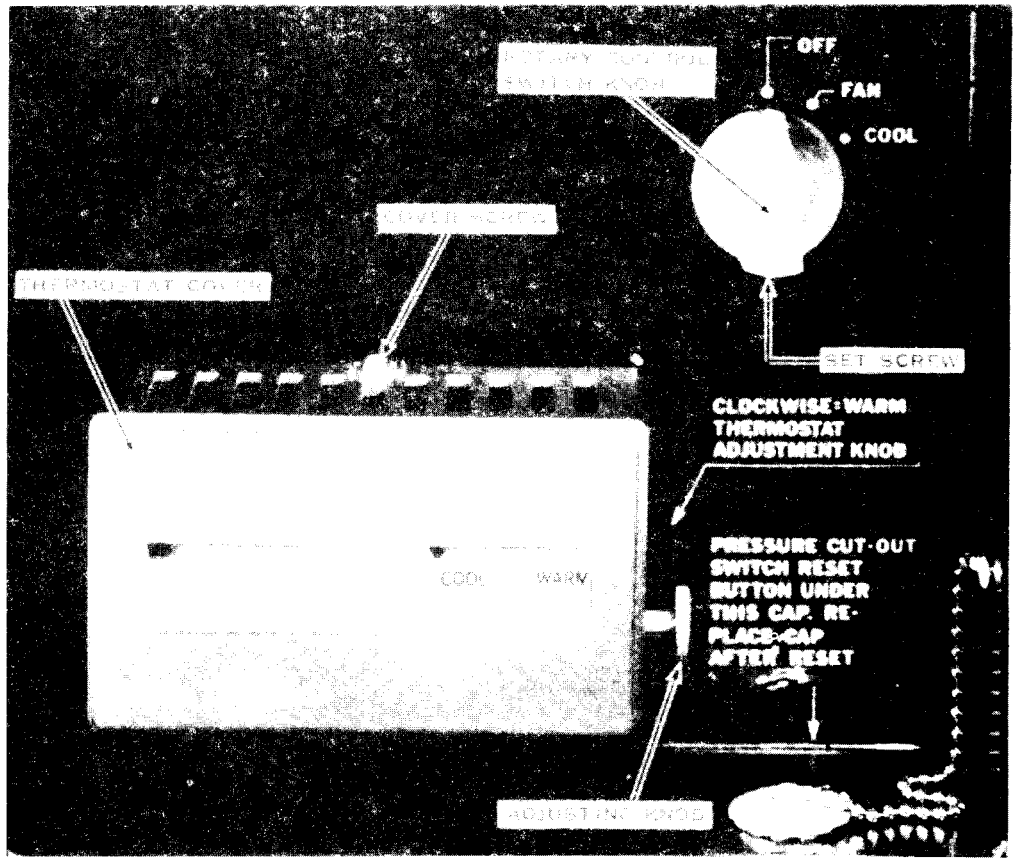
STEP 10. REMOVE THE 6 SCREWS AND NUTS THAT SECURE THE RIGHT SCROLL IN PLACE AND REMOVE RIGHT SCROLL FROM FRONT OF UNIT.

NOTE: LEFT SCROLL AND FAN MOTOR MUST BE REMOVED BEFORE RIGHT SCROLL CAN BE REMOVED.

NOTE: REVERSE REMOVAL PROCEDURE FOR INSTALLATION. INSTALL FAN GUARDS IN BOTTOM PANEL WHILE MOUNTING SCROLLS. ADJUST MOTOR POSITION TO CENTER IMPELLERS IN SCROLLS. ALL ARROWS SHOULD SHOW CLOCKWISE ROTATION WHEN VIEWED FROrA LEFT SIDE OF UNIT. INSTALL IMPELLER HUBS SO THEY ARE EVEN WITH ENDS OF MOTOR SHAFT. ROTATE BY HAND TO ASSURE RUNNING CLEARANCE. REPLACE DUAL PRESSURE SWITCH.

Figure 17. Condenser Fans And Motor, Removal And Installtion (Cont'd).

b. Removal and Installation. To replace the two main cabinet harnesses, the front and right side panels must be removed, all clamps opened, and components disconnected at connectors or quick disconnects. The connectors must be unmounted from the partitions where



STEP 1. REMOVE SET SCREW FROM ROTARY CONTROL SWITCH KNOB AND REMOVE KNOB. REMOVE RETAINER NUT FROM SWITCH.

STEP 2. PULL ADJUSTING KNOB OUT OF THERMOSTAT COVER AND USE IT TO LOOSEN THE COVER SCREW. REPLACE ADJUSTING KNOB. REMOVE COVER SCREW AND REMOVE THERMOSTAT COVER.

STEP 3. REMOVE THE 8 SCREWS (NOT SHOWN) THAT SECURE THE CONTROL BOX TO THE FRONT PANEL AND REMOVE THE CONTROL BOX.

STEP 4. DISCONNECT ELECTRICAL CONNECTOR AT BACK OF BOX.

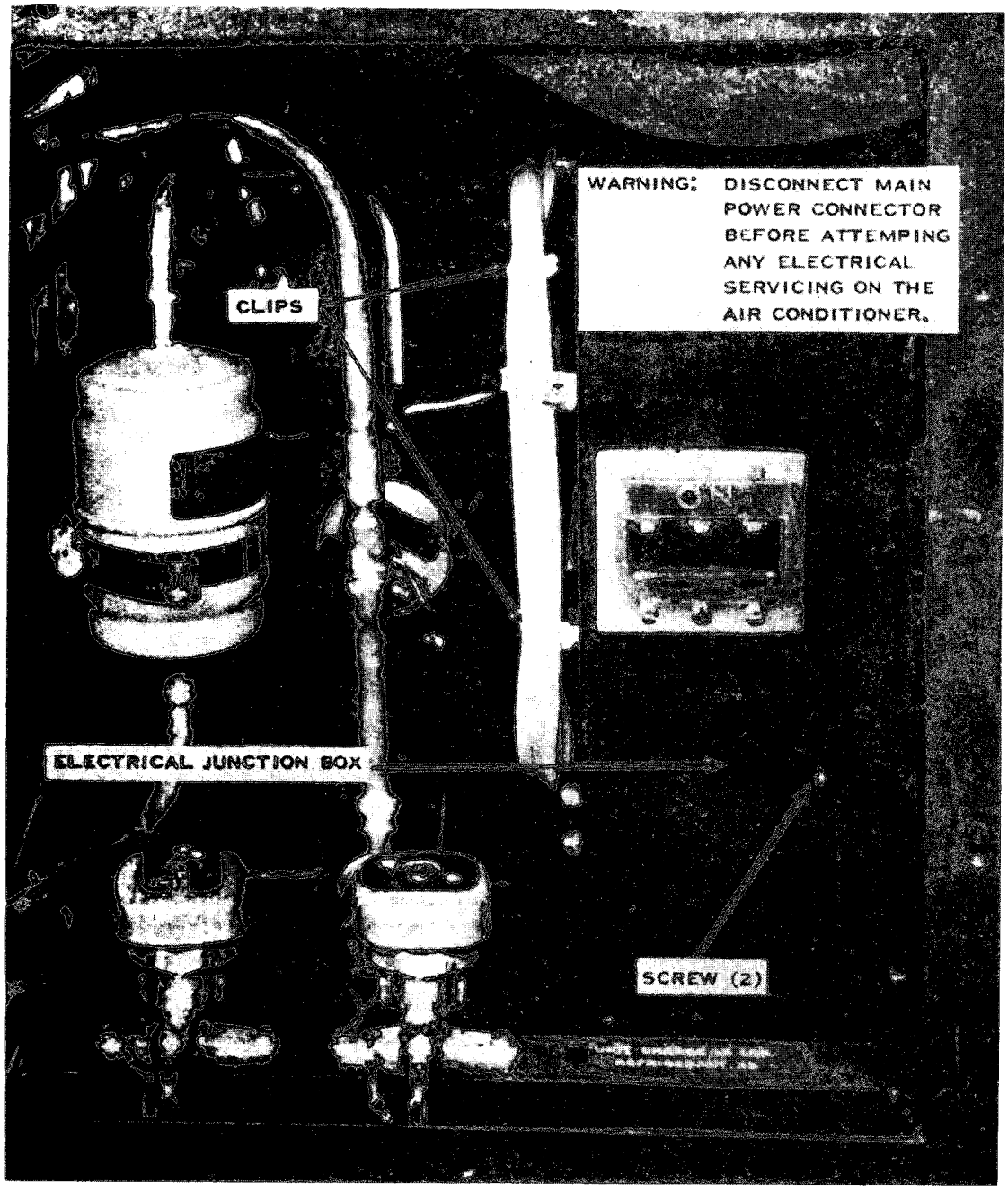
STEP 5. REMOVE 8 SCREWS AT BACK OF BOX AND REMOVE BACK COVER FROM CONTROL BOX.

Figure 18. Control Box, Rotary Control Switch And Thermostat, Removal And Installation.

they are soldered to the harnesses. Replacement harnesses include all necessary connectors, disconnect parts, terminals, and switches, completely fastened in place on the wires.

68. Evaporator Drain Hose and Connection

Remove and install the evaporator drain hose and connection as shown by figure 26.

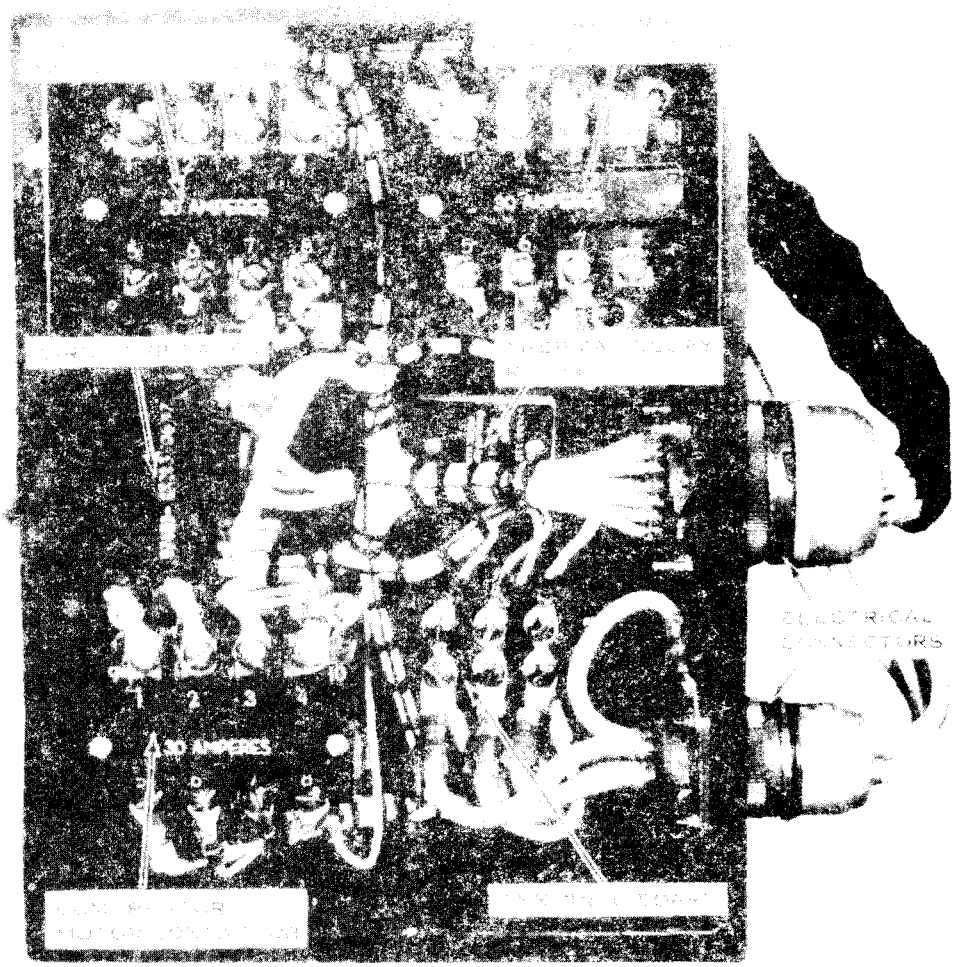


STEP 1. REMOVE LEFT SIDE ACCESS PANEL (FIG. 13).

STEP 2. RELEASE THE 2 PLASTIC CLIPS THAT SECURE THE WIRING HARNESSES TO THE BOX.

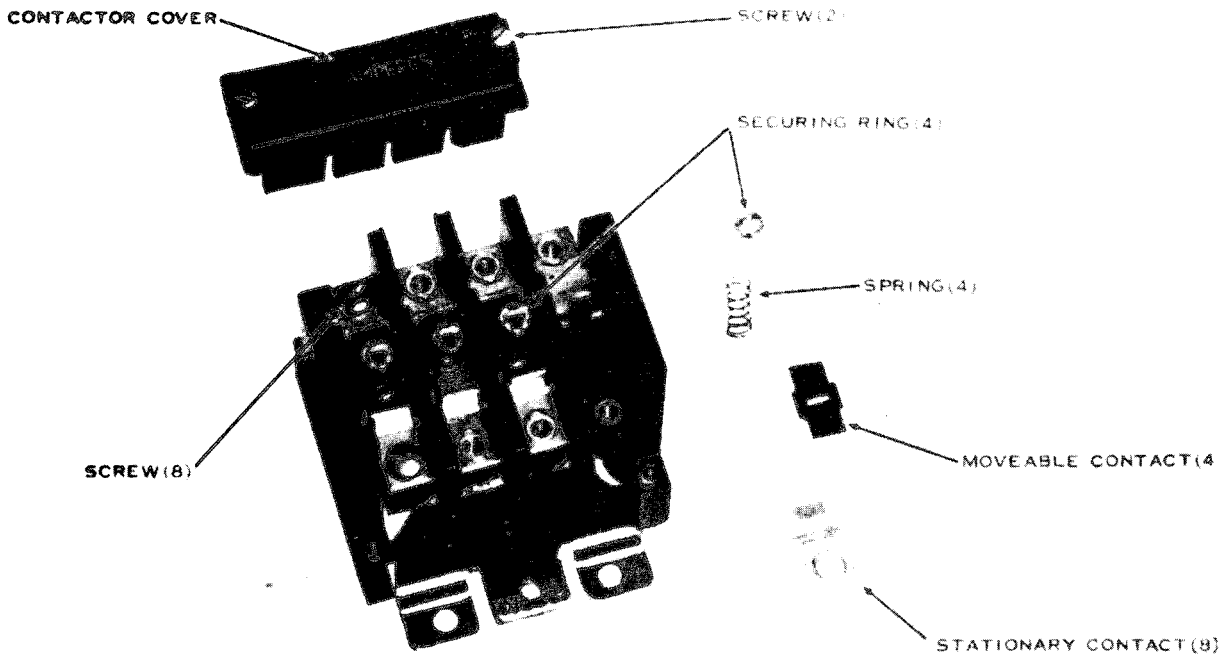
STEP 3. REMOVE 2 SCREWS AND REMOVE JUNCTION BOX.

Figure 19. Electrical Junction Box, Removal And Installation.



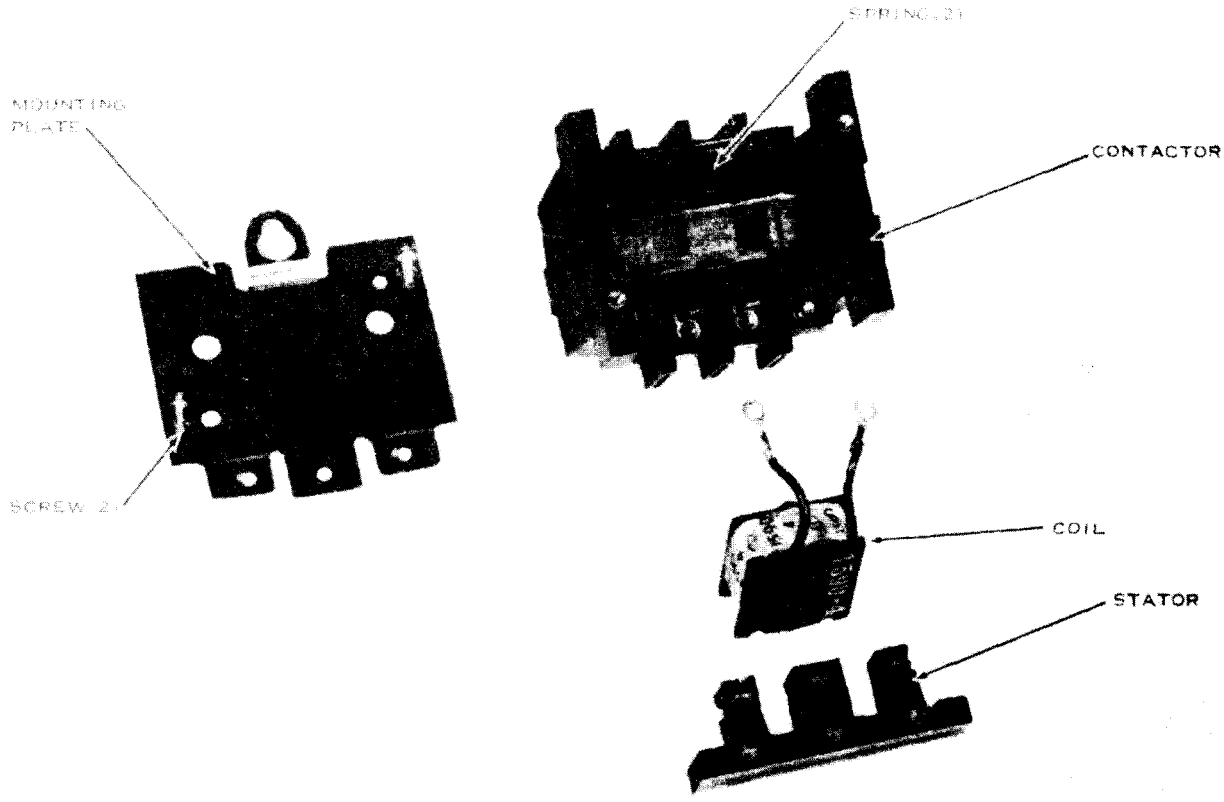
STEP 1. REMOVE JUNCTION BOX (FIG. 19).
STEP 2. DISCONNECT 2 ELECTRICAL CONNECTORS.
STEP 3. TAG AND DISCONNECT ELECTRICAL LEADS AND REMOVE MOUNTING HARDWARE AS NECESSARY.

Figure 20. Junction Box Components, Removal And Installation.



STEP 1. REMOVE COVER FROM CONTACTOR.
STEP 2. REMOVE 4 SPRING ASSEMBLIES THAT SECURE MOVEABLE CONTACT5 IN PLACE AND REMOVE 4 MOVEABLE CONTACTS.
STEP 3. REMOVE 8 SCREWS SECURING THE STATIONARY CONTACTS IN PLACE AND REMOVE THE CONTACTS.
NOTE : REPLACE OTHER CONTACTOR CONTACTS IN SAME MANNER.
NOTE : REVERSE REMOVAL PROCEDURE FOR INSTALLATION.

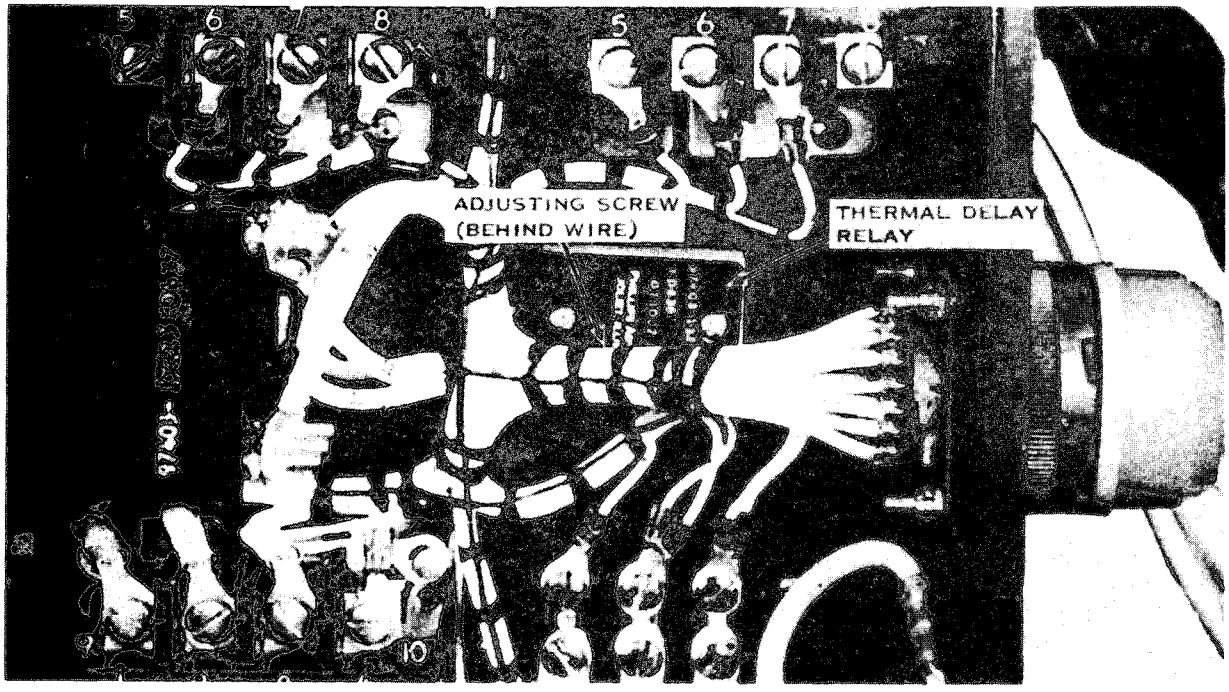
Figure 21. Contactor Contacts Replacement.



STEP 1. REMOVE 3 SCREWS THAT SECURE CONTACTOR TO JUNCTION BOX.
STEP 2. REMOVE MOUNTING PLATE.
STEP 3. LIFT OUT STATOR AND COIL.
NOTE : REMOVE OTHER CONTACTOR COILS IN SAME MANNER.
NOTE : REVERSE REMOVAL PROCEDURE FOR INSTALLATION.

Figure 22. Contactor Coil Replacement.

WARNING: BE SURE TO USE A WELL INSULATED SCREWDRIVER WITH CAUTION WHILE ADJUSTING.



STEP 1. REMOVE ELECTRICAL JUNCTION BOX (FIG. 19).

STEP 2. CONNECT MAIN POWER CONNECTOR.

STEP 3. TURN ROTARY CONTROL SWITCH TO COOL AND NOTE TIME LAPSE BETWEEN STARTING OF CONDENSER FAN AND STARTING OF COMPRESSOR. (PROPER TIME LAPSE IS FROM 4 TO 18 SECONDS).

STEP 4. IF TIME LAPSE IS LESS THAN 4 SECONDS, TURN CONTROL SWITCH OFF AND TURN TIME DELAY ADJUSTING SCREW ONE TURN COUNTERCLOCKWISE.

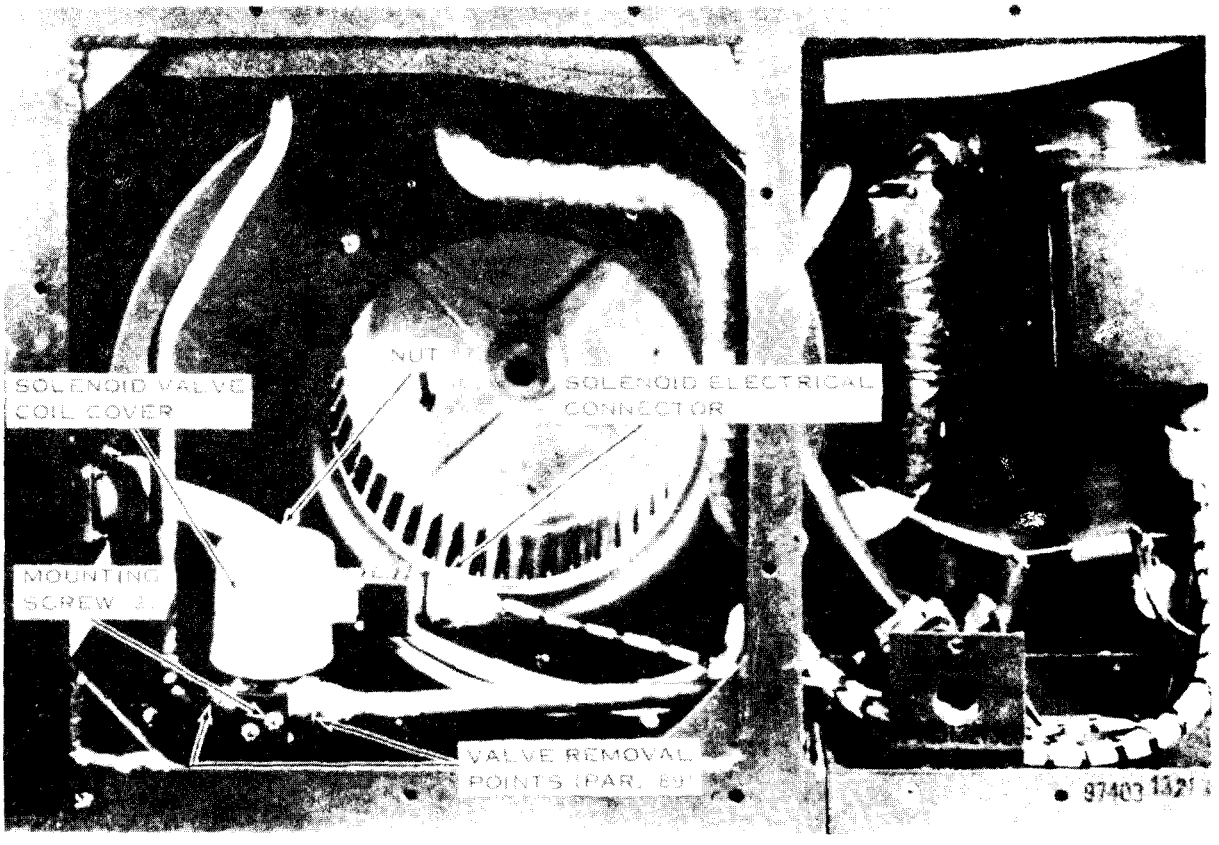
STEP 5. WAIT 3 MINUTES AND REPEAT STEP 3. IF TIME LAPSE IS MORE THAN 18 SECONDS, TURN ADJUSTING SCREW ONE TURN CLOCKWISE.

STEP 6. WAIT 3 MINUTES AND REPEAT STEP 3. CONTINUE ADJU5TING UNTIL PROPER TIME LAPSE IS REACHED.

NOTE: PROPER TIME LAPSE AT 150° IS 7 SECONDS ±3, AT 100° IT IS 10 SECONDS ±3, AND AT 50°, IT IS 15 SECONDS ±3.

STEP 7. UNPLUG POWER CONNECTOR AND INSTALL ELECTRICAL JUNCTION BOX (FIG. 19).

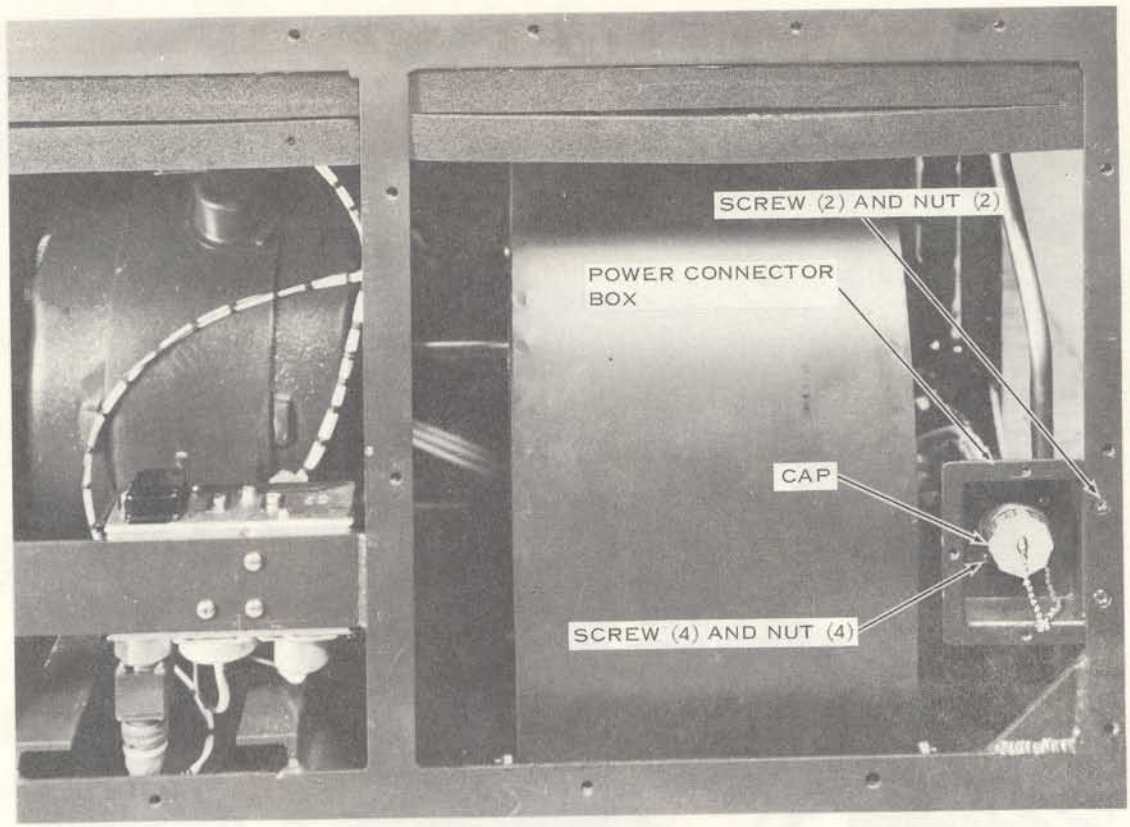
Figure 23. Thermal Delay Switch Adjustment.



STEP 1. DISCONNECT AIR CONDITIONER MAIN POWER CONNECTOR.
STEP 2. REMOVE RIGHT SIDE PANEL (FIG. 13).
STEP 3. DISCONNECT SOLENOID ELECTRICAL CONNECTOR.
STEP 4. TEST FOR SOLENOID COIL CONTINUITY WITH MULTIMETER.
STEP 5. TO REMOVE COIL, REMOVE NUT, WASHER NAMEPLATE AND LIFT COVER AND COIL FROM SOLENOID BODY.

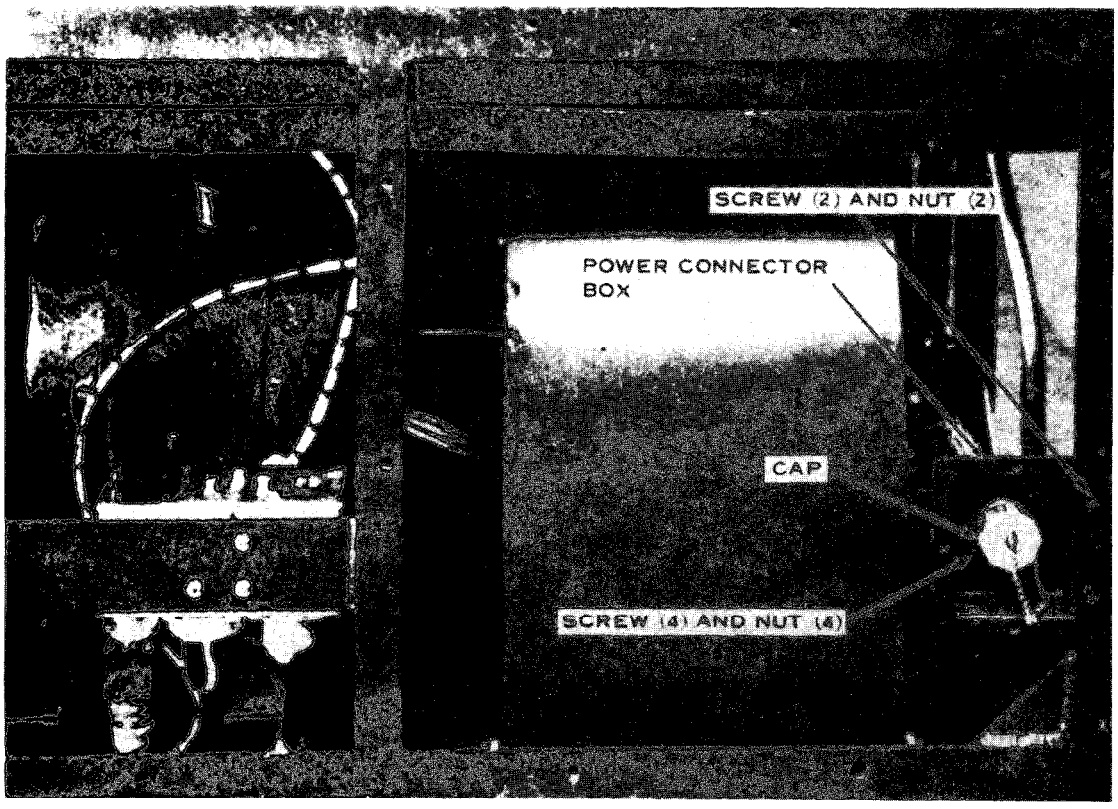
NOTE: REVERSE PROCEDURE FOR INSTALLATION.

Figure 24. Solenoid Valve And Coil, Testing And Installation.



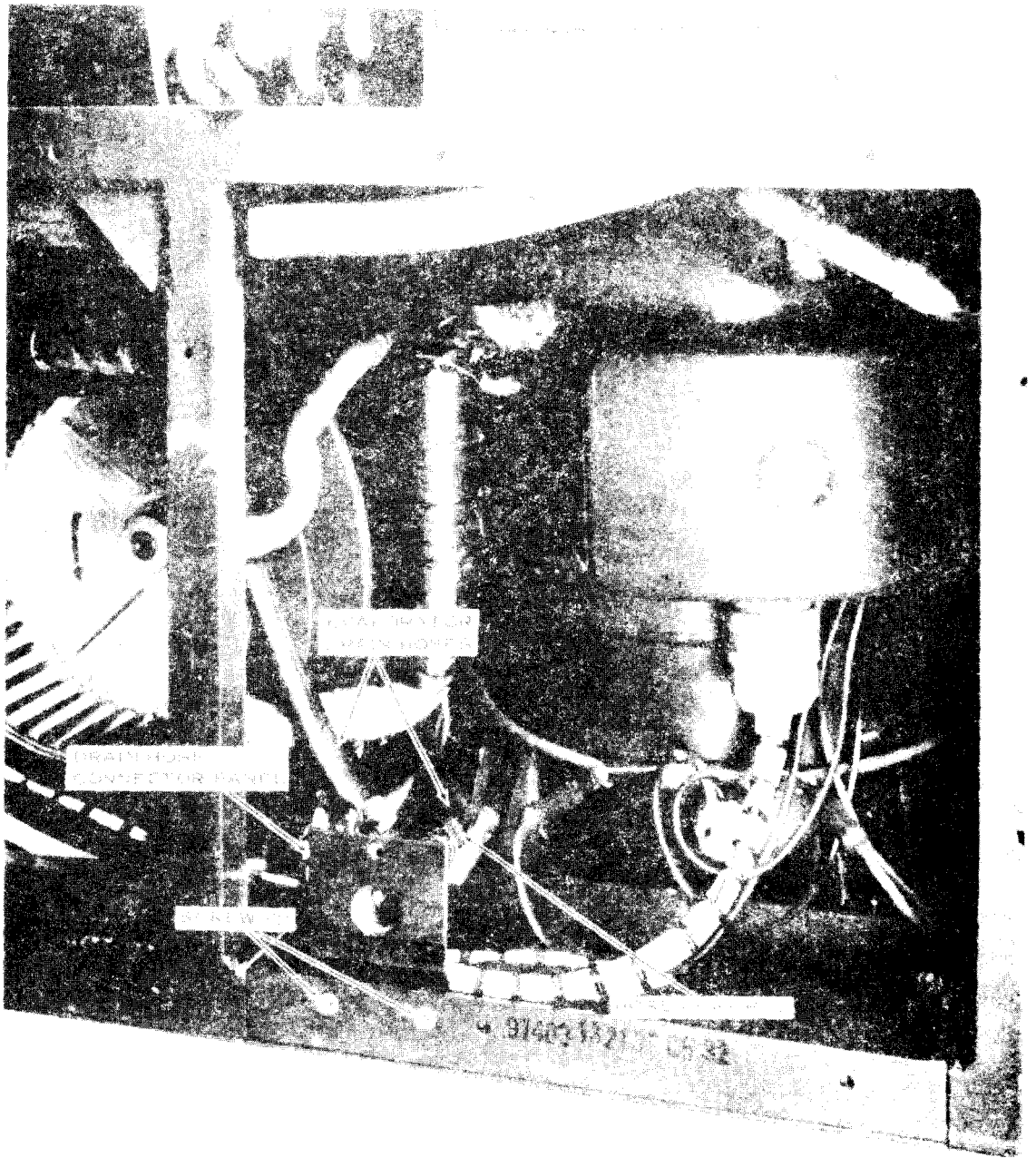
STEP 1. REMOVE FRONT PANEL (FIG. 13).
STEP 2. REMOVE 2 SCREWS AND NUTS AND REMOVE BOX FROM FRAME.
STEP 3. UNSCREW CAP.
STEP 4. REMOVE 4 SCREWS AND NUTS AND REMOVE THE POWER CONNECTOR FROM THE BOX.
NOTE: REVERSE PROCEDURE FOR INSTALLATION.

Figure 25. Main Power Connector And Box, Removal And Installation.



STEP 1. REMOVE FRONT PANEL (FIG. 13).
STEP 2. REMOVE 2 SCREWS AND NUTS AND REMOVE BOX FROM FRAME.
STEP 3. UNSCREW CAP.
STEP 4. REMOVE 4 SCREWS AND NUTS AND REMOVE THE POWER CONNECTOR FROM THE BOX.
NOTE: REVERSE PROCEDURE FOR INSTALLATION.

Figure 25. Main Power Connector And Box, Removal And Installation.



STEP 1. REMOVE RIGHT SIDE PANEL (FIG. 13).
STEP 2. DISCONNECT DRAIN HOSES BY REMOVING BOTH CLAMPS.
STEP 3. REMOVE 2 SCREWS AND REMOVE CONNECTOR PANEL FROM FRAME.
NOTE: REVERSE PROCEDURE FOR INSTALLATION.

Figure 26. Evaporator Drain Hose And Connection, Removal And Installation.

CHAPTER 4

FIELD AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

69. Scope

These instructions are published for the use of direct and general support and depot maintenance personnel maintaining the air conditioning unit. They provide information cm the maintenance of the equipment, which is beyond the scope of the tools, equipment, personnel, or supplies normally available to ting organizations.

70. Record and Report Forms

Refer to paragraph 2.

71. Description

For a complete description of the air conditioner see paragraph 3.

72. Tabulated Data

General. This paragraph contains all the overhaul data pertinent to direct and general support and depot maintenance personnel. Refer to figure 5 for wiring diagram of the air conditioning unit, and to figure 27 for the unit flow diagram.

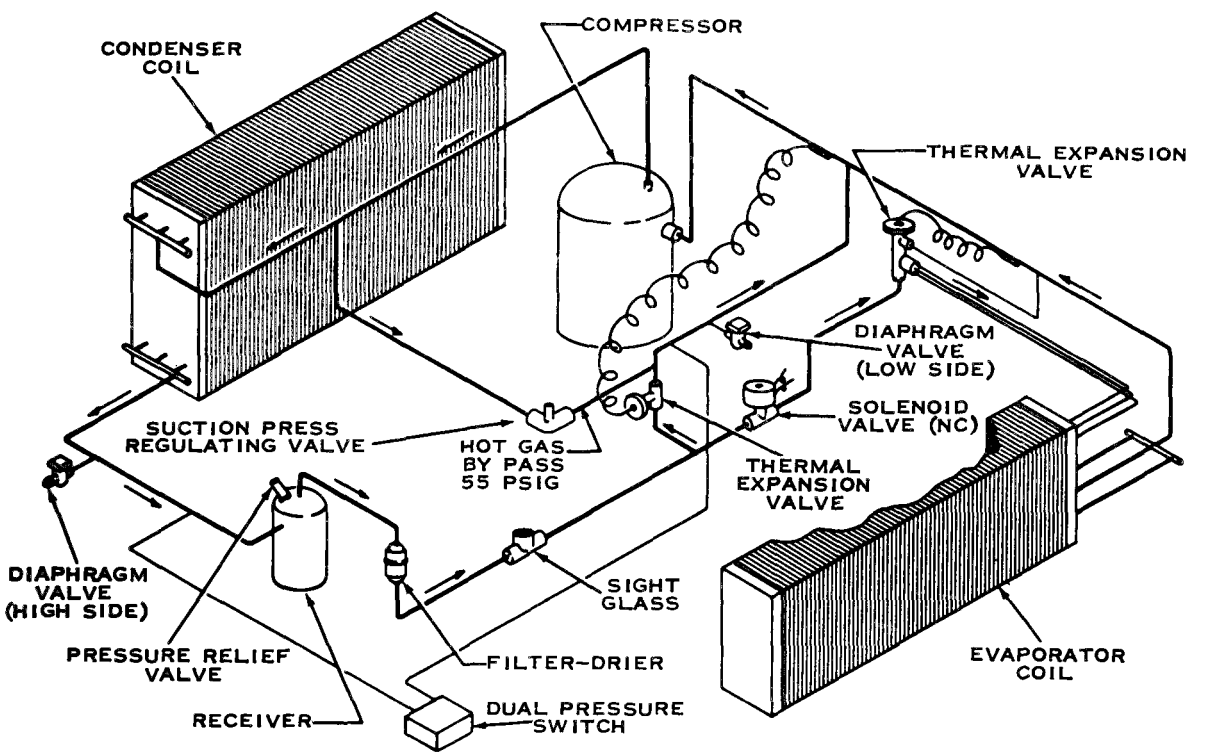


Figure 27. Refrigerant Flow Diagram.

CHAPTER 5

GENERAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND EQUIPMENT

73. Special Tools and Equipment

No special tcmls and equipment are required for servicing or repair operation on the air conditioner.

74. Direct and General Support and Depot Maintenance Repair Parts

This paragraph is not applicable.

75. Specially Designed Tools and Equipment

There are no specially designed tools or equipment required for the maintenance of this air conditioner.

Section II. TROUBLESHOOTING

76. General

Refer to paragraphs 33 through 49 for information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner or any of its components.

Section III. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

77. General

This section provides instructions for the removal and installation of the frame, motors, fans, compressor, solenoid, valves, sight glass, receiver, and coils as prescribed by the maintenance allocation chart, Appendix II. Refer also to Chapter 6 which covers general refrigerant system repairs.

78. Frame Assembly

To gain access to the frame assembly, remove and install housing panels and grilles as shown by figure 13.

79. Data Plates

Remove and install data plates as necessary, using new rivets to fasten new data plates.

80. Condenser Motor

Remove and install the condenser motor se shown by figure 17.

81. Evaporator Motor

Remove and install the evaporator motor as shown by figure 16.

82. Compressor

Remove and install the compressor as shown by figure 28.

83. Solenoid Valve

Remove, install, and test the solenoid valve as shown by figure 24.

84. Expansion Valve

Remove, install, and adjust the expansion valve as shown by figure 29.

85. Service Valves

Remove and install the service valves as shown by figure 30.

86. Sight Glass

Remove and install sight glass as shown by figure 32.

87. Receiver, Clamp and Relief Valve

Remove and install receiver and associated parts as shown by figure 31.

88. Condenser

Remove and install the condenser as shown figure 33.

89. Dehydrator

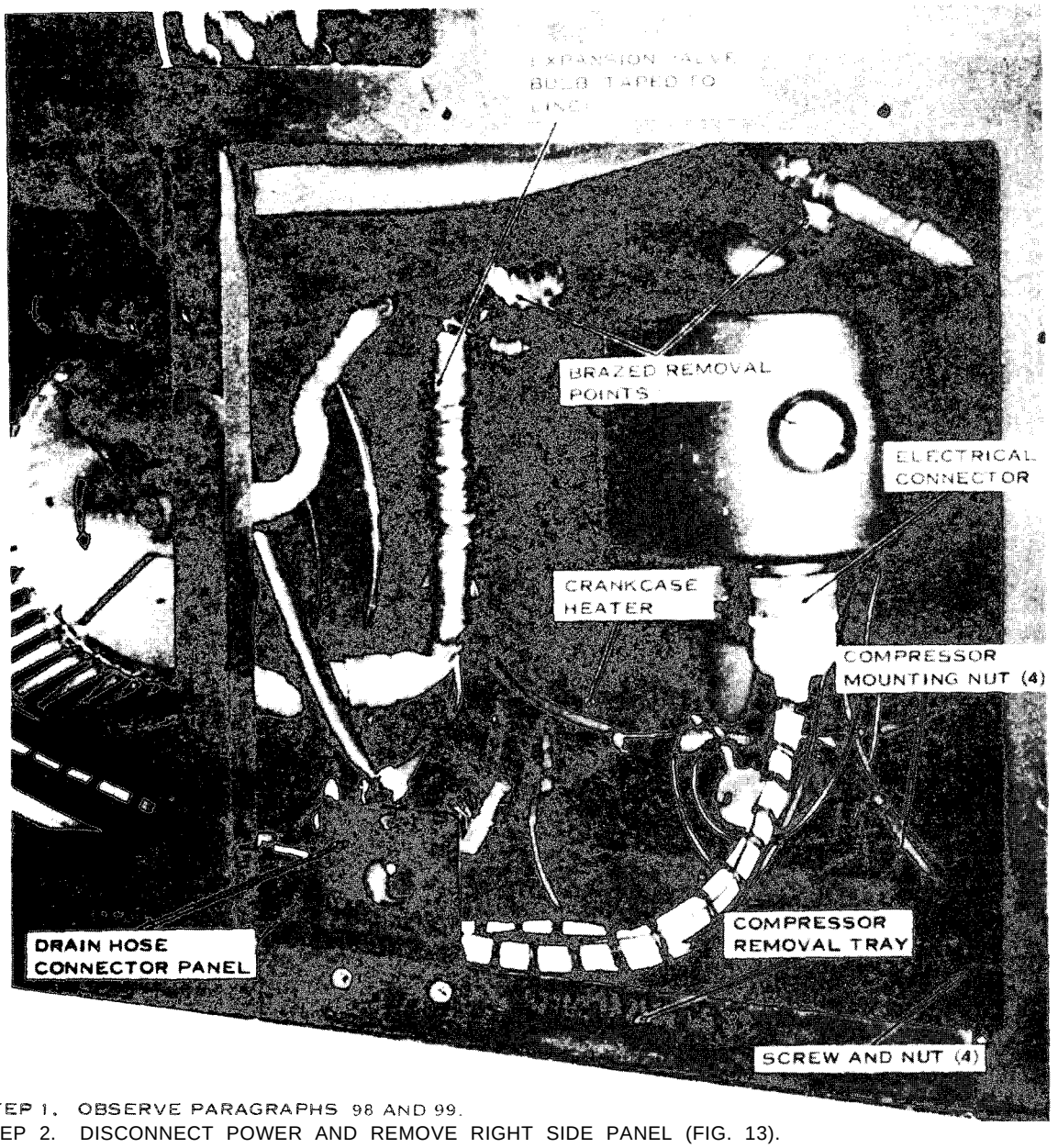
Remove and install the dehydrator as shown by figure 34.

90. Evaporator

Remove and install the evaporater as shown by figure 35.

91. Dual Pressure Switch

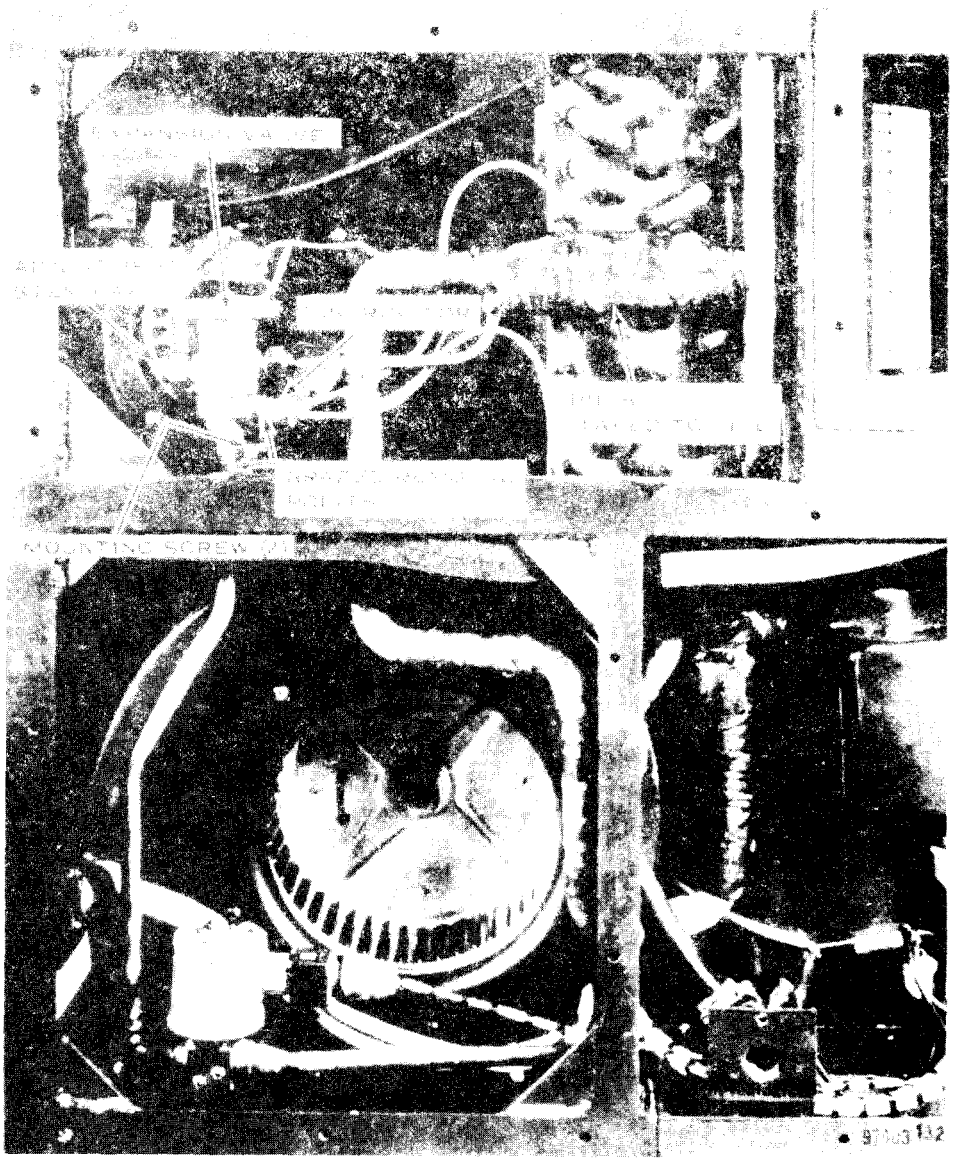
Remove, install and adjust the dual pressure switch as shown by figure 36.



STEP 1. OBSERVE PARAGRAPHS 98 AND 99.
STEP 2. DISCONNECT POWER AND REMOVE RIGHT SIDE PANEL (FIG. 13).
STEP 3. REMOVE EVAPORATOR DRAIN HOSE CONNECTOR PANEL (FIG. 26) AND PLACE DRAIN HOSE AWAY FROM WORKING AREA.
STEP 4. DISCONNECT ELECTRICAL CONNECTOR AT COMPRESSOR JUNCTION BOX AND PLACE ELECTRICAL CABLE AWAY FROM WORKING AREA.
STEP 5. REMOVE TAPE FROM SUCTION LINE TUBING AND PLACE VALVE SAMPLING TUBE TO ONE SIDE, TAKING CARE NOT TO KINK THE TUBING.
STEP 6. UNBRAZE TUBING AT REMOVAL POINTS INDICATED (SEE PAR. 96).
STEP 7. REMOVE COMPRESSOR TRAY FROM FRAMING.
STEP 8. REMOVE COMPRESSOR FROM TRAY.
STEP 9. PREPARE NEW COMPRESSOR FOR INSTALLATION (PAR. 99).
INSTALL NEW COMPRESSOR BY REVERSING ABOVE ORDER OF REMOVAL.

CAUTION: OBSERVE PARAGRAPH 96 WHEN MAKING REFRIGERANT CONNECTIONS.

Figure 28. Compressor Removal And Installation.



REMOVAL

STEP 1. REMOVE RIGHT SIDE PANEL (FIG. 13).

STEP 2. DISCHARGE REFRIGERANT (PAR. 94) AND OBSERVING PARAGRAPH 96, UNBRAZE THE VALVE AT JOINTS.

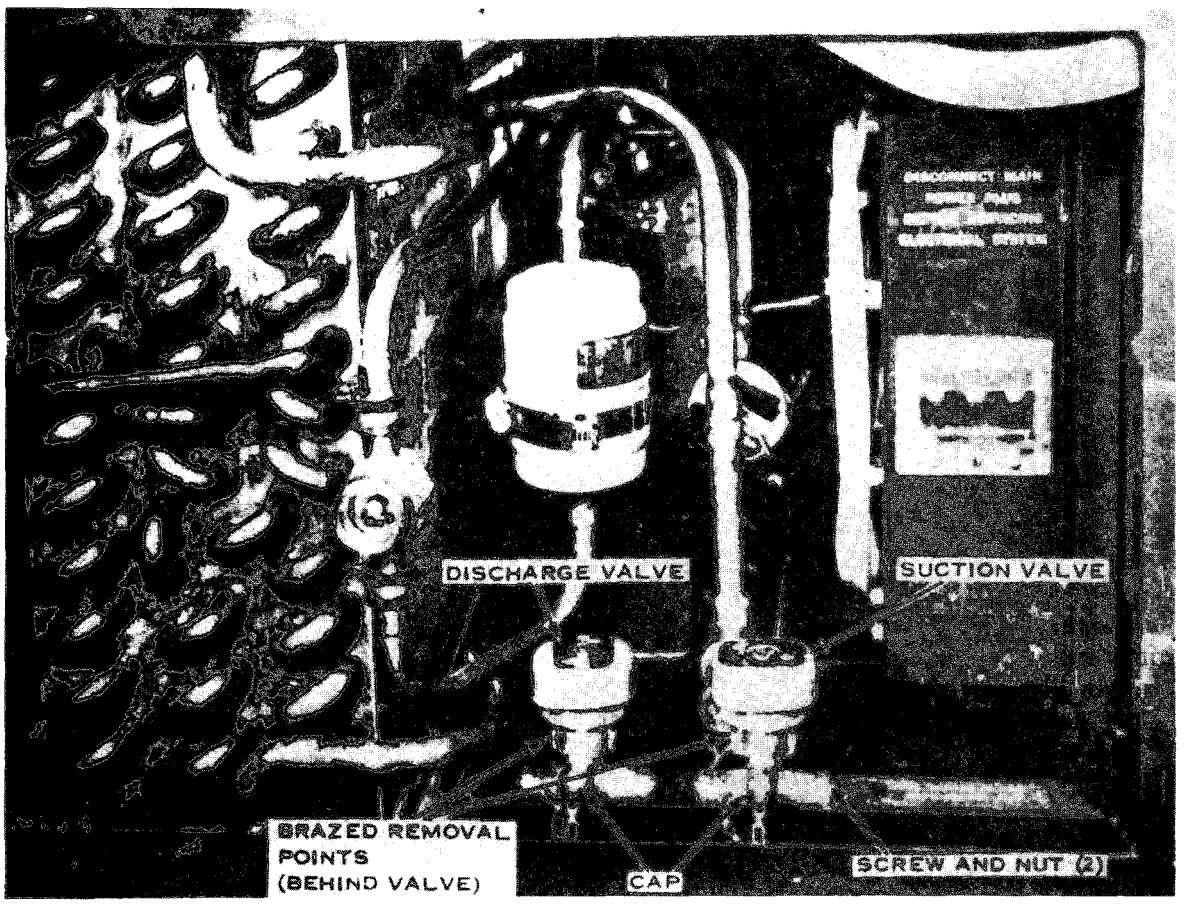
STEP 3. DISCONNECT EXPANSION VALVE BULB FROM SUCTION LINE TuBING BY REMOVING TAPE

STEP 4. UNBRAZE DISTRIBUTOR.

INSTALL NEW VALVE IN REVERSE ORDER.

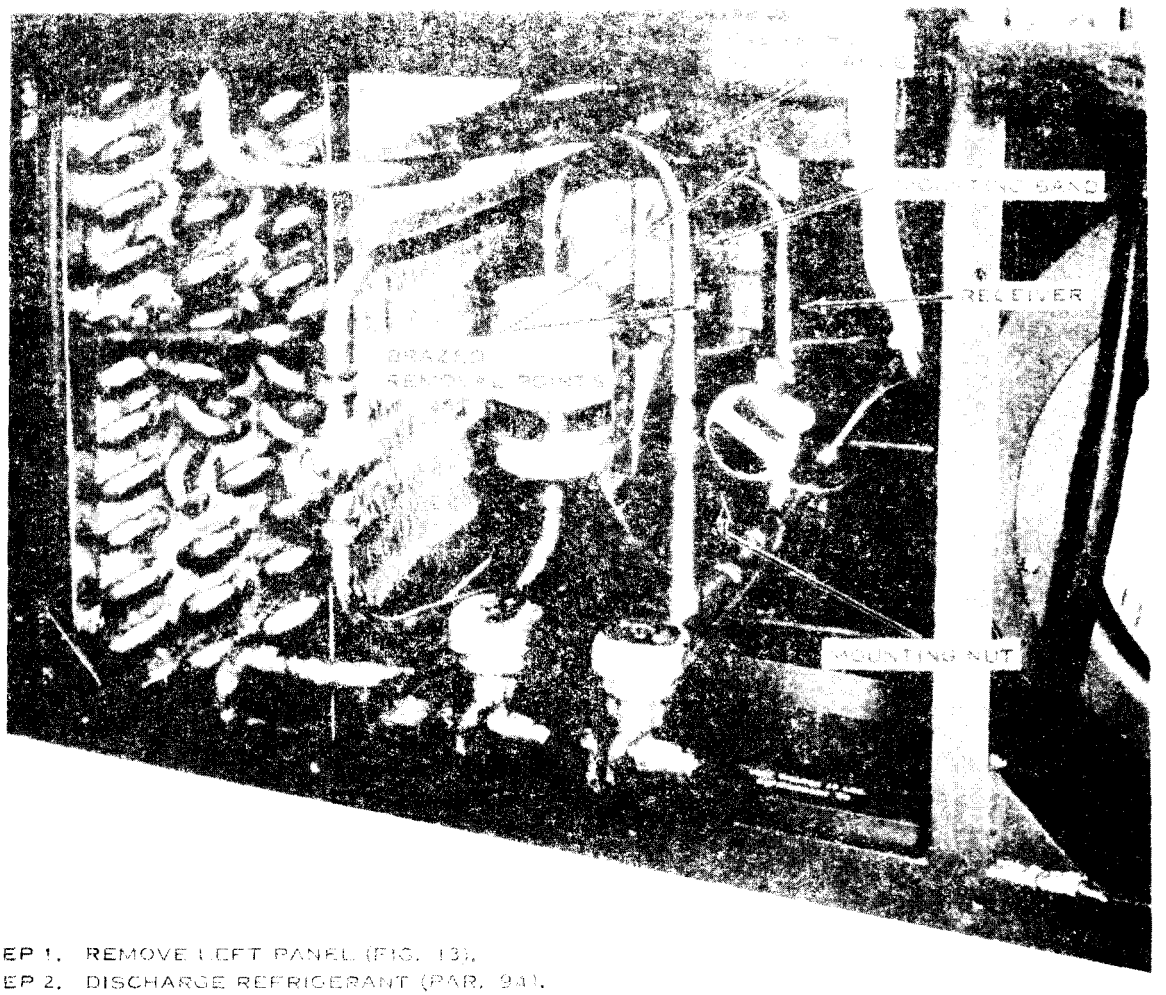
ADJUST THE VALVE BY REMOVNG THE CAP AND TURNING THE SLOTTED ADJUSTMENT STEM. TURN COUNTERCLOCKWISE TO INCREASE FLOW AND LOWER EVAPORATOR TEMPERATURE. OPPOSITE MOVEMENT WILL GIVE OPPOSITE RESULTS. TURN NO MORE THAN TWO TURNS AT A TIME. ALLOW ABOUT 30 MINUTES FOR BALANCE TO TAKE PLACE AFTER EACH ADJUSTMENT.

Figure 29. Expansion Valve, Adjustment, Removal And Installation.



STEP 1. REMOVE ACCESS PANEL (FIG. 13).
STEP 2. DISCHARGE REFRIGERANT (PAR. 94).
STEP 3. REMOVE SCREWS AND NUTS WHICH FASTEN VALVE TO FRAME.
STEP 4. OBSERVING PARAGRAPH 96, UNBRAZE TUBING FROM VALVE.
INSTALL VALVE IN REVERSE ORDER.

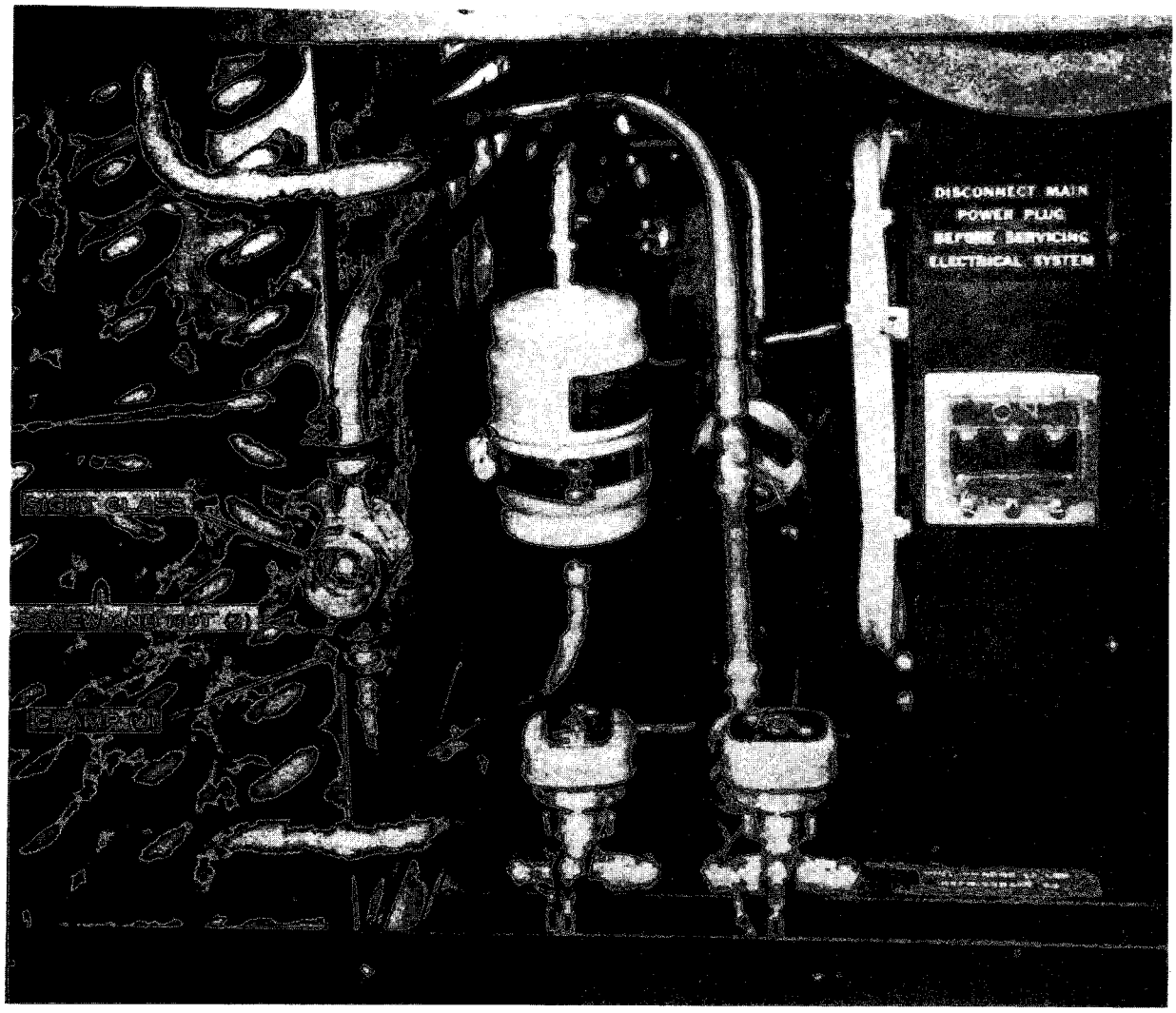
Figure 30. Service Valves, Removal And Installation.



STEP 1. REMOVE LEFT PANEL (FIG. 13).
STEP 2. DISCHARGE REFRIGERANT (PAR. 94).
STEP 3. REMOVE PRESSURE RELIEF VALVE BY USING WRENCH TO UNSCREW IT FROM RECEIVER (COUNTERCLOCKWISE).
STEP 4. OBSERVING PARAGRAPH 96, UNBRAZE INLET AND OUTLET TUBING AND REMOVE FROM RECEIVER.
STEP 5. REMOVE BOTTOM MOUNTING NUT AND MOUNTING BAND TO FREE RECEIVER FOR REMOVAL FROM UNIT.

INSTALL RECEIVER OR PRESSURE RELIEF VALVE BY REVERSING THE ABOVE ORDER.

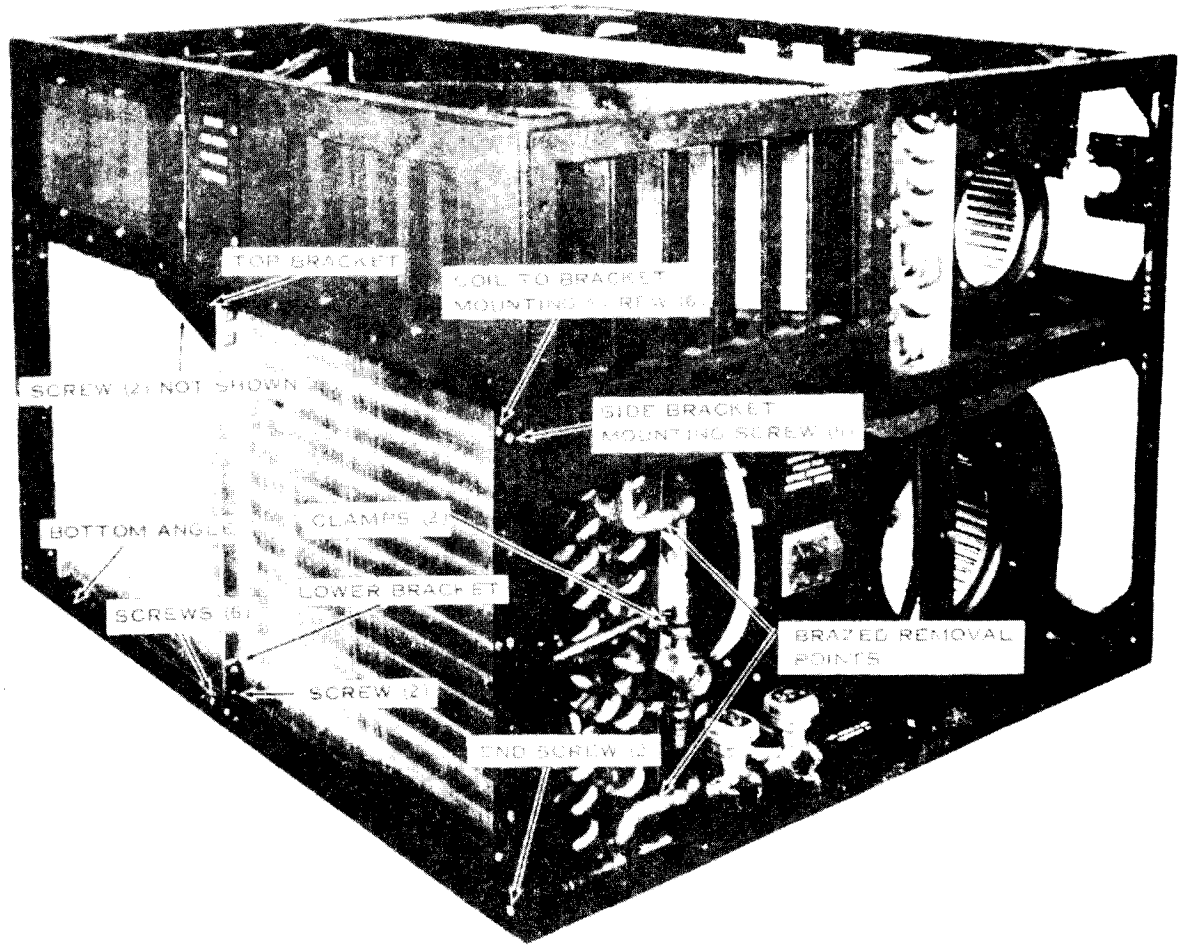
Figure 31. Receiver Or Pressure Relief Valve, Removal And Installation.



STEP 1. REMOVE LEFT SIDE PANEL OF UNIT (FIG. 13).
STEP 2. DISCHARGE REFRIGERANT (PAR. 94).
STEP 3. REMOVE CLAMPS AT SIGHT GLASS.
STEP 4. OBSERVING PARAGRAPH 96, UNBRAZE JOINTS AT SIGHT GLASS AND REMOVE SIGHT GLASS.

INSTALL SIGHT GLASS BY REVERSING THE ABOVE ORDER OF PROCEDURE.

Figure 32. Sight Glass, Removal And Installation.



STEP 1. REMOVE REAR GRILLE AND ACCESS PANEL (FIG. 13).

STEP 2. DISCHARGE THE SYSTEM AS DESCRIBED IN PARAGRAPH 94.

STEP 3. OBSERVING INSTRUCTIONS IN PARAGRAPH 96, UNBRAZE TUBING CONNECTIONS INDICATED AS "REMOVAL POINTS" ABOVE.

STEP 4. REMOVE TOP BRACKET SCREWS, LOWER BRACKET SCREWS, AND MOUNTING SCREWS AT EACH END OF THE COIL.

STEP 5. REMOVE SCREWS AND NUTS FROM SIGHT GLASS CLAMPS.

STEP 6. REMOVE 2 END SCREWS FROM BOTTOM ANGLE PIECE.

STEP 7. LOOSEN 6 SCREWS (NOT SHOWN) WHICH SECURE BOTTOM ANGLE TO BOTTOM PANEL, AND REMOVE THE ANGLE PIECE.

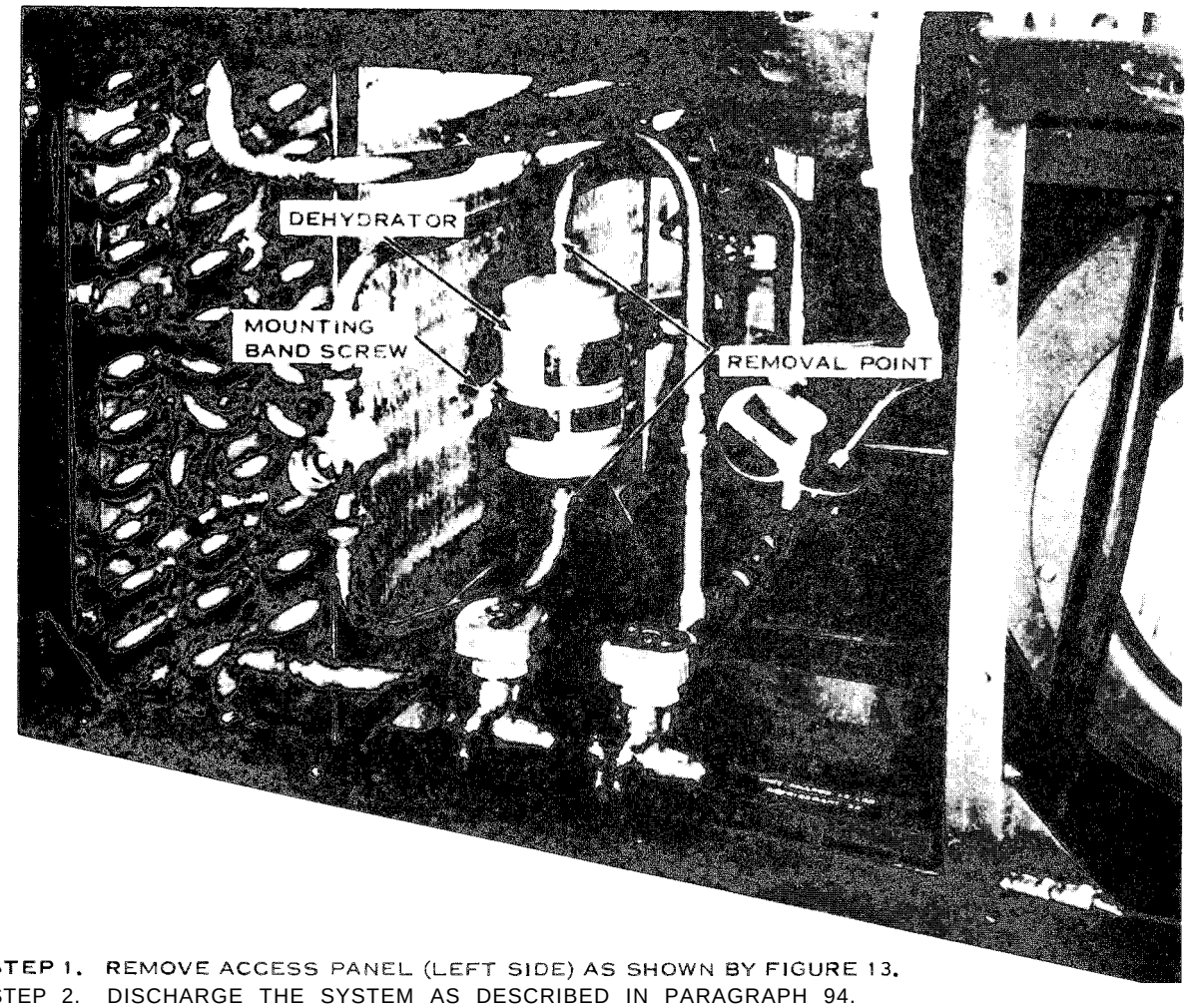
STEP 8. REMOVE COIL FROM UNIT.

CLEAN ACCUMULATED DUST AND DIRT FROM COIL WITH COMPRESSED AIR.

INSPECT COILS, FINS, AND ALL HARDWARE FOR DEFECTS OR DAMAGE. REPLACE DAMAGED OR DEFECTIVE PARTS.

INSTALL COIL IN REVERSE ORDER OF REMOVAL.

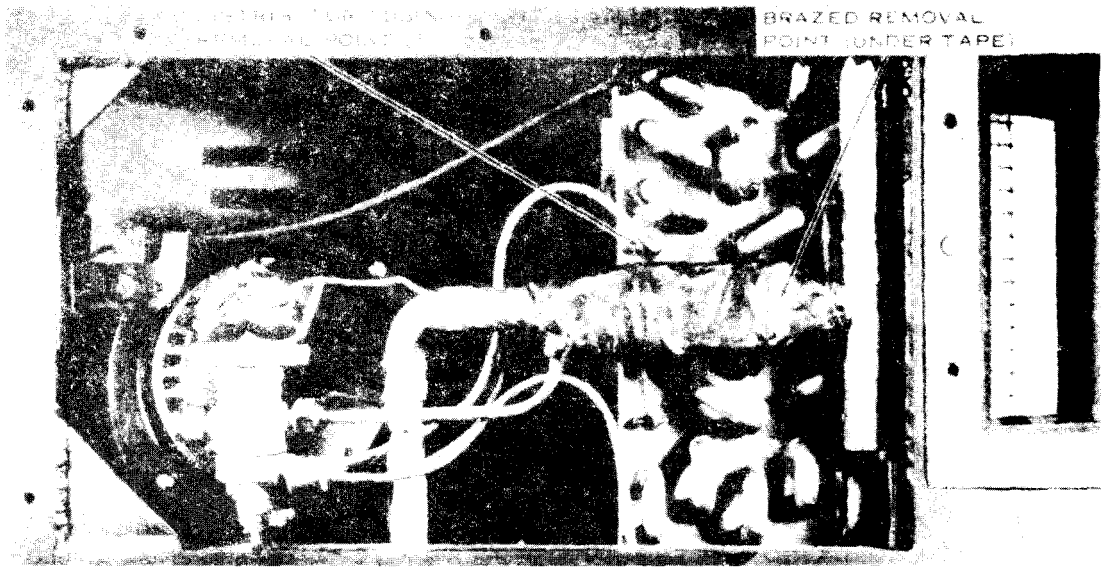
Figure 33. Condenser Coil, Removal And Installation.



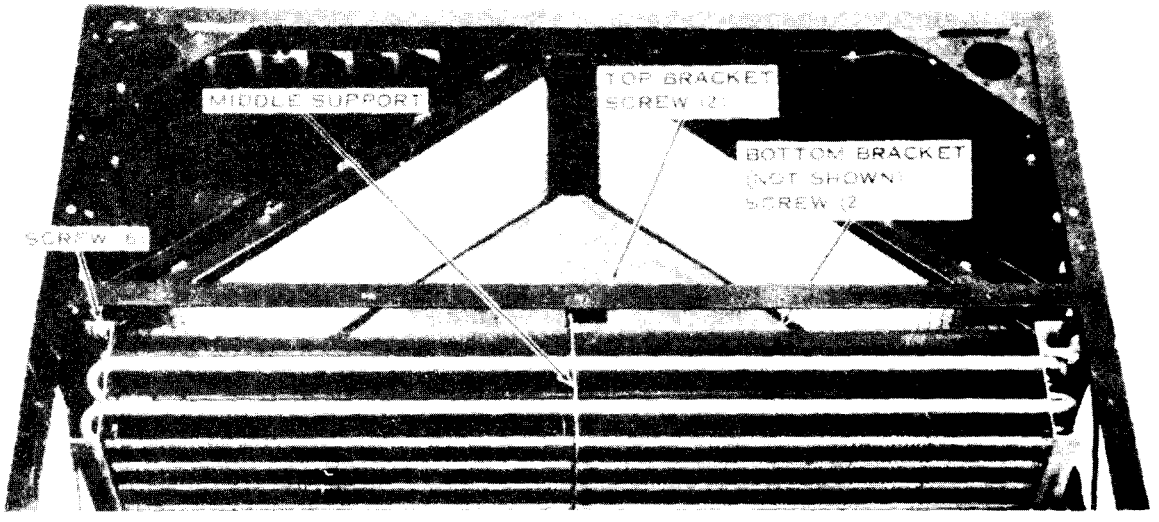
STEP 1. REMOVE ACCESS PANEL (LEFT SIDE) AS SHOWN BY FIGURE 13.
STEP 2. DISCHARGE THE SYSTEM AS DESCRIBED IN PARAGRAPH 94.
STEP 3. OBSERVING INSRUCTIONS IN PARAGRAPH 96, UNBRAZE TUBING CONNECTIONS INDICATED AS "REMOVAL POINTS" ABOVE.
STEP 4. REMOVE MOUNTING BAND FROM DEHYDRATOR AND REMOVE DEHYDRATOR FROM UNIT.

INSTALL DEHYDRATOR IN REVERSE ORDER OF REMOVAL.

Figure 34. Dehydrator, Removal And Installation.



STEP 1. REMOVE UNIT TOP AND SIDE PANELS (FIG. 13).
STEP 2. DISCHARGE THE SYSTEM AS DESCRIBED IN PARAGRAPH 94.
STEP 3. OBSERVING INSTRUCTIONS IN PARAGRAPH 96. UNBRAZE ALL TUBING CONNECTIONS INDICATED AS "REMOVE POINTS" IN ABOVE ILLUSTRATION.



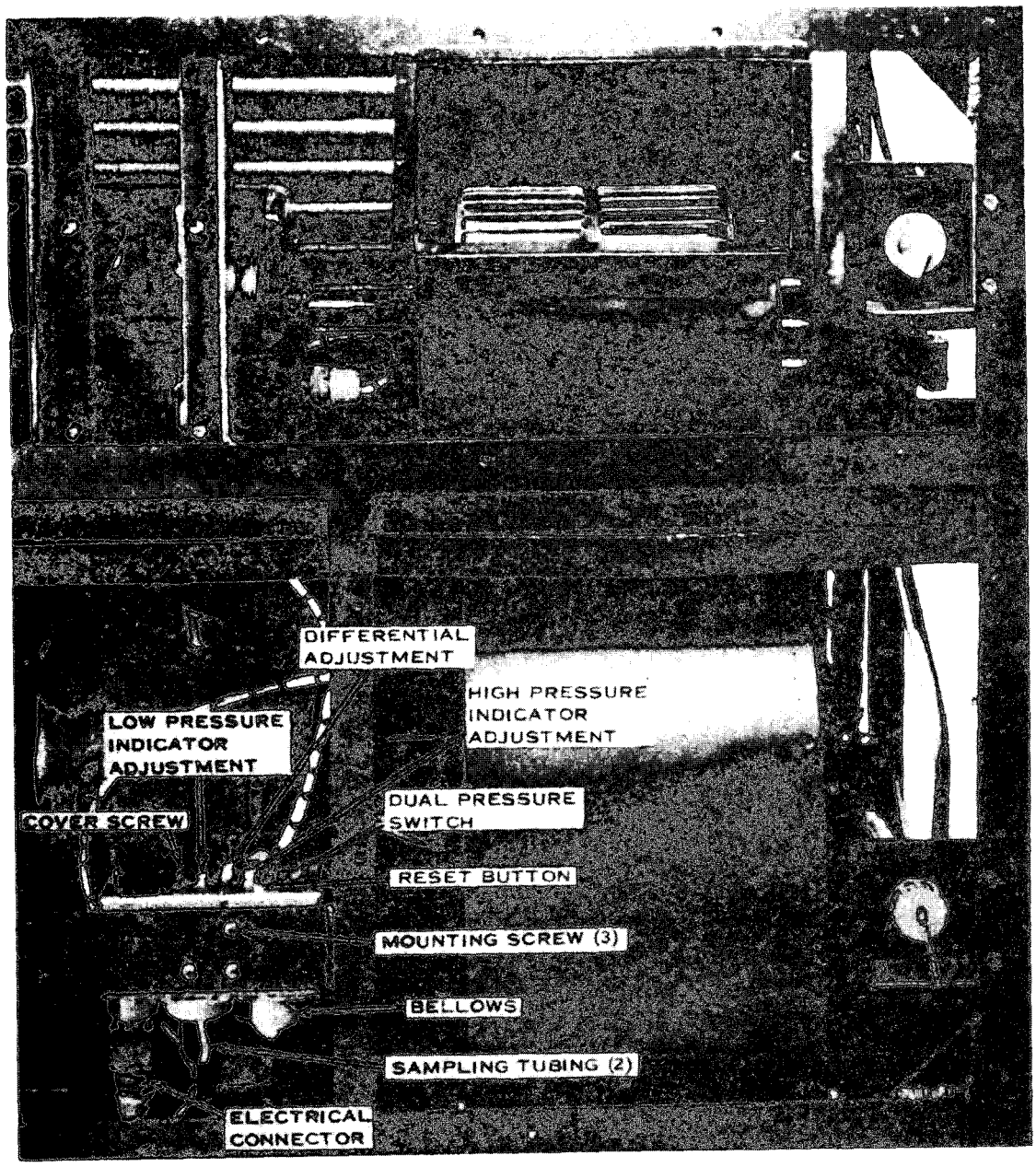
STEP 4. REMOVE 4 SCREWS WHICH SECURE TOP AND BOTTOM BRACKETS TO MIDDLE SUPPORT.
STEP 5. REMOVE FILTERS (FIG. 12) AND REMOVE 6 SCREWS WHICH SECURE COIL AT ENDS.

CLEAN ACCUMULATED DUST AND DIRT FROM COIL WITH COMPRESSED AIR.

INSPECT COILS, FINS, AND ALL HARDWARE FOR DEFECTS OR DAMAGE. REPLACE DAMAGED OF DEFECTIVE PARTS.

INSTALL COIL IN REVERSE ORDER OF REMOVAL.

Figure 35. Evaporator Coil, Removal And Installation.



STEP 1. DISCONNECT POWER FROM UNIT.
STEP 2. REMOVE FRONT PANEL (FIG. 13).
STEP 3. REMOVE MOUNTING SCREWS.
STEP 4. DISCONNECT ELECTRICAL CONNECTOR.
STEP 5. DISCONNEGT SAMPLING TUBING BY REMOVING SCREWS WHICH SECURE BELLOWS TO SWITCH.
STEP 6. REMOVE COVER.

INSTALL PRESSURE SWITCH IN REVERSE QRDER OF REMOVAL STEPS.

ADJUST SWITCH BY SETTING LOW PRESSURE INDICATOR AT 25 PSI, DIFFERENTIAL AT 25 PSI, AND HIGH PRESSURE INDICATOR AT 440 PSI.

Figure 36. Dual Pressure Switch, Adjustment, Removal And Replacement.

CHAPTER 6

REPAIR INSTRUCTIONS

Section I. REFRIGERANT SYSTEM

92. General

Refer to refrigerant flow diagram, figure 27. Liquid refrigerant which has been admitted to the evaporator absorbs heat from the air drawn over and around the evaporator coil. This cooled air is blown out into the area being conditioned. Upon absorbing heat, the refrigerant in the evaporator boils to a gas which is drawn to the compressor. The compressor raises the pressure and temperature of the gas and discharges to the condenser where the gas condenses to liquid. Heat from the gas is absorbed by the condenser coil surfaces and is carried away by air that is drawn over and round the condenser coil. The liquid refrigerant is accumulated in a receiver and is released to the evaporator by the solenoid valve when the valve is actuated by the thermostat. The thermal expansion valve senses the heat of the refrigerant leaving the evaporator, and controls the flow of liquid refrigerant to the evaporator to prevent flooding. The hot gas bypass creates a refrigerant circuit bypass which permits la continual operation of the compressor.

93. Testing for Refrigerant Leaks

a. Using Leak Detector. Proceed as follows:

(1) Make sure that the testing unit is working correctly.

(2) Hold the exploring hose close to the joint being tested, to prevent dilution of the sample by stray air currents.

(3) Move the exploring tube slowly around each joint. Allow time for detector to react to very small leaks.

(4) Follow a definite order in leak testing so that no joints will be missed. Use soap suds as necessary to find the exact point at which a leak is occuring.

Note. Do not use a leak detector in an atmosphere known to be heavy with refrigerant m this condition will tend to foul it.

b. Using Soap Suds. A soap suds test is preferred in an area which is contaminated with refrigerant. Such a tsst will also permit a more exacting location of small leaks. To prepare suds for testing, use a soap and water solution which can be worked into a lather. Glycerine added to the solution will cause the lather to remain wet longer. Where applying soap suds, paint the lather on the joint all the way around, and then examine the joint thoroughly for bubbles. Use a mirror to observe any part of the joint not directly visible. It will sometimes take a full minute or more for bubbles to appear at a small leak. Questionable spots should be covered with lather and examined again.

94. Discharging the Refrigerant System

a. General. Prior to opening the refrigerant system for maintenance, the system must be discharged. The refrigerant may be discharged into a suitable service cylinder for reuse or discharged to the atmosphere.

Warning: **Refrigerant-22 is contained in the refrigerant system under high pressure. Extreme care must be exercised to prevent refrigerant from coming in contact with exposed skin and eyes. Provide adequate ventilation when discharging the system in a confined area.**

b. Discharging Into Service Cylinder.

(1) Remove the access panel from the left side of the unit as shown by figure 13.

(2) Remove caps from discharge and suction service valves (fig. 30) and connect a charging line from each valve to the service panel arrangement shown in figure 37, after first expelling any trapped air in the line with refrigerant gas. When making connections, all panel valves should be shut off.

(3) Open the discharge service valve slowly. Open valve A of the service panel (fig. 37).

(4) Adjust the pointer of the dual pressure switch to the 20 inches of vacuum setting by turning and adjusting screw as required (fig. 36).

(5) Operate the air conditioning unit intermitently until a constant suction pressure of 3 psig is indicated on the panel suction gauge.

(6) Close the service valves and panel valves.

c. Discharging the Refrigerant to Atmosphere.

(1) Remove the access panel from the condenser section as shown by figure 13.

(2) Connect a charging line to the discharge service valve with the free end of the line in a suitable open container to receive any oil that may be present in the system.

(3) Open the suction and discharge service valves and allow the refrigerant to discharge slowly from the system.

(4) Close the suction and discharge service valves and install the two caps on the two valves.

95. System Evacuation

To minimize the time needed for evacuation and for obtaining a completely dry system, use the double evacuation procedure which follows. (See figure 37 which shows connections and procedure.)

a. With a vacuum pump, reduce the system to an absolute pressure of approximately 10,000 microns, 10 millimeters. The stop evacuation and break vacuum with oil-pumped dry nitirogen. This will cause any condensed vapor to flash back into its original state of vapor in which it can be removed by the pump.The dry nitrogen serves as a carrier for the water vapor.

b. The above procedure should be repeated several times to assure a completely dry system.

96. Replacing Tubing, Fittings or Refrigerant Components

a. General. A careful ana!ysis of any trouble should first be mde to determine if replacement is necessary. The cause of failure must be determined before replacement is made.

b. Unbrazing Joints

(1) Release system charge to the atmosphere or refrigerant cylinder through the System charging valve, figure 30.

(2) Connect a cylinder of oil pumped dry nitrogen to the system charging valve, figures 30 and 37, and, using a nitrogen regulating valve, charge the system with just enough nitrogen to insure a constant flow of nitrogen at all times when the system is open and while brazing or unbrazing joints. One to two psig is sufficient.

c. Cutting Copper Tubing.

(1) Use a sharp wheel cutter, or hacksaw of 32 teeth per inch. Avoid any burns or malforming of the tube at the cut.

(2) Cut tubing square and remove all burns from inside and outside with a sharp fine file. Hold tubing so filings will drop away from tube opening.

Caution: **Care must be taken to prevent filings or cuttings from entering the tube. Particles which enter the tube must be cleaned out before completing connections. Failure to do this may result in damage to the system through oil gumming and sludging, chemical reaction, or direct scoring of the cylinder walls and pistons.**

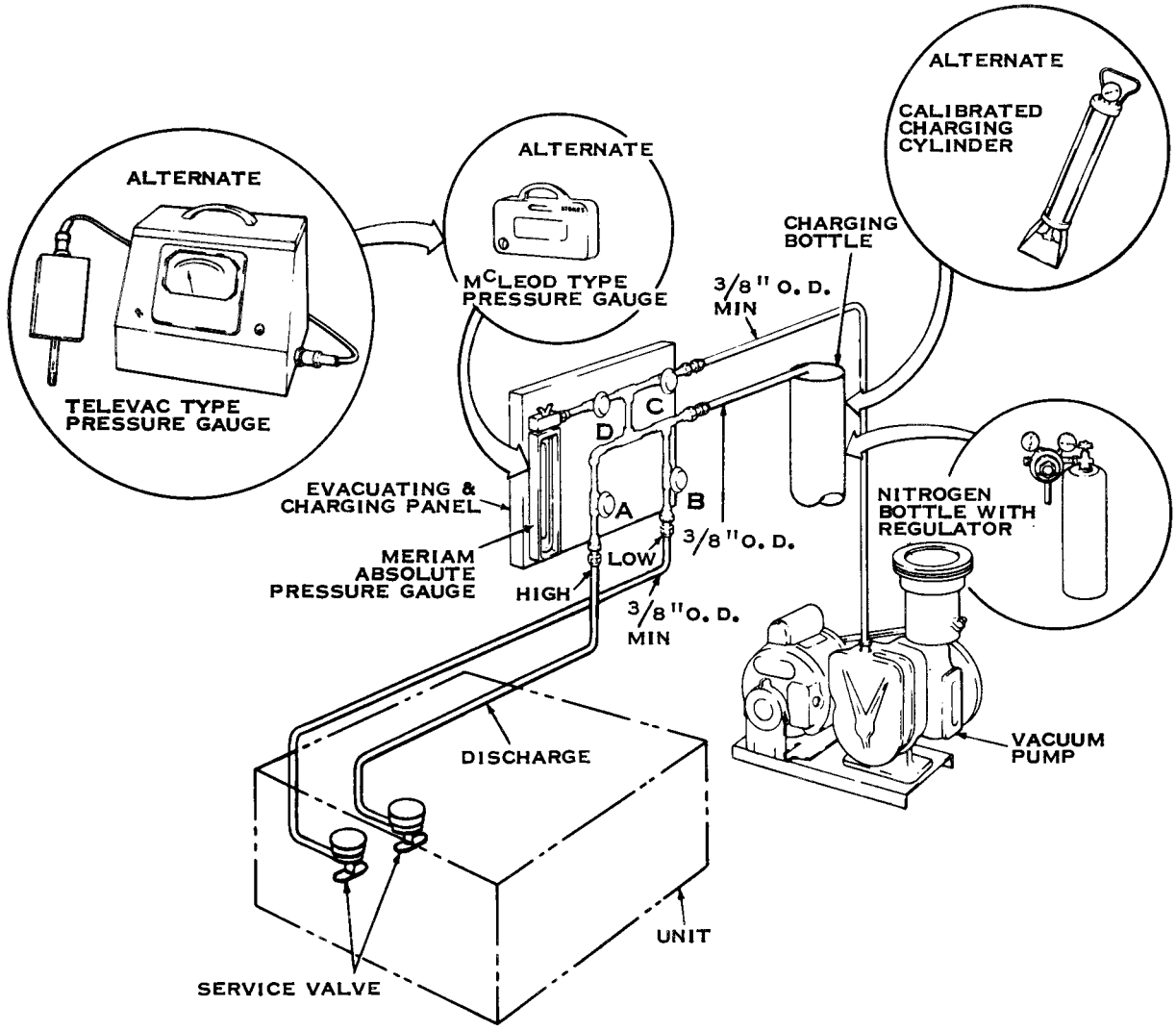


Figure 37. Refrigerant System Discharging, Evacuating And Charging Arrangement..

d. Making Brazed Joints.

(1) Cut tubing according to paragraph a, above.

(2) If not perfectly round, size the end of the tube with a sizing tool.

(3) Clean the ends of the tubing with crocus cloth or wim brush. Do not under any circumstances use sandpaper, emery cloth or steel wool for this purpose.

(4) Slip tubing into fitting until it seats properly.

(5) Blow all traces of refrigerant from that part of the system which is to be brazed before applying heat. Oil pumped nitrogen gas should be bled through the tubing or pipe being brazed to maintain neutral atmosphere within the tube. This should be continued after brazing until the temperature of the tube has been reduced below the temperature of oxidation.

Caution: **Failure to maintain a neutral atmosphere within tubing during brazing can cause copper oxidation, producing harmful chemical reactions in the compressor lubricating oil, and a deterioration of the refrigerant resulting in harmful acids and general contamination of the system.**

(6) Apply heat with an acetylene gas torch, using a neutral to reducing flame (a greenish) feather extending from the tip of the inner cone indicates a slightly reducing flame.) Heat the fitting and tubing evenly over the full circumference of the joint, keeping the torch flame in motion to assure even distribution of heat. Test the temperature by touching the edge of the joint with brazing alloy. Do not apply the flame to the alloy. When the alloy starts to melt and run, the heat is right for brazing.

Caution: **Use a piece of asbestos sheeting to protect other portions of the system from flame damage during brazing.**

(7) Feed brazing alloy cautiously. Alloy will flow freely at right temperature but will burn when too hot. When joint is full, brazing material will appwm in a complete ring around the edge of the fitting.

(8) Be sure that some part of the system is left open to atmosphere during brazing. Otherwise pressure may build in the system and blow brazing material from the joint.

(9) Wipe excess material from joint with rag or brush while joint is still hot. Inspect joint to make sure it has properly filled.

97. Charging the System

The system must be charged witih the correct amount of Refrigerant-22. The correct amount is 16 lbs. Make charging connection as shown by figure 37. Charge by the following procedure.

a. Connect a bottle of Refrigerant-22 to the charging panel (figure 37) and open valves A and B. Valves C and D should remain closed.

b. Open the valve on the refrigerant bottle to allow gas to enter the system until the pressure is equalized with that in the cylinder.

Caution: **The compressor must not be operated before step c has been completed.**

c. Close valve A.

d. Operate the compressor and slowly charge into the system, After sufficient refrigerant has been added, the refrigerant will start building up in the receiver. At this paint the discharge presure will continue a steady rise. When this condition exists, the unit is fully charged.

Note. If the unit is overcharged, the refrigerant will fill up the receiver space and back up into the condenser space. If this happens, a sudden and excessive increase in discharge pressure will be noted. If this happens, bleed the entire charge, and recharge (paragraphs 95 and 97).

Section II. COMPRESSOR

98. General

The hermetic compressor is hermetically sealed, and if found to be dafective, it must be removed from the refrigerant circuit and a new compressor installed. The new compressor will have been charged with oil and nitrogen gas as a holding charge.

99. Compressor

a. *Replacement.* Remove the compressor as shown by figure 28.

b. Installation.

(1) Using a wire brush or crocus cloth, clean the system suction and discharge connections.

(2) Crack the flare nut on the charging valve of the new compressor to release the nitrogen-holding charge pressure, then retighten the flare nut.

(3) Remove any charging fittings or caps from the compressor and prepare the

tubing for brazing according to paragraph 96.

(4) Insert the system suction line into the compressor suction connection and secure compressor as shown by figure 28.

(5) Slide the system discharge line over the discharge connection of the compressor.

(6) Flow nitrogen through the system and compressor during the brazing operation as described in paragraph 96.

(7) Evacuate and charge the system according to paragraphs 95 and 97.

Section III. EVAPORATOR FAN MOTOR

100. General

The evaporator fan motor is a 1/3 horsepower motor located in the upper or evaporator portion of the air conditioning unit, and drives the impellers of the evaporator fan assembly to circulate air over the evaporator tils and discharge it through the openings in the front of the unit.

101. Evaporator Fan Motor

a. Testing and Removal. Test and remove the evaporator fan motor as shown by figure 16.

b. Disassembly.

(1) Remove nuts and through-bolts which secure end shields b stator frame. Remove right end plate from the stator frame.

Note. Mark the end plates and stator frame prior to diaaasembly to facilitate matching of mating parts during reassembly.

(2) Remove rotor assembly with left end shield attached.

(3) Remove left end plate.

(4) Remove the washers, bearings and slingers from the shaft of the rotor assembly.

(5) Tag and disconnect the leads of the stator assembly from the motor thermal protector and connector and replace these items if necessary.

(6) Replace stator assembly as necessary.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly with compressed air and a clean cloth.

(2) Rotate bearings and inspect for any wear.

(3) Inspect the rotor assembly for a bent shaft. Replace a defective rotor.

(4) Inspect all other parts for defects or damage. Replace all unserviceable parts.

d. Testing. Test the stator assembly for short circuits as instructed in TM 5-764.

e. Reassembly. Reassemble motor in reverse order of disassembly.

f. Installation. Install motor as shown by figure 16.

Section IV. CONDENSER FAN MOTOR

102. General

The condenser fan motor is a 1.5 horsepower motor located in the lower or condenser portion of the air conditioning unit, and drives the impellers of the condenser fan assembly to circulate air over the condenser coils and discharge it through the openings in the bottom of the unit.

103. Condenser Fan Motor

a. On-Equipment Test.

(1) Disconnect the leads from the condenser fan motor as described in figure 17.

(2) Test the condenser fan motor for continuity and insulation resistance as instructed in TM 5-764.

b. Removal. Remove the condenser fan motor as Shown by figure 17.

c. Disassembly.

(1) Remove nuts and through-bolts which secure end shields to stator frame. Remove right end pkke from the stator frame.

Note. Mark the end platas and stator frame prior to disassembly to facilitate matching of mating parts during reassembly.

(2) Remove rotor assembly with left end plate attached.

(3) Remove the left end plate.

(4) Remove the washers, bearings and slingers from the shaft of the rotor assembly.

(5) Tag and disconnect the leads of the stator assembly from the motor connector and thermal protector and replace these items if necessary.

(6) Replace stator assembly if necessary.

d. Cleaning, Inspection and Repair.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly with compressed air and a clean cloth.

(2) Rotate bearings and inspeot for any wear.

(3) Inspect the rotor assembly for a bent shaft, Replace a defective rotor.

(4) Inspect all other parts for defects or damage. Replace all unservicable parts.

e. Testing. Test the stator assembly for short circuits as instructed in TM 5-764.

f. Reassembly. Reassemble motor in reverse order of disassembly.

g. Installation. Install motor as shown by figure 17.

APPENDIX I

REFERENCES

1. Fire Protection

TB 5-4200-200-10	Hand portable fire extinguishers for Army use
TM 5-687	Repair and utilities: fire protection equipment and appliances; inspections, operations, and preventive maintenance

2. Lubrication

C-9100IL	Petroleum, petroleum-base products and related matarial

3. Operating Instructions

TM 5-4120-259-15	Operator, organizational, direct and general support and depot maintenance manual

4. Painting

TM 9-213	Painting instructions for field use

5. Preventive Maintenance

TM 5-764	Electric motor and generator repair
TM 38-750	Army equipment record procedures

6. Radio Interference Suppression

TM 11-483	Radio interference suppression

7. Shipment and Limited Storage

TB 740-93-3	Administrative storage of USAMEC mechanical equipment
TM 38-230	Preservation, packaging, and packing of military supplies and equipment

APPENDIX II

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

a. Section I provides a general explanation of all maintenance and repair funotions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance operations on the identified end item or component. The implementation of the maintenance tasks upon the end item or component will be consistent with the assigned maintenance operations.

c. Section III lists the special tools and test equipment required for each maintenance operation as referenced from Section II.

d. Section IV contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

2. Explanation of Columns in Section II.

a. Functional Group Number. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-93-1 Functional Grouping Codes) are listed on the Maintenance Assignment in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Component Assembly Nomenclature. This column contains a brief description of the components of each functional group.

c. Maintenance Operations and Maintenance Levels. This column lists the various maintenance operations ("A" through "J") and indicates the lowest maintenance level authorized to perform these operations. The symbol designations for the various maintenance levels are as follows:

O/C-0perator or crew
0 -Organization maintenance
F -Direct support maintenance
H -General support maintenance
D -Depot maintenance

The Maintenance Operations are defined as follows:

A-SERVICE: Operations required periodically to keep the itern in proper operating condition, i.e., to clean, preserve, drain, paint, and replenish fuel, lubricants, hydraulic, and deicing fluids, or compressed air supplies.

B-ADJUST: Regulate periodically to prevent mzdf unction. Adjustments will be made commensurate with adjustment procedures and associated equipment specifications.

C-ALINE: Adjust two or more components of an electrical or mechanical system so that their functions are properly synchronized or adjusted.

D-CALIBRATE: Determine, check, or rectify the graduation of an instrument, weapon, or weapons system or components of a weapons system.

E-INSPECT: Verify serviceability and detect incipient electrical or mechanical failure by close visual examination.

F-TEST: Verify serviceability and detect incipient electrical or mechanical failure by measuring the mechanical or electrical characteristics of the item and comparing those characteristics with authorized standards. Tests will be

made commensurate with test procedures and with calibrated took and/or test equipment referenced in the Maintenance Assignment.

G-REPLACE: Substitute serviceable components, assemblies and subassemblies for unserviceable counterparts or remove and install the same item when required for the performance of other maintenance operations.

H-REPAIR: Restore to a serviceable conditiion by replacing unserviceable parts or by any other action required using available tools, equipment and skills-to include welding, grinding, riveting, straightening, adjusting and facing.

I-OVERHAUL: Restore an item to a completely serviceable condition (as prescribed by serviceability standards developed and published by the commodity commands) by employing techniques of "Inspect and Repair Only as Necessary" (IROAN). Maximum use of diagnostic and test equipment is combined with minimum disassembly during overhaul. “Overhaul” may be assigned to any level of maintenance except organizational, provided the time, tools, equipment, repair parts authorization, and technical skills are available at that level. Normally, overhaul as applied to end items, is limitedl to depot maintenance level.

J-REBUILD: Restore to a condition comparable to new by disassembling to determine the condition of each component part and reassembling using serviceable, rebuilt, or new assemblies subassemblies, and parts.

d. Reference Note. This column, subdivided into columns “K” and “L”, is provided for referencing
REMARKS (sec. IV) that may be associated with maintenance operations (sec. II).

3. Explanation of Columns in Section III

This paragraph is not applicable.

4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to Section II. The first letter references column L and the second letter references a maintenance operation, Column “A” through “J”.

b. Remarks. This column lists information pertinent to the Maintenance Operation being performed, as indicated on the Maintenance Assignment Section II.

SECTION II

MAINTENANCE ASSIGNMENT

For: Model MA3-F23A

Functional group number	Component assembly nomenclature	Essentiality	Maintenance operations: A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	G Replace	Maintenance levels: H Repair	I Overhaul	J Rebuild	Note ref.: K T & TE Equt	L Remarks
40	ELECTRIC MOTORS													
4000	MOTOR ASSEMBLY													
	Motor, Electric, 1-1/2 HP, Condenser	--	--	--	--	--	--	O	O	F	H			
	Motor, Electric, 1/3 HP, Evaporator	--	--	--	--	--	--	O	O	F				
52	AIR CONDITIONING COMPONENTS													
5200	GAS COMPRESSOR ASSEMBLY													
	Motor Compressor Assembly	--	F	--	--	--	--	O	F	--	--	--	--	A

Functional group number	For: Model MA3-F23A Component assembly nomenclature	Essentiality	Maintenance operations A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	G Replace	H Repair	Maintenance levels I Overhaul	J Rebuild	Note ref. K T & TE Equt	L Remarks
5217	REFRIGERANT PIPING													
	Valve, Expansion	--	--	F	--	- - - -		--	F	--				
	Valve, Solenoid	--	--	--	--	- - - -		0	F	0	--	--	--	B
5243	BLOWER ASSEMBLY													
	Blower Assembly, Evaporator	--	--	--	--	- - - -		--	O	0	--	--	--	C
	Blower Assembly, Condenser	--	--	--	--	- - - -		--	O	0	--	--	--	D

SECTION III (NOT APPLICABLE)

Section IV. REMARKS

Reference code	Remarks
A-A	Includes servicing compressor with oil and charging unit with refrigerant.
B-H	Repair by replacing coil.
C-H	Repair by replacing components,
D-H	Repair by replacing components.
	Note: Reference Code A-A This function may be accomplished at organizational Maintenance if using unita include the personnel with MOS 51L20 or 62C30, and the Refrigeration Tool Kit, FSN 5180-596-1474, is available.

APPENDIX III

BASIC ISSUE ITEMS LIST AND MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required for maintenance and operation by the operator, initially issued with, or authorized for the air conditioner.

2. Explanation of Columns in Section II

a. *Source Codes.* The information provided in each column is as follows:

(1) *Materiel.* This column is left blank. For identification of agencies assigned supply responsibility for parts, refer to appropriate Federal and Department of Army Supply Catalogs.

(2) *Source.* The selection status and source of supply far each part are indicated by one of the following code symbols:

(a) P-applied to high-mortality repair parts which are stocked in or supplied from the army supply system, and authorized for use at indicated maintenance categories.

(b) P1-applied to repair parts which are low-mortality parts, stocked in or supplied from the army supply system and authorized for installation at indicated maintenance categories.

(c) M-applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance categories.

(d) X2-applied to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

(3) *Maintenance.* The lowest maintenance level authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O-Organizational Maintenance.

(4) *Recoverability.* Repair parts and/or tool and equipment items that are recoverable are indicated by one of the following code symbols:

(a) R-applied to repair parts and assemblies which are economically repairable at direct and general support maintenance activities and normally are furnished by supply on an exchange basis.

(b) T-applied to high-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance facilities.

(c) U-applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, highdollar value mmsable casings, castings, and the like.

Note. When no code is shown in the recoverability column the part is considered expendable.

b. Federal Stock Number. When a Federal stock number is available for a part, it will be shown in this column, and will be used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part are shown.

(2) A five-digit Federal supply code for manufacturers and/or other supply services is shown in parentheses followed by the manufacturer's part number. This number shall be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column. Example: (08645) 86543

d. Unit of Issue. If no abbreviation is shown in this column, the unit of issue is "each".

e. Quantity Authorized. This column lists the quantities of repair parts, accessories, tools, or publications authorized for issue to the equipment operator or crew as required.

f. Quantity Issued with Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal supply channels as required.

g. Illustrations. This column is subdivided into two columns which provide the fdllowing information:

(1) *Figure number.* Provides the identifying number of the illustration.

(2) *Item number.* Provides the referenced number for the parts shown in the illustration.

Section II. BASIC ISSUE ITEMS LIST

Source codes			Federal stock number	Description	Unit of issue	Quantity authorized	Quantity issued with equipment	Illustration	
Material	Source	Maintenance	Recoverability						Fig	Item
				GROUP 32-BASIC ISSUE ITEMS, TROOP INSTALLED						
				3200 BASIC ISSUE ITEMS, TROOP INSTALLED OR AUTHORIZED.						
	P	O		7520-559-9618	CASE			1		
	P	O		4120-259-15	MANUAL			1		
	P	C		4130-983-5888	FILTER			2	12	
	X2	O		MS3108R-22-22S	CONNECTOR (96906)			1		

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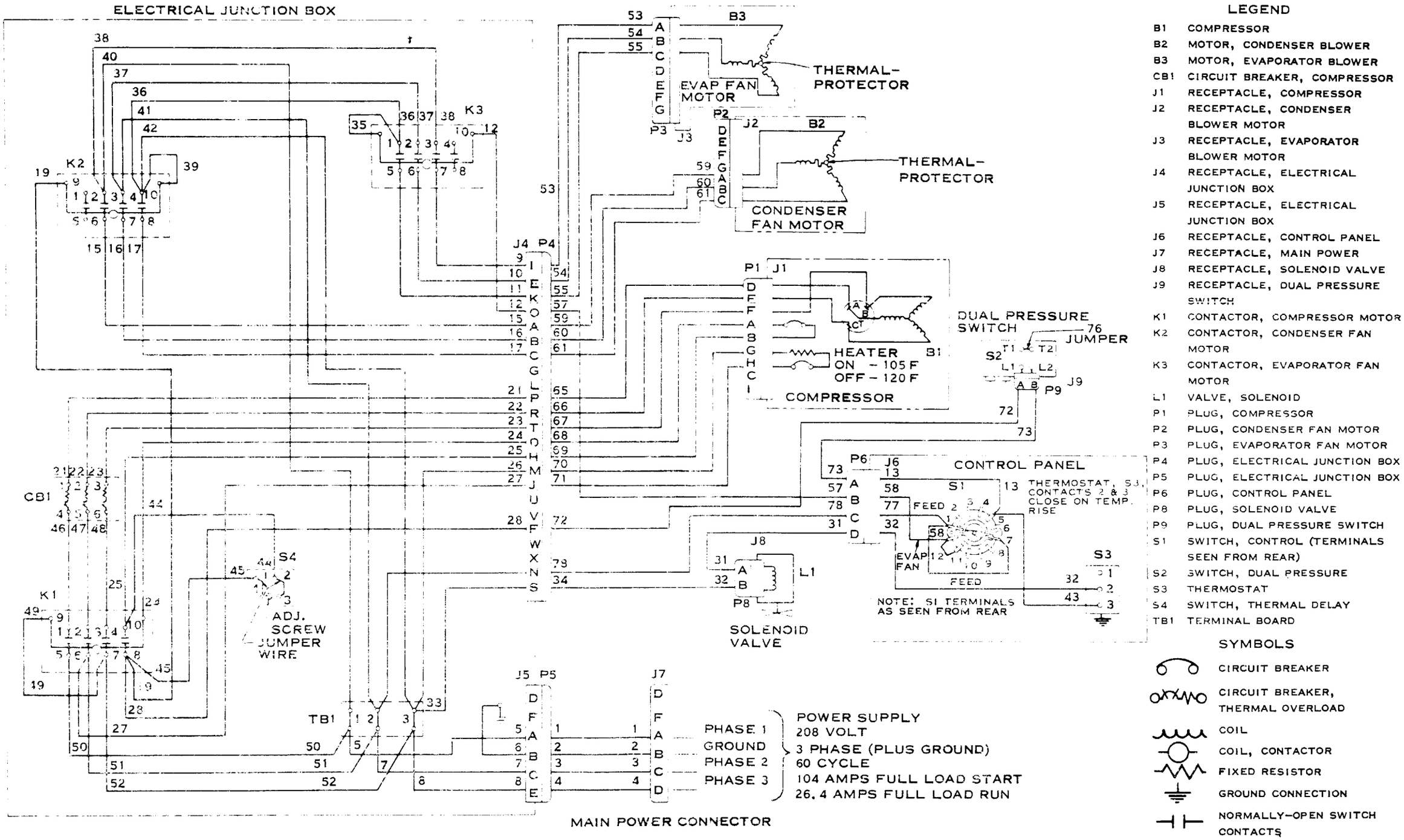


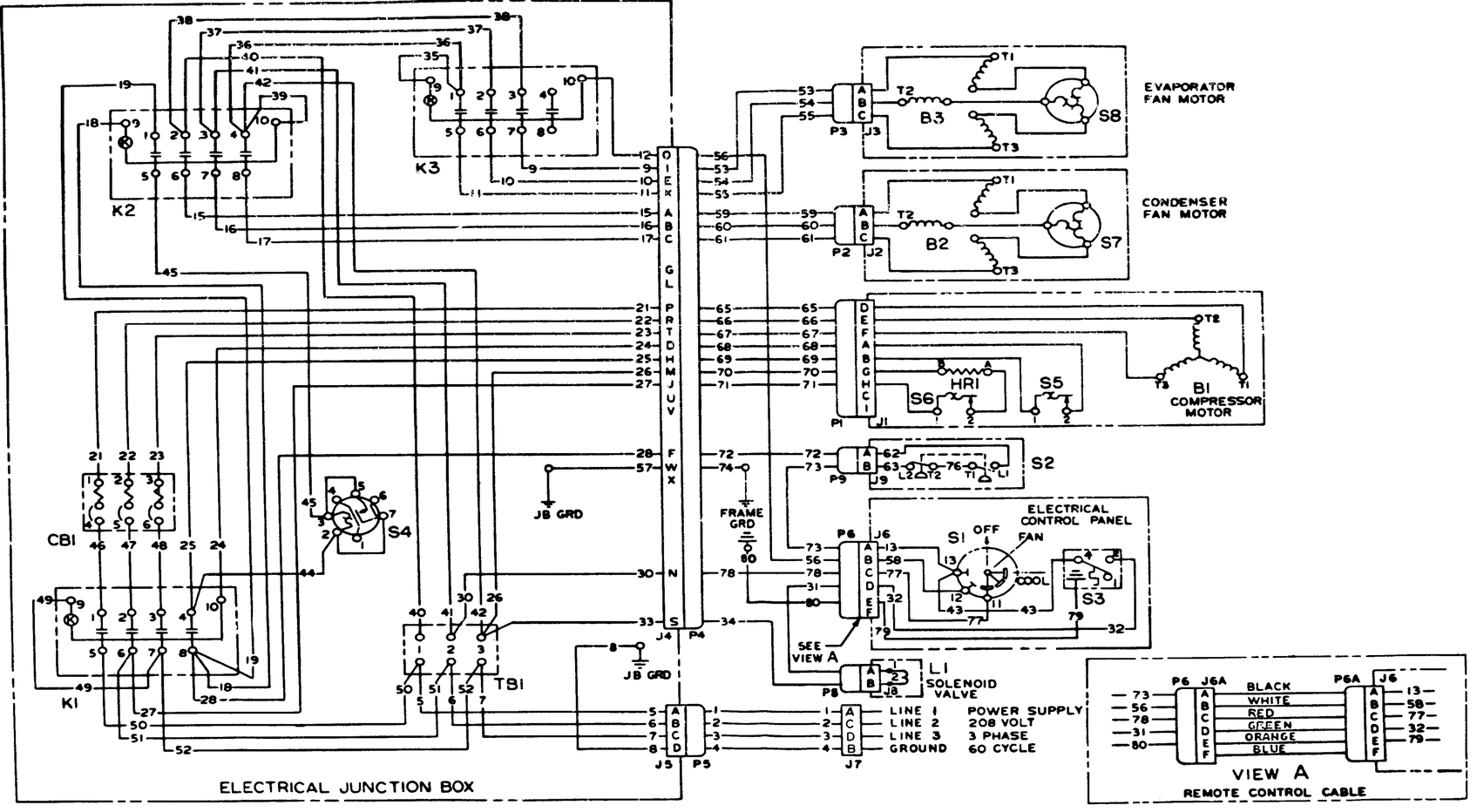
LEGEND

B1	COMPRESSOR
B2	MOTOR, CONDENSER BLOWER
B3	MOTOR, EVAPORATOR BLOWER
CB1	CIRCUIT BREAKER, COMPRESSOR
J1	RECEPTACLE, COMPRESSOR
J2	RECEPTACLE, CONDENSER BLOWER MOTOR
J3	RECEPTACLE, EVAPORATOR BLOWER MOTOR
J4	RECEPTACLE, ELECTRICAL JUNCTION BOX
J5	RECEPTACLE, ELECTRICAL JUNCTION BOX
J6	RECEPTACLE, CONTROL PANEL
J7	RECEPTACLE, MAIN POWER
J8	RECEPTACLE, SOLENOID VALVE
J9	RECEPTACLE, DUAL PRESSURE SWITCH
K1	CONTACTOR, COMPRESSOR MOTOR
K2	CONTACTOR, CONDENSER FAN MOTOR
K3	CONTACTOR, EVAPORATOR FAN MOTOR
L1	VALVE, SOLENOID
P1	PLUG, COMPRESSOR
P2	PLUG, CONDENSER FAN MOTOR
P3	PLUG, EVAPORATOR FAN MOTOR
P4	PLUG, ELECTRICAL JUNCTION BOX
P5	PLUG, ELECTRICAL JUNCTION BOX
P6	PLUG, CONTROL PANEL
P8	PLUG, SOLENOID VALVE
P9	PLUG, DUAL PRESSURE SWITCH
S1	SWITCH, CONTROL (TERMINALS SEEN FROM REAR)
S2	SWITCH, DUAL PRESSURE
S3	THERMOSTAT
S4	SWITCH, THERMAL DELAY
TB1	TERMINAL BOARD

SYMBOLS

- CIRCUIT BREAKER
- CIRCUIT BREAKER, THERMAL OVERLOAD
- COIL
- COIL, CONTACTOR
- FIXED RESISTOR
- GROUND CONNECTION
- NORMALLY-OPEN SWITCH CONTACTS

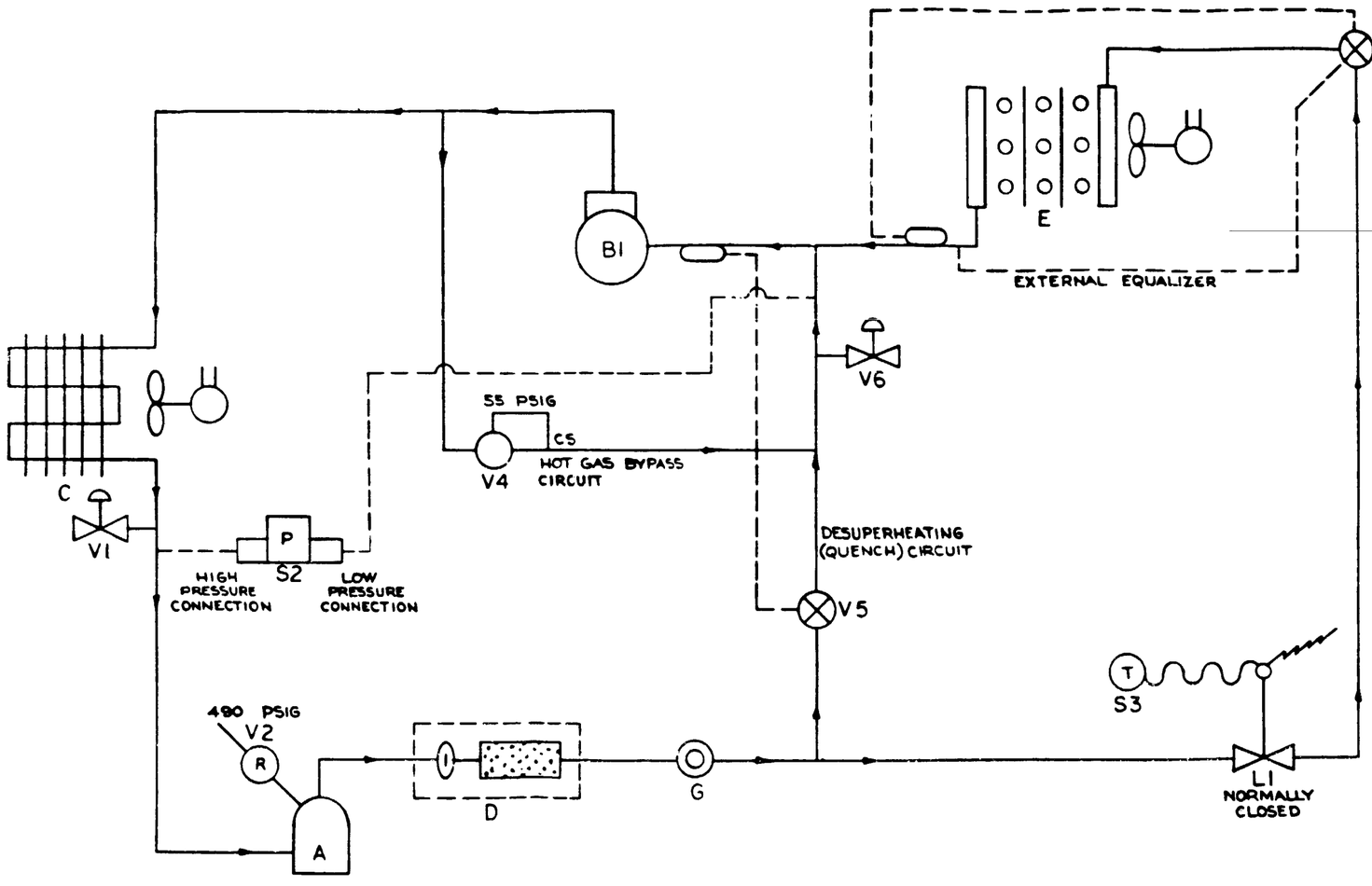
Figure 5. Wiring diagram.



LEGEND	
SYMBOL	DESCRIPTION
P1	CONNECTOR, PLUG
J1	CONNECTOR, RECEPTACLE
P2	CONNECTOR, PLUG
J2	CONNECTOR, RECEPTACLE
P3	CONNECTOR, PLUG
J3	CONNECTOR, RECEPTACLE
P4	CONNECTOR, PLUG
J4	CONNECTOR, RECEPTACLE
P5	CONNECTOR, PLUG
J5	CONNECTOR, RECEPTACLE
P6	CONNECTOR, PLUG
J6	CONNECTOR, RECEPTACLE
P6A	CONNECTOR, PLUG
J6A	CONNECTOR, RECEPTACLE
J7	CONNECTOR, RECEPTACLE
P8	CONNECTOR, PLUG
J8	CONNECTOR, RECEPTACLE
P9	CONNECTOR, PLUG
J9	CONNECTOR, RECEPTACLE
B1	MOTOR, COMPRESSOR
B2	MOTOR, AC (CONDENSER FAN)
B3	MOTOR, AC (EVAPORATOR FAN)
CB1	CIRCUIT BREAKER (COMPRESSOR MOTOR)
HR1	CRANKCASE HEATER, COMPRESSOR
K1	RELAY, ARMATURE (COMPRESSOR)
K2	RELAY, ARMATURE (CONDENSER FAN MOTOR)
K3	RELAY, ARMATURE (EVAPORATOR FAN MOTOR)
L1	VALVE, SOLENOID
S1	SWITCH, ROTARY
S2	SWITCH, PRESSURE
S3	SWITCH, THERMOSTAT
S4	RELAY, THERMAL
S5	THERMOSTAT, COMPRESSOR MOTOR
S6	THERMOSTAT, COMPRESSOR CRANKCASE HEATER
S7	OVERLOAD, CONDENSER FAN MOTOR
S8	OVERLOAD, EVAPORATOR FAN MOTOR
TB1	TERMINAL BOARD

ME 4120-259-15/5.1 C1

Figure 5.1. Wiring diagram (Therm-Air Model CB-36-08-3-60).



NOTE:

1. PRESSURE SWITCH SETTING
   LOW PRESSURE INDICATOR - 25 PSI
   DIFFERENTIAL PRESSURE - 20 PSI
   HIGH PRESSURE INDICATOR (MAX) - 465 PSI
   HIGH PRESSURE INDICATOR (MIN) - 450 PSI

2. REFRIGERANT 22 PER BB-C-310
   APPROX. 150°F CONDENSING TEMPERATURE
   50°F SUCTION TEMPERATURE

3. MOTOR COMPRESSOR RECIPROCATING, HERMETICALLY SEALED, OIL CHARGED

LEGEND	
SYMBOL	DESCRIPTION
A	RECEIVER, LIQUID, REFRIGERANT
B1	COMPRESSOR
C	COIL, CONDENSER
D	DEHYDRATOR, DESICCANT, REFRIGERANT
E	COIL, EVAPORATOR
G	INDICATOR, SIGHT, LIQUID
L1	VALVE, SOLENOID
S2	PRESSURE SWITCH ASS'Y
S3	THERMOSTAT
V1	VALVE, DIAPHRAGM (HIGH SIDE)
V2	VALVE, SAFETY RELIEF
V3	VALVE, EXPANSION
V4	VALVE, REGULATING, FLUID PRESSURE
V5	VALVE, EXPANSION
V6	VALVE, DIAPHRAGM (LOW SIDE)

Figure 27.1. Refrigerant flow diagram (Therm-Air Model CB-36-08-3-60).

GPO 803-869-2

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major *General, United States Army,*
The Adjutant General.

Distribution:

Active Army :
- USASA (2)
- ACSI (1)
- DCSLOG (1)
- CNGB (1)
- TSG (1)
- CofEngrs (3)
- CC-E (1)
- Dir of Trans (1)
- CofSptS (1)
- USAMB (1)
- USAARTYBD (2)
- USA Armor Bd (2)
- USAIB (2)
- USARADBD (2)
- USAAESWBD (2)
- USAAVNTBD (2)
- USCONARC (3)
- OS Maj Comd (5) except
  - USARJ (1)
- USASETAF (2)
- USAMC (1)
- MDW (1)
- Armies (2)
- Corps (2)
- Div (2)
- Engr Bde (1)
- Svc Colleges (2)
- Br Svc Sch (2)
- USACDCEC (10)
- USMA (2)
- GENDEP (10)
- Engr Dep (10)
- Army Dep (2) except
  - TOAD (3)
- MOTBA (2)
- MOTBY (2)
- MOTKI (2)
- MOTSU (2)
- EAMTMTS (1)
- CAMTMTS (1)
- WAMTMTS (1)
- Div Engr (2)
- Engr Dist (2)
- USAERDL (3)
- USAMECOM (46)
- Engr Cen (5)
- USAREUR Engr Proc Cen (2)
- USAREUR Engr Sup Con Agcy (10)
- Engr FLDMS (2)
- Fort Knox FLDMS (10)
- Fld Comd, DASA (8)
- AMS (8)
- USACOMZEUR (2)
- USAC (1)
- MAAG (1)
- JBUSMC (1)
- USARMA (1)
- USARMIS (1)
- Unita org under fol TOE:
  - 2-35 (2)
  - 2-37 (2)
  - 4-45 (2)
  - 4-47 (2)
  - 4-48 (2)
  - 5-45 (2)
  - 5-47 (2)
  - 5-48 (2)
  - 5-237 (5)
  - 5-262 (5)
  - 5-267 (1)
  - 5-278 (5)
  - 5-279 (2)

NG: None

USAR: Same as active Army except allowance is one (1) copy for each unit.

Far explanation of abbreviations used, see AR 320-50.

* U.S. GOVERNMENT PRINTING OFFICE : 1994 - 300-421 (02007)

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THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

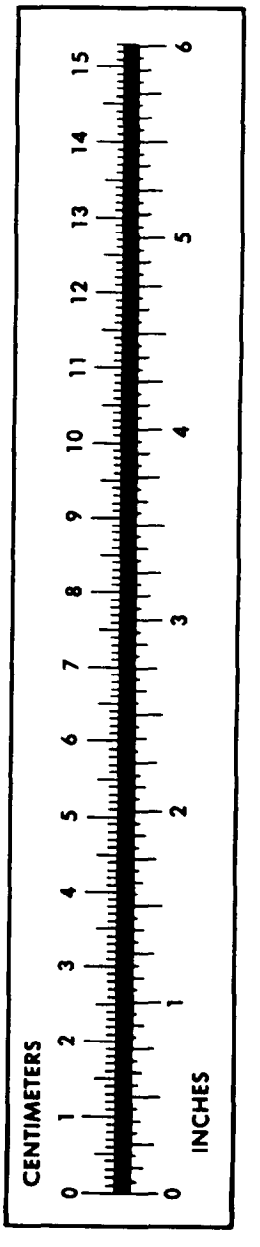
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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