TM 5-4120-274-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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

AIR CONDITIONING UNITS, ELECTRIC MOTOR DRIVEN
9,000 BTU/HR, VERTICAL COMPACT, 115 VOLT,
SINGLE PHASE, 50/60 CYCLE (THERMO-AIR MODEL
CV-9-1-15-60) FSN 4120-935-1609
9,000 BTU/HR, VERTICAL COMPACT, 230 VOLT,
SINGLE PHASE, 50/60 CYCLE (THERMO-AIR MODEL
CV-9-1-30-60) FSN 4120-935-1612
9,000 BTU/HR, VERTICAL COMPACT, 208 VOLT, 3 PHASE,
400 CYCLE (THERMO-AIR MODEL CV-9-3-08-400)
FSN 4120-935-1610
9,000 BTU/HR, VERTICAL COMPACT, 208 VOLT, 3 PHASE,
50/60 CYCLE (THERMO-AIR MODEL CV-9-3-08-60)
FSN 4120-935-1611

This copy is a reprint which includes current pages from Changes 1 through 4.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 1969

SAFETY PRECAUTIONS

BEFORE OPERATION

Disconnect air conditioner from power source before performing maintenance on components of unit. Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be careful that Refrigerant-22 does not contact eyes. In case of leaks, ventilate area immediately.

DURING OPERATION

Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be careful that Refrigerant-22 does not contact eyes. In case of leaks ventilate area immediately.

Disconnect air conditioner from power source before performing maintenance on components of unit.

AFTER OPERATION

Disconnect air conditioner from power source before performing maintenance on components of unit.

Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be careful that Refrigerant—22 does not contact eyes. In case of leaks, ventilate area immediately.

CHANGE

NO. 4

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

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

AIR CONDITIONING UNIT, ELECTRIC MOTOR DRIVEN, 9,000 BTU/HR,
VERTICAL COMPACT, 115 VOLT, SINGLE–PHASE,
50/60 HERTZ, THERMO-AIR MODEL CV–9-1–15-60,
NSN 4120-00-935-1609,9,000 BTU/HR, VERTICAL COMPACT, 230 VOLT,
SINGLE PHASE, 50/60 HERTZ, THERMO-AIR
MODEL CV–9-–1-30-60, NSN 4120-00-935-1612,
9,000 BTU/HR, VERTICAL COMPACT, 208 VOLT, 3 PHASE,
400 HERTZ, THERMO-AIR MODEL CV–9-3-08-400,
NSN 4120-00-935-1610,9,000 BTU/HR, VERTICAL
COMPACT, 208 VOLT, 3 PHASE, 50/60 HERTZ, THERMO-AIR MODEL
CV–9-3-08-60, NSN 4120-00-935-1611

Approved for public release; distribution is unlimited

TM 5-4120-274-15, 19 March 1969, is changed as follows:

Page 5-4 is changed as follows:

. Paragraph 5-21b, *Releasing Refrigerant for Service,* is superseded as follows:

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.

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

b. *Releasing Refrigerant for Service.* Connect and operate a recovery/recycling unit in accordance with the manufacturer's instructions.

. Paragraph 5-21 d, *Charging the Refrigerant System,* insert the following note:

NOTE

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

Page C-3 is changed as follows:

. SECTION III, is changed as shown:

SECTION III. TOOLS AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	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
Chiet of Staff

Official:
Milton H. Hamilton
MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
01677

DISTRIBUTION:
To be distributed in accordance with DA Form 12–25E, qty rqr block no. 0196.

CHANGE
No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *12 March 1975*

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

AIR CONDITIONING UNIT, ELECTRIC MOTOR DRIVEN, 9,000 BTU/HR, VERTICAL COMPACT, 115 VOLT, SINGLE PHASE, 50/60 HERTZ, THERMO-AIR MODEL CV-9-1-15-60, NSN 4120-00-935-1609,9,000 BTU/HR VERTICAL COMPACT, 230 VOLT, SINGLE PHASE, 50/60 HERTZ, THERMO-AIR MODEL CV-9-1-30-60, NSN 4120-00-935-1612,9,000 BTU/HR, VERTICAL COMPACT, 208 VOLT, 3 PHASE 400 HERTZ THERMO-AIR MODEL CV-9-3-08-400, NSN 4120-00-935-1610,9,000 BTU/HR, VERTICAL, COMPACT, 208 VOLT, 3 PHASE, 50/60 HERTZ THERMO-AIR MODEL CV-9-3-08-60 NSN 4120-00-935-1611

TM 5-4120-274-15, 10 March 1969, is changed as follows:
The title is changed as shown above.
Page 2 of cover. Add the following Warning as follows:

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.

Change No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 12 *April 1973*

Operator, Organizational, Direct and General Support, and Depot Maintenance Manual
AIR CONDITIONING UNITS, ELECTRIC MOTOR DRIVEN;
9000 BTU/HR; VERTICAL COMPACT; 115 VOLT,
SINGLE PHASE, 50/60 HERTZ (THERMO-AIR MODEL CV-9-1-15-60)
FSN 4120-935-1609; 9000 BTU/HR; VERTICAL COMPACT;
230 VOLT, SINGLE PHASE, 50/60 HERTZ
(THERMO-AIR MODEL CV-9-1-30-60)
FSN 4120-935-1612; 9000 BTU/HR; VERTICAL COMPACT;
208 VOLT, 3 PHASE, 400 HERTZ,
(THERMO-AIR MODEL CV-9-3-08-400)
FSN 4120-935-1610; 9000 BTU/HR; VERTICAL COMPACT;
208 VOLT, 3 PHASE, 50/60 HERTZ,
(THERMO-AIR MODEL CV-9-3-08-60)
FSN 4120-935-1611

TM 5-4120-274-15, 19 March 1969 is changed as follows:

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

Page A-1. Appendix A is superseded as follows:

A-1. Fire Protection

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

A-2. Painting

AR 746-1	Color, Marking, and Preparations of Equipment for Shipment

A-3. Maintenance

TM 5-764	Electric Motor and Generator Repair
TM 5-671	Repairs, and Utilities: Preventive Maintenance for Refrigeration, Air Conditioning, Mechanical Ventilation, and Evaporative Cooling
TM 5-670	Repairs and Utilities: Refrigeration, Air Conditioning, Mechanical Ventilation and Evaporative Cooling
TM 38-750	The Army Maintenance management System (TAMMS)

A-4. Shipment and Storage

SM 740-97-2	Preservation of USAMECOM Mechanical Equipment for Storage
TM 740-90-1	Administrative Storage of Equipment

A-5. Demolition

TM 750-244-3	Destruction of Materiel to Prevent Enemy Use

Page B-1. Appendix B is superseded as follows:

APPENDIX B
BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

B-1. Scope

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

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 conditioning units. These items are NOT SUBJECT TO TURN-IN with the air conditioning units when evacuated.

B-3. Explanation of Columns

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

a. Source, Maintenance and Recoverability Code (SMR). Not applicable.

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 information of the item required.

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

e. *Quantity Furnished with Equipment (BIIL).* Not applicable.

f. Quantity Authorized (Items Troop Installed or 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 Usable on code	(4) Unit or meas.	(5) Qty auth
	7520-559-9618	CASE, Maintenance and Operation Manuals	EA	1

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 26 *March* 1971

Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual
AIR CONDITIONING UNITS, ELECTRIC MOTOR DRIVEN
9,000 BTU/HR, VERTICAL COMPACT, 115 VOLT, SINGLE PHASE, 50/60 CYCLE (THERMO-AIR MODEL CV-9-1-15-60)
FSN 4120-935-1609
9,000 BTU/HR, VERTICAL COMPACT, 230 VOLT, SINGLE PHASE, 50/60 CYCLE (THERMO-AIR MODEL CV-9-1-30-60)
FSN 4120-935-1612
9,000 BTU/HR, VERTICAL COMPACT, 208 VOLT, 3 PHASE, 400 CYCLE (THERMO-AIR MODEL CV-9-3-08-400)
FSN 4120-935-1610
9,000 BTU/HR, VERTICAL COMPACT, 208 VOLT, 3 PHASE, 50/60 CYCLE (THERMO-AIR MODEL CV-9-3-08-60)
FSN 4120-935-1611

TM 5-4120-274-15, 19 March 1969, is changed as follows:

Page 1-1. Section I. General is superseded as follows:

1-1. Scope

a. This manual contains instructions for the use of operating personnel maintaining the air conditioning units as allocated by the Maintenance Allocation Chart. It provides information of the operation, lubrication, preventive maintenance checks and services, and maintenance of the equipment at the various levels.

b. Numbers in parenthesis on illustrations indicate quantity. Numbers preceding nomenclature callouts on illustration indicate the preferred maintenance sequence.

1-2. Maintenance Forms and Records

Maintenance forms, records and reports which are used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

Page 1-1. Paragraph 1-2.1 is added after paragraph 1-2 as follows:

1-2.1. Reporting of Equipment Publication Improvements.

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028, Recommended Changes to Publications, and forwarded direct to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, MO 63120.

Page 1-8. Paragraph 1-6 is added after paragraph 1-5 as follows:

1-6. Circuit Breakers and Power Cable Connectors

It has been found that some of the models have improper circuit breakers and power cable connectors. Make a visual check of each model to assure the following proper components are used.

Model	Circuit Breaker	Pow4r Cable Connector
CV-9-1-15-60	C13214E3711-2	MS3106R-20-4SX
CV-9-1-30-60	C13214E3711-3	MS3106R-20-4SY
CV-9-3-08-60	C13214E3787-3	MS3106R-20-4S
CV-9-3-08-400	C13214E3787-2	MS3106R-20-4S

NOTE

All data on the wiring diagram plate should coincide with the Model title such as current, voltage, phase and frequency. Where information is incorrect, place an adhesive-backed foil plate conforming to MIL-P-19834, Type I or II, with the correct information over the incorrect data.

Page 2-7. Paragraph 2-17 is superseded as follows:

2-17. Operation in Dusty or Sandy Areas

a. Clean the condenser coil (para 3-55c(2)) and evaporator coil (para 3-54c(2)) weekly or more often if necessary. Clean the air conditioning filter, fresh air inlet filter and condenser screen daily (par, 3-9b, 3-20).

b. Clean the condenser fan. Plug the balancing holds with silicone adhesive sealant, MIL-A-46106.

NOTE

The plug should take the shape of a rivet with an approximate head thickness of one thirty-second of an inch on both sides of the cross section.

Page 3-3. Acid Item 5 as follows:

Item 5 Condenser fan. Clean fan of dust and foreign matter (all models) Par. Ref. 2-17b.

Page 3-9. Section V.1 is added after Section V as follows:

Section V.1. Radio Interference Suppression

3-16.1. Requirements

a. Assure that all grounding cable terminals are free of paint or other foreign matter so there is metal-to-metal on all contacts.

b. Remove all hardware from the mounting studs on the transformer. Scrape and remove all paint or foreign matter from the nuts, washers and the area of the junction box which is in contact with the stud hardware.

c. Reinstall all hardware with the addition of internal tooth washers, No. 6 NOM, M535337-37. These washers are to be in direct contact with the junction box.

d. Touch up the exposed areas of the junction box by applying a chemical film, type 1, grade B, Class 3, MIL-C-5541.

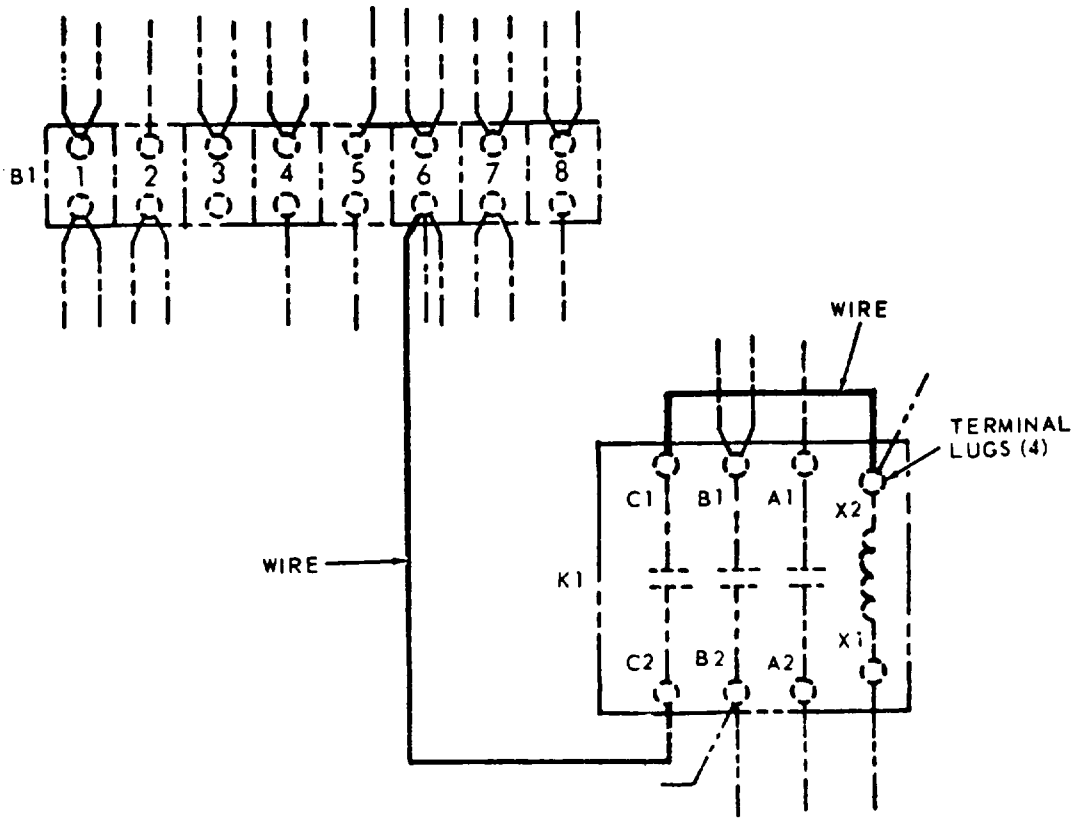
Page 3-16. Paragraph 3-37c is changaed as follows:

(1) Inspect for pitted or burned contacts.

(2) On Model CV-9-1-30-60, replace wire between terminal board No. 1 (TB 1) and relay (K1) with wire, M5086/1-16, MIL-W-5086/1, using terminal lugs, MS25036-108 (fig. 3-12-1).

(3) Replace wire on K1 relay between contacts C1 and X2 with wire M5086/1- 16 using terminal lugs MS25036-108 (fig. 3-12. 1).

Paragraph 3-37c(2) is changed to read 3-37c(4).



NOTES:
1. PHANTOM LINES DEPICT EXISING WIRING AND COMPONENTS.
2. INSTALL TERMINAL LUGS (4) WITH NEW WIRE (SOLID LINES) IN ACCORDANCE WITH MIL-T-7928.
3. THE COLOR OF NEW WIRE IS OPTIONAL.

Figure 3-12.1. Terminal board- circuit breaker rewiring details on Model CV-9- 1-30-60.

TECHNICAL MANUAL
No. 5-4120-274-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 19 March 1969

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL

AIR CONDITIONING UNITS, ELECTRIC MOTOR DRIVEN

9,000 BTU/HR, VERTICAL COMPACT, 115 VOLT, SINGLE PHASE, 50/60 CYLCE (THERMO-AIR MODEL CV-9-1-15-60)

FSN 4120-935-1609

9,000 BTU/HR, VERTICAL COMPACT, 230 VOLT, SINGLE PHASE, 50/60 CYCLE (THERMO-AIR MODEL CV-9-1-30-60

FSN 4120-935-1612

9,000 BTU/HR, VERTICAL COMPACT, 208 VOLT, 3 PHASE, 400 CYCLE (THERMO-AIR MODEL CV-9-3-08-400)

FSN 4120-035-1610

9,000 BTU/HR, VERTICAL COMPACT, 208 VOLT, 3 PHASE, 50/60 CYCLE (THERMO-AIR MODEL CV-9-3-08-60)

FSN 4120-935-1611

CHAPTER 1

INTRODUCTION

Section I. General

1-1. Scope

a. These instructions an published for the use of personnel to whom the Redmanson model CV 9 series air conditioning units are issued. They provide information on the operating and organizational maintenance of the equipment. Also included are descriptions of main units and their function in relationship to other components.

b. Appendix A contains a list of publications applicable to this manual. Appendix B 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. Appendix C contains the maintenance allocation chart.

c. Numbers in parenthesis following nomenclature callouts on illustration indicate quantity, numbers preceding nomenclature callouts indicate preferred maintenance sequence.

d. Direct reporting of errors, omissions, and recommendations for improving this equipment manual by the individual user is authorized and encouraged. Prepare DA Form 2028 (Remmmended Changes to DA Publications) for this purpose by using pencil, pen, or typewriter, and forward direct to: Commanding General, U. S. Army Mobility Equipment Command. ATTN: AMSME-MPD, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

e. Report all equipment improvement recommendations as prescribed by TM 38-750.

1-2. Record and Report Forms

a. DA Forn 2258 (Depreservation Guide for Vehicles and Equipment).

b. For other record and report forms applicable to operator, crew, and organizational mainitenance, refer to TM 38-750.

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

Section II. DESCRIPTION AND TABULATED DATA

1–3.Description

a. General. The air conditioner (fig. 1-1, 1-2, and 1-3) is used primarily in van type enclosures for providing filtered, conditional, or heated air as required to maintain service conditions necessary for the efficient operation of eletronic equipment and for the comfort of operating personnel housed within the specified vans. It is a completely self-contained, air cooled, electric motor driven unit designed for continuous operation with varying loads. It is equipped with internal ducting to the low aide of the evaporator fan so that ventilation air and air from the chemical and biological filter unit may be supplied by the evaporator fan.

b. Condensing Section. The condensing section, located at the bottom of the unit. contains the hermetically sealed compressor, condensing coil, condenser air intake opening, condenser air discharge opening, control panel, junction box, thermostatic switch, power receptacle connector, condenser fan, fan motor, filter drier, suction and discharge access fittings, solenoid valve, capacitors (models CV-9-1-15-60 and CV-9-130-60) and high pressure relief valve.

c. Evaporator Section. The evaporator section, located in the top of the unit, contains an evaporator coil, evaporator fan, air conditioning filter, intake and discharge grilles, evaporator coil drain pan, expansion valvs, electrical heaters, sight glass, fan speed relay, hi and lo pressure switches, solenoid valve, expansion valve, liquid line quench valves, hot gas bypass regulator valve, and a damper to regulate the amount of outdoor air entering the air conditioner.

Figure 1-1. Air conditioner, left front three-quarter view, with shipping dimsions.

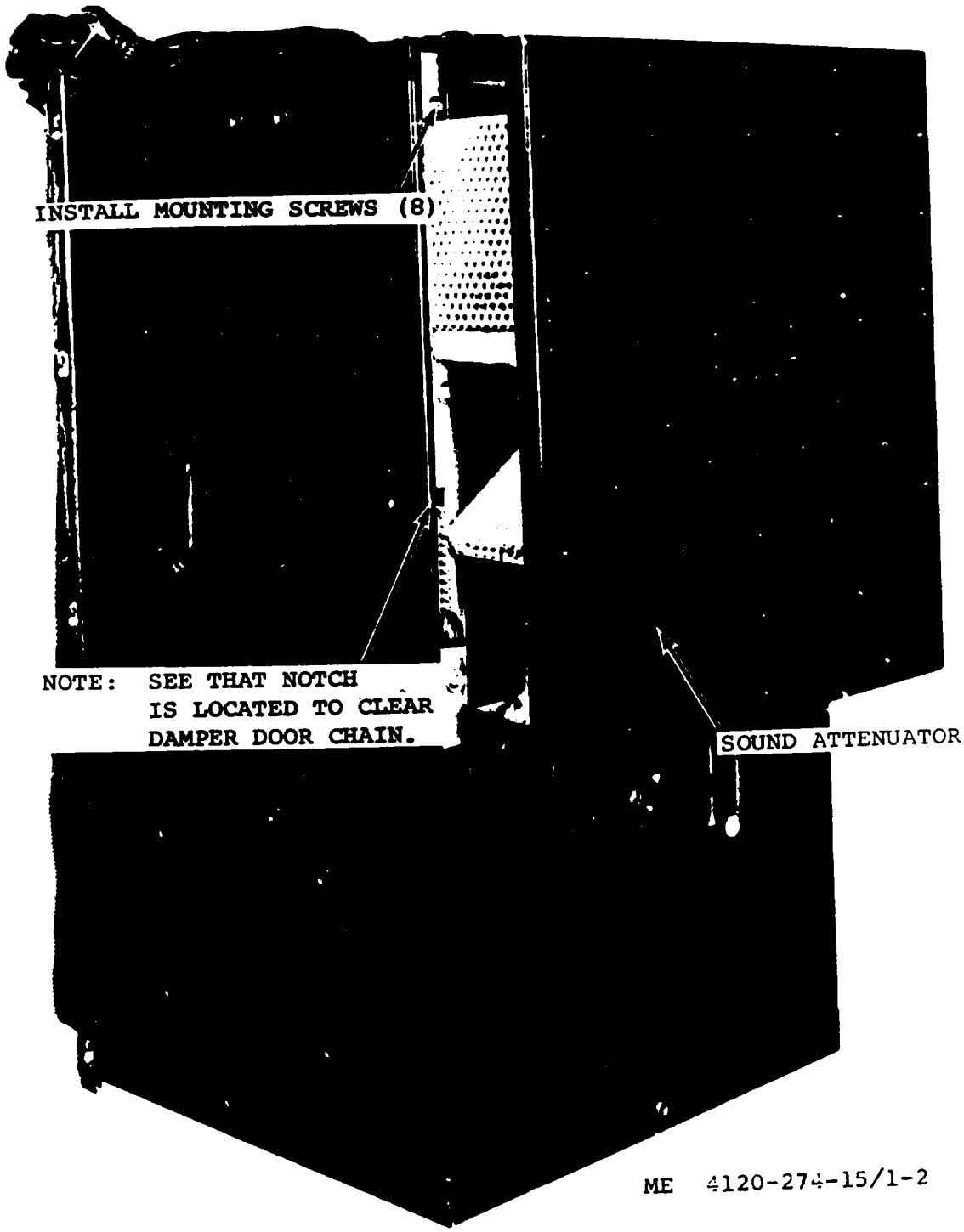
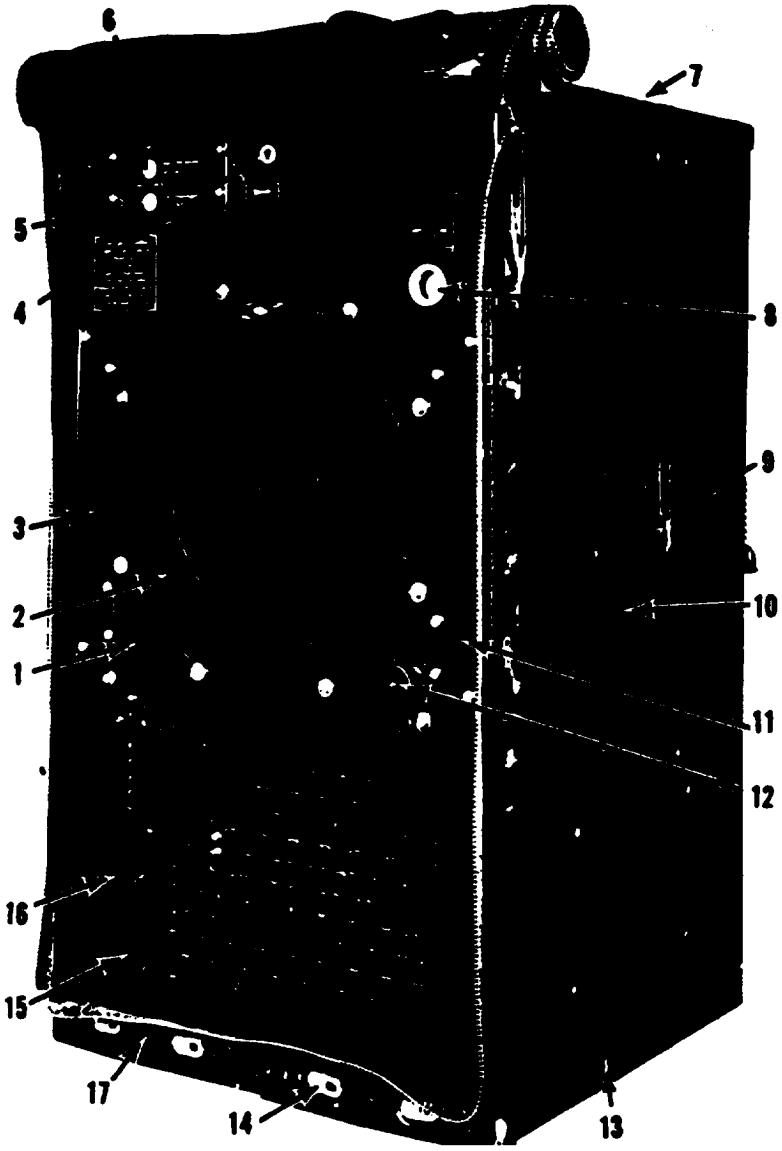


Figure 1-2. Air conditioner, right front three-quarter view with sound attenuator.



1. OUTSIDE AIR THERMOSTAT
2. FAN GUARD
3. CB COVER
4. ADDITIONAL FASTENING DEVICE
5. LOW PRESSURE CUT-OUT SWITCH
6. HIGH PRESSURE CUT-OUT SWITCH
7. COVER PANEL
8. SIGHT GLASS
9. HANDLE
10. CASING
11. FRESH AIR INLET SCREEN
12. POWER RECEPTACLE CONNECTOR
13. DRAIN PLUG (4)
14. COVER FASTENING HARDWARE
15. CONDENSER COIL
16. CONDENSER SCREEN
17. CANVAS CONDENSER COVER

ME 4120-274-15/1-3

Figure 1-3. Air conditioner, right rear three-quarter view.

1-4. Identification and Tabulated Data

a. Identification. The air conditioning units have three major nameplates. The information on these plates is listed below.

(1) *Model* CV-9-l-30-60.

(a) Manufacturer's identification plate.

Located on top of unit.
Title ----------.Air Conditioner. Vertical, Compact, 9,000 BTU/HR. 230 Volt, Single Phase, 60 Cycle,
Part No. ----------97403 13214E3800
FSN ----------4120-935-1612
Manufacturer ---------- Redmanson Corporation
Contract No. ----------DAAK-01-67-C-1040
Serial No. ----------664276, 664280, 664380 thru 664727
Weight ----------177 lbs.
Refrigerant ---------- 22
Refrigerant charge --------53 oz.

(b) *Motor identification plate.*

Located on motor.
Model ----------_4730-9
Manufacturer ---------- Welco Industries Inc. Cincinnati, Ohio
H.P. ---------- 86, .10
RPM ----------3450, 1770
Frame ----------4730-9
Volts ---------- 230
Phase ----------1
Cycles ---------- 60
FLA ----------4.0, .7
LRA ----------.13.5, 2.0
Thermal Protection
Rating ----------Cont

(c) Compressor *identification plate.*

Manufacturer ---------- whirlpool Corporation Evansville, Indiana
Model No. ---------- WHP-622H-9-230-1
Oil charge ----------17 oz.
Oil type ---------- Texaco Capella D
Refrigerant ---------- 22
FLA ----------9
LRA ----------46
Ultimate trip ----------12.5 Amps
Circuit breaker ----------47587

(2) *Model* CV-9-3-08-400.

(a) Manufacturer's identification plate.

Located on top of unit.
Title ---------- Air Conditioner, Vertical, Compact, 9000 BTU/HR. 208 Volts, 3 Phase, 400 Cycle
Part No. ----------97403-13214E3650
FSN ----------4120-935-1610
Manufacturer ---------- Redmanson Corporation
Contract No. ---------- DAAK-01-67-C-1040
Serial No. ----------664275, 664281, 664826 thru 664873 and 6703997 thru 6704235
Weight ----------160 lbs.
Refrigerant ----------22
Refrigerant charge -------53 oz.

(b) Motor identification plate.

Model ----------4720-16
Manufacturer ---------- Welco Industries Inc. Cincinnati, Ohio
H.P. ----------1.14, .15
Frame ----------4720-17
Rating ----------Cont.
FLA ----------5.64, 3.8
LRA ----------12.0, 4.0
Volts ---------- 208
Phase ----------3
Cycles ---------- 400

(c) *Compressor* identification *plate.*

Model No. ----------WHP-422H-9-208-3
Manufacturer ---------- Whirlpool Corporation Evansville, Indiana
Oil charge ----------17 oz.
Oil type ----------Texas Capella D
Refrigerant ---------- 22
FLA ----------9
LRA ----------31
Ultimate trip ---------- 11.8 Amps
Circuit breaker ----------475861

(3) *Model* CV-9-1-15-60.

(a) Manufacturer's identification plate.

Located on top of unit.
Title ----------Air Conditioner, Vertical, Compact, 9000 BTU/HR. 115 Volts Single Phase, 60 cycles.
Part No. ----------9703-13214E3700
FSN ----------4120-935-1609
Manufacturer ---------- Redmanson Corporation
Contract No. ---------- DAAK-01-67-C-1040
Serial No. ----------664277, 664278, 6655282 thru 664379
Weight ----------171 lbs.
Refrigerant ----------22
Refrigerant charge --------53 oz.

(b) Motor identification plate.

Model ----------4730-18
Manufacturer ---------- Welco Industries Cincinnati, Ohio
H.P. ----------86, .10
RPM ---------- 3450, 1735
Frame ----------4730-18
Volts ---------- 115
Phasa ----------1
Cycles ---------- 60
FLA ----------2.0, 1,4
LRA ----------24.0, 4.0
Rating ----------Cont.
Thermal Protection

(c) Compressor identification plate.

Manufacturer ----------Whirlpool Corporation Evansville, Indiana

Model.----------WHP-622H-9-115-1
Oil charge ----------17 oz.
Oil type ----------Texaco Capella D
Refrigerant----------22
F L A - - - - - - - - - - - - 18
LRA----------83
Ultimate trip----------21.5 Amps
Circuit breaker ----------475856

(4) *Model* CV-9-3-08-60.

(a) Manufacturer identification plate.

Location top of unit
Title ----------Air Conditioner, Vertical, Compact, 9000 BTU/HR. 208 volts 3 Phase, 60 Cycle
Part No.----------97403 13214E3750
FSN ----------4120-935-1611
Manufacturer ----------Redmanson Corportion
Contract No. ---------- DAAK-01-67-C-1040
Weight ----------165 lbs.
Refrigerant ----------22
Refrigerant charge ----------53 oz.

(b) Motor identification plate.

Located on motor.
Model ----------4720-17
Manufacturer ---------- Welco Industries Inc. Evansville, Indiana
H.P. ----------.86, .10
RPM ---------- 3450, 1770
Frame ----------4720-17
Volts ---------- 208
Phase ----------3
Cycles----------60
FLA ----------3.5, 0.65
LRA ----------13.0, 3.0
Rating ----------Cont.
Thermal protection

(c) Compressor identification plate.

Manufacturer ----------Whirlpool Corporation Evansville, Indiana
Model No. ----------WHP-622H-9-208-3
Oil charge ----------1702
Oil type ----------Texaco Capella D
Refrigerant----------22
FLA ----------6
LRA ----------34.5
Ultimate trip ----------8.5 Amps
Circuit breaker ----------475355

b. Tabulated Data.

(1) *Model CV-9-1-30-60.*

(a) Air conditioner.

Manufacturer ---------- Redmanson Corporation
Model ----------CV-9-1-30-60
Class ----------1
Serial No. ----------664374-664723
FSN ----------4120-935-1608
Weight ----------177 lbs.

(b) Compressor.

Manufacturer ----------Whirlpool Corporation Evansville, Indiana
Type ---------- Hermetic
Model ---------- WHP-622H-9-230-1
Capacity ----------9,000 BTU/HB

(c) Motor.

Manufacturer ---------- Welco Industries Inc. Cincinnati, Ohio
Type ---------- Open
Model ----------4730-9

(d) Evaporator coil.

Manufacturer ---------- Bohn Aluminum and Brass Company
Type ---------- Copper tubes expanded into aluminum fins.

(e) Condenser coil.

Manufacturer _____Bohn Aluminum and Brass Company
Type ----------Copper tube expanded into aluminum fins

(f) Air filter.

Manufacturer ----------Reserch Products Madison, Wisconsin
Model ----------X-5387
Type ----------Permanent

(g) *Dimensions and weight.*

Length ----------17 inches
Width ----------17 inches
Height ----------32 inches
Weight ----------177 lbs.

(h) Wiring Diagram. Refer to figure 1-5.

(i) *Base Plan.* Refer to figure 1-4.

(2) Model CV-9-3-08-400.

(a) Air conditioner.

Manufacturer ----------Redmanson Corporation
Model ----------CV-9-3-08-400
Class ----------1
Serial No. ----------664824 thru 664873 6703997 thru 6704235
FSN ----------9120-935-1610
Weight ----------160 lbs.

(b) Compressor.

Manufacturer ----------Whirlpool Corporation
Type ---------- Hermetic
Model ----------WHP-422H-9-208-3
Capacity _____-_9000 BTU/HR

(c) *Motor.*

Manufacturer ---------- Welco Industries
Model ----------4720-16

(d) Evaporator coil.

Manufacturer ---------Bohn Aluminum and Brass Company
Type ----------Copper tubes expanded into aluminum fins.

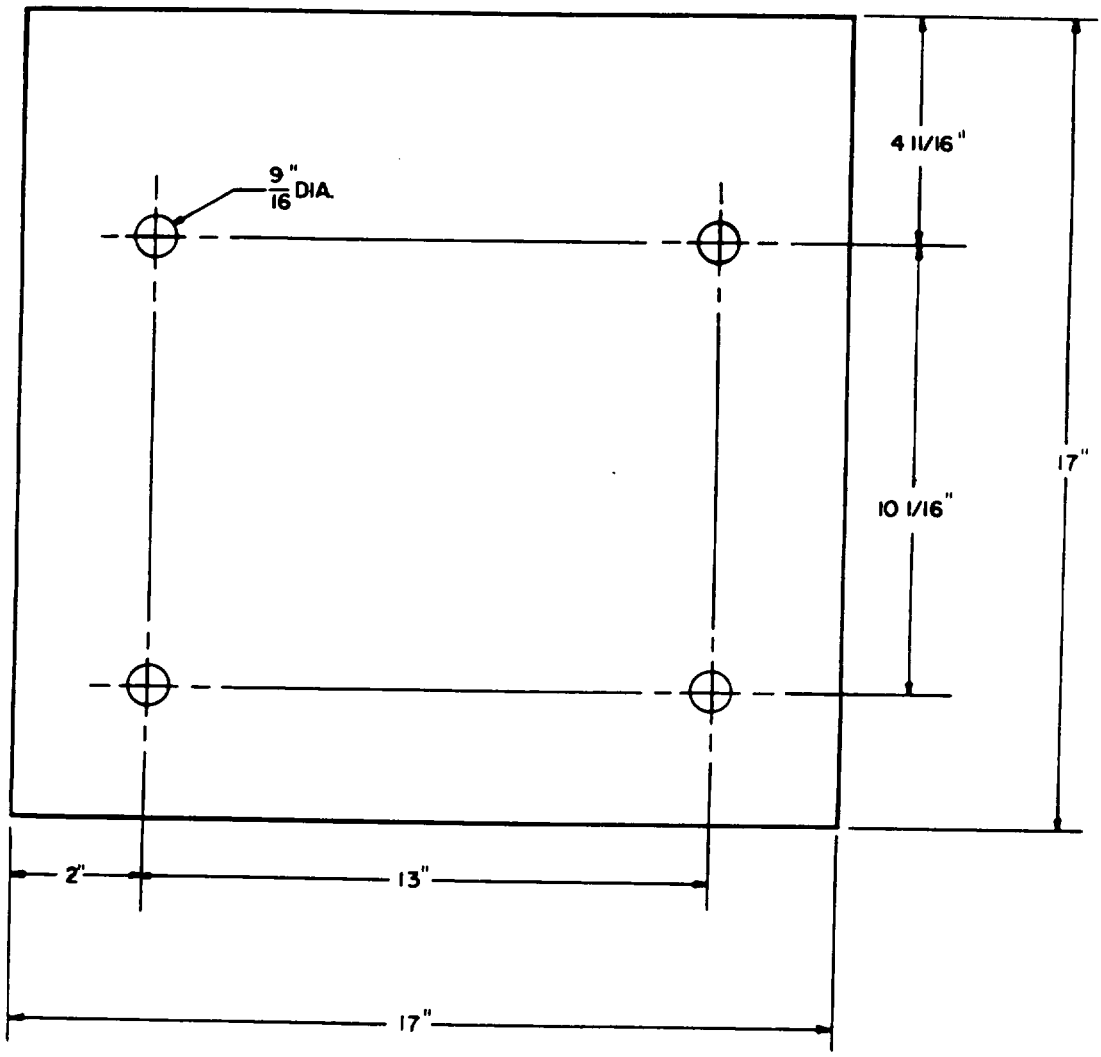


Figure 1-4. Base plan.

(e) *Condenser coil.*

Manufacturer ---------- Bohn Aluminum and Brass Company
Type ----------Copper tubes expanded into aluminum fins

(f) *Air filter.*

Manufacturer ----------Research Products
Model ----------X-5387
Type ----------Permanent

(g) Dimension and weight.

Length ----------17 inches
Width ----------17 inches
Height ----------32 inches
Weight ----------160 lbs.

(h) Wiring diagram. Refer to figure 1-5.

(i) *Base plan.* Refer to figure 1-4.

(3) *Model CV-9-3-08-60.*

(a) *Air* conditioner.

Manufacturer ---------- Redmanson Corporation
Model ----------CV-9-3-08-60
Class ---------- 1
Serial No. ----------664724 thru 664823
FSN ----------4120-935-1611
Weight ----------165 lbs.

(b) Compressor.

Manufacturer ---------- Whirlpool Corporation
Type ----------Hermetic

Model ----------WHP-622H9-208-3
Capacity ----------9000 BTU/HR

(C) *Motor—4720-17.*

Manufacturer ---------- Welco Industries Inc.
Cincinnati, Ohio
Type ----------Open
Model ----------4720-17

(d) Evaporator coil.

Manufacturer ----------Bohn Aluminum and Brass Company
Type ----------Copper tubes expanded into aluminum fins.

(e) *Condenser coil.*

Manufacturer ----------Bohn Aluminum and Brass Company
Type ----------Copper tubes expanded into aluminum fins

(f) *Air Filter.*

Manufacturer ----------Research Products
Madison, Wisconsin
Model ----------X-5387
Type ---------- Permanent

(g) Dimensions and Weight.

Length ----------17 inches
Width ----------17 inches
Height ----------32 inches
Weight ----------165 lbs.

(h) Wiring Diagram. Refer to figure 1-5.

(i) Base *Plan.* Refer to figure 1-4.

(4) *Model* CV-9-1-15-60.

(a) *Air conditioner.*

Manufacturer ---------- Redmanson Corporation
Model ----------CV-9-1-30-60
Class ---------- 1
Serial No. ----------664277, 664278, 664384 thru 664727
FSN ----------4120-935-1609

(b) *Compressor.*

Manufacturer ---------- Whirlpool Corporation
Type ----------Hermetic
Model ---------- WHP-22H9-1150-1
Capacity ----------9,000 BTU

(c) *Motor.*

Manufacturer ---------- Welco Industries
Type ----------Open
Model ----------4730-18

(d) Evaporator coil.

Manufacturer ---------- Bohn Aluminum and Brass Company
Type ----------Copper tubes expanded into aluminum fins

(e) *Condenser coil.*

Manufacturer ---------- Bohn Aluminum and Brass Company
Type ----------Copper tubes expanded into aluminum fins

(f) *Air filter.*

Manufacturer ---------- Research Products
Model ----------X-5387
Type ---------- Permanent

(g) *Dimensions and Weight.*

Length ----------17 inches
Width ----------17 inches
Height ----------32 inches
Weight ----------171 lbs.

(h) *Wiring diagram.* Refer to figure 1-5.

(i) Base plan Refer to figure 1-4.

1-5. Difference in Models

This manual covers the Redmanson Corporation models CV–9-1-30-60 (serial nos. 664276, 664280, 664380 thru 664727) CV-9-3-08-400 (serial nos. 664275, 664281, 664826 thru 664873, 6703997 thru 6704235) CV-9-3-08-60 (serial NOS. 664274, 664279, 664728 thru 664825) CV-9-1-15-60 (serial Nos. 664277, 664278, 664282 thru 664379). The differences occuring in the units are in the electrical systems, compressors, and motors. Where differences exist, each model is covered separately in appropriate sections of this manual. The single phase units (CV-9-1-15-60 and CV-9–1-30-60) have capacitors in the electrical system. The three phase units (CV-9-3-08-400 and CV–9-3-08-60) have 2 fan relays and a phase sequence relay. The single phase units have one fan relay and no phase sequence relay. The electric motors and compressors in the different models run on different electric current.

Figure *1-5 (1). Wiring diagram*
(Located in back of manual)

Figure *1-5* (2)-Continued.
(Located in back of manual)

Figure 1-5 (3)-Continued.
(Loc.ated in back of manual)

Figure 1-5 (4)-Continued.
(Located in back of manual)

Figure 1-6 (1). Wiring schematic.
(Located in back of manual)

Figure 1-6 (2)-Continued.
(Located in back of manual)

Figvre 1-6 (3)-Continued.
(Located in back of manual)

Figure 1-6 (4)-Continued.
(Located in back of manual)

CHAPTER 2

INSTALLATION AND OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Unloading the Equipment

a. Remove any blocking or tiedowns that may have been used to secure the item to carrier. The air conditioner is shipped in a wooden carton, the base of which is raised to provide for insertion of bongs of a forklift.

b. Use a forklift or other suitable lifting device to remove unit from carrier. If necessary, the unit may be unloaded manually.

Caution: Use care in handling **to** avoid damaging the air conditioner.

2-2. Unpacking the Equipment

a. General. Move air conditioner to installation site before removing shipping container. Cut the metal bands and remove top, end, and sides of carton, and the Kimpak covering. Remove bolts securing base of unit to carton, and wing the handles, lift unit from carton.

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

2-3. Inspecting and Servicing Equipment

a. Perform daily preventive maintenance services (fig. 3-1).

b. Perform quarterly preventive maintenance service (fig. 3-2).

c. Inspect entire air conditioner for signs of damage, paying particular attention to evaporator and condenser roils.

d. The air conditioner contains a full operating charge of refrigerant and compressor oil. No further service is required.

2-4. Installation of Separately Packed Components

a. General. The air conditioner is basically a self-contained unit, however, in certain installations it may become desirable to utilize the sound attnuator and/or the blockoff plate with an electrical receptacle, and use a remote control box.

b. Sound Attenuator. The sound attenuator will provide a sound dampening effect and is mounted on the front of the air conditioner (fig. 1-2). The sound attenuator replaces the air intake and discharge grilles and air is taken in and discharged through the attenuator baffles. Air is taken in through the bottom and discharged through the top of the attenuator. Refer to figure 1-2, and install the sound attenuator as follows:

(1) Remove the intake and discharge grilles (fig. 3-4, 3-5).

(2) Place the sound attenuator in position on the front of the unit by alining the grille mounting holes with the attenuator mounting holes.

Note. Make sure that the notched edge of the attenutor frame matches the damper door control chain **location.**

(3) Install the mounting bolts.

(4) Store the grilles so as to avoid possible damage.

Caution: The use of the sound attenuator may result in reduced capacity.

c. *Blockoff Plate.* The blockoff plate is pro vided for installation when the controls are removed for control operation. The blockoff plate provided must be used so that no air will enter the lower compartment. Refer to figure 2-1 and install the blockoff plate.

2-5. Installation or Setting-Up Instructions

a. General. Set air conditioner in a level position to allow proper condensate draining (operation will be satisfactory with unit sitting at a slight angle (5° maximum) and using one of the alternate drain connections).

b. Locating the Unit. The front access panel and discharge and intake grilles are removable for normal service and maintenance, and must always be unobstructed to allow sufficient air for con-

densing purpose. The discharge and intake openings at front of unit should be free from obstruction to permit maximum unit capacity.

Note. Remove discharge and intake grilles and filter, if unit is to be used with ducts carrying air to and from the conditioned space. Install grilles and filter in the duct.

Note. Remove the CB inlet cover (fig. 3-4) if a chemical and biological filter unit is to be attached to the unit.

c. Installing Unit. Bolt unit to floor or other flat surface. Refer to base plan (fig. 1-4) for dimensions. An additional fastening device (fig. 1-3) is located on the upper rear side for additional mounting rigidity if required. Connect drain hose to drain fitting at bottom of unit to lead condensate away from unit. The units are provided with four drain plugs installed. Remove plug prior to installing the drain hose.

d. Power Sources.

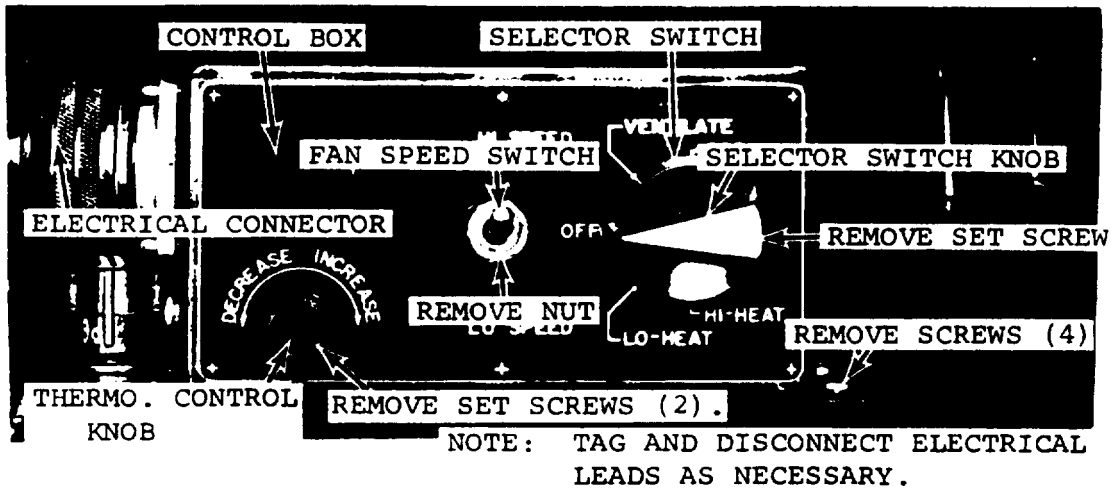
(1) Model CV-9-1-30-60 operates on 230 volts, 60 cycle, single phase power.

(2) Model CV-9-3-08-400 operates on 208 volt, 400 cycle, 3 phase power.

(3) Model CV-9-3-08-60 operates on 208 volt, 60 cycle, 3 phase power.

(4) Model CV-9-1-15-60 operates on 115 volt, 60 cycle, single phase power.

(5) Power receptacle connector. Receptacle is located at rear of unit above the condenser coil air inlet. Connect the proper electrical power supply source to this receptacle using a proper plug

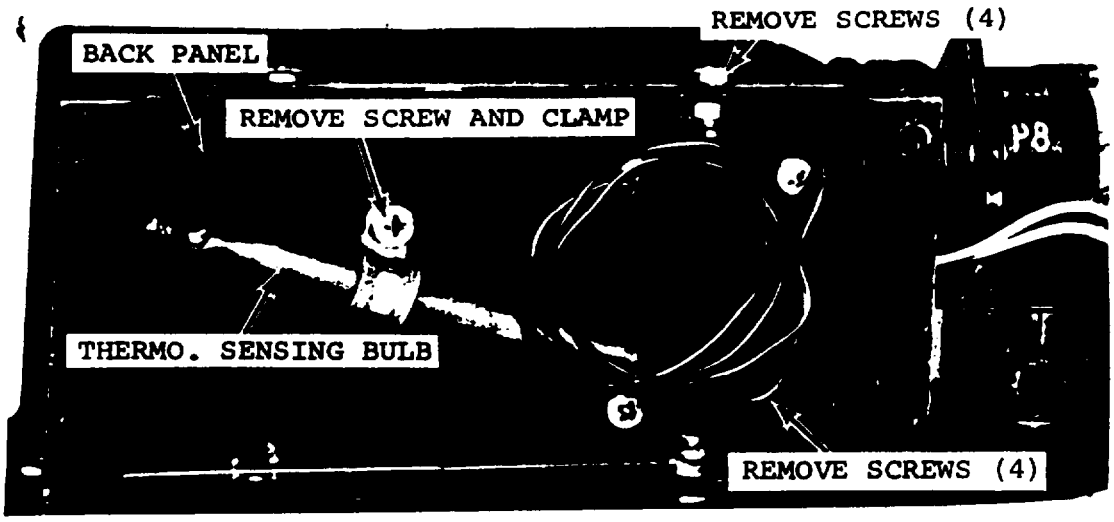


CONTROL PANEL:

STEP 1 - REMOVE THERMOSTAT CONTROL KNOB BY LOOSENING SET SCREW.
STEP 2 - REMOVE NUT FROM FAN SPEED SWITCH .
STEP 3 - REMOVE SELECTOR SWITCH KNOB BY LOOSENING SET SCREWS .
STEP 4 - UNSCREW ELECTRICAL CONNECTOR .
STEP 5 - REMOVE CONTROL BOX BY REMOVING SCREWS (4).

ME 4120-274-15/2-1 ①

Figure 2-1 (1). Control box and controls, block-off plate. thermostat, thermostat sensing bulb and control box back panel removal and installation



THERMOSTAT SENSING BULB:

STEP 1 - REMOVE THERMOSTAT SENSING BULB BY REMOVING SCREW AND CLAMP.
STEP 2 - REMOVE BACK PANEL BY REMOVING SCREWS (4) AND LOCKNUTS (4).
STEP 3 - REMOVE THERMOSTAT BY REMOVING SCREWS (4).

ME 4120-274-15/2-1 (2)

Figure 2-1 (2)-Continued.

or receptacle alternate. Alternate eletrical power connections openings are provided at both sides of the unit and front of the unit, any location may be used by interchanging the power receptacle at rear of unit and one of the cover plates at sides or front of unit. Be sure to attach cover plate over unused location at rear of unit to prevent air from being drawn through the opening.

e. Remote Control.

(1) General. The control box (fig. 2-1) may be removed from the unit and used for remote control operation of the air conditioner. A block-off plate provided must be used when this control box is used as a remote control.

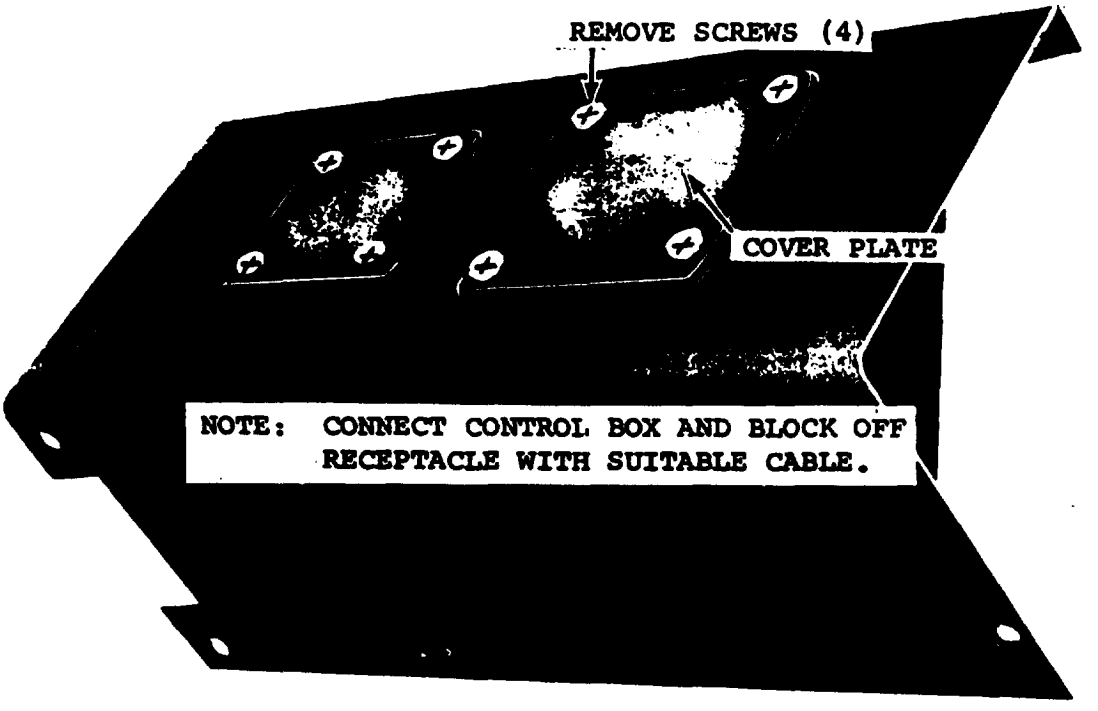
(2) Remote control connection.

(a) Disconnect power source from unit.

(b) Refer to figure 2-1 and set the unit for remote control operation.

2-6. Equipment Conversion

Not Applicable.



BLOCK OFF PLATE:

STEP 1 - REMOVE COVER PLATE FROM BLOCK OFF PLATE AND INSTALL ELECTRICAL CONNECTOR FROM REAR, SECURE WITH SCREWS (4).
STEP 2 - REPLACE CONTROL BOX WITH BLOCK OFF PLATE AND SECURE WITH SCREWS (4).

ME 4120-274-15/2-1 (3)

Figure 2-1 (3)-Continued.

Section II. MOVEMENT TO NEW WORKSITE

2-7. Dismantling for Movement

a. General.

(1) Shut off electrical power supply to air conditioner and disconnect power cable from unit.

(2) Disconnect drain hose from unit

Note. Disconnect all duct work and remote control cable if used with unit.

(3) Unbolt unit from mounting surface.

b. Short distance movement. Use a forklift and lift unit at base, or carry unit to new worksite using the recessed handles at aides of unit.

c. Long distance movement. Crate the air conditioner, providing adequate protection to grilles and control box. Refer to TM 38-250 for instruction in crate fabrication. Provide suitable blocking and tiedowns to prevent unit from shifting during transfer.

2-8. Reinstallation after Movement

Reinstall the air conditioner as instructed in paragraph 2-5.

Section III. CONTROLS AND INSTRUMENTS

2-9. General

This salon describes, locates, illustrates, and furnishes the operator, crew or organizational maintenance personnel sufficient information about the various controls and instruments for proper operation of the air conditioner.

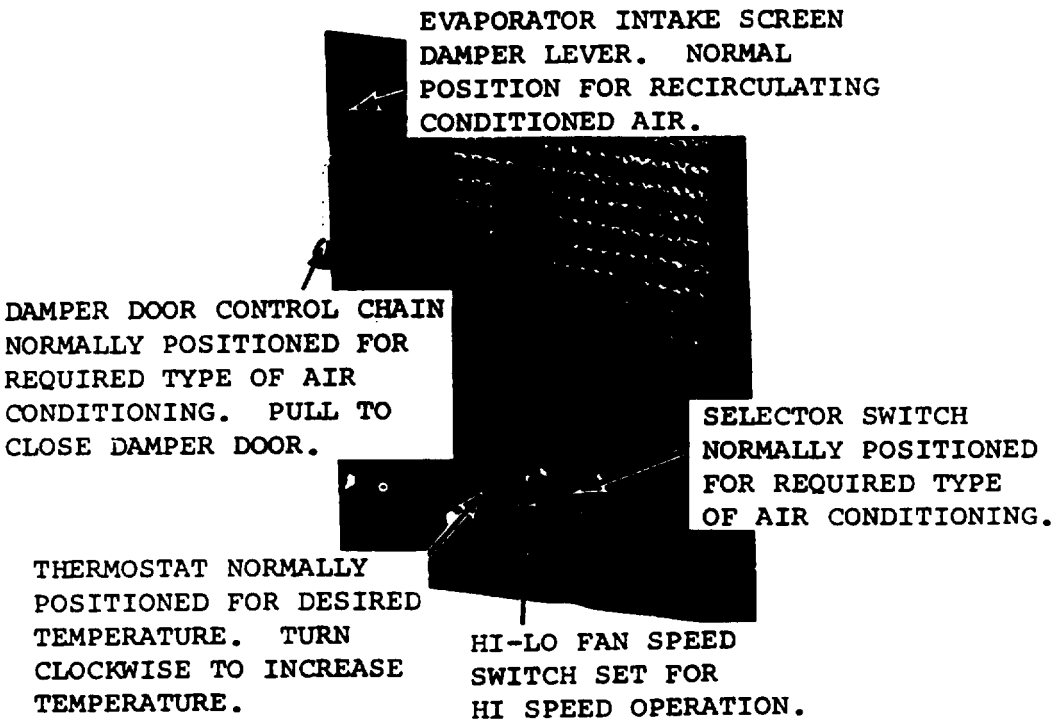
2-10. Controls and Instruments

a. General. The purpose of Controls and instruments and their normal and maximum readings are illustrated in figure 2-2.

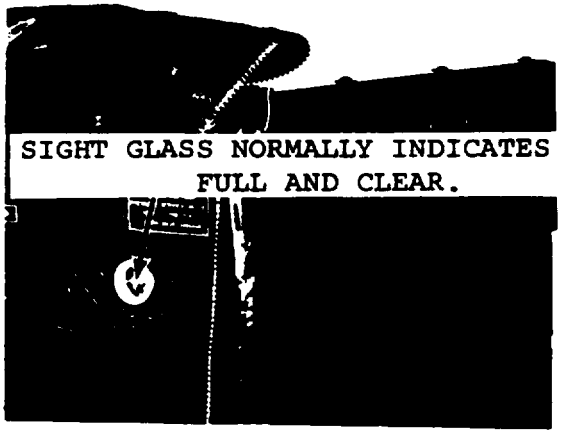
b. High Pressure Cutout Control. The high pressure cutout located at the upper left rear of the unit (fig. 1-3) is designed to sense line pressure from the compressor and will cutout at 445 psig (pounds per square inch gage). When the line pressure has reduced to 400 psig, the high pressure cutout control can be reset by pushing the reset button (fig. 3-13).

c. Low Pressure Cutout Control. The low pressure cutout located at the upper left rear of the unit (fig. 1-3) is designed to sense line pressure from the compressor and will cutout at 25 psig pounds per square inch gage. When the line pressure has increased to 50 psig, the low pressure cutout control can be reset by pushing the reset button (fig. 3-13).

d. Liquid Line Sight Glass. The sight glass (fig. 1-3) indicates dryness of the system. Moisture in the refrigerant is shown by the indicator turning from green to yellow. A shortage of refrigerant is indicated by flash gas in the sight glass.

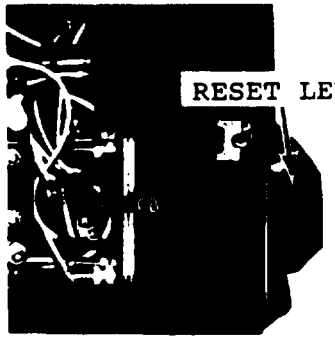


A. CONTROLS



B. SIGHT GLASS

NOTE: PUSH LEVER TO RESET CIRCUIT BREAKER



C. CIRCUIT BREAKER

ME 4120-274-15/2-2

Figure 2-2. Controls and instruments.

Section IV. OPERATION OF EQUIPMENT

2-11. General

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

b. The operator must know how to perform every operation of which the air conditioner is capable. This section gives instructions on starting, stopping, and operating details of the air conditioner. Since nearly every application presents a different problem, the operator may have to vary given procedure to fit the individual job.

2-12. Starting

a. Preparation for *Stating.*

(1) Perform necessary daily preventive maintenance services (fig. 3-1).

(2) Check electrical requirements (pars 2-5d).

b. Starting.

(1) Cooling operation.

(a) Position thermostat for desired temperature.

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

(c) Place selector switch on cool position.

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

(e) For cooling with fresh makeup air, open damper door and partially close intake grille damper.

(f) For cooling with fresh makeup air drawn through chemical biological filter unit when outdoor air is contaminated, close damper door and partially close intake grille damper.

(2) Heating Operation.

(a) Position thermostat for desired temperature.

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

(c) Place selector switch on lo-heat or hi-heat position.

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

(e) For heating with fresh makeup air, open damper door and partially close intake grille damper.

(f) For heating with fressh makeup air drawn through chemical biological filter unit when outdoor air is contaminated, close damper door and partially close intake grille damper.

(3) Ventilating operation.

(a) Place selector switch in ventilate position.

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

(c) For ventilating operation open damper door and close intake grille damper.

Note. If the air conditioner fails to start, open front access panel, and push reset control on circuit breaker (fig. 2-2).

2-13. Stopping

Refer to figure 2-3. Place selector switch in "OFF" position.

2-14. Operation Under Usual Conditions

a. Refer to paragraph 2-12, and start the air conditioner.

b. Refer to figure 2-3 and operate the air conditioner.

2-15. Operation in Extreme Cold

a. General. The air conditioner is designed to operate at a maximum low temperature of 50°F. Be sure that all thermostatic controls and dampers are in working order.

b. Electrical System. Make sure the electrical system is free of ice and moisture.

Caution: Do not disturb the wiring during cold weather unless absolutely necessary. Cold temperatures make wiring and insulation brittle and are l asily broken.

2-16. Operation in Extreme Heat

a. General. The air conditioner is designed to operate satisfactorily at temperatures up to 120°F.

b. Ventilation. Allow sufficient room around the air conditioner for adequate air circulation.

Note. Do not restrict the flow of air at the intake and discharge openings of the unit.

2-17. Operation in Dusty or Sandy Areas

Clean the condenser coil (par 3-55c(2)) and evaporator coil (para 3-54c(2)) weekly or more often if necessary. Clean the air conditioning filter, fresh air inlet filter and condenser screen daily (para 3-9b, 3-20).

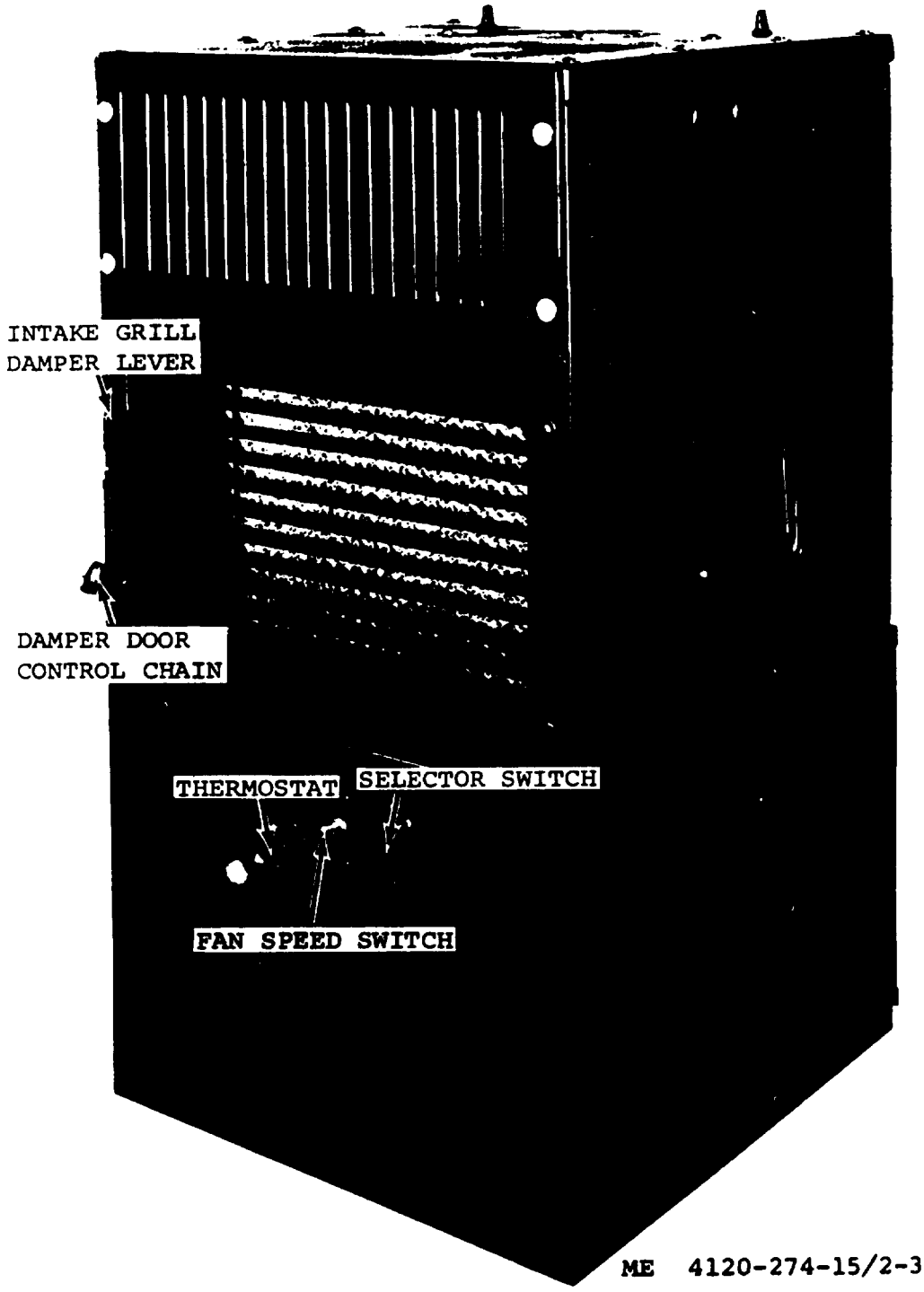


Figure 2-3. Air conditioning unit operation.

2-18. Operation in Salt Water Areas

Wash the exterior of the unit with clean, fresh water at frequent intervals. Do not damage the electrical equipment during the cleaning operation. Coat exposed metal surfaces with rust proofing material. Remove corrosion and paint the exposed metal surface.

2-19. Operation at High Altitudes

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

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR AND ORGANIZATONAL MANTENANCE TOOLS AND EQUIPMENT

3-1. Special Tools and Equipment

No special tools or equipment are required by the operator or organizational maintenance personnel.

3-2. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for the air conditioner are listed in appendix B of this manual.

Section II. LUBRICATION

3-3 General Lubrication Information

All bearings are permanently lubricated.

3-4. Detailed Lubrication Information

(Not applicable)

Section III. PREVENTIVE MAINTENANCE SERVICE

3-5. 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 3-6 and 3-7. The item numbers indicate the sequence of minimum inspection require ments. Defects discovered during operation of the unit will be noted for further correction, to be made as soon as operation has ceased. Stop operation immediate y if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with corretive action take, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

3-6. Daily Preventive Maintenance

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 3-1 for the daily preventive maintenance services.

3-7. Quarterly Preventive Maintenance Services

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

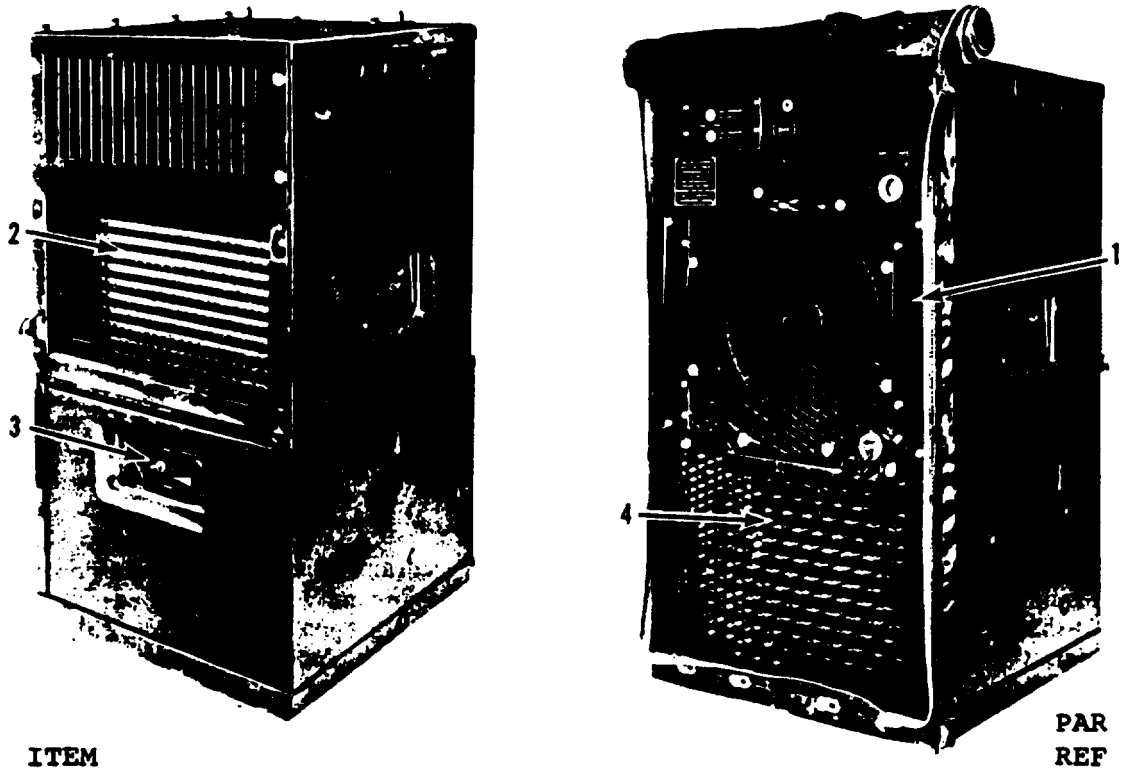
b. The item numbers are listed consecutively and indicate the sequence of minimum requirement. Refer to figure 3-2 for quarterly preventive maintenance services.

PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 5-4120-274-15 **REFRIGERATION UNIT**

REDMANSON MODEL CV-9-1-15-60, CV-9-1-30-60, CV-9-3-08-400, CV-9-3-08-60.



ITEM		PAR REF
1	**AIR FILTER.** Wash and dry fresh air inlet screen.	3-20
2	AIR FILTER. Clean air conditioning filter.	3-9

ME 4120-274-15/3-1 (1)

Figure 3-1 (1). Daily preventive maintenance service

ITEM		PAR REF
3	CONTROLS. Check for damage and improper operation.	2-9
4	CONDENSER SCREEN. Clean condenser screen.	3-18
	NOTE 1. WIRING. Look for broken or loose wires or connections. NOTE 2. REFRIGERANT SYSTEM. Inspect refrigerant hoses and tubing for signs of leakage, abrasions, tearing, kinking, etc.	

ME 4120-274-15/3-1 (2)

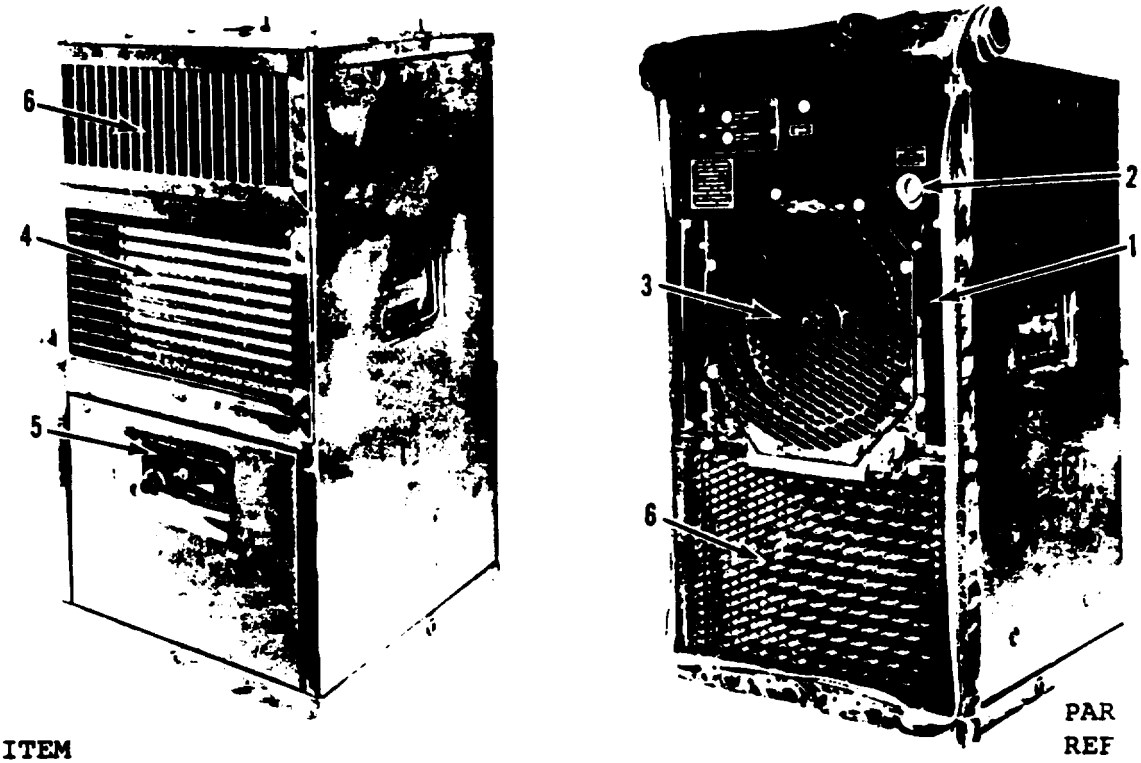
Figure 3-1 (2)-Continued.

PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TM 5-4120-274-15 **REFRIGERATION UNIT**

REDMANSON MODEL CV-9-1-15-60, CV-9-1-30-60, CV-9-3-08-400, CV-9-3-08-60.



ITEM		PAR REF
1	AIR FILTER. Clean and dry fresh air inlet screen. Replace damaged screen.	3-20
2	SIGHT GLASS. Check for damaged or broken glass. Check for full condition of unit.	3-52

ME 4120-274-15/3-2 ①

Figure 3-2 (1). Quarterly preventive maintenance services.

ITEM		PAR REF
3	FAN. Tighten loose mounting. Check for damage. Replace damaged fan.	3-22, 3-23
4	AIR FILTER. Clean air conditioning filter. Replace damaged filter.	3-9
5	CONTROLS. Check for damage and improper operation.	2-9
6	CONDENSER AND EVAPORATOR COILS. Check coil fins for dust, dirt, or foreign matter. Check all tubing connections for signs of leaking or other defects.	3-54, 3-55
	NOTE 1. WIRING. Look for broken or loose wires or connections. NOTE 2. REFRIGERANT SYSTEM. Inspect refrigerant hoses and tubing for signs of leakage, abrasion, tearing, kinking, etc.	

ME 4120-274-15/3-2 (2)

Figure 3-2 (2)-Continued.

Section IV. OPERATOR'S MAINTENANCE

3-8. General

Instructions in this section are published for the information and guidance of the operator to maintain the air conditioner.

3-9. Air Filter inspection and Service

a. *Inspection.*
(1) Remove intake grille (fig. 3-5).
(2) Remove air filter (fig. 3-3).

(3) Inspect filter for dirt.

b. Service.

(1) Wash filter in hot water or approved solution.

(2) Dry with compressed air.

(3) Spray with light coat of cd.

(4) Reinstall air filter into unit

3-10. Inspection of Panels, Grilles and Screens

Refer to figure 3-4 and 3-5 to inspect panels, grilles, and screens.

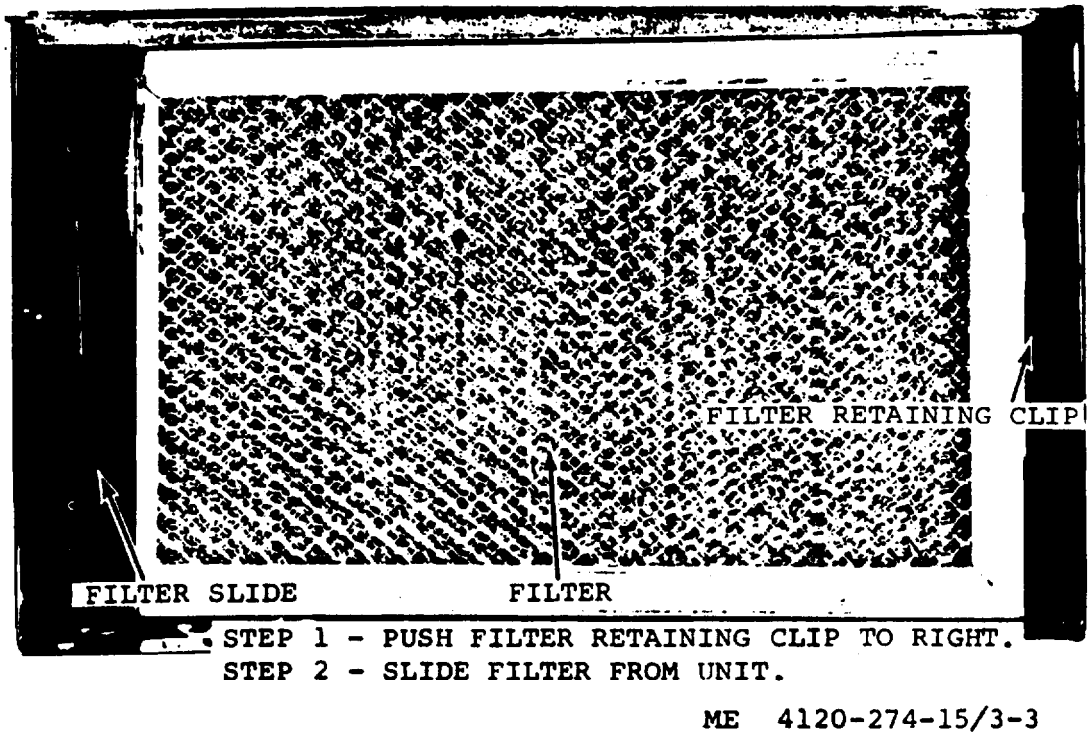


Figure 3-3 Air filter, removal and installation.

Section V. TROUBLESHOOTING

3-11. General

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

3-12. Compressor Fails to Start

Probable cause	Probable remedy
Selector switch improperly set	Set switch to COOL position. (fig. 2-1).
Circuit breaker contracts open	Reset circuit breaker (fig. 2-2).
Contacts of high presure cutout switch or low pressure open	Push reset button to reset cutout switch (fig. 3-13) .

3-13. Compressor Starts but Goes Out on Overload

Probable cause	Probable remedy
Condenser fan not operating	Check motor leads and power line running to motor (para 5-22).
Condenser coil blocked	---Clean condenser coil (para 3-55c(2)).

3-14. Little or no Heating Capacity

Probable cause	Probable remedy
Selector switch improperly set	Set switch to proper setting (fig. 2-3).

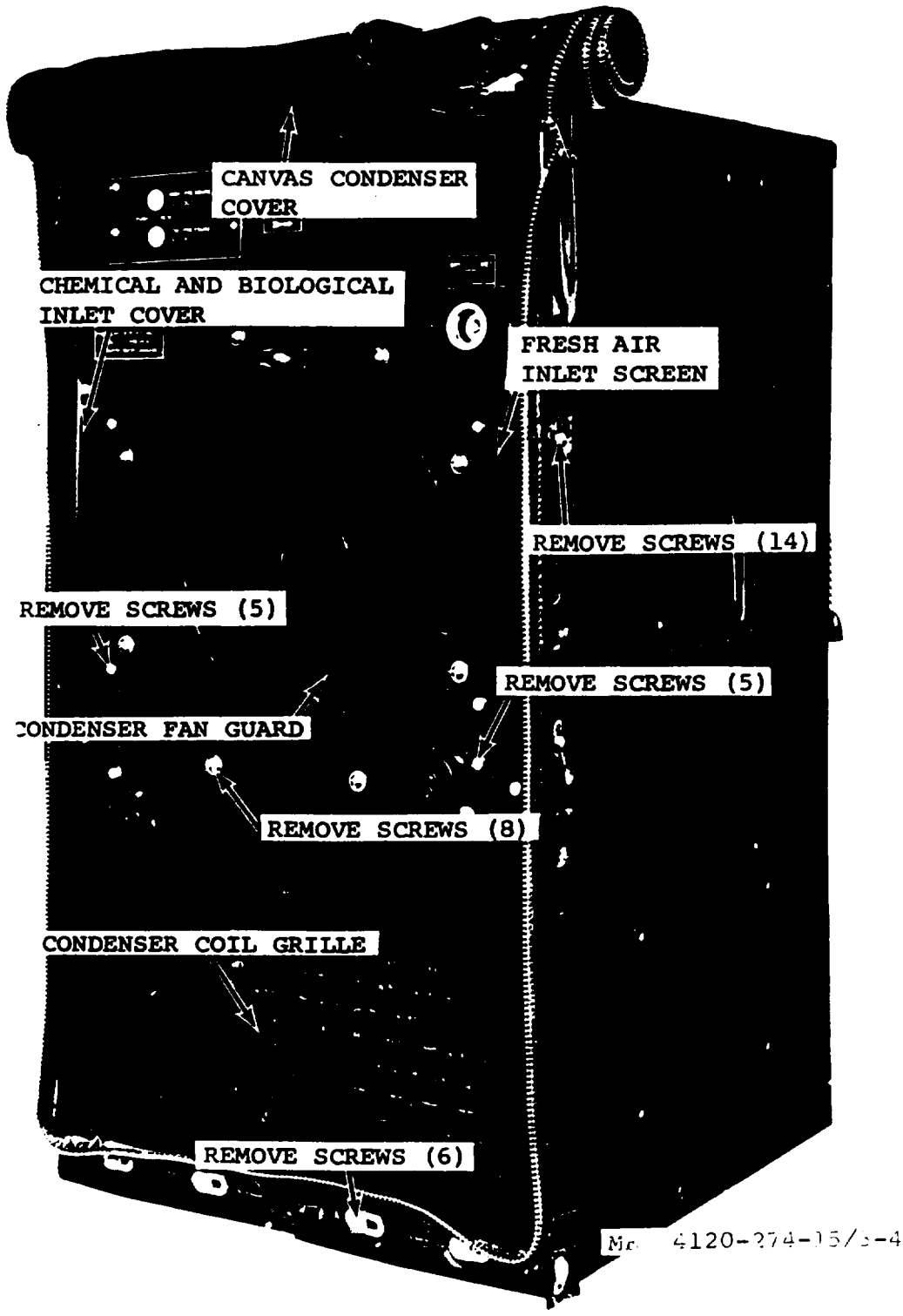


Figure 3-4. *Fresh air inlet screen, chemical and biological inlet cover, cond. fan guard, and condenser coil grille removal and installation.*

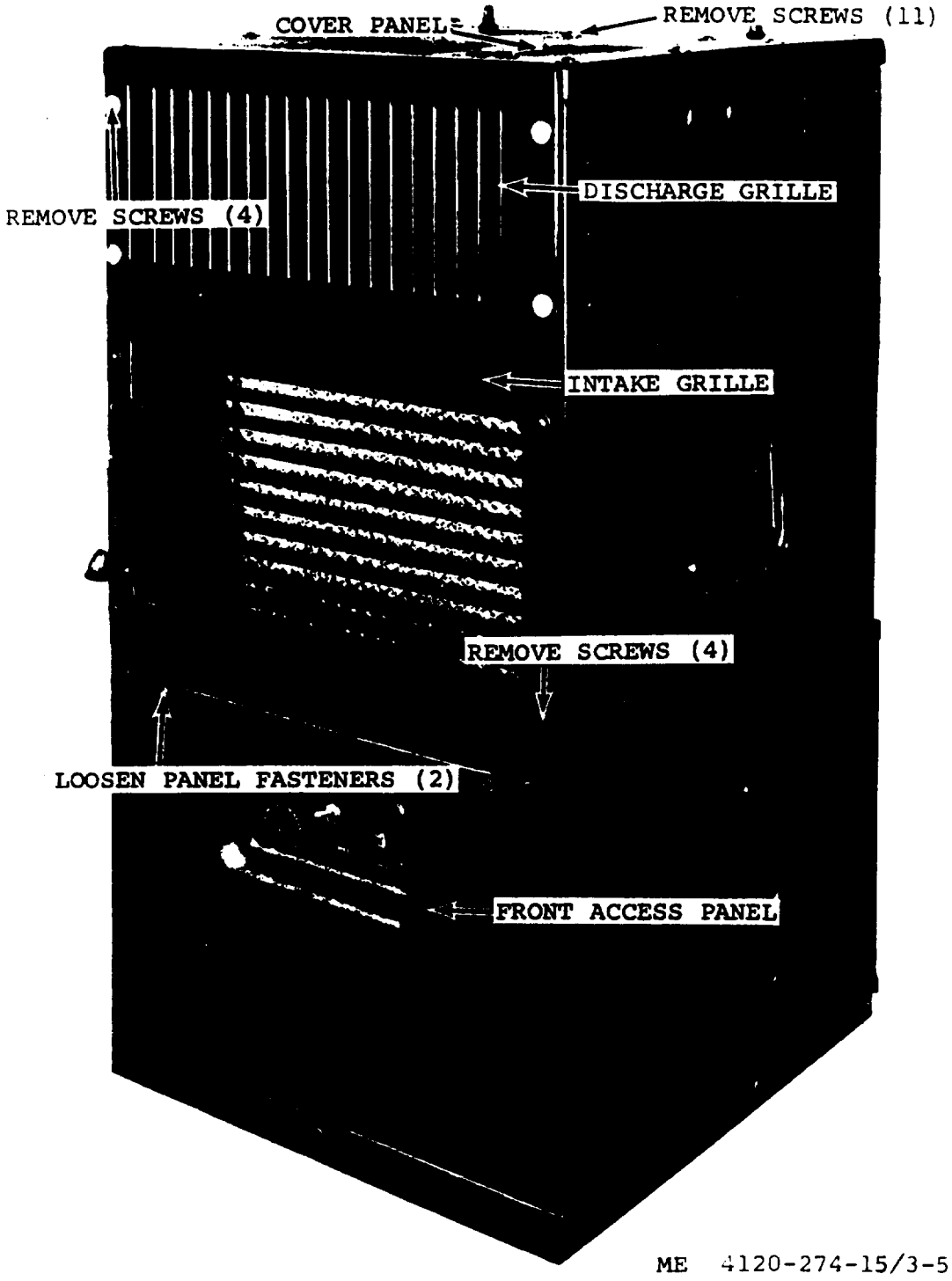


Figure 3-5. Discharge grille, *intake* grille, front access *panel* and cover panel removal and installation

Probable cause	Probable remedy
Air movement over evaporator insuffic.ient	Clean the air filter (para 3-9b).
Burned out heater element (s)	Replace heater element(s) (para 3-39).
Improper electrical connections	Check all heater wiring. (para 5-22).

3-15. Suction Pressure Inadequate

Probable cause	Possible remedy
Low or refrigerant --------	Add refrigerant (para 5-21).
Air temperature in sir conditioned space excessively low	Reset thermostat (fig. 2-3).
Inadequate air across evaporator coil	Check fan for tightness on shaft. Clean evaporator coil (para 3-54c(2)) and filter (para 3-9b).

3-16. Low Suction and Discharge Pressures

Probable cause	Probable remedy
Lack of refrigerant --------	Check eight glass for appearance of flash gas (fig. 3-13). Report low refrigerant charge to direct support maintenance.
Clogged air filter ----------	Clean filter (para 3-9b).

Section VI. HOUSING ASSEMBLY

3-17. General

The air conditioner is constructed with removable aluminum panels. The front access panel provides access to the junction box, control panel, and access fittings. A discharge panel protects the evaporator and controls the direction of discharge of the conditioned air. The intake grille protects the air conditioning filter and regulates the amount of air returned to the unit. The condenser coil grille and fan guard protects the condenser coil and fan. A fresh air inlet screen permits the entry of outside air and is controlled by the damper door with the control spring and chain. The cover panel covers the top of the unit.

Warning: Disconnect the air conditioner from the power source before performing any maintenance on the components of the unit.

3-18. Top Panel, Discharge Grille, Intake Grille, and Front Access Panel

a. Removal. Refer to figure 3-4 and 3–5 and remove panels and grilles.

b. Inspection and Repair. Inspect for minor dents and cracked or chipped paint. Repair minor damage, repaint.

c. Installation. Refer to figure 3-4 and 3-5 to install panels and grilles.

3-19. Canvas Condenser Cover

a. Removal. Remove retaining hardware and lift off cover. Refer to figure 3-4.

b. Inspection and repair. Inspect cover for rips or tears. Repair with water proof tape.

c. *Installation.* Place cover in position and secure with retaining hardware.

3-20. Fresh Air Inlet Screen, Chemical and Biological Inlet Cover, Condenser Fan Guard and Condenser Coil Grille

a. Removal. Refer to figure 3-4, and remove fresh air inlet screen, CB (chemical and biological) inlet cover, condenser fan guard, and condenser coil screen.

b. Inspection. Inspect for dirt of debris clogging grilles or screens.

c. Installation. Install the fresh air inlet screen, CB inlet cover, condenser fan guard, and condenser coil screen (fig. 3-4).

Section VII. GENERAL ORGANIZATIONAL, MAINTENANCE INSTRUCTIONS

3-21. Compressor (fig. 3-6)

Test for continuity across motor windings with multimeter set on OHMS. Refer to the wiring diagrams figure 1-5 to establish points of continuity.

3-22. Evaporator Fan and Inlet Ring

a. General. The Redmanson model CV-9 series air conditioning units are equipped with a centrifugal inclined blade evaporator fan. The air foil fan reduces excessive vibration and noise.

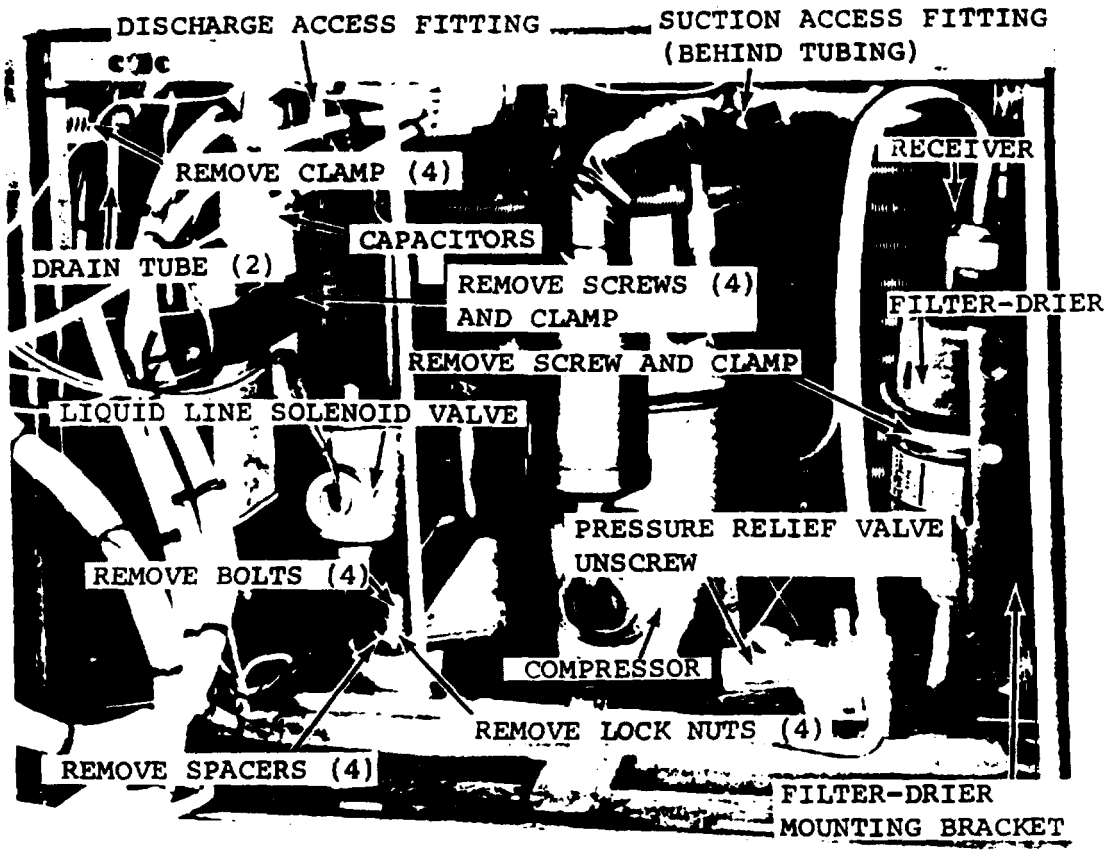


Figure 3-6. Compressor, pressure relief valve, capacitors, liquid line solenoiol valve, remove and installation

b. Removal. Refer to figure 3-7, and remove inlet ring and evaporator fan.

c. *Installation.* Refer to figure 3–7, and install inlet ring and evaporator fan.

3–23. Compressor Fan

a. Removal. Refer to figure 3-8 and remove condenser fan.

b. Inspection. Inspect unit for dents, cracks, bends and chipped paint.

c. Installation. Refer to figure 3-8, and install condenser fan.

3-24. Fan Motor

a. General. The fan motor in the CV-9 series air conditioner drives both the evaporator and condenser fans.

b. Removal. Refer to figure 3-9 and remove motor.

c. *lnspection and Testing.*

(1) Inspect for dents, cracks and broken or damaged leads.

(2) Test for continuity across windings with a multimeter set on OHMS. Refer to the wiring diagram figure 1-5 to establish points for continuity.

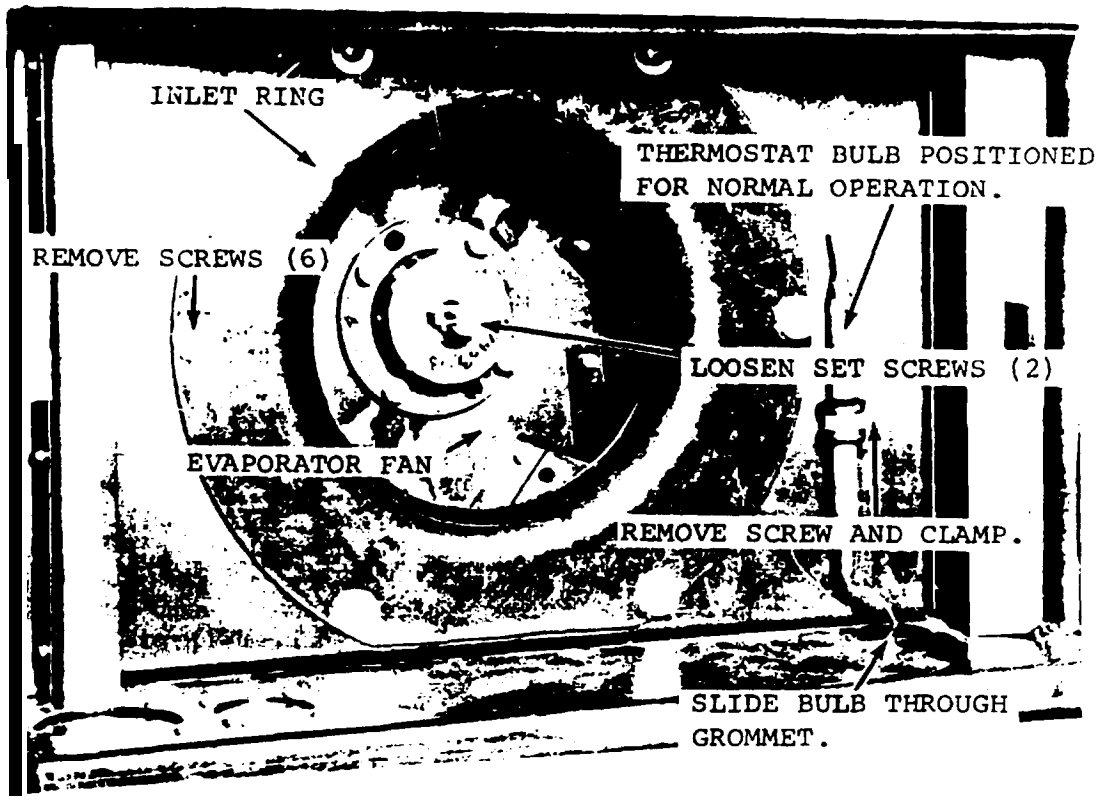


Figure 3-7. Evaporator fan, inlet ring and thermostat sensing bulb removal and installation

d. Installation. Refer to figure 3-9 and install motor.

3-25. CAPACITORS (models CV-9-1-15-60 and CV-9-1-30-60 only)

a. Removal Refer to figure 3-6 and remove capacitors.

b. Inspection and Testing.

(1) Inspect for cracked case and broken or damaged contracts.

(2) Use a multimeter set on OHMS. Refer to wiring diagram figure 1–5. A full reading should be made with a steady return to zero.

c. *Installation.* Refer to figure 3-6 and install capacitors.

3-26. Fan Motor Relays

Note. Models CV-9-1-15-60 and CV-9-1-30-60 have one fan motor relay. Model CV-9-3-08-400 and CV-9-3-08-60 have two fan relays.

a. General. Fan motor relays are located in the top of the unit, figures 3-10, 3-11. A fan motor relay starts the fan motor and controls the high and low speeds.

b. Removal Refer to figure 3-10, 3-11 and remove fan motor relay.

c. *Inspection and testing,*

(1) Inspect for pitted or burned contacts.

(2) Test for continuity across coil with multimeter set on OHMS. Refer to wiring diagram figure 1-4 to establish points for continuity.

d. Installation. Refer to figures 3–10, 3–11 and install relay.

3-27. Diode Surge Protector (models CV-9-3-08-60 and CV-9-3-08-400 only)

a. Removal. Refer to figure 3-11 and remove diode surge protector.

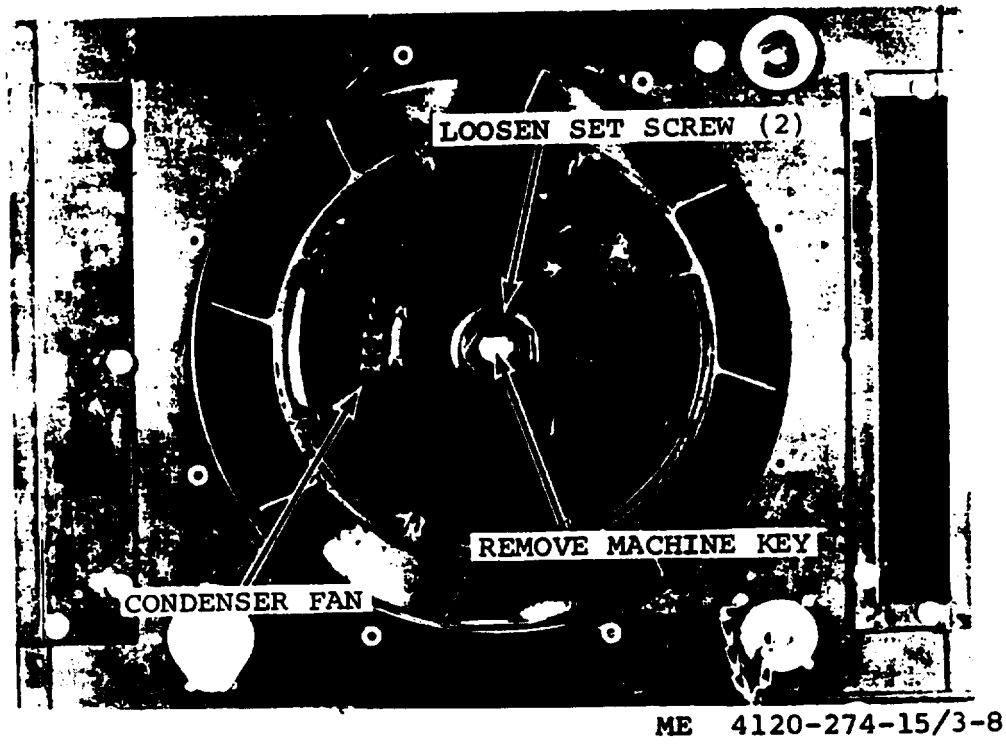


Figure 3-8. Condensr fan removal and istallation.

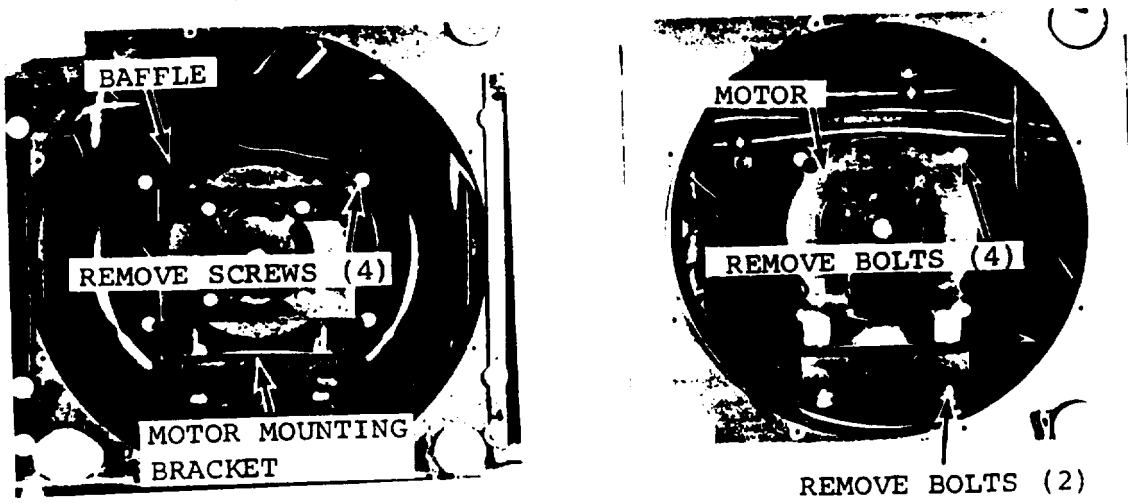


Figure 3-9. Fan motor removal and installation

b. Inspection. Inspect for cracked or broken case.

c. Testing. Test for continuity across protector. Refer to wiring diagram figure 1-5 to establish points for continuity.

d. Installation. Refer to figure 3-11 and install diode surge protector.

3-28. Control Sox

a. General. The control box hoses the selector switch, thermostat, and hi-lo fan speed switch and is mounted on the junction box. The selector switch is a manually operated, five+position switch. Automatic control of both the heasting and cooling cycle is provided by the thermostat. The hi-lo fan speed switch controls the fan speed. The control box may be used in a remote position by utilizing a blockoff plate and a remote control cable, figure 2-1 and 2-1.

b. Inspection. Inspect for loose knobs and switches.

3-29. Selector Switch

a. Removal. Refer to figure 2-1 and remove selector switch.

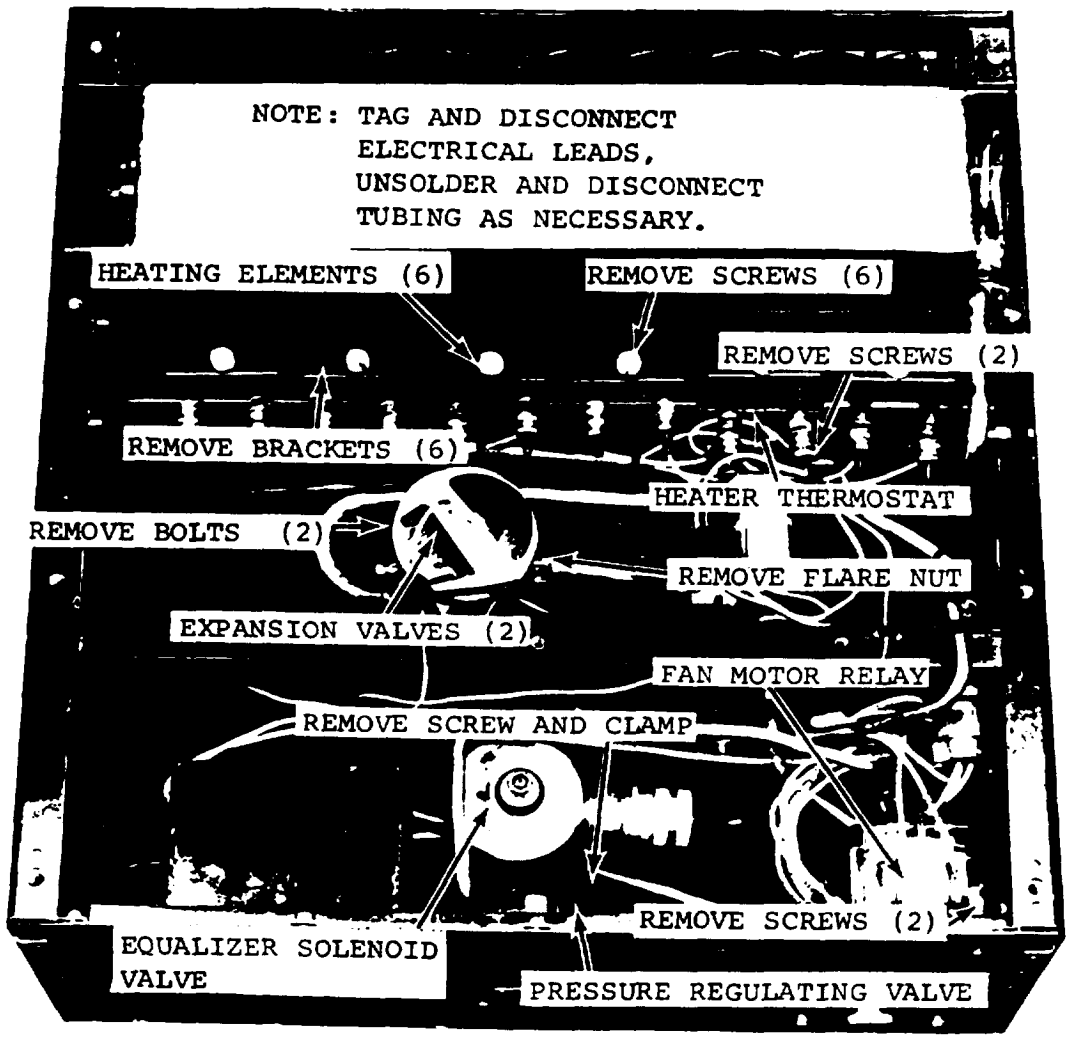


Figure 3-10. Models CV-9-1-15-60 and CV-9-1-30-60, **heating element, expansion valve, fan motor relay, equalizer solenoid** ***valve, presure regulating valve, removal and installation***

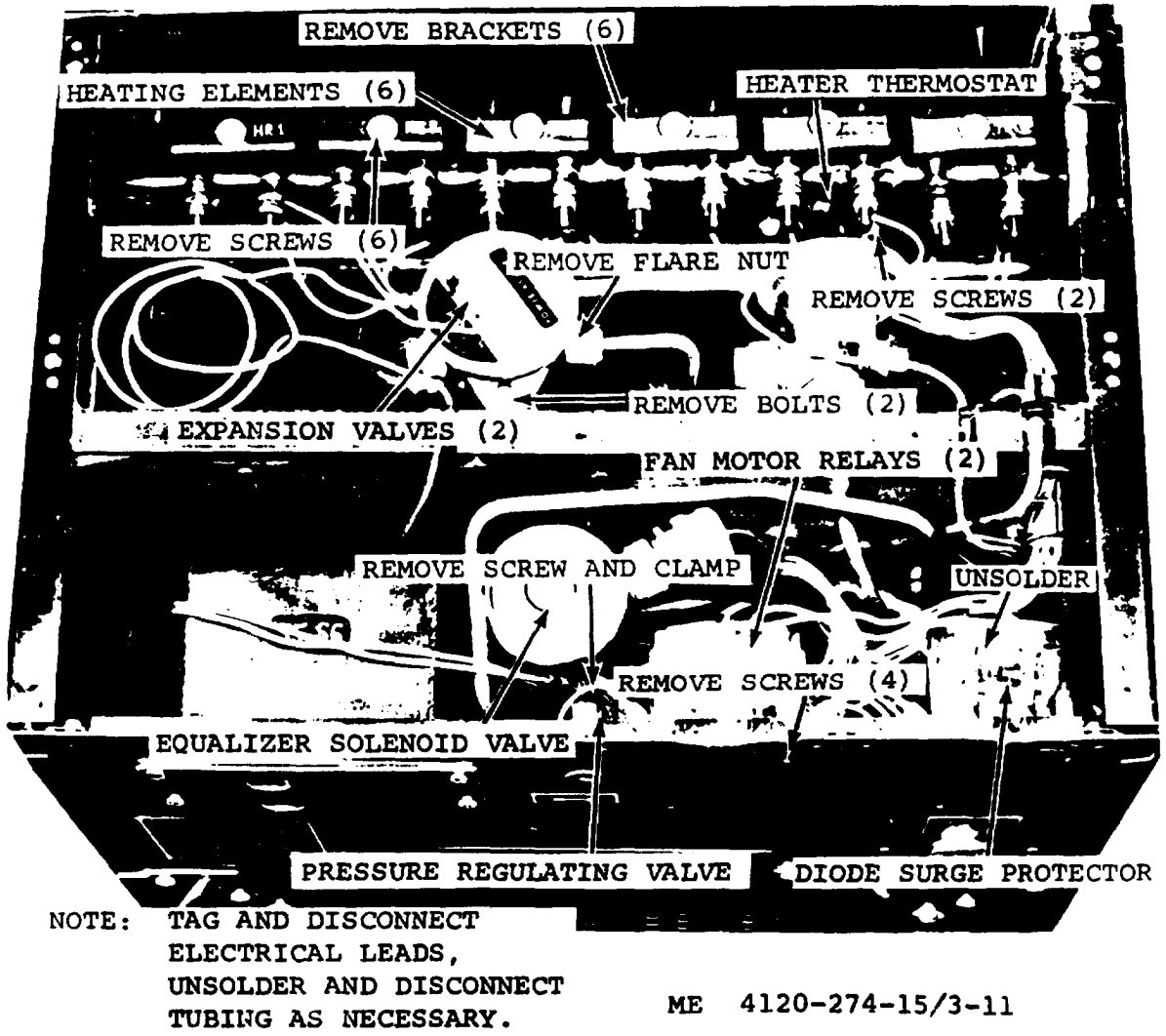


Figure 3-11. Models CV-9-3-08-60 and CV-9-3-08-400, heating element, expansion valve, fan motor relay, equalizer solenoid valve, pressure regulating valve diode surge protector, removal and installation

b. Testing. Test for continuity across coils using multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

c. Installation. Refer to figure 2-1 and install selector switch.

3-30. Hi-Lo fin Speed Switch

a. *Removal.* Refer to figure 2–1 and remove fan speed switch.

b. Testing. Test for continuity. Refer to wiring diagram figure 1-5 to establish points of continuity.

c. Installtion. Refer to figure 2-1 and install fan speed switch.

3-31. Thermostat

a. Removal. Refer to figure 2-1 and remove thermostat.

b. Testing. Test for continuity using multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

c. Installation. Refer to figure 2–1 and install thermostat.

3-32. Junction Box

a. Removal. Refer to figure 3-12 and remove junction box.

b. Installation. Refer to figure 3-12 and install junction box.

3-33. Fuses

a. *Removal.* Refer to figure 3-12 and remove fuses from holders located in junction box.

b. Inspection and Testing.

(1) Inspect for cracked or broken case.

(2) Test for continuity through fuse with multimeter set on OHMS. Refer to the wiring diagram figure 1-5 to establish points of continuity.

c. Installation. Install fuse in fuse holder. Refer to figure 3–12.

3-34. Transformer

a. *Removal.* Refer to figure 3-12 and remove transformer.

b. Inspection and Testing.

(1) Inspect for broken or cracked case and broken or damaged contacts.

(2) Test for continuity through both primary and secondary sides with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

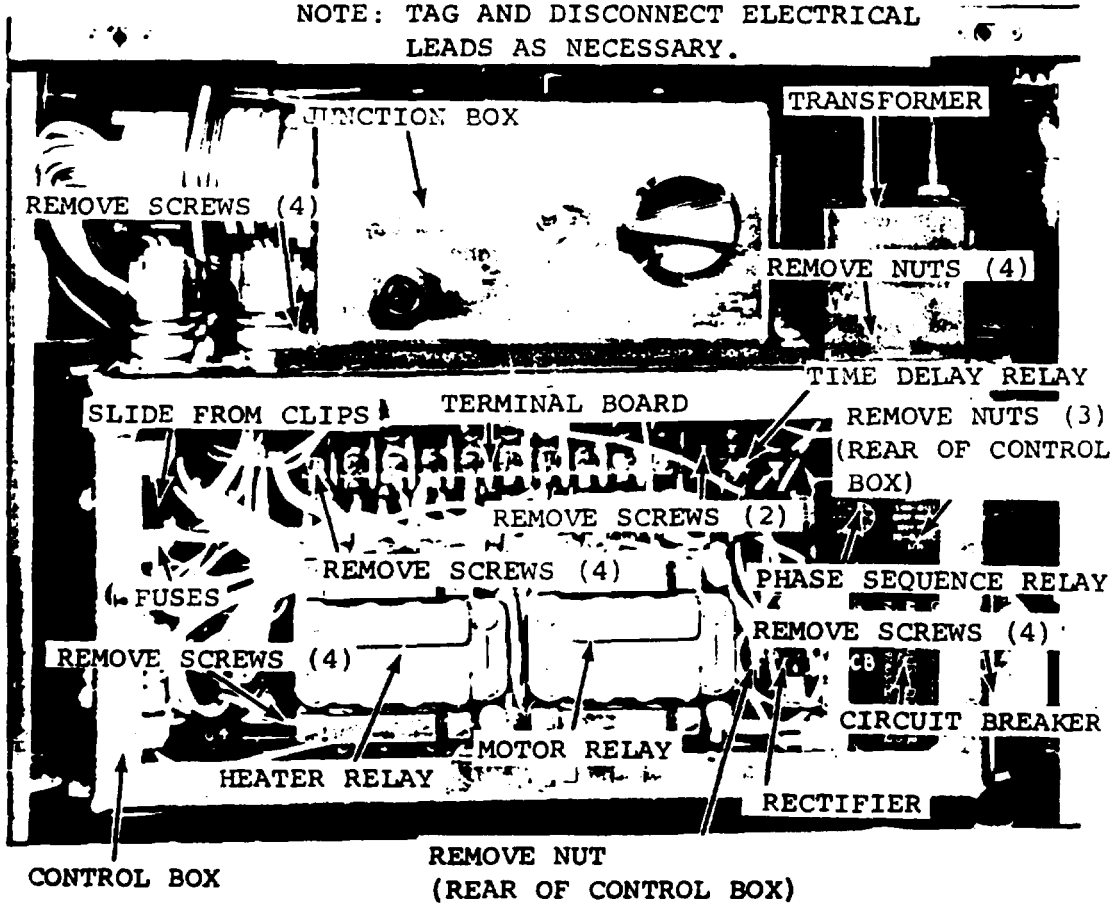


Figure *3-12 Junction box, fuses, rectifier, time delay relay, terminal boad, heater relay, compressor relay, circuit breaker and phase sequence relay, removal and installation.*

c. Installation. Refer to figure 3-12 and install transformer.

3-35. Circuit Breaker

a. General. The circuit breaker protects the compressor from continuous overcurrent and short circuits. It is located in the lower right corner of the junction box. Refer to figure 2-2 for reset procedure.

b. Removal. Refer to figure 3-12 and remove the circuit breaker.

c. Testing. Refer to figure 3-12 and tag and disconnect the leads and teat the circuit breaker for continuity with a multimeter set on OHMS. Refer to the wiring diagram figure 1–5 for points to establish continuity.

d. Installation. Refer to figure 3-12 and install circuit breaker.

3-36. Phase Sequence Relay

a. General. The phase sequence relay prevents operation of the unit unless the phase sequence is correct and the fan and compressor motors rotate in the proper direction.

Note. Used only on 3 phase units, CV-9-3-08-60 and CV-9-3-08-400.

b. Removal. Refer to figure 3-12 and remove phase sequence relay.

c. *Inspection and Testing.*

(1) Inspect for cracked or broken casing.

(2) Test for continuity with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

d. installation. Refer to figure 3-12 and install the phase sequence relay.

3-37. Compressor Motor Relay and Electrical Heater Relay

a. General. Both relays are located in the junction box figure 3-12. A motor relay starts the compressor motor and a heater relay is connected to the electrical heaters.

b. Removal. Refer to figure 3–12 and remove relays.

c. Inspection and Testing.

(1) Inspect for pitted or burned contacts.

(2) Test for continuity across coil with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

d. Installation. Refer to figure 3-12 and install relays.

3-38. Rectifier

a. General. The rectifier changes alternating current to direct current.

b. Removal. Refer to figure 3-12 and remove rectifier.

c. Inspection and Testing.

(1) Inspect for crackd or broken casing and burned or damaged contacts.

(2) Test for continuity with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

d. Installation. Refer to figure 3-12 and install rectifier.

3-39. Heater Elements

a. General. The electrical resistance heaters are mounted directly behind the evaporator coil. These heaters provide the heat called for by the thermostat to maintain the required temperature of the conditioned air. The heaters provide two ranges of heating and are manually controlled by placing the selector switch in the proper position (LO-HEAT or HI-HEAT) to maintain the required temperature.

b. Removal. Refer to figure 3-10, 3-11 and remove the heater elements.

c. Inspection and Testing.

(1) Inspect for broken or damaged elements.

(2) Test for continuity across elements with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

d. Installation. Refer to figure 3-10, 3-11 and install heating elements.

3-40 High Pressure Switch

a. General. The high pressure switch prevents the compressor from operating if the head pressure exceeds 445 psig (pounds per square inch gage) (fig. 3-13).

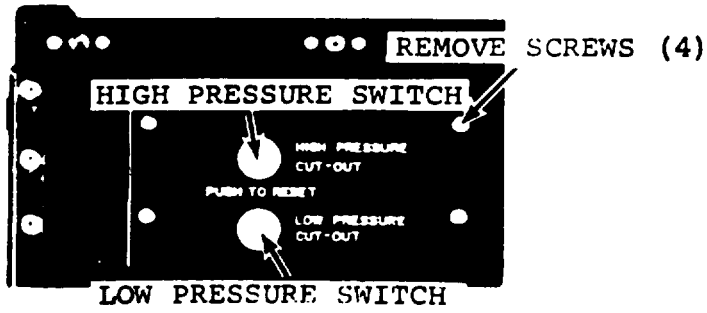
b. lnspection and Testing.

(1) Inspect for broken or damaged leads and kinked or broken capillary tubing.

(2) Test for continuity across switch with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

3-41 Lo Pressure Switch

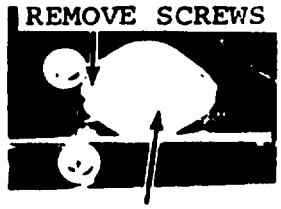
a. General. The low pressure switch prevents the compressor from operating if the suction pressure drops below 25 psig (pounds per square inch gage)) (fig. 3-13).



A. LOW PRESSURE AND HIGH PRESSURE SWITCH.

B. SIGHT GLASS.

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS, UNSOLDER AND DISCONNECT TUBING AS NECESSARY.



C. OUTSIDE AIR THERMOSTAT

Figure 3-13. High pressure switch, low pressure switch, sight glass outside air. thermostat, removal and installation.

b. Inspection and Testing.

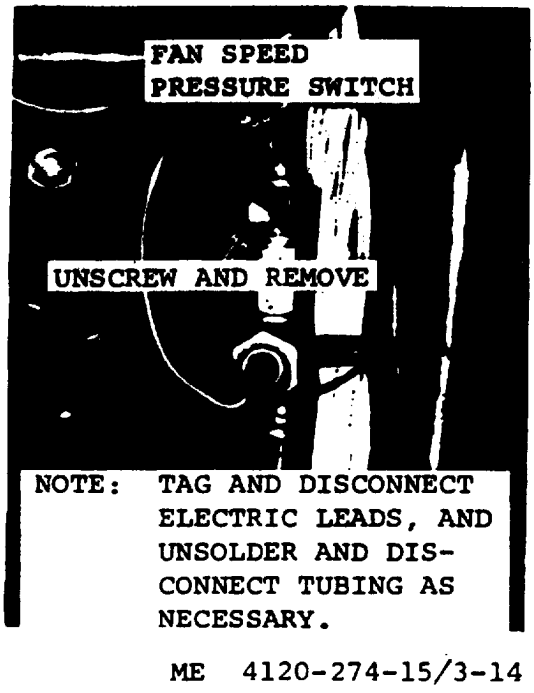
(1) Inspect for broken or damaged leads and kinked or broken capillary tubing.

(2) Test for continuity across switch with multimeter set on OHMS. Refer to wiring diagram figure 1–5 to establish points of continuity.

***3-42.* Fan Speed Pressure Switch (fig. 3-14).**

a. Inspect for broken or damaged contacts.

b. Test for continuity with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.



Figures 3-14. Fan speed pressure switch removal and installation.

3-43. Outside Air Thermostat

a. General. The outside air thermostat is mounted to the rear housing of the air conditioner. It prevents the compressor from being started when the outside temperature is below 50°F. This prevents the unit from being operated at a time when low condensing and suction pressures will hamper system operation.

b. Removal. Remove outside air thermostat as illustrate on figure 3-13.

c. Testing. Test the thermostat for continuity with a multimeter set on OHMS. Refer to the wiring diagram figure 1-5 for the points to establish continuity.

d. Installation. Refer to figure 3–13 and install outside air thermostat.

3-44. Electric Heater Thermostat

a. General. The electric heater thermostat (fig. 3-11) protects the heater elements from overheating.

b. Removal. Refer to figure 3–10, 3-11 and remove electrical heater thermostat.

c. Testing. Test for continuity with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

d. Installation. Refer to figure 3-10, 3-11 and install electric heater thermostat.

3-45. Refrigerant Piping

a. Inspection. Inspect refrigerant piping for kinking, holes and unsatisfactory welding.

b. Testing.

(1) *Halide torch leak detector.* The preferred method of field testing for leaks in the refrigeration system is by using a halide torch. Operate the air conditioner (fig. 2-3) and pass the exploring tube slowly over all sweat fittings, mechanical couplings, and valves. If refrigerant is leaking from the system the flame of the torch will change from blue to green when the leak is small. If the leak is large, the flame will be a deep blue with a reddish tip or the flame may be entirely extinguished.

(2) Soap solution method. Operate the air conditioner (fig. 2-3). Brush all points of possible leakage with soap solution. Watch for bubbles. Follow a definite sequence so that all joints will be thoroughly tested. Wipe the solution from all joints and mark any spot where leakage occurs.

3-46. Liquid Line Solenoid Valve

a. General. The liquid line solenoid valve is automatically actuated by the thermostat and controls the flow of refrigerant to the evaporator coil.

b. Inspection. Inspect for cracked or broken casing and damaged or broken terminals.

c. Testing. Test for continuity across coil with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

3-47. Equalizer Solenoid Valve

a. General. The equalizer solenoid valve is actuated by the on-off switch and serves to equalize system pressures during shutdown.

b. Inspection. Inspect for cracked or broken casing and damaged or broken terminals.

c. Testing. Test for continuity across coil with multimeter set on OHMS. Refer to wiring diagram figure 1-5 to establish points of continuity.

3-48. Access Fittings

a. General. The two access fittings (suction line and discharge line) provide access to the refrigerant system, figure 3-6.

b. Inspection. Inspect for cracked casing or damaged threads.

3-49. Pressure Relief Valve

a. *General.* Pressure relief valve (fig. 3-6) is located on a tee just below the filter-drier. The pressure relief valve protects the refrigerant system from excessive pressure.

b. Inspection. Inspect for cracked or broken casing.

3-50. Pressure Regulating Valve

The evaporator pressure regulating valve figures 3-10, 3–11 regulates refrigerant pressure in the evaporator to prevent coil freeze up. The valve is preset to establish a minimum pressure in the evaporator of 58 psig.

3-51. Expansion Valves

a. General A 1-ton expansion valve controls the rate of flow of liquid refrigerant into the evaporator coil during the cooling cycle of operation (fig. 3-11, 3-12). The one-half ton expansion (fig. 3-11, 3-12) valve functions when the unit is in tie bypass cycle of operation.

b. Inspection.

(1) Check for loose or leaking connections.

(2) Make sure the thermal bulb is securely fastened and is covered with rubber insulation.

3-52. Sight Glass

a. General. The sight glass indicates the refrigerant is indicated by flash gas in sight glass (fig. 3-13).

b. Inspection. Inspect for excessive moisture in refrigerant. Excessive moisture is indicated by the changing of the color code from green to yellow.

3-53. Liquid Receiver

Inspect for cracks or broken casing.

3-54. Evaporator Coil (fig. 3-15).

a. General. The evaporator coil is mounted on the casing, directly behind the discharge grille. The coil must be removed from the air conditioner for repair or replacement. The mixture of fresh air and re-circulated air is passed through the evaporator coil and forced into the conditioned air space by the evaporator fan.

b. Testing. Refer to paragraph *3-45b* and test with halide torch for refrigerant leaks.

c. Inspection and Cleaning.

(1) Inspect coil for bent fins, cracks or breaks, solder any cracks. Straighten bent fins with coil comb or thin nose pliers.

(2) Clean coil with low pressure, compressed air.

d. Removal.

(1) Remove top panel and discharge grille, refer to paragraph 3–18.

(2) Refer to figure 3-15 and remove the evaporator coil.

e. Installation.

(1) Install the evaporator coil refer to figure 3-15.

(2) Install the top panel and discharge grille, refer to paragraph 3-18.

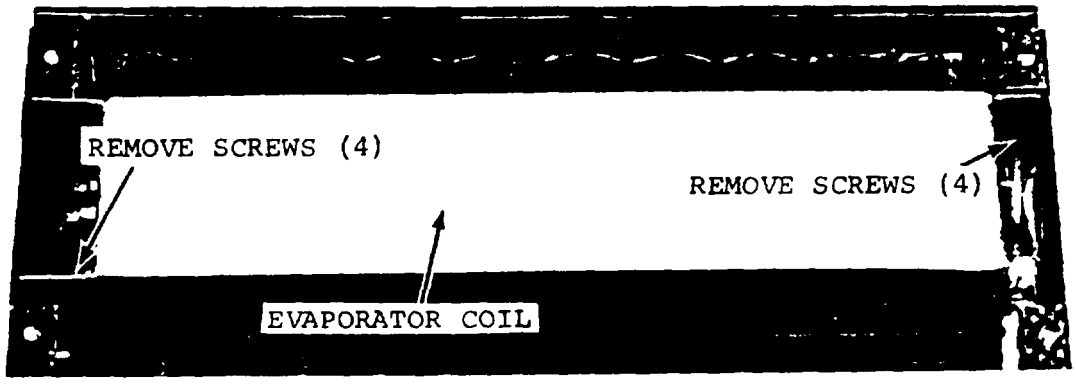


Figure 3-15. Evaporator removal and installation.

3-55. Condenser Coil (fig. 1-3).

a. General. The condenser coil is mounted on the bottom rear of the casing, directly beneath the condenser fan. The coil must be removed from the air conditioner for repair *or* replacement. The coil is made from copper tube and aluminum fin and is of fin-tube configuration.

b. Testing. Refer to paragraph *3-45b* and test with halide torch for refrigerant leaks.

c. Inspection and Cleaning.

(1) Inspect coil for bent fins cracks or breaks. Solder any cracks. Straighten bent fins with coil comb or thin nose pliers.

(2) Clean coil with low pressure compressed air.

3-56. Drain Tubes

a. Removal

(1) Remove front access panel, refer to paragraph 3-18.

(2) Pullout junction box and control box, refer to paragraph 3-32.

(3) Unscrew clamps holding drain tubes to unit and remove drain tubes, refer to figure 3-6.

b. Inspection and Servicing.

(1) Inspect tubes for obstructions, kinks or holes.

(2) Clean tubes with low pressure compressed.

c. *Installation.*

(1) Install drain tubes and tighten clamps.

(2) Install junction box and control box, refer to paragraph 3-32.

(3) Install front access, panel to paragraph 3-18.

3-57. Air Filter

a. Removal. Refer to figure 3-3 and remove air filter.

b. lnstallation. Refer to figure 3-3 and install air filter.

CHAPTER 4

DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

4-1. Scope

These instructions are published for the use of direct and general support and depot maintenance personnel maintaining the Redmanson model CV–9 series air conditioned. They provide in formation on the maintenance of the units, which is beyond the scope of tools, equipment, personnel, or supplies normally available to using organizations.

4-2. Record and Report Forms

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

Note. Applicable forms, excluding Standard Form 46 which is carried by the operator, shall be kept in a canvas bag mounted on equipment.

Section II. DESCRIPTION AND TABULATED DATA

4-3. Description

A general description of the air conditioned, the location of the identification and instruction plates, and information on the differences in models are contained in the Operator and Organizational Maintenance Manual. Direct and General Support and Depot Repair and Maintenance Instruction are described in appropriate sections of this manual, see paragraph 1-5.

4-4. Tabulated Data

a. General. This paragraph contains all the overhaul data pertinent to direct and general support and depot maintenance personnel. Wiring diagrams figure 1–5 and practical wiring schematics figure 1-6 are also included.

b. Capacities.

Refrigerant system Refrigerant-22
Refrigerant charge-----53 oz.
Compressor crankcase-----17 oz. refrigerant compressor lubricating oil-FED VV-L-825, Type IV.

c. Compressor. All Redmanson model CV-9 series air conditioners have hermetically sealed compressors. If failure occurs compressor should be replaced.

CHAPTER 5

GENERAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND EQUIPMENT

5-1. Special Tools and Equipment

No special tools or equipment are required to perform field and depot maintenance on the air conditioners.

5-2. Specially Designed Tools and Equipment

No specially designed tools or equipment are required to perform field and depot maintenance on the air conditioners

Section II. TROUBLESHOOTING

5-3. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner or any of its components. Each trouble symptom stated is followed by a list of probable causes. The possible remedy recommended is described opposite the probable cause.

5-4. Compressor Will not Start

Probable cause	Possible remedy
Power off	Check relay (para 3-37), fuses (para 3-33) and wiring (para 5-22) and circuit breaker (para 3-35).
Thermostat set too high	Reset thermostat (fig.2-3).
Loose electrical connections or faulty wiring	Tighten conections. Check wiring and rewire if necessary. (para 6-22).
Compressor motor burned out	Check and replace compressor if defective (para 5-17).
High-low pressure switch defective	Replace high-low pressure switch (para 6-6 and 6-7).
Thermostat defective	Replace thermostat (para 3-31).

5-5. Compressor Cycles Intermittently

Probable cause	Possible remedy
Low pressure switch erratic in operation	Check tubing to switch, may be clogged. Also check setting of switch. It may be tooll high.
Insufficient refrigerant in system	Add refrigerant. Refer to paragraph *5-21c*.
Dirt or restriction in tubing to pressure switch	Check and clean tubing.
Faulty preasure switch	Repair or replace pressure switch (para 6-6 or 6-7).
Condenser capacity reduced by refrigerant overcharge accompanied by high discharge pressure.	Remove excess refrigerant (para 5-21b).
Air in system	Evacuate system (para 5-21c).

5-6. High Discharge Pressure

Probable cause	Possible remedy
Condenser fan inoperative	Check condenser fan motor (para 3-24).
Too much refrigerant	Remove excess refrigerant (para 5-21b).
Air in system	Evacuate system (para 5-21c) .

5-7. Low Discharge Pressure

Probable cause	Possible remedy
Suction line partially obstructed	Clean the line.

5-8. Flooding

Probable cause	Possible remedy
Defective or impromperly set expansion valve	Reset expansion valve (para *6-12c).*

5-9. low Suction Pressure

Probable cause	Possible remedy
Insufficient refrigerant in system	Add refrigerant (para 5-*21e.*
Excessive superheat	Reset expansion valve (para *6-12c.*

5-10. Compressor Noisy

Probable cause	Possible remedy
Insufficient clearance between rotating compressor parts	Replace compressor (para 5-17).
Bearings worn	Replace compressor (para 5-17).
Slugging due to floodback of refrigerant	Check setting or expansion valve. Check sensing bulb.

5-11). Hissing

Probable cause	Possible remedy
Insufficient refrigerant flow through expansion valves	Add refrigerantt (para 5-21e).

5-12. Cold Compressor

Probable cause	Possible remedy
Liquid carrying over from evporator or through quench valve	Check refrigerant charge and expansion valves. (para 3-51).

5-13. Cylinders and Crankcase Sweating

Probable cause	Possible remedy
Floodback------	Check refrigerant charge and expansion valves. (para 3-51).

5-14. High Crankcase Temperature

Probable cause	Possible remedy
Excessive superheat	Reset expansion valve (para 6-12c).

5-15. Little or no Heating Capacity

Probable cause	Possible remedy
Wiring and wiring harness defective	Replace wire or wiring harness (para 5-22)

5-16. System Losing Cooling Capacity

If the system is losing cooling capacity, or is in some way not functioning properly, a check of system operating pressure will frequently lead to cause of malfunction. Install pressure gages on access fittings of suction and discharge lines and expose gages to system pressure. Compare gage readings with normal ranges of systems pressures listed in table 5-1

Table 5-1. Normal Operating Pressures

Return air to unit	90°F/75°F WB		80°F/67°F WB
Outdoor ambient	120°F	125°F	95°F
GAGE PRESSURE			
Suction	85–95	87–97	70–80
Discharge	387–395	406–416	253–263

Section III. REMOVAL AND INSTALLATION OF MAJOR COMPONENT'S OR AUXILIARIES

5-17. Compressor

a. General. The sole purpose of the compressor is to raise the pressure of refrigerant gas from evaporator pressure to condensing pressure. The function of the compressor is to deliver refrigerant to the condenser at a pressure and temperature at which the condensing process can readily be accomplished. The motor/compressor is a hermetically sealed unit and is not repairable in the field. An inoperative compressor is usually due to a mechanical failure causing the compressor to freeze, control failure, or a motor burnout. If the motor/compressor is mechanically frozen or there has been a motor burnout, the compressor must be removed and replaced. When the motor of a hermetic compressor fails, high temperatures may develop within the compressor causing a breakdown of the oil and refrigerant, resulting in formation of acid, moisture, and sludge. All these are extremely corrosive and must be flushed from the system. Repeated burnouts will occur if all of the contaminants are not removed.

b. Removal.

(1) Remove front access panel, refer to paragraph 3-18 and pullout the junction and control box, refer to paragraph 3-28.

(2) Discharge refrigerant from system refer to paragraph *5-21b.*

(3) Remove condenser coil, refer to paragraph 6-5.

(4) Refer to figure 3-6 and remove compressor through rear of unit.

c. Installation.

(1) Refer to figure 3-6 and install compressor.

(2) Refer to paragraph 6-5 and install the condenser coil.

(3) Evacuate and recharge the unit, refer to paragraph 5-21.

(4) Install junction and control box, refer to paragraph 3-28.

(5) Install front access panel, refer to paragraph 3-18.

Warning: **Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas Be especially careful that the R-22 refrigerant does not contact the eyes. In case of refrigerant leaks ventilate area immediately.**

Section IV. GENERAL REPAIR INSTRUCTIONS

5-18. General

The air conditioner, after it is started is automatic in operation. The relationship of the automatic components, controls, and instruments, is explained in the operation analysis for maintenance of the air conditioner (para 5-17). A refrigerant piping diagram (fig. 5-1) and practical wiring diagrams (fig. 1-5), are included to assist in the maintenance of the electrical components, wiring harness, wire leads, and refrigerant components.

Figure 5-1. Refrigerant flow diagram
(Located in back of manual)

Warning: Disconnect the air conditioner from the power source before performing any maintenance on the components of the unit. Failure to observe this warning may result in injury to personnel and damage to the equipment.

5-19. Analysis of Operation

a. General. The type and degree of air conditioning provided by the unit is controlled by a five-position selector switch (fig. 2-3), a thermostat (fig. 2-3), and a hi-lo fan speed switch (fig. 2-3).

(1) When the selector switch is in the OFF position the entire circuit is dead.

(2) Placing the selector switch in the HI-HEAT position actuates the fan motor with all six heater elements being under the control of the thermostat. If the air temperature falls below the set point of the thermostat the control contacts close, energizing the evaporator contactor which supplies power to the heaters through the normally closed contacts of the evaporator heater thermostat.

(3) Moving the *selector* switch to the LO-HEAT position presents the same control sequence but reduces the heating capacity of the unit by supplying *power* to threw of the heater elements only.

(4) The fan motor starts when the selector switch is placed in the VENTILATE position.

(5) In the COOL position, the fan motor is in operation and the compressor motor contactor is energized through the contacts of the thermostatic switch. The energized contactor supplies power to the compressor through the normally closed contacts of the circuit breaker and the compressor overload protector. After the fan motor and compressor have started, the operation of the refrigerant unit is controlled by the thermostat. Sensing a rise in the air temperature above the set point, the thermostat opens its contacts, de-ener gizing the liquid line solenoid valve. This positions the valve for cooling service. Sensing a fall in the air temperature below the set point, the contacts of the thermostat close, energizing the valve. This positions the system for bypass service.

(6) The HI-LO fan speed switch controls the speed of the fan motor and the fans.

b. Cooling Cycle of Operation.

(1) The fan motor and compessor run continuously, whether the thermostat is calling for cooling or not, when the unit is set operate on the cooling cycle of operation. This feature provides a constant electrical load thus preventing voltage fluctuations within the system.

(2) Bypass cycle of operation. When the conditioned air temperature falls below the thermostat setting, the circuit which controls the sole noid valves is energized causing:

(a) The hot gas bypass line to flow discharge gases through the evaporator pressure regulator bypassing a major part of the compassed refrigerant vapor directly back to the suction side of the compressor.

(b) To prevent f rest from forming on the evaporator, a back pressure regulating valve is provided to prevent the suction pressure fromcreasing to a pressure of 58 psig which corresponds to a temperature of less than 32 degrees F. (Fahrenheit).

d. Heating Operation. Placing the selector switch in the LO-HEAT postinactuates half of the evaporator heatrs mounted, in the conditioned air stream directly behind the evaporator coil. When the selector switch is placed in the HI-HEAT position, the remaining heaters are energized, providing maximum heating capacity.

5-20. General Repair Procedures

a. If the refrigerant system must be opened for repair or replacement of parts, first discharge the refrigerant from the system. Refer to paragraph 5-21b for instructions for discharging the system.

b. After discharging the system allow the tubing to warm to the ambient temperature before opening the system; this delay will help prevent the formation of condensation on the inside wall of the tubing. Plug or cap all openings as a part is removed to minimize the entry of dirt and moisture into the system.

c. Use a silver solder on all soldered connections. Silver solder (or equivalent) with a 50 percent silver capacity and a melting point of approximately 1300 degrees F. is recommended. Continually pass dry nitrogen through the tubing or connections being soldered to prevent formation of harmful copper oxides.

5-21. Servicing the Refrigerant System

a. Testing Refrigerant System for Leaks. Refer to paragraph *3-45b,* and test refrigerant system for leaks.

b. Releasing Refrigerant for Service. Release refrigerant slowly to a well vented atmosphere. Adjust the release so that a vaporized discharge is made to avoid loss of refrigerant oil.

c. Evacuating the Refrigerant System.

(1) *General.* Opening the system to the atmosphere will cause entry of air and moisture into the system. After any servicing operation, when the system is opened, the entire system should be evacuated before recharging with refrigerant.

(2) *Evacuation.*

(a) Connect hose assemblies of evacuation gage manifold to discharge valve access fitting and to the suction access *fitting* of unit, refer to figure 3-6.

(b) Connect vacuum pump to center hose of gage manifold.

(c) Evacuate pump down unit to 100 microns.

(d) Break vacuum by admitting refrigerant, paragraph 5–21d(1).

Caution: **Do not use the compound gage as an *indicator for satisfactory vacuum pressure.***

d. Charging the Refrigerant System. There are two preferred methods used to charge the refrigerant system.

(1) *Sight glass method.*

(a) Evacuate the system, paragraph 5-21.

(b) Remove cap from suction tube charging valve.

(c) Connect hose from refrigeration charging hookup loosely to suction tube charging valve. Open refrigerant drum shutoff valve slightly to purge hose. Tighten connection at charging valve. Open shutoff valve and backseat charging valve.

(d) Refrigerant drum must be in up-right position to allow only gaseous refrigerant to enter system.

(e) Start unit.

(f) To Speed up charging, set refrigerant drum in warm water. Never use a heating torch for this purpose.

(g) Observe sight glass (fig. 3-13) at the time of charging, and even though flash gas is apparent, shutoff refrigerant flow and observe sight glass for a period of 10 to 20 minutes. If at the end of this time period the sight glass is not free from the flash gas, admit a small amount of charge and observe for the same time period. Repeat this operation until sight glass is clear.

(h) Frontseat charging valves and close refrigerant drum shutoff valve. Stop the unit and disconnect manifold hoses from charging valves, install caps.

(2) *Weight method.* With this method you are charging the unit with liquid.

(a) Evacuate the system, paragraph 5-21.

(b) Connect a bottle of refrigerant-22 to discharge high side access fitting, figure 3-6.

(c) Weight refrigerant bottle.

(d) Invent charging cylinder and open valve on refrigerant bottle and allow refrigerant to flow through system.

(e) Periodically weigh bottle until it is lighter by amount needed in system, must be exact amount.

Caution: **Total amount of charge must be exactly 53 oz**

5-22. Wiring Harness and Wire Leads

a. General. The electrical circuits in the refrigeration unit are completed by individual wire leads or by leads laced or enclosed to form a wiring harness, When testing, repairing, or replacing the individual wires or harnesses refer to the wiring diagram (fig. 1-5).

b. Inspection. Inspect the wiring insulation for cracks and frayed material. Pay particular attention to the wires passing through holes in the frame or over rough edges. If inspection reveals a broken or cut wire, and the break in the wire is exposed, the wire must be repaired *(d* below). If

the break in a wire is in a harness or inaccessible area, replace wire *(e* below).

c. Testing. Teat a wire for continuity by disconnecting each end from the component or components to which it is connected. Touch the test probes of a multimeter to each end of the wire. If continuity is not indicated, the wire is defective and must be repaired or replaced.

d. Repair. Remove the insulation on the wire to expose one-half inch of bare wire at both ends of the break. Twist bare wire together and solder the connection. Cover the repaired break with electrical tape and friction tape. Do not leave any bare wire exposed. If a terminal lug breaks off a wire, replace it, using an exact duplicate terminal lug.

e. Replacement. Replace a wire by disconnecting it from the component or components and remove the wire. Install a new wire and connect it to the component or components. If a broken wire is part of a wiring harness, disconnect the wire at each end and tape these ends with electrical tape. Install a new wire and attach it to the outide of the wiring harness.

5-23. Tubing and Fittings

The refrigerant piping used on the air conditioning units consists of copper tubing and necessary fittings. Joints of refrigeration pipes and fittings are soldered. Inspect the piping and fittings for cracks and breaks. (para 3-45b). Replace defective pipes with those of the same length, size, shape, and material. When soldering or unsoldering items such as the thermostatic expansion valves, or solenoid valves, disassemble valves and wrap valve bodies with a damp cloth to protect them from damage by heat.

CHAPTER 6

REPAIR INSTRUCTIONS

Secion I. COMPRESSOR

6-1. General

The compressor is hermetically sealed and cannot be repaired. In case of failure the compressor must be replaced.

6-2. Compressor

a. Removal. Refer to paragraph 5-17.

b. Installation. Refer *to* paragraph 5-17.

Section II. CONDENSER COIL, EVAPORATOR COIL

6-3. General

The evaporator and condenser coils must be removed from the air conditioner for repair and replacement.

6-4. Evaporator Coil

a. Remove top panel and discharge grille refer to paragraph 3-18.

b. Refer to figure 3-15 and remove evaporator coil.

c. Repair. Repair minor leaks or holes by soldering with silver solder (class 4 or 6A QQS-561) per MIL-B-7883. If damage is excessive replace evaporator coil.

d. Installation.

(1) Refer to figure 3-15, and install evaporator coil.

(2) Install top panel and discharge grille refer to paragraph 3-18.

{3) Leak test the entire system. Refer to paragraph 3-45b.

(4) Evacuate the *system* (para *5-21c).*

(5) Recharge the system (para *5-21d).*

6-5. Condenser Coil

a. Removal.

(1) Evacuate system, refer to paragraph 5-21c.

(2) Remove condenser coil grille, refer to figure 3-4.

(3) Remove screws (3) holding filter-drier bracket to shell.

(4) Pull condenser coil, figure 1-3 from unit and unsolder as required.

b. Repair. Repair minor leaks or holes by soldering with silver solder (class 4 or 6A QQS-561) per MIL-B-7883. If damage is excessive replace condenser coil.

c. Installation

(1) Replace *condenser coil.*

(2) Leak test the entire system. Refer to paragraph *3-45b.*

(3) Evacuate the system (para 5-21c).

(4) Evacuate the system (para 5-21c).

(5) Replace screws in filter-drier bracket.

(6) Replace condenser coil grille, figure 3-1.

Section III. HIGH Pressure SWITCH, LOW PRESSURE SWITCH, FAN SPEED PRESSURE SWITCH

6-6 High Pressure Switch

a. General. The high pressure switch prevents the compressor from operating if the head pressure exceeds 445 psig (pounds per square inch gage).

b. Removal. Refer to figure 3-13, and remove high pressure switch.

c. Installation. Refer to figure 3-13, and install high pressure switch.

6-7. Low Pressure Switch

a Genenal. The low pressure switch prevents the compressor from operating if the suction pressure drops below 25 psig (pounds per square inch gage .

b. Removal. Refer to figure 3-13, and remove low pressure switch.

c. Installation. Refer to figure 3-13, and install low pressure switch

6-8. Fan Speed Pressure Switch

a. General The fan speed switch changes the speed of the fan motor from low to high when the pressure reaches 425 psig (pounds per square inch gage).

b. *Removal.* Refer to figure 3-14, and remove fan speed pressure switch.

c. Installation. Refer to figure 3-14, and install fan speed pressure switch

Section IV. LIQUID LINE SOLENOID VALVE AND EQUALIZER SOLENOID VALVE

6-9. Liquid Line Solenoid Valve

a. General The liquid line solenoid shuts off flow of refrigerant to the evaporator coil when the thermostat is satisfied

b. Removal Slowly discharge refrigerant from system (para 5-21b). Refer to figure 3-6 and remove the liquid line solenoid valve.

c. *Installation.* Refer to figure 3-6 and install the liquid line solenoid. Evacuate and recharge refrigeration system (para *5-21c* and *5-21d).*

Caution: **The solenoid valves must be dis assembled before disconnecting the tubing from the valve to avoid heat distortion. Refer to figure 6-1.**

Caution: **Solder the tubing to the body of the valve before reassembling the valve to avoid heat distortion. Refer to figure 6-1.**

6-10. Equalizer Solenoid Valve (hot gas solenoid valve)

a. General. The equalizer solenoid valve (hot gas solenoid valve) actuated by the on-off switch and serrves to equalize system pressures during shutdown.

b. Removal. slowly refrigerant from system *(para* 5-21b). Refer to figure 3-10, 3-11 and remove the equalizer solenoid valve (hot gas bypass solenoid valve).

c. Installation. Refer to figure 3-10, 3-11 and install equalizer solenoid valve (hot gas bypass solenid valve). Evacuate and recharge the re frigeration system (para 5-21c and 5-21d).

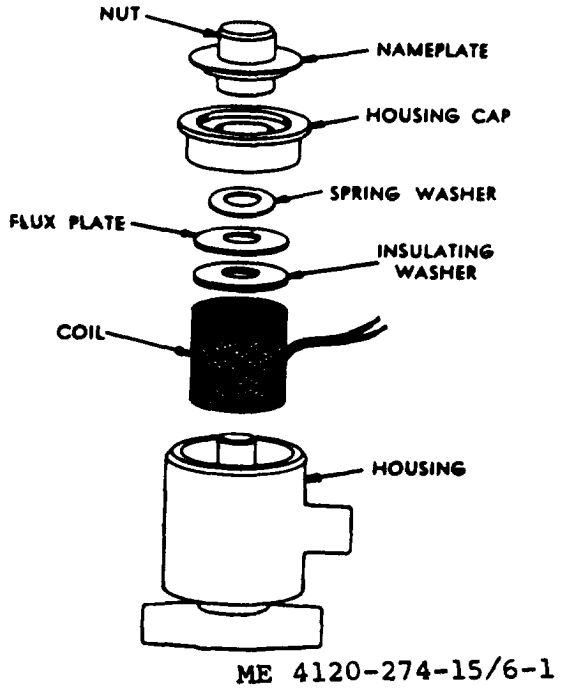


Figure 6-1 Solenoid valve, disassembly and reassembly.

Section V. PRESSURE RELIEF VALVE

6-11. Pressure Relief Valve

a. General. The pressure relief valve protects the refrigerant system from excessive pressure.

b. Removal. Slowly discharge refrigerant from system (pare 5-21b). Refer to figure 3-6 and remove pressure relief valve.

c. Installation. Refer to figure 3-6, and install pressure relief valve. Evacuate (para 5-21c) and recharge (para 5-21d the refrigeration system.

Section VI. EXPANSION VALVES

6-12. Expansion Valves

a. General. Each air conditioner contains two expansion valves One controls the refrigerant flow to the evaporator coil during the cooling cycle. The other functions when the refrigerant flows through the bypass cycle.

b. Removal

(1) Remove cover panel, refer to paragraph 3-18.

(2) Discharge refrigerant from system, refer to paragraph 5-21c.

(3) Refer to figures 3-10 and 3-11 and remove expansion valves.

c. Adjustment.

(1) Remove side cap from expansion valve base.

Note. Make sure thermal bulb is securely fastened to suction line and the bulb is covered with rubber insulation.

(2) Turn stem clockwise for higher superheat and counterclockwise for lower superheat. One full turn is equivalent to approximately 2°F superheat. A suction gas superheat of 5°F to 10°F out of the evaporator coil is satisfactory. A superheat of 10°F to 20°F when measuring the superheat at the thermal bulb is also satisfactory. If the superheat does not reach the required value when adjusted, check for dirt or other restrictions in the liquid line or expansion valve.

d. Installation.

(1) Refer to figures 3-10 and 3-11 and install the expansion valve.

(2) Charge unit, refer to paragraph *5-21d.*

(3) Replace cover panel refer to paragraph 3-18.

6-13. Access Fittings

a. General. The access fittings provide access to the refrigerant system for service.

b. Removal.

(1) Remove front access panel, refer to paragraph 3-18.

(2) Slowly discharge the refrigerant charge from system (para *5-21b).*

(3) Unscrew valve stem from inside access valve.

c. Installation.

(1) Install valve stem into access valve.

(2) Recharge system, refer to paragraph 5-21d.

(3) Install front access panel refer to paragraph 3-18.

Section VIII. SIGHT GLASS

6-14. Sight Glass

a. General. The sight glass indicates the refrig erant moisture content. When the indicator is green the refrigerant is dry. A color shading into yellow indicates that the refrigerant has become contaminated with moisture. A shortage of refrigerant is indicated by flash gas in the sight glass.

b. Removal. Slowly discharge the refrigerant charge from system (para *5-21b).* Refer to figure 3-13 and remove sight glass.

c. Installation. Refer to figure 3-13 and install sight glass.

Section IX. FILTER DRIER

6-15. Filter Drier

a. General. The filter drier prevents the accumulation of moisture and contaminants within the refrigeration system. The filter drier must be replaced each time the system is exposed to the atmosphere.

b. Removal. Slowly discharge the refrigerant charge from the system (para 5-21b). Refer to figure 3-6 and remove the filter drier.

c. lnstallation. Refer to figure 3-6 and install filter drier.

APPENDIX A

REFERENCES

A-1. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguisher, approved for Army users.
TM 5-687	Repair and Utilities: Fire Protection Equipment and Appliance: Inspection, Operations, and Preventive Maintenance.

A-2. Painting

TM 9-213	Painting Instructions for field use.

A-3. Preventive Maintenance

TM 5-764	Electric Motor and Generator Repair.
TM 38-750	Army Equipment Records Procedures.

A-4. Supply Publications

C9100-IL	Fuels, Lubricants Oils and Waxes.

APPENDIX B

BASIC ISSUE ITEMS LIST AND MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

B-1. Scope

This appendix lists items which accompany the air conditioner or are required for installation, operation, or operator's maintenance.

B-2. General

This Basic Issue Items List is divided into the following sections:

a. Basic Issue Items-Section II. This section is a listing of accessories, repair parts, tools and publications required for operator's maintenance and operation, initially issued with, or authorized for the air conditioner.

b. Maintenance and Operating Supplies-Section III. This section is a listing of maintenance and operating supplies required for initial operation.

B-3. Explanation of Columns

The following provides an explanation of columns in, the tabular list of basic issue items, section II:

a. Source, Maintenance, and Recoverability *Codes (SMR), Column (1):*

(1) Source Code indicates the selection status and source for the listed item. Source codes are:

Code	Explanation
P	Applied to repair parts which are stocked in or supplied from GSA/DSA Army Supply system, and authorized for use at indicated maintenance categories.
M	Applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance categories.
A	Applied to assemblies which are not procured or stocked as such, but made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.
X	Applied to parts and assemblies which are not procudred or stocked, the mortality of which is normally below that of the applicable end item, and the failure of which should result in retirement of the end item from the supply system.
X1	Applied to repair parts which are not procured or stocked, the requirement for which will be supplied by use of the next higher assembly or component.
X2	Applied to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain then through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.
C	Applied to repair parts authorized for local procurements. If not obtainable from local procurement, such repair will be requisitioned through normal supply channels with a supporting statement of nonavailability from local procurement.
G	Applied to major assemblies that are procured with PEMA '(Procurement Equipment Missile Army) funds for initial issue only to be used as exchange assemblies at DSU and GSU level or returned to depot supply level.
	Note. Source code is not shown on common hardware items known to be readily available in Army supply channels and through local procurement.

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

Code	Explanation
C	Operator/crew

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

Code	Explanation
R	Applied to repair parts and assemblies which are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

Code	Explanation
T	Applied to high dollar valve recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activites
U	Applied to repair parts specifically selected for salvage by reclamation units because of precious metal content critical materials, high dollar value reusable casings and castings.

b. Federal Stock Number, Column (2). This column indicates the Federal stock number for the item.

c. Description, Column (3). This column indicates the Federal item name and any additional description required. A five-digit manufacturer's or other service code is shown in parentheses followed by the manufacturer's part number. Repair parts quantities included in kits, sets, and assemblies that differ from the actual quantity used in the specific item, are listed in parentheses following the repair part name.

d. Unit of Issue, Column (4). This column indicates the unit used as a basis of issue, e.g., ea, pr, ft, yd, etc.

e. Quantity Incorporated in Unit Pack, Column (5). This column indicates the actual quantity contained in the unit pack.

f. Quantity Incorporated in Unit, Column (6). This column indicates the quantity of the item used in the equipment.

g. Quantity Furnished with Equipment, Column (7). This column indicates the quantity of an item furnished with the equipment in excess of the quantity incorporated in the unit.

h. Quantity Authorized, Column (8). This column indicates the quantity of an item authorized the operator/crew to have on hand or to obtain as required. As required items are indicated with an asterisk.

i. Illustration, Column (9). This column is divided as follows:

(1) *Figure number, column (9)(a)* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number, column (9)(b).* Indicates the callout number used to reference the item in the illustration.

B-4. Explanation of Columns in the Tobular list of Maintenance and Operating Supplis-Section III

a. item, Column (1). This column contains numerical squence item numbers assigned to each component application to facilitate reference.

b. Component Application, Column (2). This column identifies the component application of each maintenance or operating supply item.

c. Federal Stock Number, Column (3). This column indicates the Federal stock number for the item and will be used for requisitioning purposes.

d. Description, Column (4). This column indicates the item and a brief description.

e. Quantity Required for Initial Operation, Column (5). This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

f. Quantity Required for 8-Hours Operation, Column (6). This column indicates the estimated quantities required for an average eight hours of operation.

g. Notes, Column (7). This column indicates informative notes keyed to data appearing in a preceding column.

Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal stock number	(3) Description: Ref No & Mfr Code / Useable on Code	(4) Unit of issue	(5) Qty inc in unit pack	(6) Qty inc in unit	(7) Qty furn with equip	(8) Qty auth	(9) Illustration (a) Fig No.	(9) Illustration (b) Item No.
		Group 31—Basic Issue Items Manufacturer Installed.							
PO	5220–559–9618	**CASE: Maintenance and operational manuals, cotton duck, water repellant mildew resistant, MIL–B–11743B.**	**Ea**			**1**	**1**		
		Department of the Army operator, organizational, direct and general support and depot maintenance manual TM 5–4120–274–15.				**1**	**1**		
PO		**Block off panel, D13214E3665**	**Ea**			**1**	**1**		

(1) SMR code	(2) Federal stock number	(3) Description: Ref No & Mfr Code / Useable on Code	(4) Unit of issue	(5) Qty inc in unit pack	(6) Qty inc in unit	(7) Qty furn with equip	(8) Qty auth	(9) Illustration: (a) Fig No.	(b) Item No.
PO		Receptacle MS–3106R–204S used on the 400 cycle, 3 ph, 208V; 60 cycle, 3 ph 208V. MS3106R–204SY used on the 115V, single phase, 60 cycle; 230V, single phase, 60 cycle	Ea			1	1		
PO		Sound Attenuator D13214E3640. Group 32—Basic Issue Items Troop Installed 3200—Basic Issue Items, Troop Installed or Authorized.	Ea			1	1		
PO	5120–223–7396	Pliers, Slipjoint, stght, nose comb, w/cutter, 8 in. lg.	Ea				1		
PO	5120–277–9491	Screw Driver, flat tip: wood hdl, 1/4 in. w/flared tip, 4 in. lg.	Ea				1		
PO	5120–240–5328	Wrench, open end, adjustable: sgle hd, 0.947 in. jaw opng 8 in. lg.	Ea				1		

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Item	(2) Component application	(3) Federal stock number	(4) Description	(5) Quantity required F/initial operation	(6) Quantity required F/8 hrs operation	(7) Notes
1.		6830–837–9927	Monochlorodifluromenthane, Technical, Type R–22, Fed. Spec. BB–F–671, 25 lb. cylinder.			
2.		9150–823–7905	Lubricating Oil, Refrigerant compressor, without additives, Fed. VV–L–825, Type IV, Refrigerant – 22.			

APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

a. This section provides a general explanation of all maintenance and repair function authorized at various maintenance levels.

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

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

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

C-2. Explanation of Columns in Section II

a. Group Number (1). 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 MAC (Maintenance Allocation Chart) in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each.

b Functional Group Column (2). This column contains a brief description of the components of each functional group.

c. Maintenance Functions *Column (3). This* column lists the various maintenance functions (A through K) and indicaes the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

C - Operator or crew
O - Organizational maintenance
F - Direct support maintenance
H - General support maintenance
D - Depot maintenance

The maintenance functions are defined as follows:

A—inspect: To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B - Test: To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C - Service: To clean, to preserve, to charge, to paint, and to add fuel, lubricants, cooling agents, and air.

D - Adjust: To rectify to the extent necessary to bring into proper operating range.

E - Aline: To adjust specified variable ele ments of an item to bring to optimum performance.

F - Calibrate: To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

G - Install: To set up for use in an operational environment such as an emplacement, site, or vehicle.

H - Replace: To replace unserviceable items with serviceable assemblies, subassemblies, or parts.

I - Repair: To restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.

J - Overhaul: To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards using the Inspect and Repair Only as Necessary (IROAN) technique.

K - Rebuild: To restore an item a standard as nearly as possible to original or new con-

dition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts or components repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerance and specifications, and sub sequent reassembly of the item.

d. Tools and Equipment Column (4). This column is provided for referencing by code the special tools and test equipment, (sec. III) required to perform the maintenance functions (sec. II).

e. Remarks Column (5). This column is Provided for referencing by code the remarks (sec. IV) pertinent to the maintenance functions (Not Applicable).

C-3. Explanation of Columns in Section IlI

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T&TE requirements column on the MAC. The letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. Maintenance Functions. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal shock number of tools and test equipment.

C-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 (5) and the second letter references a maintenance function, column (3), A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, section II (Not Applicable).

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance functions A Inspect	B Test	C Service	D Adjust	E Aline	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
18	BODY, CAB, HOOD, HULL													
1801	Body, Cab, Hood, Hull Assemblies:													
	Panels and grille, fresh air screen	C	--	--	O	--	--	O	O	O				
22	BODY CHASSIS, HULL ACCESSORY ITEMS													
2201	Canvas, Rubber or Plastic Items:													
	Canvas, condenser cover	O	--	--	--	--	--	O	O	O				
40	ELECTRIC MOTORS GENERATORS													
4000	Motors:													
	Motor assembly, evaporator blower	O	O	--	--	--	--	O	O	F				
	Motor assembly, condenser fan	O	O	--	--	--	--	O	O	F				
4006	Starting and Protective Devices:													
	Protectors, overload, temperature/current	O	O	--	--	--	--	O	O					
	Capacitors	O	O	--	--	--	--	O	O					
	Relays	O	O	--	--	--	--	O	O					
	Fuses	O	O	--	--	--	--	O	O					
4010	Master or Auxiliary Control Assembly:													
	Contactors, electrical	O	O	O	--	--	--	O	O					
	Control module	O	O	--	--	--	--	O	O	F				
	Transformer	O	O	--	--	--	--	O	O					

(1) Group No.	(2) Functional group	(3) Maintenance functions A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
4011	Circuit Breakers:													
	Compressor, circuit breakers	--	O	--	--	--	--	--	O	O				
4012	Switches:													
	Selector switch	--	O	--	--	--	--	--	O					
	Evaporator fan speed switch	--	O	--	--	--	--	--	O					
	Thermostatic switches	--	O	--	--	--	--	--	O					
	Pressure switches	O	O	--	--	--	--	F	F					
4212	Heating Units:													
	Heater, electrical	O	O	--	--	--	--	O	O					
4213	Non Rotating Rectifiers													
	Rectifier	O	O	--	--	--	--	O	O					
4216	Miscellaneous Wiring and Fittings:													
	Wiring harness assemblies	O	O	--	--	--	--	O	O	O				
47	GAGES (NON-ELECTRICAL), WEIGHING AND MEASURING DEVICES													
4702	Gages, Mounting, Lines and Fittings:													
	Sight glass	O	--	--	--	--	--	--	F					
52	REFRIGERATION AND AIR CONDITIONING COMPONENTS													
5200	Gas Compressor Assembly:													
	Compressor assembly	O	O	F	--	--	--	H	H	O				
5217	Refrigerant Piping:													
	Piping	O	O	F	--	--	--	F	F	F				
	Vibration eliminators	O	O	F	--	--	--	F	F					
	Valve, solenoid, liquid	O	O	F	--	--	--	F	F	F				
	Valve, solenoid, equalization	O	O	F	--	--	--	F	F	F				
	Valve, assemblies, charging	O	--	--	--	--	--	F	F					
	Head pressure control Actuator w/cable	O	O	--	O	--	--	F	F					
	Strainer, suction	O	--	--	--	--	--	F	F					
	Valve, expansion	--	O	--	F	--	--	--	F					
	Valve, pressure relief	O	O	--	--	--	--	F	F					
	Valve, pressure regulating	O	O	--	--	--	--	F	F					
5230	Condenser:													
	Condenser, coil	O	O	O	--	--	--	F	F	F				
5241	Evaporator													
	Tubes, drain	O	--	O	--	--	--	O	O					
	Evaporator, coil	O	O	O	--	--	--	F	F	F				
	Receiver, liquid	O	O	--	--	--	--	H	H					
5245	Air Filter:													
	Filters, evaporator	O	--	O	--	--	--	O	O					

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance level	Nomenclature	Tool number
		No special tools or test equipment required.	

Section IV. REMARKS

Reference code	Remarks
	Not applicable

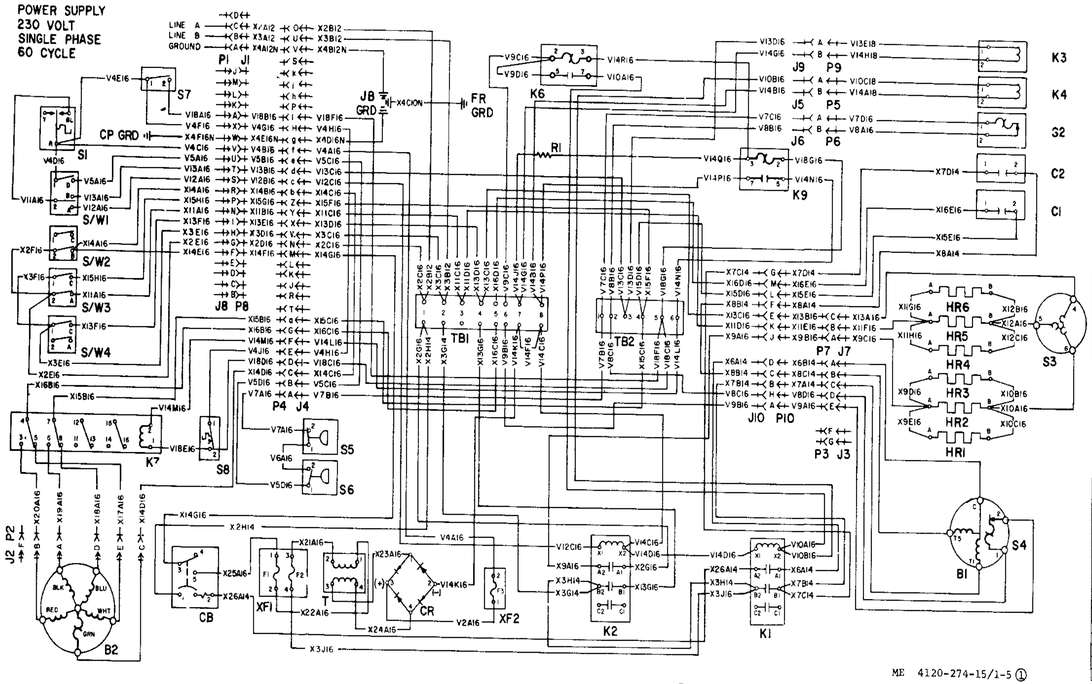


Figure 1-5 (1). Wiring diagram

ME 4120-274-15/1-5 (1)

LEGEND		
SYMBOL	PART NUMBER	DESCRIPTION
B1	D13209B41B2-4	COMPRESSOR
B2	D13214E372B-3	MOTOR ALTERNATING CURRENT
C1	D13214E3529-4	CAPACITOR DIELECTRIC 60UF, 660V
C2	D13214E3529-2	CAPACITOR DIELECTRIC 25UF 370V
CB	C13214E3711-3	CIRCUIT BREAKER
CP GRD		CONTROL PANEL GROUND
CR	C13214E3652	RECTIFIER, SEMICONDUCTOR DEVICE
F1 F2	MIL-F-15160	FUSE (TYPE FO9A250V2A)
F3	B13211E3785	FUSE
FR GRD		FRAME GROUND
HR1-6	C13214E3698-7	HEATING ELEMENT, ELECTRICAL
J1	MS3100R-20-4PY	CONNECTOR RECEPTACLE
J2	MS3102R-14S-6P	CONNECTOR RECEPTACLE
J3	MS3102R-20-15P	CONNECTOR RECEPTACLE
J4	MS3102R-32-7P	CONNECTOR RECEPTACLE
J5	MS3102R-12S-3S	CONNECTOR RECEPTACLE
J6	MS3102R-12S-3SX	CONNECTOR RECEPTACLE
J7	MS3100R-16-10P	CONNECTOR RECEPTACLE
J8	C13211E8399C2B-11P	CONNECTOR RECEPTACLE
J9	MS3102R-12S-3SZ	CONNECTOR RECEPTACLE
J10	MS3102R-28-9S	CONNECTOR RECEPTACLE
JB GRD		JUNCTION BOX GROUND
K1 K2	MS24192-D1	RELAY, 25 AMP 3 PST
K3 K4	C13214E3524	VALVE SOLENOID
K5	C13214E0752-3	RELAY TIME DELAY
K7	13216E7688	FAN RELAY
K9	C13214E0752-4	RELAY, TIME DELAY
P1	MS3106R-20-4SY	CONNECTOR PLUG
P2	MS3106R-14S-6S	CONNECTOR PLUG
P3	MS3106R-20-15S	CONNECTOR PLUG
P4	MS3106R-32-7S	CONNECTOR PLUG
P5	MS3106R-12S-3P	CONNECTOR PLUG
P6	MS3106R-12S-3PX	CONNECTOR PLUG
P7	MS3106R-16-10S	CONNECTOR PLUG
P8	MS3100R-28-11S	CONNECTOR RECEPTACLE
P9	MS3106R-12S-3PZ	CONNECTOR PLUG
P10	MS3106R-28-9P	CONNECTOR PLUG
R1	13216E7691	RESISTOR 12W 30 OHMS
S/W1-S/W4	C13211E8298	SWITCH, ROTARY
S1	C13211E8301-1	THERMOSTAT
S2	C13211E8181	THERMOSTAT
S3	B13211E8265	THERMOSTAT HEATER
S4	WITH COMPRESSOR	THERMOSTAT
S5	C13211E8404	SWITCH HIGH PRESSURE CUTOUT
S6	C13214E3794	SWITCH, LOW PRESSURE CUTOUT
S7	MS35058-22	SWITCHES, TOGGLE SP/ST
S8	13216E7688	SWITCH PRESSURE CONTROL
T	D13214E3818-4	TRANSFORMER
TB1	MIL-T-55164/3A	TERMINAL BLOCK
TB2	C13214E3804	TERMINAL BLOCK
XF1	B13211E3784	FUSE HOLDER
XF2	B13214E3811	FUSE HOLDER

Figure 1-5 (1).

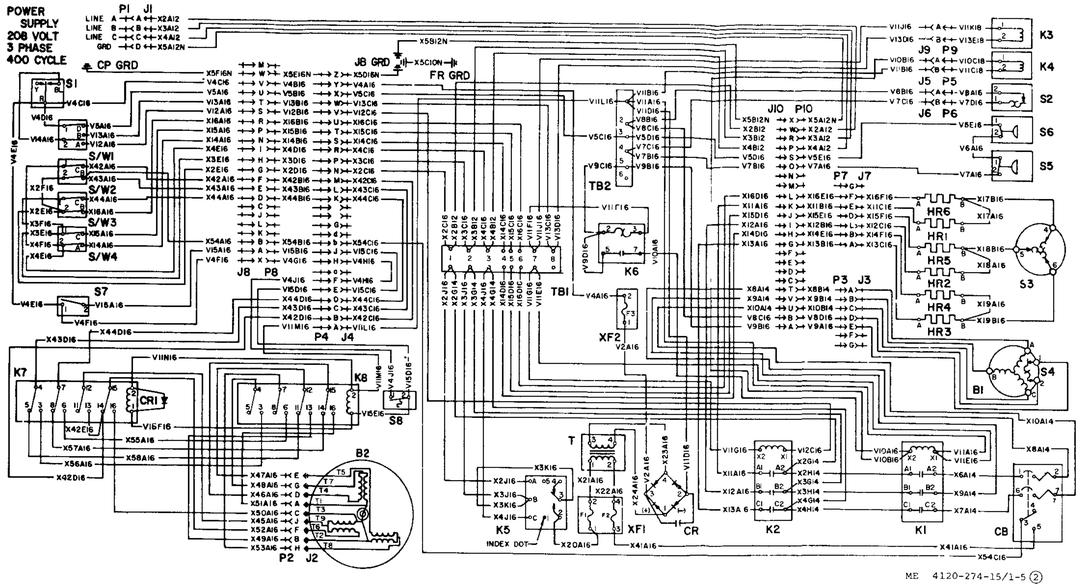


Figure 1-5 (2).—Continued

SYMBOL	PART NO	LEGEND DESCRIPTION
B1	D11208E4182-2	COMPRESSOR, ROTARY, POWER DRIVEN
B2	D13214E3748-4	MOTOR, ALTERNATING CURRENT
CB	C13214E3787-2	CIRCUIT BREAKER
CP GRD		CONTROL PANEL GROUND
CR	C13214E3652	RECTIFIER, SEMI-CONDUCTOR DEVICE
CR1	13216E7689	DIODE SURGE PROTECTOR
F1,F2	MIL-F-15160	FUSE(TYPE F09A250V2A)
F3	B11211E3785	FUSE
FR GRD		FRAME GROUND
HR1-6	C13214E3698-1	HEATING ELEMENT
J1	MS3100R-20-4P	CONNECTOR RECEPTACLE
J2	MS3100R-20-27P	CONNECTOR RECEPTACLE
J3	MS3102R-20-15P	CONNECTOR RECEPTACLE
J4	MS3102R-28-12S	CONNECTOR RECEPTACLE
J5	MS3102R-12S-3S	CONNECTOR RECEPTACLE
J6	MS3102R-12S-3SX	CONNECTOR RECEPTACLE
J7	MS3100A-16S-1PW	CONNECTOR RECEPTACLE
J8	C13211E8399C28-11P	CONNECTOR RECEPTACLE
J9	MS3102R-12S-3SZ	CONNECTOR RECEPTACLE
J10	MS3102R-32-6P	CONNECTOR RECEPTACLE
JB GRD		JUNCTION BOX GROUND
K1 K2	MS24192-D1	RELAY, 25 AMP, 3 PST N O
K3 K4	D11214E3524	VALVE, SOLENOID
K5	C13214E3487-1	RELAY, PHASE SEQUENCE
K6	C13214E0752-3	RELAY, TIME DELAY
K7 K8	13216E7688	RELAY, FAN
P1	MS3106R-20-4S	CONNECTOR PLUG
P2	MS3106R-20-27S	CONNECTOR PLUG
P3	MS3106R-20-15S	CONNECTOR PLUG
P4	MS3106R-28-12P	CONNECTOR PLUG
P5	MS3106R-12S-3P	CONNECTOR PLUG
P6	MS3106R-12S-3PX	CONNECTOR PLUG
P7	MS3106R-16S-1SW	CONNECTOR PLUG
P8	MS3100R-28-11S	CONNECTOR RECEPTACLE
P9	MS3106R-12S-3PZ	CONNECTOR PLUG
P10	MS3106R-12-6S	CONNECTOR PLUG
S/W1-S/W4	C13211E8298	SWITCH, ROTARY
S1	C13211E8301-1	THERMOSTAT
S2	C13211E8180	THERMOSTAT
S3	B13211E8265	THERMOSTAT, HEATER
S4	WITH COMPRESSOR	THERMOSTAT
S5	C13211E8404	SWITCH HIGH PRESSURE CUTOUT
S6	C13214E3794	SWITCH, LOW PRESSURE CUTOUT
S7	MS35058-22	SWITCHES, TOGGLE, SP/ST
S8	13216E7690	SWITCH PRESSURE CONTROL
T	D13214E3818-1	TRANSFORMER
TB1	MIL-T-55164/3A	TERMINAL BLOCK
TB2	C13214E3804	TERMINAL BLOCK
XF1	B13211E3784	FUSEHOLDER
XF2	B13214E3811	FUSEHOLDER

Figure 1-5 (2).

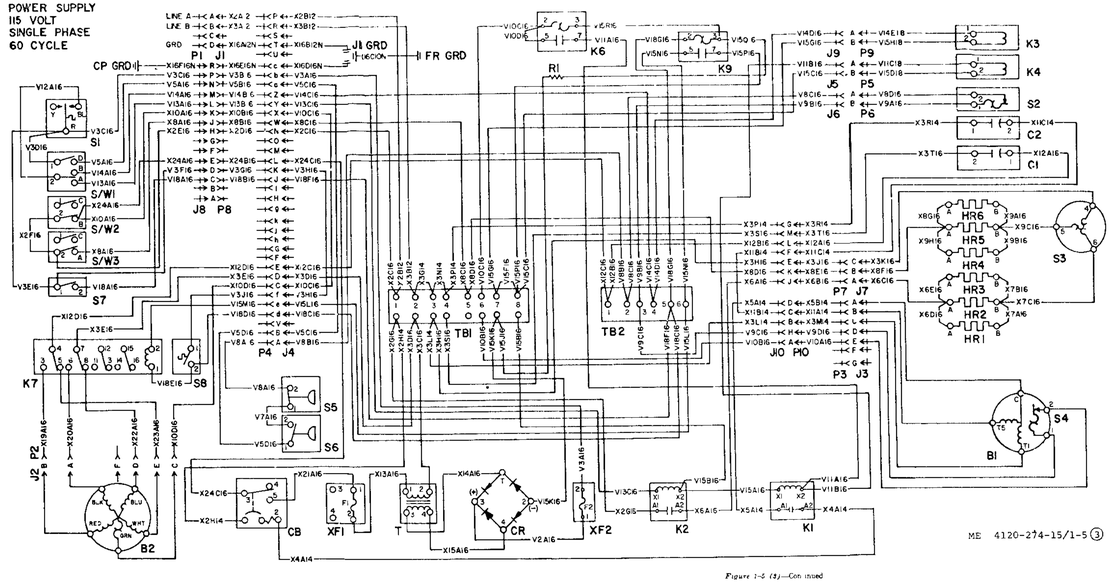


Figure 1-5 (3).—Continued

SYMBOL	PART NO	DESCRIPTION
		LEGEND
B1	D13208E4102-1	COMPRESSOR, ROTARY, POWER DRIVEN
B2	D13214E3728-8	MOTOR, ALTERNATING CURRENT
C1	C13214E3529-5	CAPACITOR 12UF 370 VOLTS
C2	C13214E3529-2	CAPACITOR 25UF 370 VOLTS
CB	C13214E3711-2	CIRCUIT BREAKER
CP GRD		CONTROL PANEL GROUND
CR	C13214E3652	RECTIFIER, SEMI-CONDUCTOR DEVICE
F1	MIL-F-15160	FUSE(TYPE FO9A250V3A)
F2	B13211E3785	FUSE
FR GRD		FRAME GROUND
HR1-6	C13214E3698-1	HEATING ELEMENT
J1	MS3100R-20-4PX	CONNECTOR RECEPTACLE
J2	MS3102R-14S-6P	CONNECTOR RECEPTACLE
J3	MS3102R-20-15P	CONNECTOR RECEPTACLE
J4	MS3102R-32-7P	CONNECTOR RECEPTACLE
J5	MS3102R-12S-3S	CONNECTOR RECEPTACLE
J6	MS3102R-12S-3SX	CONNECTOR RECEPTACLE
J7	MS3100R-16-10P	CONNECTOR RECEPTACLE
J8	C13211E8399C-28-17P	CONNECTOR RECEPTACLE
J9	MS3102R-12S-3SZ	CONNECTOR RECEPTACLE
J10	MS3102R-28-9S	CONNECTOR RECEPTACLE
JB GRD		JUNCTION BOX GROUND
K1 K2	C13214E3403	RELAY, 25 AMP
K3 K4	C13214E3524	VALVE SOLENOID
K6	C13214E0752-3	RELAY, TIME DELAY
K7	13216E7688	RELAY, FAN
K9	C13214E0752-4	RELAY, TIME DELAY
P1	MS3106R-20-4SX	CONNECTOR PLUG
P2	MS3106R-14S-6S	CONNECTOR PLUG
P3	MS3106R-20-15S	CONNECTOR PLUG
P4	MS3106R-32-7S	CONNECTOR PLUG
P5	MS3106R-12S-3P	CONNECTOR PLUG
P6	MS3106R-12S-3PX	CONNECTOR PLUG
P7	MS3106R-16-10S	CONNECTOR PLUG
P8	MS3100R-28-17S	CONNECTOR RECEPTACLE
P9	MS3106R-12S-3PZ	CONNECTOR PLUG
P10	MS3106R-28-9P	CONNECTOR PLUG
R1	13216E7691	RESISTOR, 12W 30 OHMS
S1	C13211E8301-1	THERMOSTAT
S2	C13211E8180	THERMOSTAT
S3	B13211E8265	THERMOSTAT HEATER
S4	WITH COMPRESSOR	THERMOSTAT
S5	C13211E8404	SWITCH, HIGH PRESSURE CUTOUT
S6	C13214E3794	SWITCH LOW PRESSURE CUTOUT
S7	MS35058-22	SWITCHES, TOGGLE SP/ST
S8	13216E7690	SWITCH, PRESSURE CONTROL
S/W1-S/W3	C13211E8298	SWITCH, ROTARY
T	D13214E3818-2	TRANSFORMER
TB1	MIL-T-55164/3A	TERMINAL BLOCK
TB2	C13214E3804	TERMINAL BLOCK
XF1	B13211E3784	FUSEHOLDER
XF2	B13214E3811	FUSEHOLDER

Figure 1-5 (3).

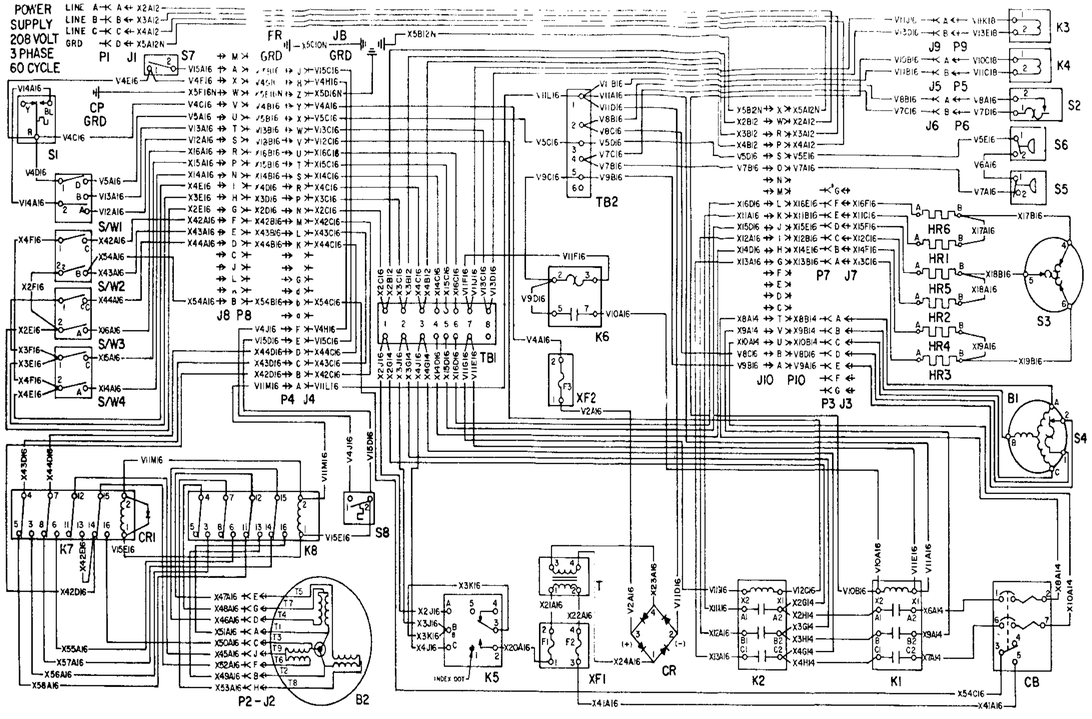


Figure 1-5 (4)—Continued

SYMBOL	PART NO	LEGEND DESCRIPTION
B1	D13211E4184-3	COMPRESSOR, ROTARY, POWER DRIVEN
B2	D13J14E.728-7	MOTOR, ALTERNATING CURRENT
CB	C13214E3787-3	CIRCUIT BREAKER
CP GRD		CONTROL PANEL GROUND
CR	C13214E3652	RECTIFIER, SEMI-CONDUCTOR DEVICE
CR1	13216E7689	DIODE SURGE PROTECTOR
F1,F2	MIL-F-15160	FUSE(TYPE FO9A250V2A)
F3	B13211E3785	FUSE
FR GRD		FRAME GROUND
HR1-6	C13214E3698-1	HEATING ELEMENT
J1	MS3100R-20-4P	CONNECTOR RECEPTACLE
J2	MS3102R-20-27P	CONNECTOR RECEPTACLE
J3	MS3102R-20-15P	CONNECTOR RECEPTACLE
J4	MS3102R-28-12S	CONNECTOR RECEPTACLE
J5	MS3102R-12S-3S	CONNECTOR RECEPTACLE
J6	MS3102R-12S-3SX	CONNECTOR RECEPTACLE
J7	MS3100R-16S-1PW	CONNECTOR RECEPTACLE
J8	C13211E8399C28-11P	CONNECTOR RECEPTACLE
J9	MS3102R-12S-3SZ	CONNECTOR RECEPTACLE
J10	MS3102R-32-6P	CONNECTOR RECEPTACLE
JB GRD		JUNCTION BOX GROUND
K1 K2	MS24192-D1	RELAY, 25 AMP, 3 PST
K3,K4	C13214E3524	VALVE, SOLENOID
K5	C13214E3487-2	RELAY, PHASE SEQUENCE
K6	C13214E0752-3	RELAY, TIME DELAY
K7 K8	13216E7688	RELAY, FAN
P1	MS3106R-20-4S	CONNECTOR PLUG
P2	MS3106R-20-27S	CONNECTOR PLUG
P3	MS3106R-20-15S	CONNECTOR PLUG
P4	MS3106R-28-12P	CONNECTOR PLUG
P5	MS3106R-12S-3P	CONNECTOR PLUG
P6	MS3106R-12S-3PX	CONNECTOR PLUG
P7	MS3106R-16S-1SW	CONNECTOR PLUG
P8	MS3100R-28-11S	CONNECTOR RECEPTACLE
P9	MS3106R-12S-3PZ	CONNECTOR PLUG
P10	MS3106R-32-6S	CONNECTOR PLUG
S/W1-S/W4	C13211E8298	SWITCH, ROTARY
S1	C13211E8301-1	THERMOSTAT
S2	C13211E8180	THERMOSTAT
S3	B13211E8265	THERMOSTAT, HEATER
S4	WITH COMPRESSOR	THERMOSTAT
S5	C13211E8404	SWITCH, HIGH PRESSURE CUTOUT
S6	C13214E3794	SWITCH, LOW PRESSURE CUTOUT
S7	MS35058-22	SWITCHES, TOGGLE, SP/ST
S8	13216E7690	SWITCH PRESSURE CONTROL
T	D13214E3618-3	TRANSFORMER
TB1	MIL-T-55164/3A	TERMINAL BLOCK
TB2	C13214E3804	TERMINAL BLOCK
XF1	B13211E3784	FUSEHOLDER
XF2	B13214E3811	FUSEHOLDER

ME 4120-274-15/1-5 ④

Figure 1-5 (4).

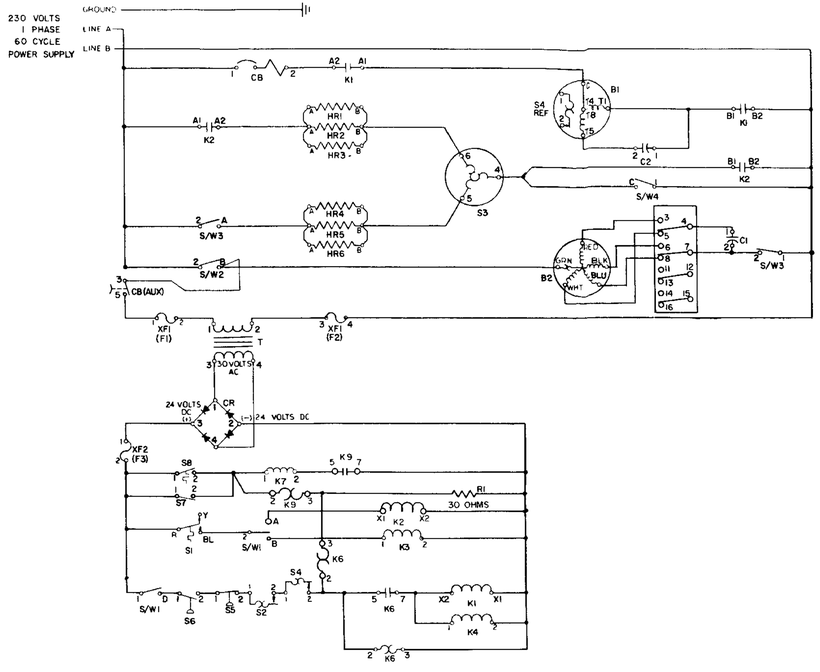


Figure 1-6 (1) Wiring schematic.

LEGEND	
SYMBOL	DESCRIPTION
B1	COMPRESSOR MOTOR
B2	FAN MOTOR
C1	CAPACITOR, FAN MOTOR, 6 UF, 660 V
C2	CAPACITOR, COMPRESSOR MOTOR, 25 UF, 370 V
CB	CIRCUIT BREAKER
CR	RECTIFIER, SEMICONDUCTOR DEVICE
F1 - F3	FUSE
HR1 - 6	HEATING ELEMENT
K1	RELAY, COMPRESSOR
K2	RELAY, HEATER
K3	SOLENOID VALVE, LIQUID LINE
K4	SOLENOID VALVE, PRESSURE EQUALIZATION
K6	RELAY, TIME DELAY
K7	RELAY, FAN SPEED
K9	RELAY, TIME DELAY
R1	RESISTOR, 12 W, 30 OHMS
S/W1-S/W4	ROTARY SWITCH
S1	THERMOSTAT, TEMPERATURE CONTROLLER
S2	THERMOSTAT, OUTSIDE AIR
S3	THERMOSTAT, HEATER COMPARTMENT
S4	THERMOSTAT, COMPRESSOR MOTOR
S5	SWITCH, HIGH PRESSURE CUT-OUT
S6	SWITCH, LOW PRESSURE CUT-OUT
S7	SWITCH, FAN SPEED BYPASS
S8	SWITCH, HIGH PRESSURE FAN SPEED
T	TRANSFORMER
XF1, XF2	FUSEHOLDER

SWITCH POSITION						
	CONTACT NO	1 HI HEAT	2 LO HEAT	3 OFF	4 VENT	5 COOL
S/W1	2 & A	CLOSED	CLOSED	OPEN	OPEN	OPEN
	2 & B	OPEN	OPEN	OPEN	OPEN	CLOSED
	1 & D	OPEN	OPEN	OPEN	OPEN	CLOSED
S/W2	2 & B	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
	1 & C	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
S/W3	2 & A	CLOSED	OPEN	OPEN	OPEN	OPEN
S/W4	2 & A	CLOSED	OPEN	OPEN	OPEN	OPEN
	1 & C	CLOSED	OPEN	OPEN	OPEN	OPEN

ME 4120-274-15/1-6 (1)
Figure 1-6 (1).

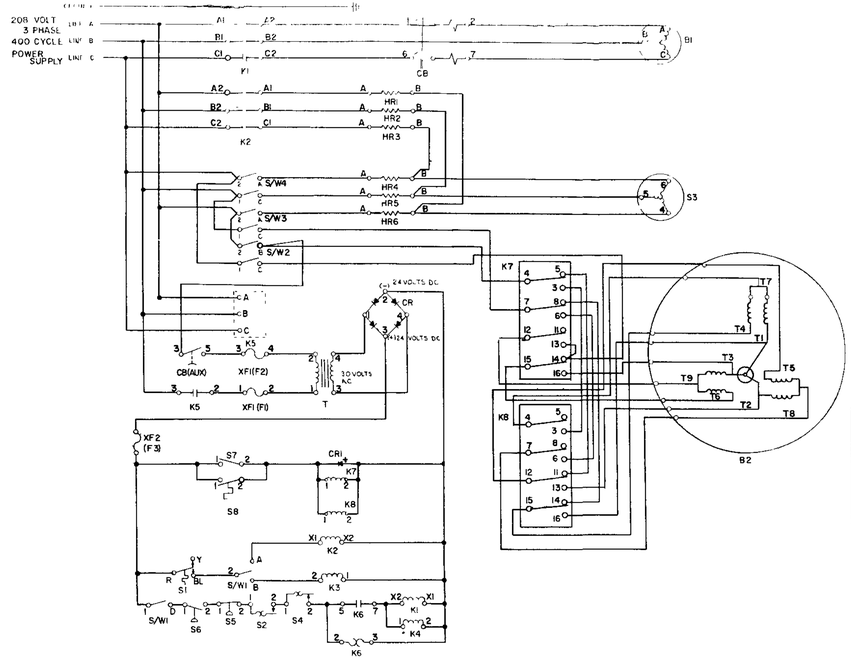


Figure 1-6 (2)—Continued

SYMBOL	DESCRIPTION
B1	COMPRESSOR MOTOR
B2	FAN MOTOR
CB	CIRCUIT BREAKER
CR	RECTIFIER, SEMICONDUCTOR DEVICE
CR1	DIODE
F1,F2,F3	FUSE
HR1-6	HEATING ELEMENT
K1	RELAY, COMPRESSOR
K2	RELAY, HEATER
K3	SOLENOID VALVE, LIQUID LINE
K4	SOLENOID VALVE, PRESSURE EQUALIZATION
K5	RELAY, PHASE SEQUENCE
K6	RELAY, TIME DELAY
K7	RELAY, FAN
K8	RELAY, FAN
S	SWITCH, ROTARY
S1	THERMOSTAT, TEMPERATURE CONTROLLER
S2	THERMOSTAT, OUTSIDE AIR
S3	THERMOSTAT, HEATER COMPARTMENT
S4	THERMOSTAT, COMPRESSOR MOTOR
S5	SWITCH, HIGH PRESSURE CUT-OUT
S6	SWITCH, LOW PRESSURE CUT-OUT
S7	SWITCH, FAN BYPASS
S8	SWITCH, HIGH PRESSURE FAN SPEED
T	TRANSFORMER
XF1,XF2	FUSEHOLDER

	CONTACT NO	1 HI HEAT	2 LO HEAT	3 OFF	4 VENT	5 COOL
		SWITCH POSITION				
S/W1	2 & A	CLOSED	CLOSED	OPEN	OPEN	OPEN
	2 & B	OPEN	OPEN	OPEN	OPEN	CLOSED
	1 & D	OPEN	OPEN	OPEN	OPEN	CLOSED
S/W2	2 & B	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
	1 & C	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
S/W3	2 & A	CLOSED	OPEN	OPEN	OPEN	OPEN
	1 & C	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
S/W4	2 & A	CLOSED	OPEN	OPEN	OPEN	OPEN
	1 & C	CLOSED	OPEN	OPEN	OPEN	OPEN

ME 4120-274-15/1-6 ②
Figure 1-6 (2).

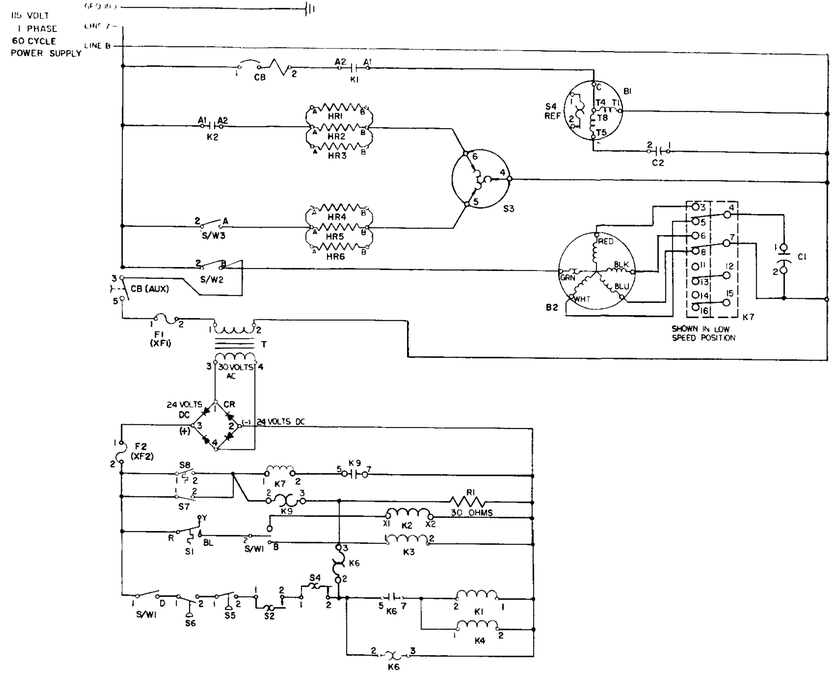


Figure 1-6 (3)—Continued

LEGEND	
SYMBOL	DESCRIPTION
B1	COMPRESSOR MOTOR
B2	FAN MOTOR
C1	CAPACITOR, FAN MOTOR, 12 UF, 370 V
C2	CAPACITOR, COMPRESSOR MOTOR, 25 UF, 370 V
CB	CIRCUIT BREAKER
CR	RECTIFIER, SEMICONDUCTOR DEVICE
F1, F2	FUSE
HR1-6	HEATING ELEMENT
K1	RELAY, COMPRESSOR
K2	RELAY, HEATER
K3	SOLENOID VALVE, LIQUID LINE
K4	SOLENOID VALVE, PRESSURE EQUALIZATION
K6	RELAY, TIME DELAY
K7	RELAY, FAN SPEED
K9	RELAY, TIME DELAY
R1	RESISTOR, 12 W, 30 OHMS
S/W1-S/W3	ROTARY SWITCH
S1	THERMOSTAT, TEMPERATURE CONTROLLER
S2	THERMOSTAT, OUTSIDE AIR
S3	THERMOSTAT, HEATER COMPARTMENT
S4	THERMOSTAT, COMPRESSOR MOTOR
S5	SWITCH, HIGH PRESSURE CUT-OUT
S6	SWITCH, LOW PRESSURE CUT-OUT
S7	SWITCH, FAN SPEED BYPASS
S8	SWITCH, HIGH PRESSURE FAN SPEED
T	TRANSFORMER
XF1, XF2	FUSEHOLDER

SWITCH POSITION						
	CONTACT NO.	1 HI HEAT	2 LO HEAT	3 OFF	4 VENT	5 COOL
S/W1	2 & A	CLOSED	CLOSED	OPEN	OPEN	OPEN
	2 & B	OPEN	OPEN	OPEN	OPEN	CLOSED
	1 & D	OPEN	OPEN	OPEN	OPEN	CLOSED
S/W2	2 & B	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
S/W3	2 & A	CLOSED	OPEN	OPEN	OPEN	OPEN

ME 4120-274-15/1-6 (3)
Figure 1-6 (3).

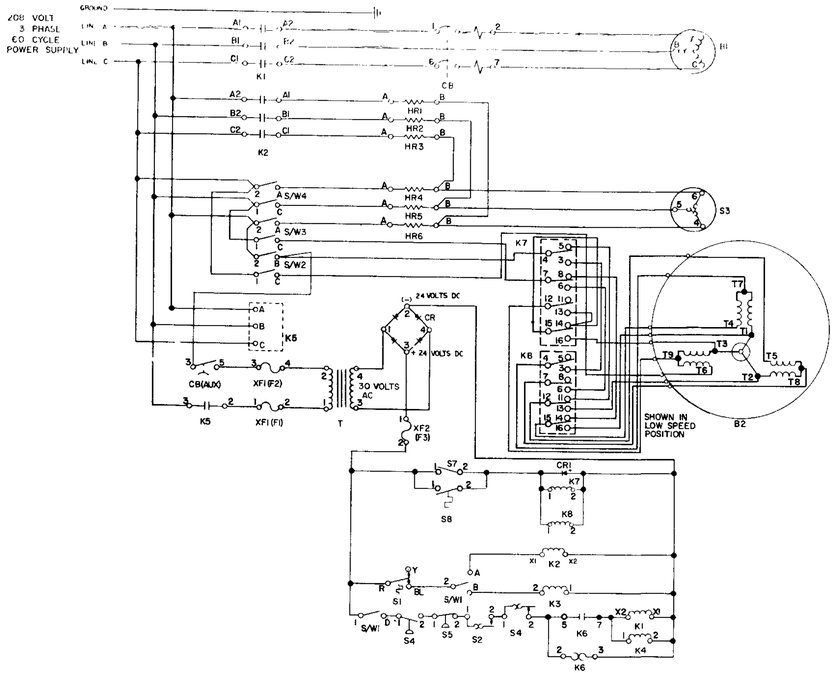


Figure 1-6 (4)—Continued

SYMBOL	LEGEND DESCRIPTION
B1	COMPRESSOR MOTOR
B2	FAN MOTOR
CB	CIRCUIT BREAKER
CR	RECTIFIER, SEMICONDUCTOR DEVICE
CR1	DIODE
F1,F2,F3	FUSE
HR1-6	HEATING ELEMENT
K1	RELAY, COMPRESSOR
K2	RELAY, HEATER
K3	SOLENOID VALVE, LIQUID LINE
K4	SOLENOID VALVE, PRESSURE EQUALIZATION
K5	RELAY, PHASE SEQUENCE
K6	RELAY, TIME DELAY
K7	RELAY, FAN
K8	RELAY, FAN
S	SWITCH, ROTARY
S1	THERMOSTAT, TEMPERATURE CONTROLLER
S2	THERMOSTAT, OUTSIDE AIR
S3	THERMOSTAT, HEATER COMPARTMENT
S4	THERMOSTAT, COMPRESSOR MOTOR
S5	SWITCH, HIGH PRESSURE CUT-OUT
S6	SWITCH, LOW PRESSURE CUT-OUT
S7	SWITCH, FAN BYPASS
S8	SWITCH, HIGH PRESSURE FAN SPEED
T	TRANSFORMER
XF1,XF2	FUSEHOLDER

		SWITCH POSITION				
	CONTACT NO.	1 HI HEAT	2 LO HEAT	3 OFF	4 VENT	5 COOL
S/W1	2 & A	CLOSED	CLOSED	OPEN	OPEN	OPEN
	2 & B	OPEN	OPEN	OPEN	OPEN	CLOSED
	1 & D	OPEN	OPEN	OPEN	OPEN	CLOSED
S/W2	2 & B	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
	1 & C	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
S/W3	2 & A	CLOSED	OPEN	OPEN	OPEN	OPEN
	1 & C	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
S/W4	2 & A	CLOSED	OPEN	OPEN	OPEN	OPEN
	1 & C	CLOSED	OPEN	OPEN	OPEN	OPEN

Figure 1-6 (4).

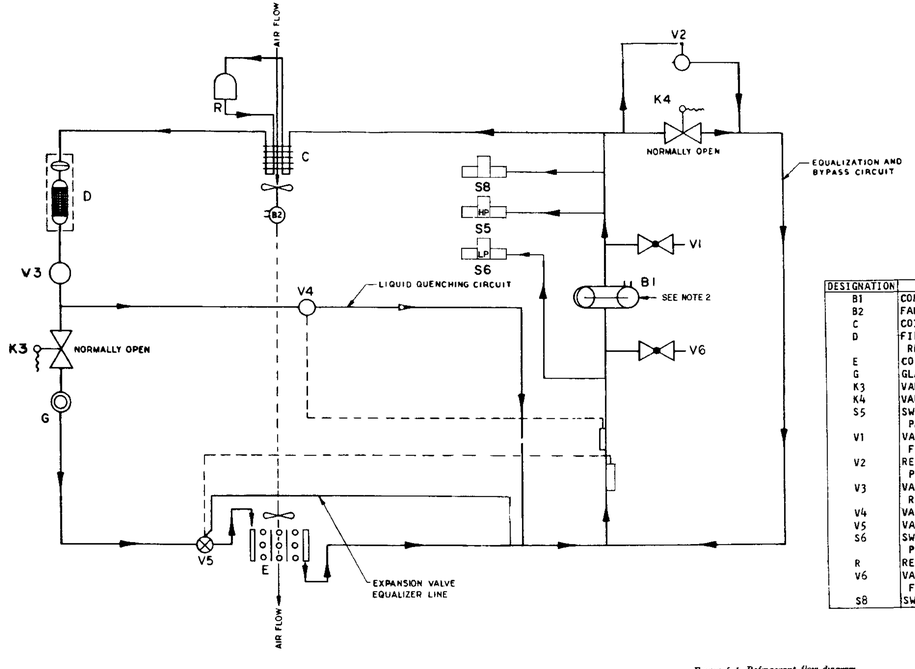


Figure 5-1 Refrigerant flow diagram.

NOTE:

1. REFRIGERANT 22 PER BB-C-310.
   150° F CONDENSING TEMPERATURE
   50° F SUCTION TEMPERATURE
   120° F MAXIMUM OUTSIDE AMBIENT
   160° F MAXIMUM RETURN AIR TEMPERATURE
   70° F MINIMUM RETURN AIR TEMPERATURE
   50° F MINIMUM AMBIENT

2 MOTOR - COMPRESSOR, ROTARY, HERMETICALLY SEALED, OIL CHARGED.

		NEXT ASSEMBLY					
		D13214E3455-1	D13214E3455-2	D13214E3755-3	D13214E3755-1	D13214E3755-2	D13214E3755-4
DESIGNATION	NAME	DRAWING NUMBER					
B1	COMPRESSOR	D13214E3538-2	D13214E3538-1	D13208E4182-2	D13208E4182-1	D13208E4182-3	D13208E4182-4
B2	FAN MOTOR	D13214E3728-2	D13214E3728-1	D13214E3728-4	D13214E3728-8	D13214E3728-7	D13211E8275-3
C	COIL, CONDENSER	D13214E3553	D13214E3553	D13214E3708	D13214E3708	D13214E3708	D13214E3708
D	FILTER-DRIER, REFRIGERANT	C13214E3557	C13214E3557	C13214E3793	C13214E3793	C13214E3793	C13214E3793
E	COIL, EVAPORATOR	D13214E3554	D13214E3554	D13214E3709	D13214E3709	D13214E3709	D13214E3709
G	GLASS, SIGHT	C13211E8218	C13211E8218	C13211E8218	C13211E8218	C13211E8218	C13211E8218
K3	VALVE, SOLENOID	C13214E3524	C13214E3524	C13214E3524	C13214E3524	C13214E3524	C13214E3524
K4	VALVE, SOLENOID	C13214E3524	C13214E3524	C13214E3524	C13214E3524	C13214E3524	C13214E3524
S5	SWITCH, HIGH PRESSURE CUTOUT	C13211E8404	C13211E8404	C13211E8404	C13211E8404	C13211E8404	C13211E8404
V1	VALVE, ACCESS FITTING	B44532-102	B44532-102	B44532-102	B44532-102	B44532-102	B44532-102
V2	REGULATOR, FLUID PRESSURE	C13214E3742	C13214E3742	C13214E3742	C13214E3742	C13214E3742	C13214E3742
V3	VALVE, PRESSURE RELIEF	B13211E8369	B13211E8369	B13211E8369	B13211E8369	B13211E8369	B13211E8369
V4	VALVE, EXPANSION	C13214E3785	C13214E3785	C13214E3785	C13214E3785	C13214E3785	C13214E3785
V5	VALVE, EXPANSION	C13214E3568-1	C13214E3568-1	C13214E3568-2	C13214E3568-2	C13214E3568-2	C13214E3568-2
S6	SWITCH, LOW PRESSURE CUTOUT	C13214E3794	C13214E3794	C13214E3794	C13214E3794	C13214E3794	C13214E3794
R	RECEIVER	C13214E3798-1	C13214E3798-1	C13214E3798-2	C13214E3798-2	C13214E3798-2	C13214E3798-2
V6	VALVE, ACCESS FITTING	B44532-101	B44532-101	B44532-101	B44532-101	B44532-101	B44532-101
S8	SWITCH, PRESSURE	C44538-101	C44538-101	C44538-101	C44538-101	C44538-101	C44538-101

Figure 5-1.

INDEX

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
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Major *General, United States Army,*
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