DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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

AIR CONDITIONER, BASE-MOUNTED, SELF-CONTAINED LIGHTWEIGHT, AIR-COOLED, 38,000 BTU/HR COOLING AND 35,000 BTU/HR HEATING CAPACITY; FAIRCHILD STRATOS MODEL VEA4-3A, PN 107201 (FSN 4120-926-4280)

This copy is a reprint which includes current pages from Changes 2 through 5.

HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 1968

SAFETY PRECAUTIONS

The operating voltage of this air conditioner is dangerous to persons coming in contact with any part of the electrical system. Severe, possibly fatal, shock may result. Disconnect the power source before performing any maintenance or inspection, other than operating tests of the air conditioner.

The refrigerant used in the air conditioner (refrigerant-12) is injurious to the eyes and skin. Wear goggles and gloves to avoid injury. If l*ea*ks occur in the refrigerant system, immediately and thoroughly ventilate the area.

Purge the system refrigerant charge completely prior to opening the system for maintenance and repair.

Refrigerant-12 decomposes in the presence of fire, forming a toxic gas. Do not release the refrigerant when a torch or other flame-producing apparatus is being used.

Do not connect the master power cable unless the master circuit breaker is in the OFF position.

Avoid breathing smoke when using the monobromotrifluoromethane-type fire extinguisher.

Changes in force: C2, C3, C4, C5, C6 and C7

C7

CHANGE
NO. 7

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

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

AIR CONDITIONER, BASE MOUNTED, SELF-CONTAINED,
LIGHTWEIGHT, AIR COOLED, 38,000 BTU/HR COOLING AND
35,000 BTU/HR HEATING CAPACITY
(FAIRCHILD-STRATOS MODEL VEA4-3A, P/N 107201
NSN 4120-00-926-4280

Approved for public release; distribution is unlimited

TM 5-4120-287-15, 15 July 1968, is changed as follows:

Page 1-1, paragraph 1-1b is superseded as follows:

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

Page 7-2 is changed as follows:

- Preceding paragraph 7-5a., Adding Refrigerant, insert the following note:

NOTE

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

Page 7-4 is changed as follows:

- Preceding paragraph 7-7a, Discharging Refrigerant System, insert the following note:

NOTE

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

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

- Paragraph 7-7c is superseded as follows:

(c) Connect and operate recovery/recycle unit in accordance with the manufacturers instructions.

- Delete paragraphs 7-7d and 7-7e.

Page 7-4 (cont.):

- Preceding paragraph 7-9a., Charging Refrigerant System, insert the following note:

NOTE

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

Page C-4 is changed as follows:

- Add following text to Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS as shown:

Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
	F-H	RECOVERYAND RECYCLING UNIT, REFRIGERANT	4130-01-338-2707	17500B (07295)

By Order of the Secretary of the Army:

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

Official

MILTON H. HAMILTON
Administrative Assistant to the Secretary of the Army
01686

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25E, qty rqr block no. 0019.

PIN: 026142-007
U.S. GOVERNMENT PRINTING OFFICE: 1992 - 654-028/60264

Changes in force: C2, C3, C4, C5, and C6

CHANGE NO.6

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

Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual
AIR CONDITIONER, BASE MOUNTED, SELF-CONTAINED,
LIGHTWEIGHT, AIR COOLED, 38,000 BTU/HR COOLING AND
35,000 BTU/HR HEATING CAPACITY
(FAIRCHILD-STRATOS MODEL VEA4-3A, P/N 107201)
NSN 412040-926-4280

Approved for public release; distribution is unlimited

TM 5-4120-287-15, 15 July 1968 is changed as follows:

Page 2-8, paragraph 2-12.1 is added as follows:

2-12.1. Operation in Extreme Heat.

NOTE

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

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

b. Protection.

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

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

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

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

NOTE

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

c. Cleaning.

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

Page 2-9, paragraph 2-13 is superseded as follows:

2-13. Operation in Dusty or Sandy Conditions.

NOTE

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

C6

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

CAUTION

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

b. Protection.

(1) Shield the air conditioner from dust as much as possible.

(2) Take advantage of any natural barriers, which offer protection.

(3) Limit the amount of dusty or sandy outside air introduced through the fresh air damper.

(4) Roll down and secure the fabric cover on the back of the cabinet during periods of shutdown.

c. Cleaning.

(1) Keep the air conditioner as clean as possible.

(2) Pay particular attention to the outside grilles, condenser, filters, mist eliminator, louvers, and electrical components.

(3) In extreme conditions, daily cleaning of condenser, filters, and outside grilles may be necessary.

By Order of the Secretary of the Army:

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

Official:

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

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25E, (qty rqr block no. 0019)

*U.S. GOVERNMENT PRINTING OFFICE: 1991 554-123/20185

PIN: 026142-006

Changes in force: C2, C3, C4 and C5

C 5

CHANGE

NO. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 14 April 1988

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

AIR CONDITIONER, BASE MOUNTED, SELF-CONTAINED, LIGHTWEIGHT, AIR COOLED, 38,000 BTU/HR COOLING AND 35,000 BTU/HR HEATING CAPACITY (FAIRCHILD-STRATOS MODEL VEA4-3A, P/N 107201)
NSN 4120-00-926-4280

TM 5-4120-287-15, 15 July 1968, is changed as follows:

Page 1-17, figure 1-9, is superseded as follows:

By Order of the Secretary of the Army:

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

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25A, Operator, Unit, Direct Support and General Support Maintenance Requirements for Air Conditioner, Base Mounted, Air Cooled, self-contained, 38,000 BTU Cool/35,OOO BTU Heat (VEA4-3A).

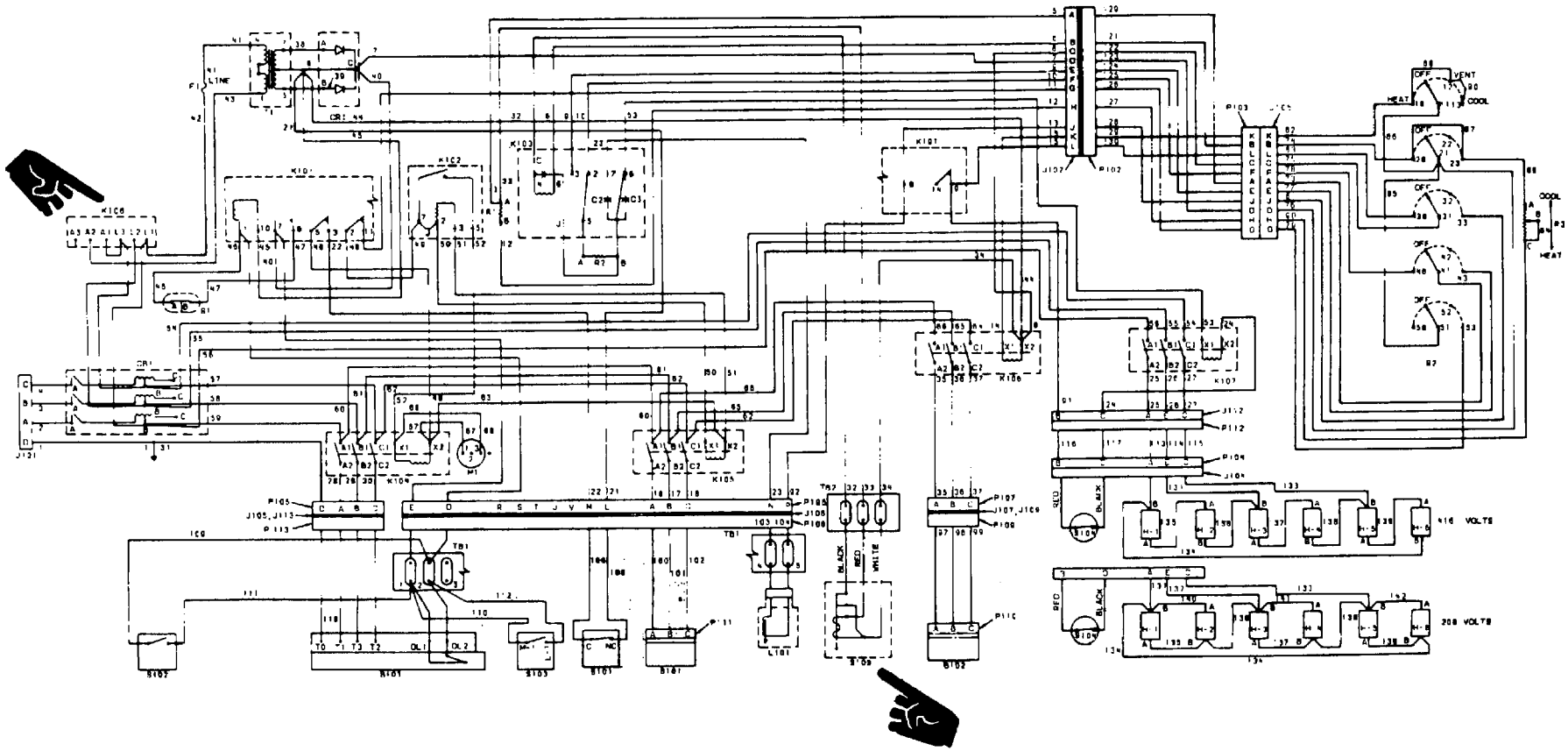


Figure 1-9. Air conditioner electrical system wiring diagram.

Changes in force: C2, C3 and C4

C4

CHANGE

NO. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *3 July 1978*

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

AIR CONDITIONER, BASE MOUNTED, SELF-CONTAINED,
LIGHTWEIGHT, AIR COOLED, 38,000 BTU/HR COOLING AND
35,000 BTU/HR HEATING CAPACITY (FAIRCHILD-STRATOS
MODEL VEA4-3A, P/N 107201)
NSN 4120-00-926-4280

TM 5-4120-287.15, 15 July 1968, is changed as follows:

Page 1-1. Paragraph 1-1d, lines 6 thru 9 change to read: "forward direct to Commander, U.S. Army Troop Support and Aviation Materiel Readiness Command. ATTN: DRSTS-MTPS, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120.

Page 1.11. Paragraph 1-4b. (18), line 4, change model number FR-3S-ND-28 to FR3SNO28.

Page 1-17. Figure 1-9, make the following changes:

(1) T1 pin 6 is shown connected to pin C of CR1 (top, left). Delete this connection.

(2) K108 does not have a wire on pin A3 as shown. The wire shown as pin A3 should go to pin A1.

(3) Contacts between overloads OL1 and OL2 are incorrectly shown in the normally closed posi tion, mark these contacts normally open (NO).

Page 6-1. Table 6-1, make the following changes:

(1) The continuity check between pins A-E should indicate continuity (C) when the switch is set to the COOL" position.

(2) Add continuity check for pins G-D. Continuity should be present in the "COOL" position and open (O) in the other positions.

Page 6-5. Paragraph 6-6c, after last sentence add:

A replacement pressure switch may be supplied without capillary tubes. This type pressure switch would contain 1/4-inch male flare connections and can be installed by utilizing existing capillary tubes from the original pressure switch as follows:

(1) Discharge the refrigerant system (para. 7-7)

(2) Cut capillary tubes close to base of original pressure switch leaving other ends brazed in place on the respective high and low refrigerant line tee fittings.

(3) Braze a short piece of 1/4-inch O. D. copper tubing, approximately 2 inches long, to cut end each capillary tube.

(4) Install 1/4-inch flare nut on each capillary tube and flare ends of copper tubing added in step (3) above. The flare nuts and capillary tubes will remain permanently installed on the refrigerant lines.

(5) Connect capillary tubes to their respective high and low outlet on new pressure switch.

(6) Refer to Chapter 7, leak test, evacuate, add compressor-lubricating oil, and charge refrigerant

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25C, Operator maintenance requirements for Air Conditioners, 38,000 BTU.

Changes in force: C 2 and C 3

C3

CHANGE

No.3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 March 1975

**Operator, Organizational, Direct Support,
General Support and Depot Maintenance Manual
AIR CONDITIONER, BASE MOUNTED, SELF-CONTAINED,
LIGHTWEIGHT, AIR COOLED, 38,000 BTU/HR COOLING AND
35,000 BTU/HR HEATING CAPACITY (FAIRCHILD-STRATOS
MODEL VEA4-3A, P/N 107201)
NSN 4120-00-9264280**

TM 4120-287-15, July 1968, is changed as follows:
Title is changed as shown above.
Page 2 of Cover. Add the following warning to the list of precautions:

WARNING

The burning of polyurethane forms 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 a paint spray booth should be used. Air supplied respirators, approved by the National Institute for Occupational Safety and Health or the US Bureau of Mines, should be used for all welding in confined spaces and when ventilation is inadequate. Individuals who have chronic or recurrent respiratory conditions, including allergies and asthma, should not be employed in this type of environment.

Page 7-6, paragraph 7-14*a*. Add the following warning.

WARNING

The burning of polyurethane forms 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 a paint spray booth should be used. Air supplied respirators, approved by the National Institute for Occupational Safety and Health or the US Bureau of Mines, should be used for all welding in confined spaces and when ventilation is inadequate. Individuals who have chronic or recurrent respiratory conditions, including allergies and asthma, should not be employed in this type of environment.

By Order of the Secretary of the Army:

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

Official:

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

Distribution:

To be distributed in accordance with DA Form 12-25C (qty rqr block No. 566), organizational maintenance requirements for Environmental Equipment, Air Conditioners, 38,000 BTU.

Change in force: C 2

***C 2**

Change
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D C, *19 April 1973*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual
AIR CONDITIONER, BASE-MOUNTED, SELF-CONTAINED, LIGHTWEIGHT, AIR-COOLED, 38,000 BTU/HR COOLING AND 35,000 BTU/HR HEATING CAPACITY; (FAIRCHILD-STRATOS MODEL VEA4-3A, PN107201)
FSN 4120-926-4280

TM 5-4120-287-15, 15 July 1968, is changed as follows:

Page 1-1. Paragraph 1-1 is superseded as follows

1-1. Scope

a. This manual is for your use in operating and maintaining the air conditioner.

b. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA forms 2028 (Recommended Changes to Publications) and forwarded direct to: Commander, US Army Mobility Equipment Commander, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished directly to you. Paragraph 1-2 is superseded as follows:

1-2. Maintenance Forms and Records

Maintenance forms and records that you are required to use are explained in TM 38-750.

Page 1-17, figure 1-9. In the bottom center of the illustration, "S101" is changed to read "S105".

Page 3-2, paragraph 3-6. In line 3, "figure 3-1" changed to read "table 3-1".

Paragraph 3-7b. In line 3, "figure 3-2" is changed to read "table 3-2".

Table 3-1 is added as follows:

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services *W-Weekly*

Internal And Sequence No.		*Item to be Inspected*
D	W	*Procedure*
1		REFRIGERANT LIQUID SIGHT GLASS Inspect refrigerant condition at sight glass for condition of refrigerant in system while unit is operating with air conditioning switch in cool, and temperature control set in MAXIMUM COOL position. Milky flow indicates moisture, bubbles indicate low charge. Report either condition to organizational maintenance.
2		FILTER CLEAN INDICATORS Inspect filter clean indicators while air conditioning is operating. Clean or replace filter when indicator ball rises to SERVICE position (para. 3-1, 3-12.)
3		FUSE INDICATOR Indicator will glow if fuse is defective. Replace defective fuse (para. 3-9).
4		CONTROLS AND INSTRUMENTS Inspect controls and instruments for loose mounting and any damage that would affect operation of controls.

***This change supersedes C1, 17 May 1972.**

Table 3-2 is added as follows:

Table 3-2. Organizational Preventive Maintenance Checks and Services

Q-Quarterly

Sequence Number	*Item to be Inspected Procedure*	*Work Time (M/H)*
1.	EVAPORATOR BLOWER WHEEL Inspect blower wheel for accumulation of dirt or lint on wheel blades. Clean wheel with brush.	
2	EVAPORATOR ASSEMBLY AND MIST ELIMINATOR Inspect evaporator coil and mist eliminator for accumulation of dirt clogging air flow. Clean evaporator coils and fins with soft brush and compressed air Wash mist eliminator with water.	
3	CONDENSER ASSEMBLY Inspect condenser coil and fins for accumulation of dirt and lint. Clean condenser coils and fins with soft brush and compressed air.	
4	CONTROLS AND INSTRUMENTS Inspect controls and instruments on electrical tray panel and remote control box for operation.	

Pages 3-3 and 3-4. Figure 3-1 is rescinded.
Pages 3-5 and 3-6. Figure 3-2 is rescinded.
Page 6-1. In table 6-1, line AE, "0-0-0-0" is changed to read "0-0-0-C".
Page 6-5, paragraph 6-6e (1). In line 3, "TB 1" is changed to read "TB 2".
Page B-1. Appendix B is superseded as follows:

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

Section I. INTRODUCTION

B-1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the air conditioner and are required by the crew/operator for operation, installation, or operator's maintenance.

B-2. General

This basic issue items, items troop installed or authorized 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 in alphabetical sequence of items which, at the discretion of the unit commander, may accompany the end item, but are NOT subject to be turned in with the end item.

B-3. Explanation of Columns

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

a. Source, Maintenance, and Recoverability code(s) (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 description of the item required.

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

e. Quantity Authorized (Items Troop Installed or Authorized Only). 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 Of Meas	(5) Qty. auth.
	7520-559-9618	CASE, MANUAL	EA	1
	4130-860-0042	OIL FILTER: Water Soluble	EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

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

Distribution:

To be distributed in accordance with DA Form 12-25C (qty rqr block No. 566) Organizational Maintenance requirements for Air Conditioners: 38,000 BTU.

TECHNICAL MANUAL

No. 5-4120-287-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *15 July 1968*

OPERATOR, ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL AIR CONDITIONER, BASE-MOUNTED, SELF-CONTAINED LIGHTWEIGHT, AIR-COOLED, 38,000 BTU/HR COOLING AND 35,000 BTU/HR HEATING CAPACITY; FAIRCHILD STRATOS MODEL VEA4-3A, PN 107201 FSN 4120-92644280)

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions are published for use by personnel to whom the air conditioner, base-mounted, self-contained, lightweight, air cooled, 38,000 BTU/hr (British Thermal Units per hour) cooling and 35,000 BTU/hr heating capacity, Model VEA4-3A (manufactured by Stratos Division, Fairchild Hiller Corporation, Bay Shore, New York) is issued. The equipment will hereafter be referred to as the air conditioner. Chapters 1 through 3 provide information on operation, preventive maintenance services and organizational maintenance of equipment, accessories, components, and attachments. Chapter 4 provides information for direct and general support and depot maintenance. Also included are descriptions of main units and their functions in 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. Organizational, direct and general support and depot maintenance repair parts and special tools are listed in TM 5-1420-287-25P.

c. Numbers in parentheses following nomenclature callouts on illustrations indicate quantity; numbers preceding nomenclature callouts indicate preferred sequence.

d. Report 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 DA Publications) and forwarded direct to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

1-2. Record and Report Forms

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

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

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

Section II. DESCRIPTION AND TABULATED DATA

1-3. Description

a. General. The air conditioning unit (figs. 1-1 and 1-2) is a lightweight, air transportable, vapor cycle air conditioning package specifically designed to provide conditioned able, vapor cycle air conditioning package specifically designed to provide conditioned air for guided missile ground support shelters. This unit may also be utilized in other vehicles having similar personnel and equipment cooling requirements. After initial installation on a trailer or in a shelter, the unit is capable of an air cooling load capacity of 38,000 BTU/hr utilizing a 416-volt, 6-pole motor, 7700 rpm (revolutions per minute), 8-hp (horsepower) motor compressor. The unit has

heating capacity of 35,000 BTU/hr (10.5 kw (kilowatts)). The air conditioning unit is contained in a single enclosure of compact sturdy construction built to rigid military specifications and standards. The enclosure is subdivided into a condenser section and evaporator section. The condenser section contains the compressor, condenser fan, and high-pressure refrigerant controls. The evaporator section contains the evaporator, evaporator fan, expansion valve, heaters, electrical controls, and temperature controls. Functionally, the air conditioning unit consists of a cooling subsystem and a heating subsystem regulated by either automatic or manual controls from a remote control box.

b. Electrical Tray Assembly. The electrical tray assembly (fig 1-3) contains the electrical power controls and relays. The front panel of the electrical tray assembly contains the circuit breaker, the system reset push button, the hourmeter, the control circuit fuse, the main power connector, and the remote control box assemble connector. Mounted within the electrical tray assembly are the motor control relays, the temperature control relays, the transformer, the phase sequence relay, and the rectifier. The 28-vdc (volts direct current) power required for the operation of the relays is obtained from the transformer and the rectifier.

c. Remote Control Box Assembly. The remote control box assembly (fig 1-1) contains the operating controls for the air conditioning unit. Mounted on the front panel is a four-position (HEAT, OFF, VENT, COOL) five-deck switch and a temperature control variable resistor (minimum setting COOL; maximum setting HEAT). The rheostat dial is continuously variable between the COOL and WARM positions, which corresponds to a return air temperature range of 60F to 90F.

d. Motor-compressor. The motor compressor (fig 1-4) consists of positive-displacement compressor which is directly driven by an integral 8-hp, 416-volt, 400-cycle, 3-phase, 4-wire induction motor with a designed speed of 7700 rpm. The compressor draws low pressure refrigerant vapor from the evaporator and compresses it to a high pressure, high temperature refrigerant vapor. The motor-compressor runs continuously when the air conditioner is operating in the COOL mode.

e. Thermostat. The thermostat (fig 1-3) is located in the evaporator compartment. The thermostat senses the temperature of the air entering the evaporator and provides control signals to maintain desired temperatures.

f. High-low Pressure Cut-out Switch. The high-low pressure cutout switch (fig 1-4) is a dual single pole, single throw switch which projects the cooling system from excessive compressor discharge pressure and low compressor inlet pressure. The high-pressure side of the switch is connected into the compressor discharge line; the low pressure side into the compressor inlet line. The switch has a rating of 2 amperes at 28 vdc. The high pressure side is set to close the switch (energizing the trip relay, which removes power from the compressor) when the pressure in the compressor discharge line increases to 260 to 265 psig (pounds per square inch gage). The switch will automatically reset when the discharge line pressure decreases to 200 to 220 psig. The low-pressure side is set to close the switch when the pressure in the compressor inlet line decreases to 20 to 21 psig. The switch will automatically reset when the inlet line pressure increases to 30 to 40 psig. The system trip relay is reset by pressing the system RESET switch (fig 1-3).

g. Condenser Fan. The condenser fan assembly (fig 1-5) provides cooling air for the condenser. As supplied, it is complete with its own bearings and seals and is permanently lubricated. The fan is a high-speed (5800 rpm) continuos duty, vane-axle type with a self-contained motor for use on 416-volt, 3-phase, 400-cycle, 4-wire power. The condenser fan is rated at 4120 SCFM (Standard Cubic Feet/Minute). The fan motor is constructed with an internal automatic reset thermal and overcurrent protector.

Note

The condenser fan discharge door must be open when unit is operating in cooling cycle. A Microswitch, activated by the door, prevents operation of compressor motor and condenser fan motor if door is closed.

(h) Condenser-subcooler Assembly.

(1) Condenser subassembly. The condenser (fig. 1-4) is a crossflow-type heat exchanger of copper tube and aluminum fin construction. The condenser rejects the heat absorbed by the refrigerant in the evaporator and the heat of compression added by the compressor; thereby transforming the refrigerant vapor into a liquid. The liquid refrigerant is then passed from the condenser outlet to the receiver inlet.

(2) Subcooler subbassembly. The subcooler (fig. 1-4) is integral with the condenser, and is cooled by air drawn across it by the condenser fan. The subcooler, located in the line between the receiver and the filter drier, lowers the refrigerant temperature approximately 80F; and thereby prevents flashback (vaporization) of the liquid refrigerant before it passes through the expansion valve.

i. Low Ambient Switch. The low ambient temperature switch (fig. 6-2) located in the condenser air inlet stream closes when the ambient air temperature falls below 400F; causing the cooling cycle to cease by de-energizing the motor compressor and condenser fan motor. The evaporator fan motor continues to operate, recirculating the shelter air and/or drawing in fresh air. When ambient temperature rises above 50F, the low ambient temperature switch opens; then upon pressing the system reset switch, the cooling cycle resumes.

j. Receiver. The receiver, located between the condenser and the subcooler (fig. 1-4), stores condensed (liquified) refrigerant. This stored liquid refrigerant acts as a seal between the partial vapor-liquid state in the condenser and the liquid supply to the evaporator expansion valve.

k. Hot Gas Bypass Valve. The hot gas bypass valve (fig. 1-4) regulates the compressor inlet pressure. It consists of a housing with a replaceable power unit. The power unit contains a spring and diaphragm which actuate the valve mechanism. Three tube connections on the housing accommodate the inlet and outlet lines and the pressure equalizing line which is connected to the compressor inlet line. The valve maintains a minimum compressor inlet pressure of 28 psig during light-load operation; thus preventing evaporator air side freeze-up. This function is accomplished by passing compressor discharge gas into the compressor inlet line.

l. Filter-drier. The filter-drier (fig. 1-4) consists of a sheet of metal housing with ½-inch flared inlet and outlet connections. The unit contains a conical filter screen, the base of which is mounted to a fiber glass pad at the outlet end of the housing. Within the housing, both inside and outside the cone screen, is the drying agent (desiccant), which is cast in the form of 1/8-inch balls of activated aluminum. (The filter-drier is installed directly in the liquid-refrigerant line between the subcooler subassembly and the refrigerant solenoid valve.) It is used to remove entrained moisture, sludge, dirt, and other foreign particles from the liquid refrigerant. The filter-drier is a throwaway unit which must be replaced when the refrigerant charge is replaced and/or when the system has been subjected to extensive maintenance or servicing.

m. Solenoid Valve. The solenoid valve (fig. 1-4) is an electrically operated, thermostatically controlled shutoff valve located in the liquid refrigerant line between the filter-drier and the expansion valve. When the solenoid valve is closed, refrigerant flow to the expansion valve is stopped and compressor discharge has is bypassed to the compressor suction inlet line through the hot gas bypass valve. When the air conditioner is operating in the cooling mode the compressor operates continuously. Air temperature regulation is accomplished by the thermostatically controlled opening and closing of the solenoid valve.

n. Refrigerant Liquid Sight Indicator. The refrigerant liquid sight indicator (fig. 1-2), installed upstream of the expansion valve, can be viewed through a port in the air conditioner rear wall. The indicator consists of a metal body with ½-inch inlet and outlet connections; and a glass viewing window, permitting visual indication of adequate liquid refrigerant flow to the thermostatic expansion valve. The system moisture content indicator,

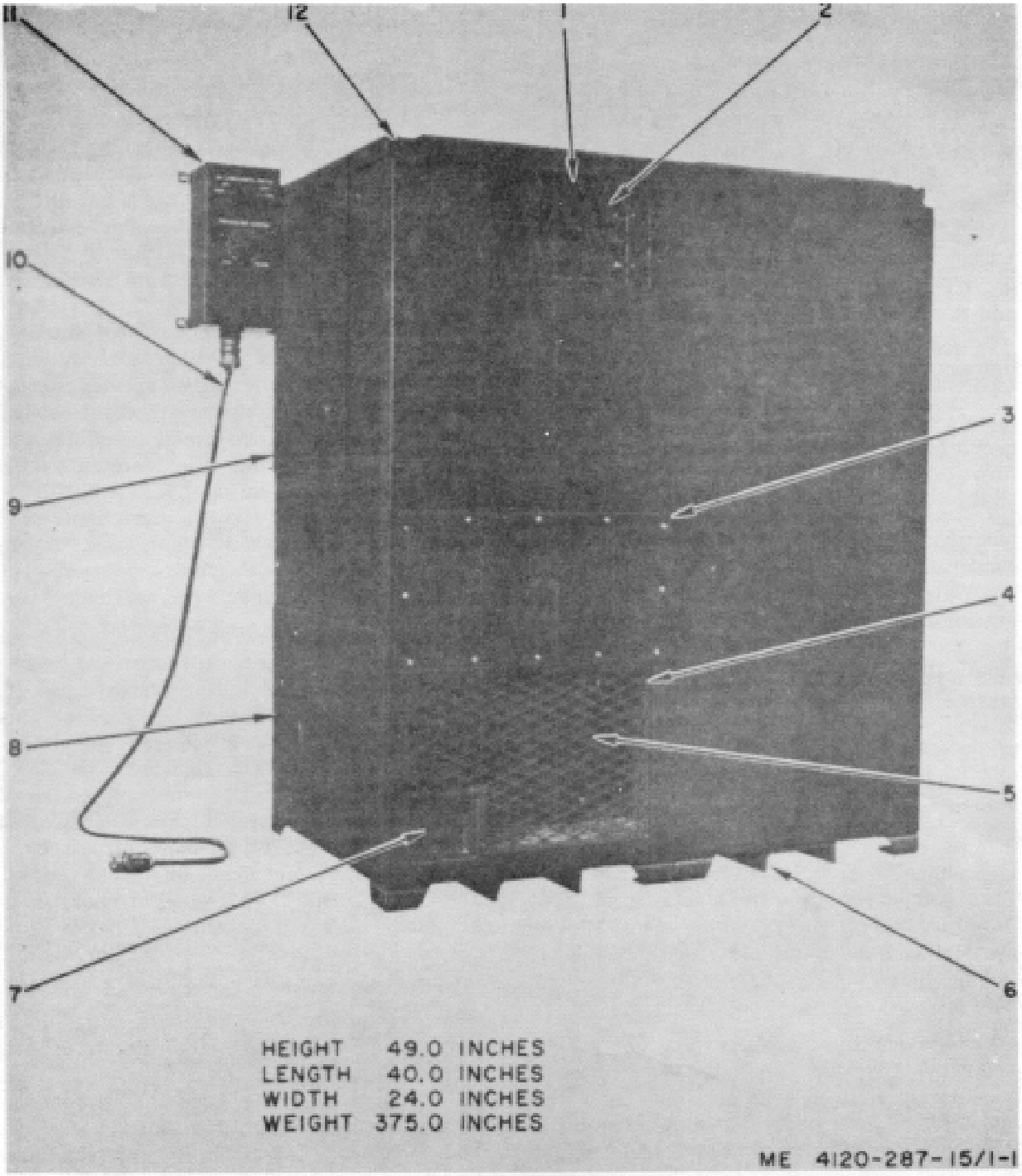


Figure 1-1. Air conditioner, three quarter, left-front view.

1 Conditioned air outlet port
2 Heater bank assembly (2)
3 Electrical tray access panel assembly
4 Recirculating air inlet port
5 Recirculating air door
6 Fork lift channel (2)
7 Vent air door control knob
8 Evaporator blower access panel assembly
9 Evaporator left-side *access* panel assembly
10 Remote control harness assembly
11 Remote control box assembly
12 Lifting eye (4)

Figure 1 Continued.

located within the glass viewing window, changes from green to yellow as the system moisture content becomes critical. System
moisture content in excess of 15 ppm (parts per million) is considered critical.

o. Thermostatic Expansion Valve.

(1) The thermostatic expansion valve (fig. 1-6) is utilized to regulate liquid refrigerant flow to the evaporator. It is the dividing point between the high and low pressure sides of the system. The valve responds to the temperature of the refrigerant vapor leaving the evaporator; and regulates the amount of refrigerant entering the evaporator in exact proportion to the rate of evaporation of the liquid refrigerant in the evaporator. This controlled flow ,prevents the return of liquid refrigerant to the compressor.

(2) The valve consists of a body flange mounted on the inlet side of the evaporator, a cage assembly, and a power assembly with a remote temperature-sensing bulb which is clamped on the suction line leaving the evaporator. The power assembly contains a diaphragm, diaphragm chamber, capillary tube connection for the remote bulb, and a port for the external equalizing line. The remote temperature-sensing bulb, capillary tube, and the chamber formed by the diaphragm comprise a closed system which is charged with a volatile fluid. An external equalizer line is connected to the evaporator outlet. The cage assembly contains a valve pin and the superheat adjusting spring.

p. Evaporator Assembly. The evaporator assembly (fig. 1-7) consists of an evaporator cooling coil and refrigerant distributor. The evaporator is a 13 circuit, direct expansion coil of aluminum fin and copper tube construction. It removes heat from the air being conditioned by vaporization of the liquid refrigerant flowing through it. In order to assure efficient use of this multicircuited coil a distributor is used to direct equal amounts of refrigerant to each individual coil circuit. The unit is of cross-counterflow design with both air and refrigerant flowing in a horizontal plane.

q. Evaporator Blower. The evaporator blower (fig. 1-7) directs the air to be conditioned through the evaporator where it is cooled. As supplied, the evaporator fan is complete with scroll, wheel and inlet rings; and is rated at 1200 SCFM. It is a medium speed (3750 rpm), double inlet centrifugal blower with a continuous duty direct coupled motor. The evaporator fan operates on 416-volt, 3-phase, 400-cycle, 4-wire power. The motor is designed with inherent thermal and over-current protection and permanently lubricated sealed bearings.

r. Pressure Relief Valve. The pressure relief valve (fig. 1-4) is a straight through type valve, located in the refrigerant liquid line, downstream from the filter-drier. It functions to protect the system components from high internal pressure, resulting from possible malfunctions of the system or its components, by discharging the high pressure refrigerant to the atmosphere. The valve consists of a metal body which encloses a spring-loaded piston assembly. The valve is set to relieve at 350 psig internal system pressure.

s. Liquid Quench Valve. The liquid quench valve (fig. 1-4) is utilized to prevent excessive compressor inlet temperature during light-load operation when the refrigerant solenoid valve is closed and the hot gas bypass valve is open. The valve, in effect, is a small capacity expansion valve with its sensing bulb mounted to the compressor inlet line. The valve function is to de-superheat bypassed compressor discharge gas.

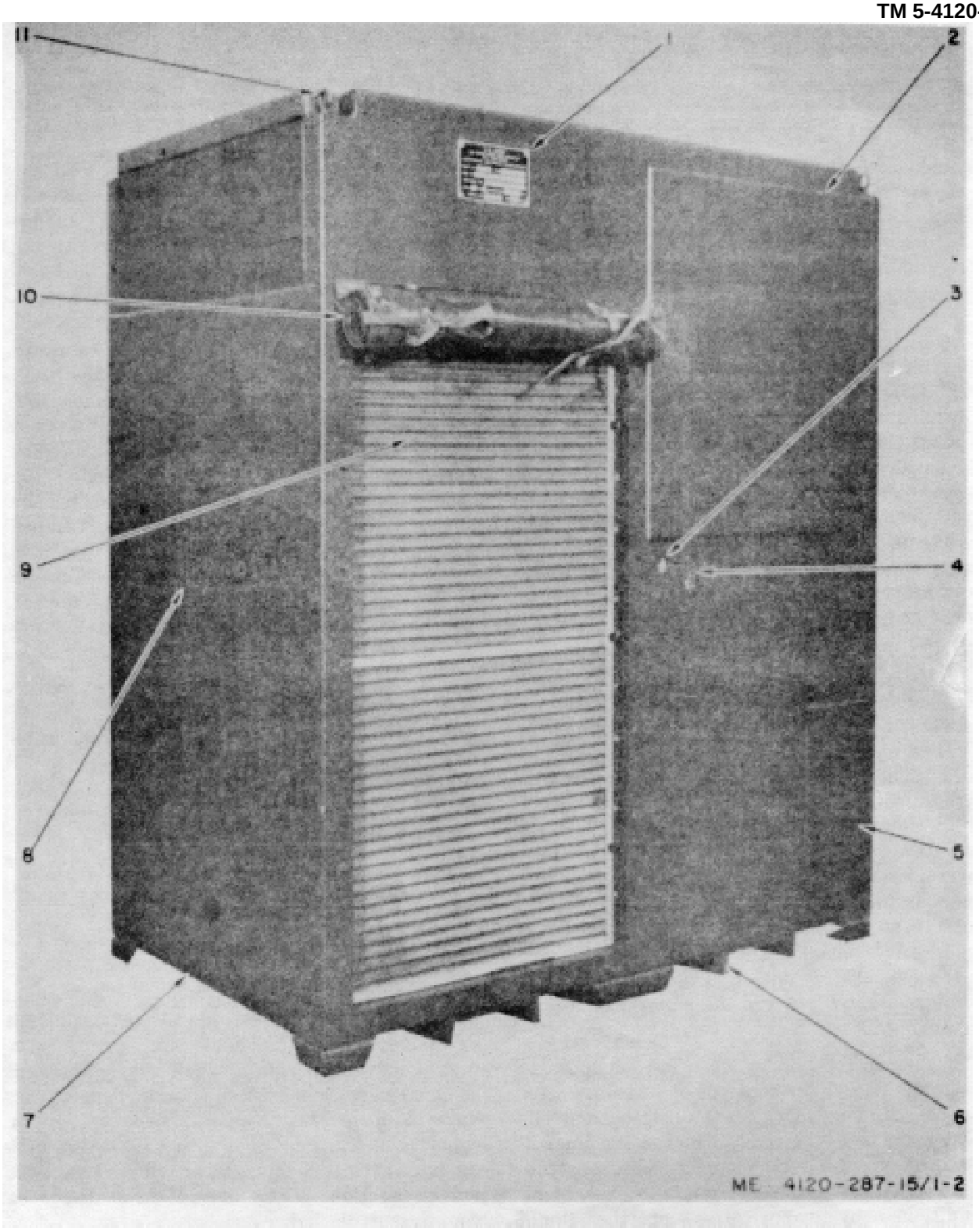


Figure 1-2. Air conditioner, three quarter, right-rear view.

1 U. S. Army identification plate
2 Evaporator rear access panel assembly
3 Liquid refrigerant sight indicator
4 Evaporator filter clean indicator
5 Vent air inlet port
6 Fork lift channel (2)
7 Condenser right-side access panel assembly
8 Condenser filter clean indicator
9 Condenser inlet air filter
10 Condenser air inlet weather cover
11 Lifting eye (4)

Figure 1-2 continued.

t. Heater Assembly. The heater assembly (fig. 1-3) consists of six electrically operated CAL-ROD type heaters which provide a total heating capacity of 10.5 kw or 35,000 BTU/hour. The heater assembly is mounted in the evaporator outlet air stream so as to permit the evaporator fan to circulate ambient air over the heater assembly when the unit is in the heating cycle. The heater assembly operates on 416-volt, 400-cycle, 3-phase power and consumes approximately 10.5 kw. The operation of the heater assembly is controlled by the return air thermostat and the setting of the controls on the remote control box assembly.

u. Mist Eliminator. The mist eliminator (fig. 1-3) located between the evaporator assembly and the heater assembly, is constructed of eight double layers of high tru-put herringbone mesh aluminum wire enclosed in a four by four mesh aluminum wire cloth screen. The frame and drain channels are constructed of aluminum alloy. The mist eliminator causes tiny water particles in the conditioned air stream (mist) to coalesce into water droplets sufficiently large to precipitate within the mist eliminator. The precipitated water is collected in the mist eliminator drain channels; and then flows into the air conditioner drain tube (fig. 1-3).

1-4. Identification and Tabulated Data

a. Identification. The air conditioner has five major identification plates (fig. 1-8). The U.S. Army plate (A) on the rear of the air conditioner specifies the official nomenclature, including cooling capacity; Federal stock number; manufacturer, part number, serial number and date; inspection date; and contract number and unit weight. The compressor motor identification plate (B) located on top of the motor frame assembly specifies the manufacturer, part number, serial number, stock number and Stratos part number; voltage, amperage, frequency and phase requirements; horsepower, and rotational speed expressed in revolutions per minute. The compressor identification plate (C) on the upper face of the compressor specifies the manufacturer, serial number and part number. The evaporator fan motor identification plate (D) on top of the motor frame specifies the manufacturer, model number, serial number and frame number; voltages, amperages, frequency and phase requirements; horsepower and duty ratings; and rotational speed expressed in revolutions per minute. The condenser fan assembly identification plate (E) located on the fan shroud specifies the evaporator manufacturer, model number, part number and aerial number; voltages, amperages, frequency and phase requirements; horsepower and duty ratings, rotational speed expressed in revolutions per minute; and direction of fan rotation and direction of air flow.

b. Tabulated Data.

(1) *Air conditioner.*

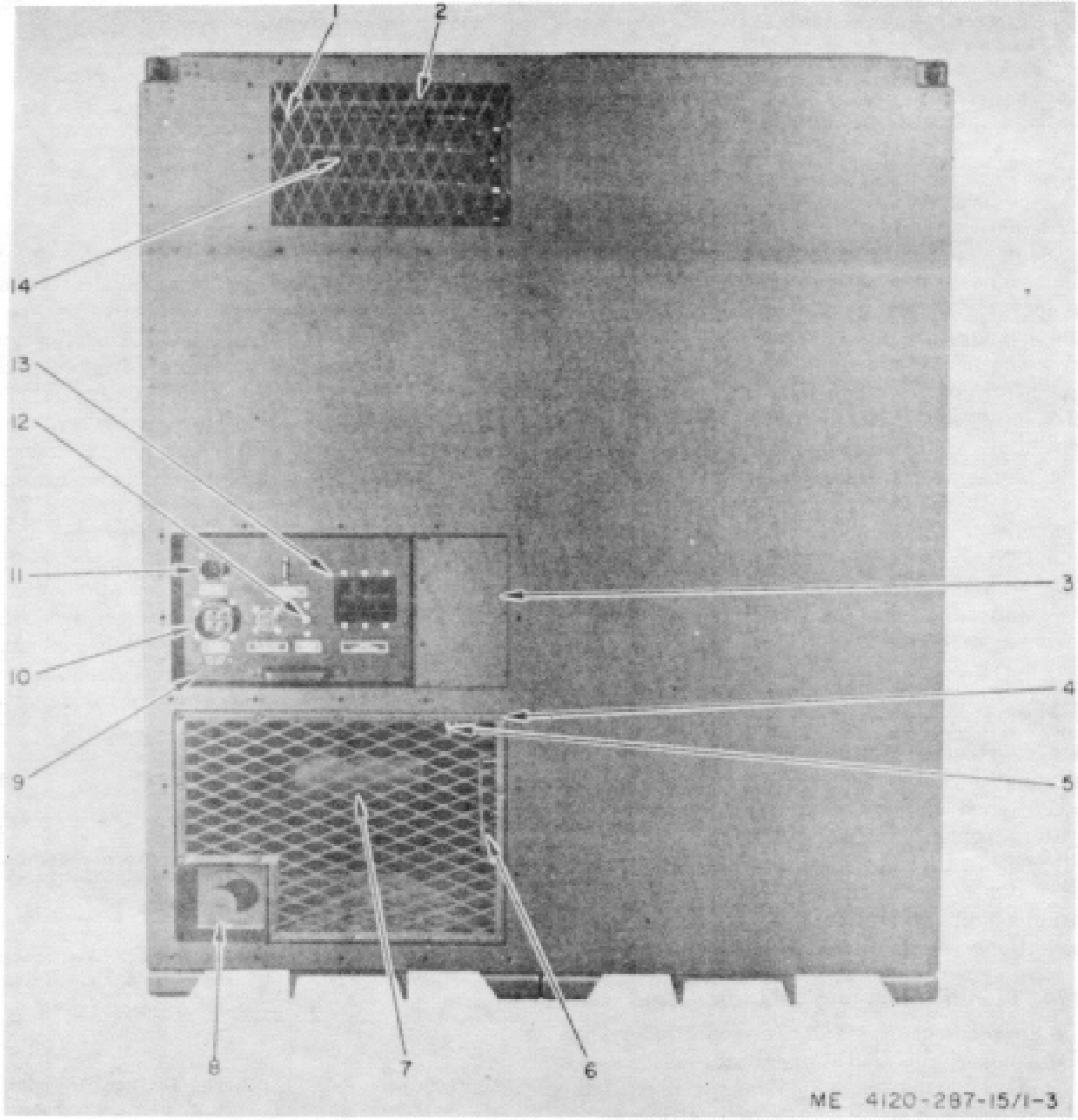
Manufacturer Stratos Division, Fairchild Hiller Corp., Bay Shore, New York
Model VEA-3A
Refrigerant Refrigerant-12 (Fed Spec BB-F-671a, Type R-12)
Capacity 38,000 BTU/hr

(2) *Compressor.*

Manufacturer Stratos Division Fairchild Hiller Corp., Bay Shore New York
Model FCR4-3
Part Number 26664-1
Type Positive displacement, helical rotary

(3) *Compressor motor*

Manufacturer Westinghouse Electric Corp.
Part Number 923B238-2



1 Conditioned air outlet screen
2 Heater bank assembly (2)
3 Thermostat access panel
4 Recirculating air inlet screen
5 Thermostat temperature sensing bulb
6 Evaporator assembly drain tube
7 Evaporator blower scroll
8 Vent air door control knob
9 Electrical tray assembly
10 Main power supply electrical connector
11 Remote control harness assembly electrical connector
12 System reset switch
13 Master circuit breaker
14 Mist eliminator

Figure 1-3. Air conditioner, front view with panel removed

Stratos PN 201782
Voltage ..... 416 vac
Amperage ..... 15 amps
Frequency ..... 400 cps
Phase 3-phase
Horsepower ..... 8.4 hp
Rotational Speed ..... 7700 rpm

(4) Evaporator fan motor

Manufacturer ..... Aerospace Division, WELCO Industries, Inc. Cincinnati, Ohio
Part Number 02-009947
Frame Number 472-19
Voltages ..... 206/416 vac
Amperages ..... 7.4/3.7 amps
Frequency ..... 400 cps
Phase 3-phase
Horsepower ..... 1.66 hp
Rotational Speed ..... 3750 rpm
Duty Rating ..... Continuous

(*5) Condenser fan assembly motor.*

0Manufacturer ..... General Dynamics Electro Dynamic, Avenel, New Jersey
Model K9130KC38
Part Number ..... 2660-811-X (GD-ED)
Voltages ..... 208/416 vac
Amperages ..... 11/55 amps
Frequency ..... 400 cps
Phase 3-phase
Horsepower ..... 3.4 hp
Rotational Speed ..... 5800 rpm
Duty Rating ..... Continuous

(6) Refrigerant solenoid valve.

Manufacturer ..... ALCO Valve Co., St. Louis, Mo.
Type ..... S-FR, 1/20D
Voltage ..... 24 vdc
Amperage ..... 1 amp
Power ..... 24 watts
Capacity ..... 18 pounds per minute of refrigerant -12 at 265 psia and 150 F at inlet, at 1 psia pressure differential across the valve

(*7) Pressure relief valve.*

Manufacturer ..... Henry Valve C, Melrose Park, Ill.
Part Number 22-5
Relief Pressure ..... 350 ± 25 psig at 80 ± 20F
Reset Pressure ..... 250 ± 25 psig

(*8) Liquid quench valve.*

Manufacturer ..... ALCO Valve Co.,
St Louis, Mo.
Type ..... TL-200 FL 27A
Power Assembly ..... XB1O33 FL 1A
Capacity ..... 2.8 tons with refrigerant -12

(9) *Filter-drier*

Manufacturer ..... .McIntyre Co., Subsidiary of Superior Valve Co., Livingston, N. J.
Type M18
Flow Capacity – ..... 34 pounds per minute minimum refrigerant-l12 flow at 2 psi prepare drop
Water Capacity ..... 250 drops at 7F and 200 drops at 125F at 15 ppm

(10) *Hot gas bypass valve.*

Manufacture ..... ALCO Valve Co., St. Louis, Mo.
Type CPRH-435F
Capacity ..... 390 cubic feet per hour refrigerant -12 discharge
Adjustment ..... 0 to 40 psig; set to crack at 35 to 37 psig outlet pressure

(11) *Drain-charge valve.*

Manufacturer ..... Henry Valve Co., St. Louis, Mo.
Type ..... 623l, packless
Capacity ..... 265 psig 15 300F

(12) *High-low pressure cut-out switch.*

Manufacturer ..... Penn Products Division, Penn Controls, Inc., Goshen, Indiana
Type 1277BP12
Style 34
Voltage ..... 28 vdc
Amperage ..... 2 amps
Setting ..... High Pressure: trip at 265 ± 5 psig, reset at 210 ± 10 peig
Setting ..... Low Pressure: trip at 20 (+1-0) psig, and reset at 35 ± 5 psig.

(13) *Thermoexpansion valve.*

Manufacturer ..... ALCO Valve Co., St. Louis, Mo.
Type ..... TCL-300 FW
Power Assembly ..... XB1019 FW 1B
Capacity ..... 5.0 ton with Refrigerant-12

(14) *Master circuit breaker.*

Manufacturer ..... Heineman Electric Co. Trenton, N. J.
Catalog Number ..... CD3-3 pole
Current Rating ..... 21/52 Amp
Voltage ..... 416/208 vac
Frequency ..... 400 cps

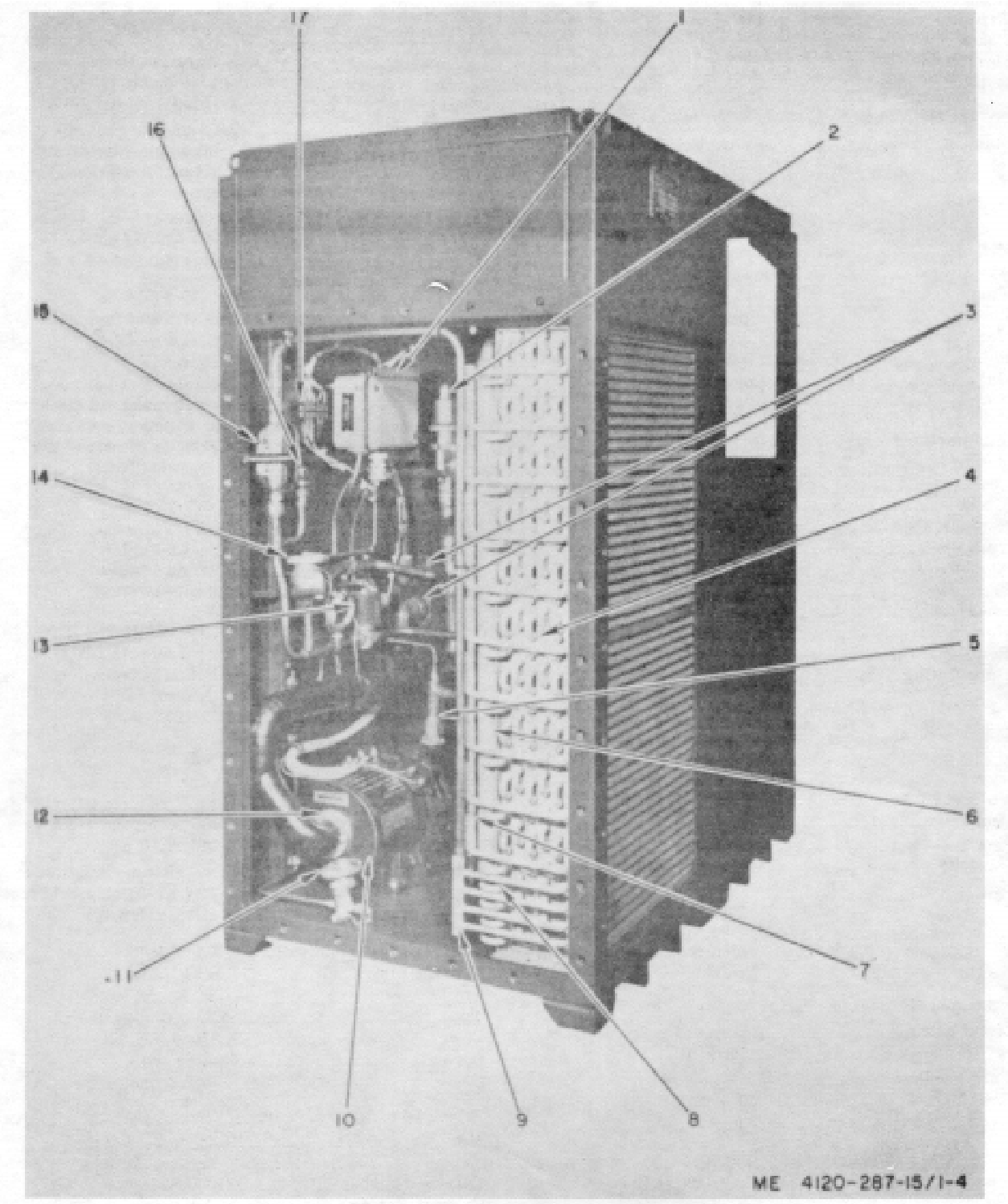


Figure 1-4. Air conditioner, right-side view with panel removed.

1 High-low pressure switch
2 Hot gas bypass valve
3 Thru-bulkhead electrical connector (2)
4 Condenser-subcooler assembly
5 Motor-compressor assembly outlet tube
6 Condenser inlet manifold tube
7 Condenser outlet manifold tube
8 Subcooler inlet manifold tube
9 Subcooler outlet manifold tube
10 Motor-compressor assembly
11 Charge valve
12 Motor-compressor assembly inlet fixture
13 Solenoid valve
14 Liquid quench valve
15 Filter-drier
16 Pressure relief valve
17 Terminal board (TB-1)

Figure 1-4--Continued.

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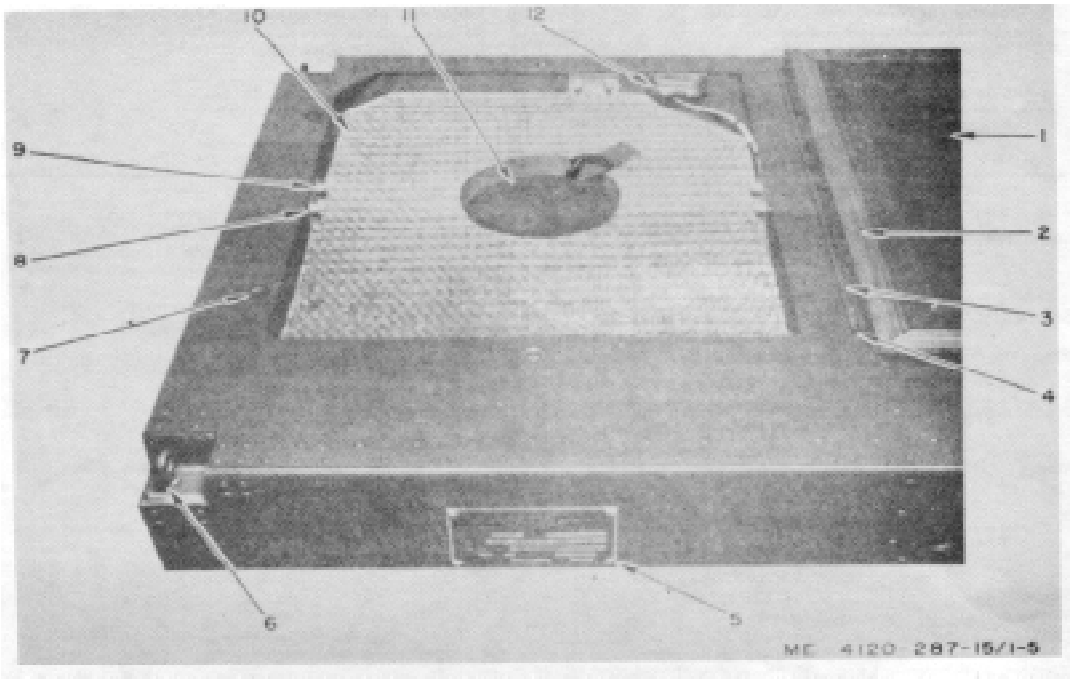
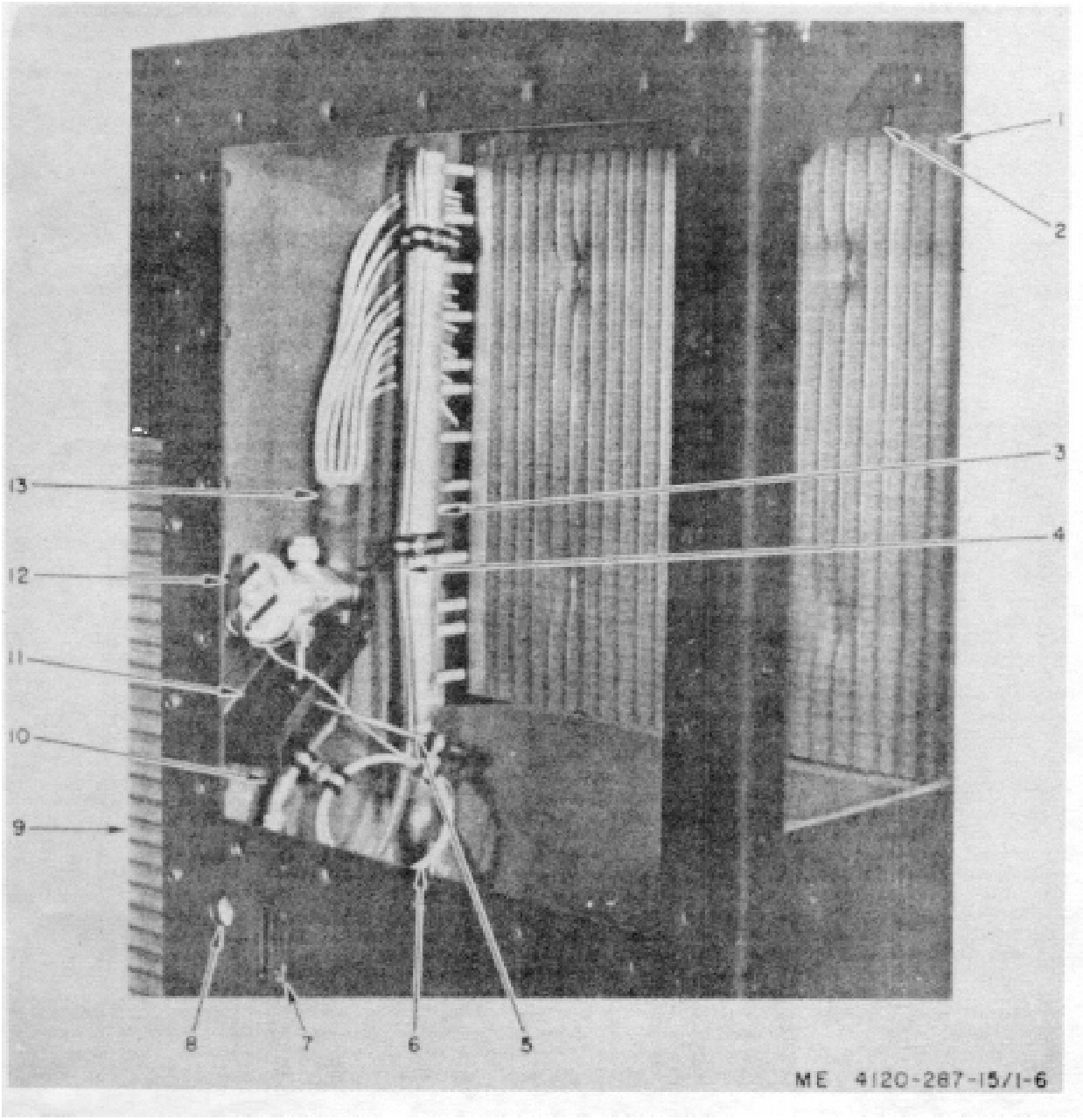
(15) *Power transformer (T1).*
Manufacturer---------- Microtran Co., Valley Stream, N.Y.
Model ---------- M3328
Primary Voltage ---------- 208/416 vac
Secondary Voltage ---------- 30.2 ± 1 vac *(rms)* for a 1.4 amp secondary load
Frequency ---------- 400 cps
(16) *Silicon rectifier (CR 1).*
Manufacturer---------- Sarkes Tarzian Inc. 415 North College, Bloomington, Indiana
Model ---------- S-6184
Current Ratings ---------- 3.6 amps at 55C (131F) 1.6 amps at 125C (257F)
(17) *Trip relay (K101).*
Manufacturer---------- Potter & Brumfield, Inc Princeton, Indiana
Model ---------- MH17DM24V
Voltage ---------- 24 vdc
Contact Rating---------- 5.0 amp at 115-volts, 60-cycle resistive load
Contact Arrangement---------- Four pole-double throw, double make.
(18) *Time delay relay (K102).*
Manufacturer---------- Dialtron Corp., Brooklyn, N.Y.
Model ---------- FR-3S-ND-28
Type ---------- D8497-143-1
Contact Rating---------- 2.0 amp, 28 vdc; resistive load.
Contact Arrangement---------- Single pole-single throw, normally open.
Nominal Delay Time ---------- 3 sec ± 25 percent at 70F.
(19) *Thermo relay (K103).*
Manufacturer---------- Couch Ordnance Inc., N. Quincy, Massachusetts
Model ---------- 2B36-B.
Contact Rating---------- 5 amps, 8 vdc; minimum resistive load.
(20) *Compressor motor relay (K104).*
Manufacturer---------- Cutler-Hammer Controls, Division of Cutler- Hammer Int.., Milwaukee, Wis.
Catalog Number---------- 9565H94 (C-H)
Military Standard---------- MS24193 D1 (ASG)
Nominal Coil Voltage ---------- 28 vdc
Contact Arrangement---------- Three pole-single throw
Contact Rating---------- 50 amps, 200 vac (400 cps) rated load per contact.
Class ---------- A5 (unsealed)
(21) *Condenser fan assembly motor re-lay (K105).*
Manufacturer---------- Culter-Hammer Controls, Division of Cutler- Hammer Int, Milwaukee, Wis
Catalog Number---------- 9565H2B (C-H)
Military Standard---------- MS24192D1 (ASG)
Nominal Coil Voltage ---------- 28 vdc
Contact Arrangement---------- Three pole-single throw
Contact Rating 25 amps, 200 vac (400 cps) rated load per contact.
Class ---------- A5 (unsealed)
(22) *Evaporator fan motor relay (K106).*
Manufacturer---------- Cutler-Hammer Controls, Division of CutlerHammer Int., Milwaukee, Wis.
Catalog Number---------- 9565H2B (C-H)
Military Standard---------- MS24192 D1 (ASG)
Nominal Coil Voltage ---------- 28 vdc
Contact Arrangement---------- Three pole-single throw
Contact Rating---------- 25 amps, 200 vac (400 cps) rated load per contact
Class ---------- A5 (unsealed)
(23) *Heater control relay (K107).*
Manufacturer---------- Cutler-Hammer Controls, Division of Cutler- Hammer Int., Milwaukee, Wis.
Catalog Number---------- 9565H94 (C-H)
Military Standard---------- M S2MS193aD1 (ASG)
Nominal Coil Voltage ---------- 28 vdc
Contact Arrangement---------- 50 amps, 200 vac (400 cps) rated load per contact
Class ---------- A5 (unsealed)



1 Condenser air discharge door
2 Gasket
3 Piano hinge
4 Piano hinge pin
5 U. S. Army identification plate
6 Lifting eye (4)
7 Quarter-turn fastener stud receptadle (4)
8 Screw (8)
9 Nut (8)
10 Honeycomb assembly
11 Condenser fan assembly motor
12 Micro-switch (normally closed)

Figure 1-5. Air conditioner, top view with condenser discharge door open.

(24) *Thermostat*
Manufacturer ---------- Vap Air Division of Vapor Corp., Chicago, Ill.
Catalog Number ---------- 26420036
Ambient Temp. Range ---------- -65F to 200F
Control Contact Setting ---------- 100±3F
Maximum Current Rating ---------- 100 ma at 30 vdc
Wattage ---------- 3 watts (any voltage)
(25) *Phase sequence relay (K108).*
Manufacturer ---------- Autron Mfg., Inc. Cleveland, Ohio
Model ---------- AVR-869F—T6 or 4F
Nominal Rating ---------- 416 vac, 400cps
Pick-up sequence ---------- L1, L2, and L3, L1 and L2 pick-up not possible as L1,L3 and L2.
(26*) Capacities.*
Refrigerant-12 ---------- 10.0 pounds of refrigerant-12.
Oil ---------- 400 cc (16.9 fluid ounces) oil, Fed. Spec. VV-L-825 RCO-3, Type III.
(27) *Nut and bolt torque data.* Refer to table 1-1, torque requirements.



1 Evaporator air inlet filter
2 Filter hold down clamp (4)
3 Evaporator outlet manifold tube
4 Evaporator clean indicator pressure sensing tube
5 Thermostatic expansion valve external equalizer tube
6 Thermostatic expansion valve remote temperature sensing bulb tubing
7 Evaporator filter clean indicator
8 Liquid refrigerant sight indicator
9 Condenser air inlet filter
10 Thermostatic expansion valve inlet
11 Thermostatic expansion valve bracket
12 Thermostatic expansion valve
13 Evaporator inlet distributor

Figure 1-6. Air conditioner, rear view with panels removed.

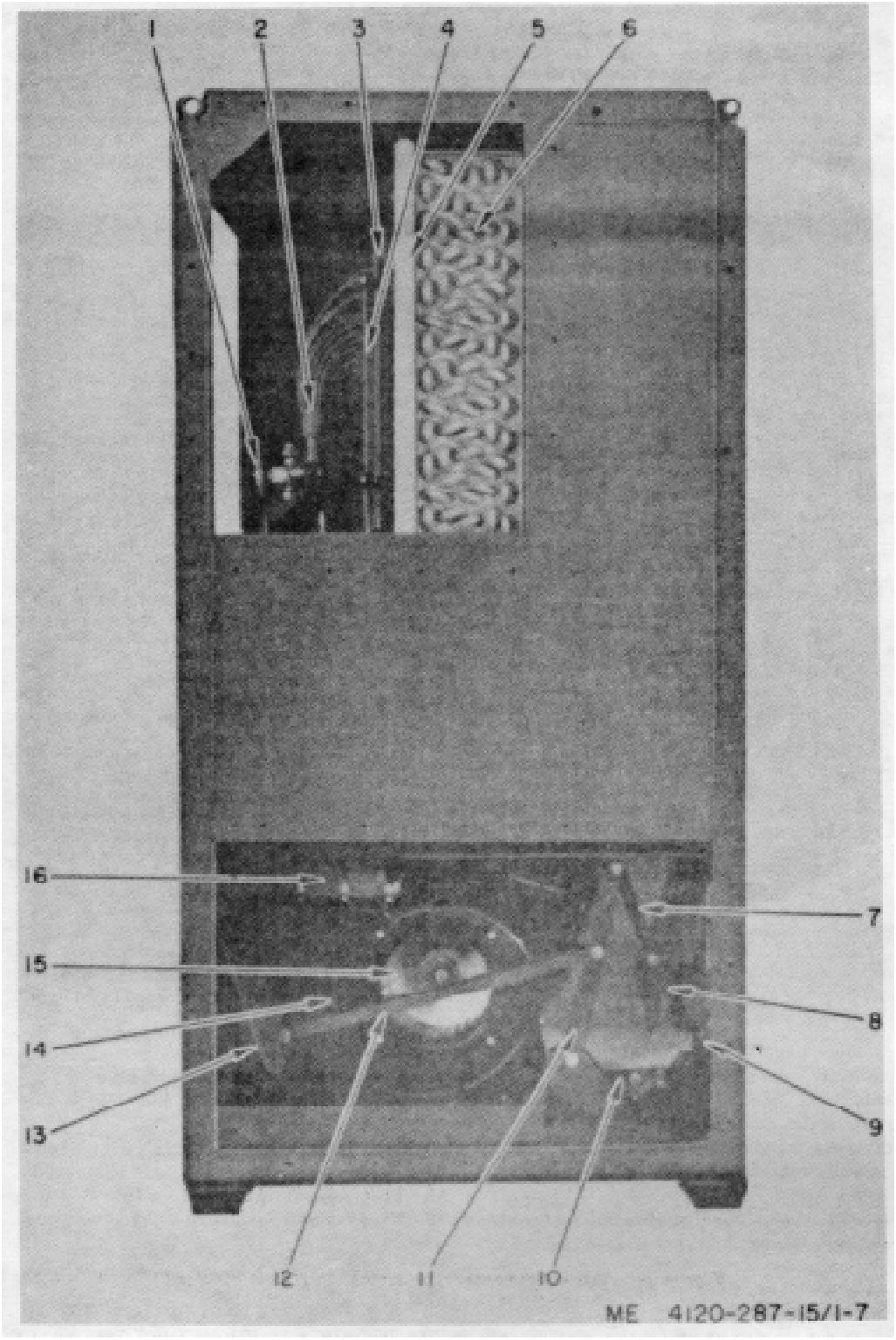


Figure 1-7. Air conditioner, left-side view with panels removed.

1 Thermostatic expansion valve
2 Evaporator inlet distributor
3 Evaporator outlet manifold tube
4 Evaporator filter clean indicator pressure sensing tube
5 Evaporator air inlet filter
6 Evaporator assembly
7 Recirculating air door link
8 Recirculating air door
9 Vent air door control knob recessed panel
10 Air circulation control link
11 Connector link
12 Vent air door link
13 Vent air door
14 Evaporator blower scroll
15 Evaporator blower wheel
16 Evaporator blower shroud

Figure 1-7--Continued.

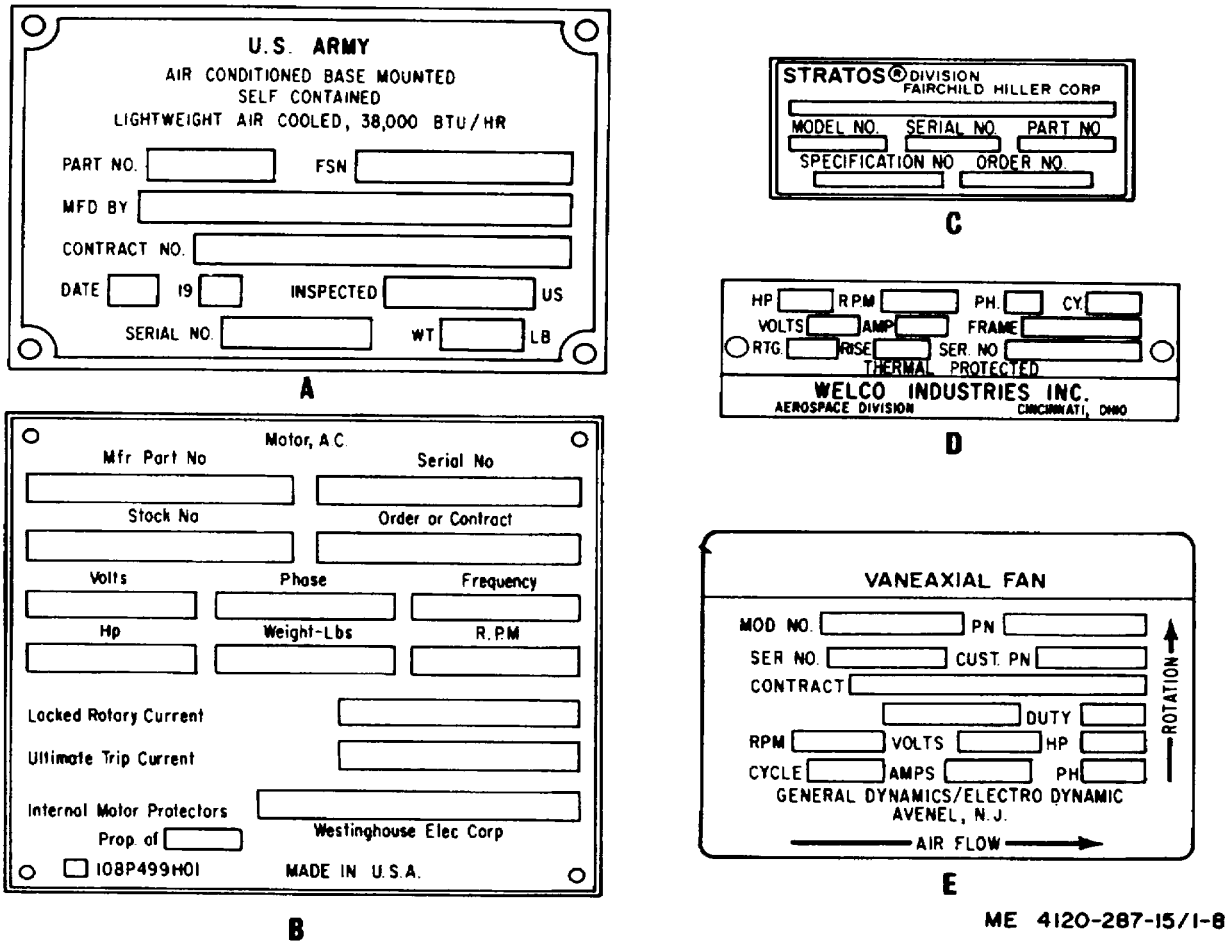


Figure 1-8. Identification plates.

Table 1-1. Torque Requirements

Tube size OD (inches)	Nut size	Aluminum tubing		Steel tubing	
		Minimum (ft-lb)	Maximum (ft-lb)	Minimum (ft-lb)	Maximum (ft-lb)
0.250	9/16 in.	40	60	135	150
0.375	11/16 in.	150	200	---	---
0.500	7/8 in.	250	350	---	---
0.625	1 in.	200	350	350	400
0.750	1-1/4 in.	300	500	350	400

(28) *Dimensions and Weight* (fig. 1-1).

Length..... 40.0 inches
Width ..... 24.0 inches
Height ..... 49.0 inches
Weight ..... 375 pounds
Volume ..... 27.2 cubic feet

(29) *Wiring diagram.* A practical wiring diagram of the air conditioner electrical system is shown in figure 1-9.
(30) *Base plan.* Refer to figure 1-10 for air conditioner installation.

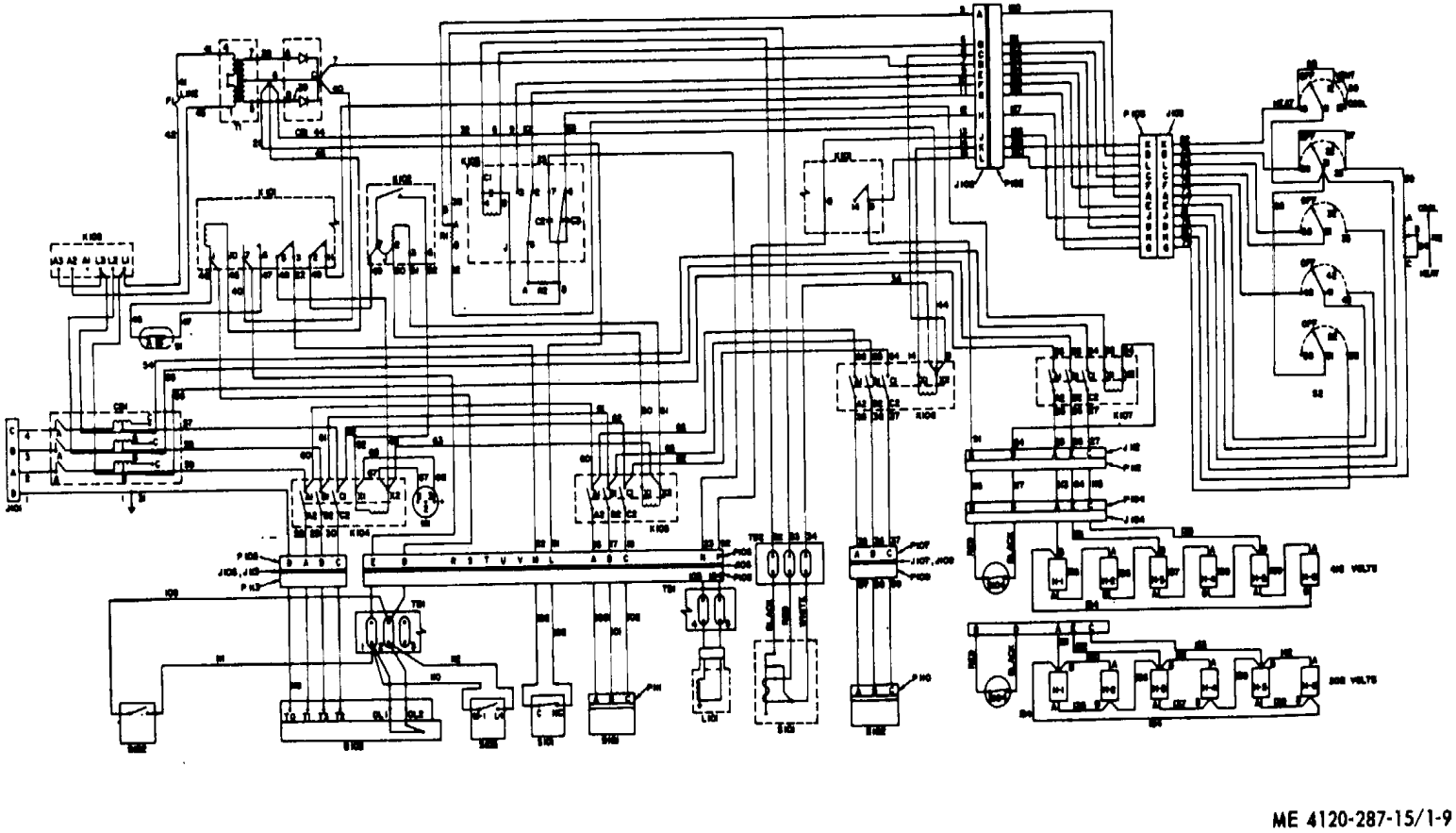


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Figure 1-9. Air conditioner electrical system wiring diagram.

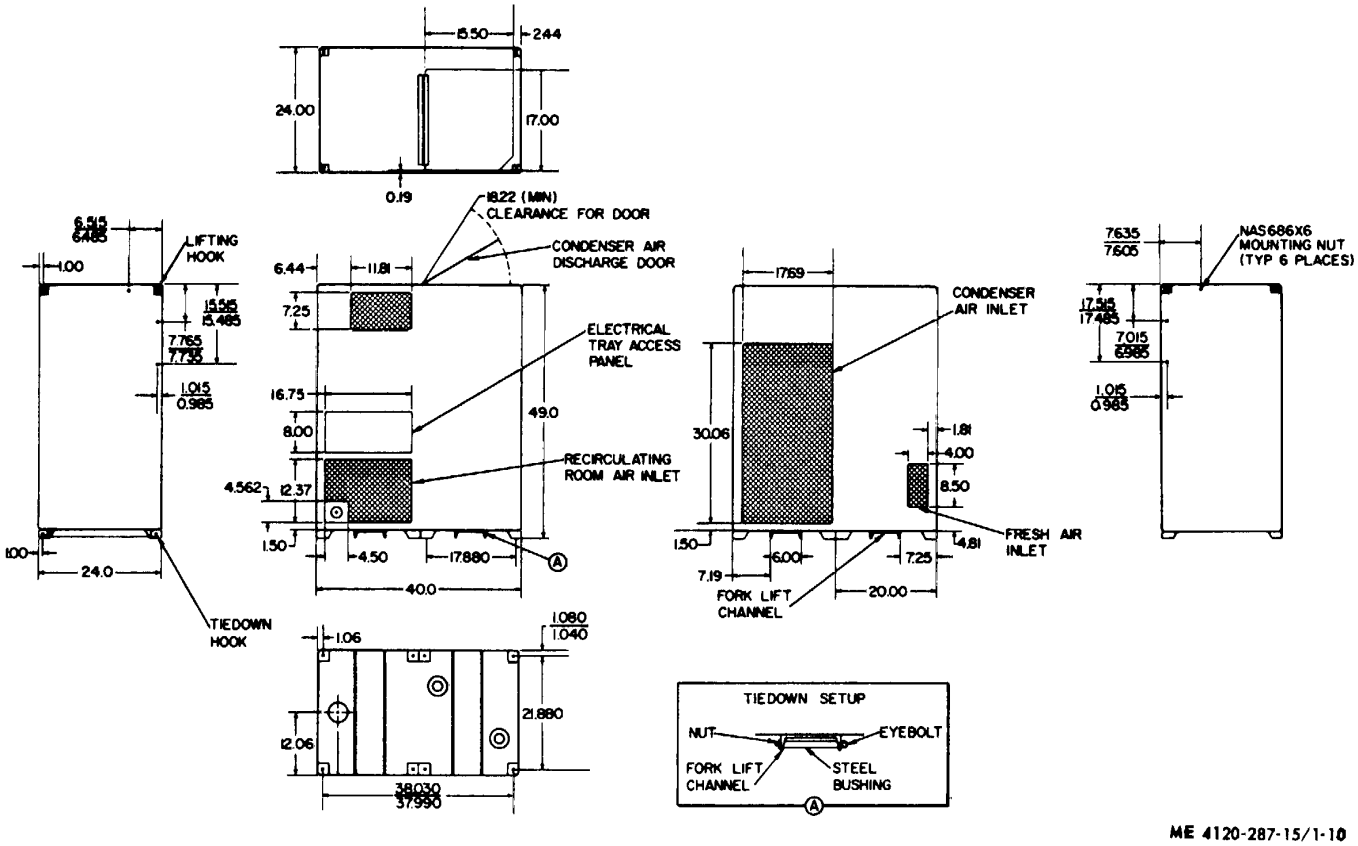


Figure 1-10 Installation and base plan.

Section III. THEORY OF OPERATION

1-5. General

This section describes the theory of operation of the refrigerant vapor cycle system .

1-6. Theory (fig. 1-11)

a. During air conditioning operation, the condenser fan draws ambient air through the condenser and discharges it through the condenser fan discharge door. The evaporator fan draws air from the compartment to be air conditioned into the evaporator section where it is mixed with fresh air (if desired) and conditioned; then the air is passed back into the compartment through the evaporator conditioned air outlet port.

b. Low pressure, low temperature refrigerant vapor (refrigeran-12) enters the compressor through the compressor inlet leading from the evaporator outlet. The refrigerant vapor is compressed to a high pressure and temperature.

c. From the compressor, the refrigerant vapor enters the condenser, where it is condensed into a high-pressure liquid by giving up heat to the condenser airstream. The electrically driven condenser fan draws cooling air through the condenser and exhausts it to atmosphere. The liquid refrigerant then collects in the receiver, upstream of the condenser. The receiver stores surplus liquid refrigerant and compensates for inequalities in flow rates.

d. After leaving the receiver, the liquid refrigerant flows through the subcooler. Subcooling is necessary because of the line pressure drop in the line leading to the thermo-expansion valve. The subcooler lowers the liquefied refrigerant temperature sufficiently (appro*xim*ately 8F) to preclude flashback (vaporization) of the refrigerant on the way to the thermo-expansion valve.

e. From the subcooler, the liquid refrigerant passes through the filter-drier. The liquid refrigerant upon entering the filter-drier is directed through the drying agent and the filterscreen.

f. From the filter-drier, the liquid refriger**a**nt flows to the solenoid valve. The remote thermostat, which senses compartment temperature, controls the operation of the solenoid valve. The valve closes to stop the flow of refrigerant to the expansion valve when compartment cooling is not required. When the solenoid valve is closed, pressure in line from the evaporator to the compressor drops because the compressor is still operating. When this pressure drops to 35 to 37 psig, the hot gas bypass valve opens permitting compressor discharge vapor to flow into the compressor inlet line. When the temperature in the compressor inlet line becomes excessive due to hot bypassed vapor, the liquid quench valve opens to permit high-pressure liquid refrigerant to vaporize and flow into the line; thereby de-superheating the bypassed vapor and reducing the line temperature to a safe superheat level entering the compressor.

g. The liquid refrigerant passes from the solenoid valve through the refrigerant liquid sight indicator, and enters the inlet port of the thermostatic expansion valve where it is metered by the action of the valve pin. The valve pin is actuated by a diaphragm whose position is determined by the evaporator load and the superheat level sensed by the valve thermal bulb. To compensate for the effect of pressure drop across the evaporator, an external pressure equalizing line is connected between the evaporator outlet and the chamber below the valve diaphragm. Thus, the true evaporator outlet pressure is exerted beneath the valve diaphragm. The operating pressures on the valve diaphragm are now free from the effect of the pressure drop through the evaporator, and the expansion valve will respond to the superheat of the refrigerant vapor leaving the evaporator.

h. The thermostatic expansion valve is factory adjusted to maintain a nominal 5F superheat setting. The valve function is to maintain the nominal superheat setting in the evaporator, as dictated by the thermal sensing bulb. This is accomplished by modulating the flow rate of liquid refrigerant to the evaporator.

i. The actual cooling effect in this vapor cycle system occurs in the evaporator where the liquid refrigerant is evaporated under re

duced pressure. In vaporizing, the refrigerant absorbs heat from the air being drawn through the evaporator by the evaporator fan, thereby reducing the temperature of the air which then flows to the compartment to be air conditioned.. The low-pressure, low-temperature reabsorb heat from the air being drawn through the evaporator by the evaporator fan, thereby reducing the temperature of the air which then flows to the compartment to be air conditioned. The low-pressure, low-temperature refrigerant vapor then leaves the evaporator and flows through the compressor suction line through the compressor motor windings, to the compressor assembly and the cycle is repeated.

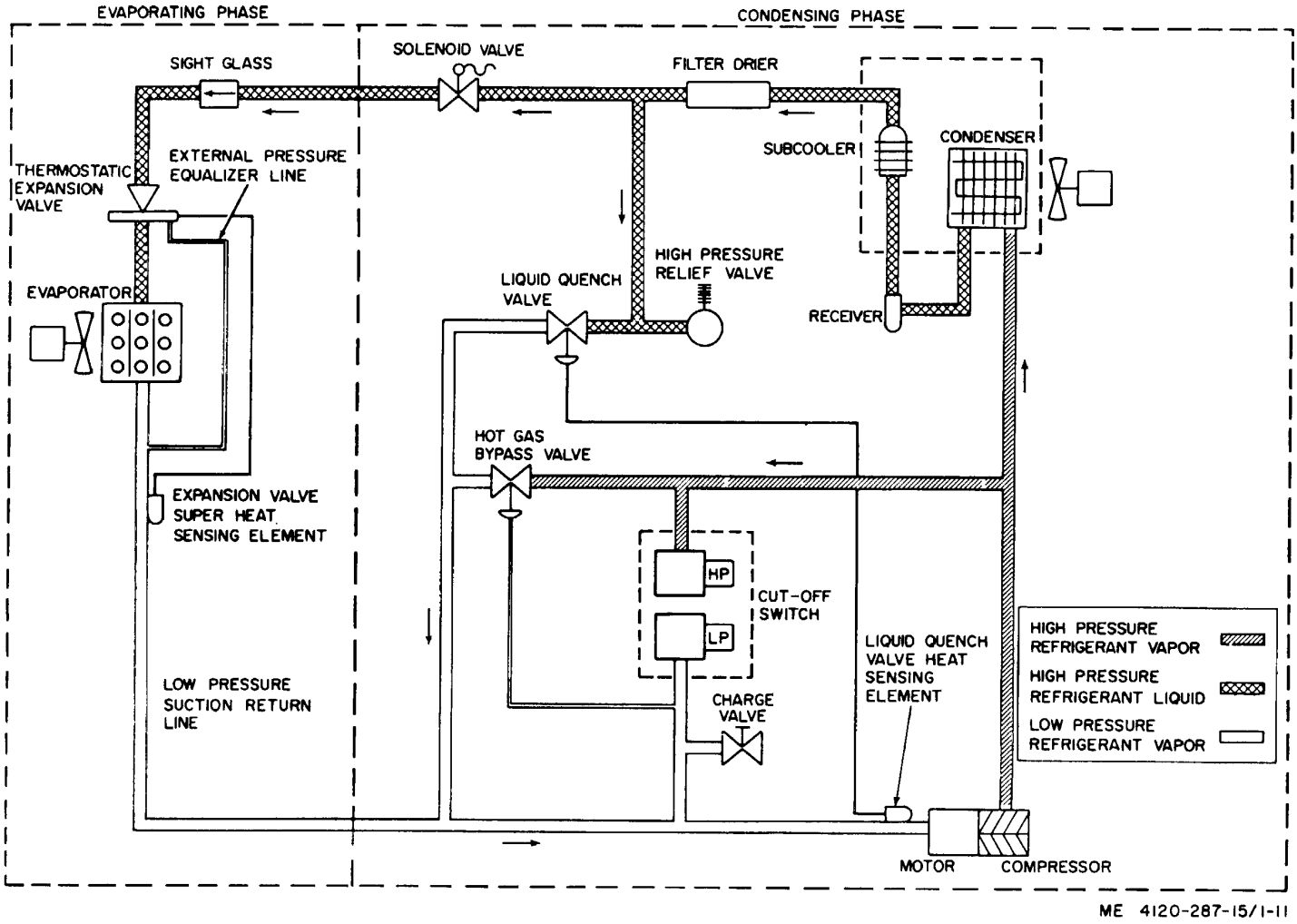


Figure 1-11. Refrigerant vapor cycle schematic diagram.

CHAPTER 2
INSTALLATION AND OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Unloading Equipment

a. The air conditioner is shipped in a single wood crate, packaged for shipment in conformance with Military Specifications PPP-B-636 and PPP-B-601.

b. Lift the packaged air conditioner from the carrier using a hoisting device with a minimum rating of 750 pounds capacity.

Caution:

When unloading the unit be careful to avoid damage to the air conditioner and separately packaged components. Make sure the air conditioner maintains an upright position during unloading.

2-2. Unpacking Equipment

The air conditioner is securely fastened to supports and bolted to a wooden skid within the crate as shown in figure 2-1. Unpack equipment as follows:

a. Cut the metal straps, and uncrate the air conditioner.

b. Carefully remove the barrier paper and tape.

c. Remove the eight bolts securing the air conditioner to the wood skid. Using one of the following two methods, remove the air conditioner from the skid.

(1) Using the four lifting eyes in the top corners of the cabinet(fig. 1-10) lift the air conditioner with a sling. Use spreader bars to maintain a 90-degree angle between the sling and cabinet top panel while lifting air conditioner off skid.

Caution:

Guy ropes must be used to prevent excessive swinging that might damage the air conditioner when a hoisting device is used.

(2) Using a fork lift with suitable fork prong dimensions, insert fork lift prongs into fork lift channels formed by the base of the airconditioner (fig. 1-10). Elevate slightly and check stability of unit; the lift air conditioner off skid.

d. Open the separate shipping carton and unpack the remote control box and wiring harness assemblies.

Note

Tiedown points, located at each of the four ends of the fork lift channels, facilitate moving the airconditioner after its been uncrated. When using the diedown points place a pipe bushing at the four points between the holes in the ends of the fork lift channels (fig. 1-10); then attach an eyebolt and clevis through the bushings to provide for attaching the tiedown straps to the airconditioner.

2-3. Inspecting and Servicing Equipment

a. A complete inspection of the air conditioner should be made upon receipt of unit. Inspect the air conditioner as follows:

(1) Remove the housing panels (para. 3-23 thru 3-29), and open the condenser discharge door (para. 3-30).

(2) Inspect the housing panels and condenser discharge door for dents, breaks, missing or defective fasteners, loose welds or revets, defective gaskets, and damaged insulation (para. 3-21 thru 3-30).

(3) Visually inspect the entire unit for cracks, breaks, loose or missing hardware, loose connections, and broken or damaged wire leads. Inspect for any tampering or damage that may have occurred in transit.

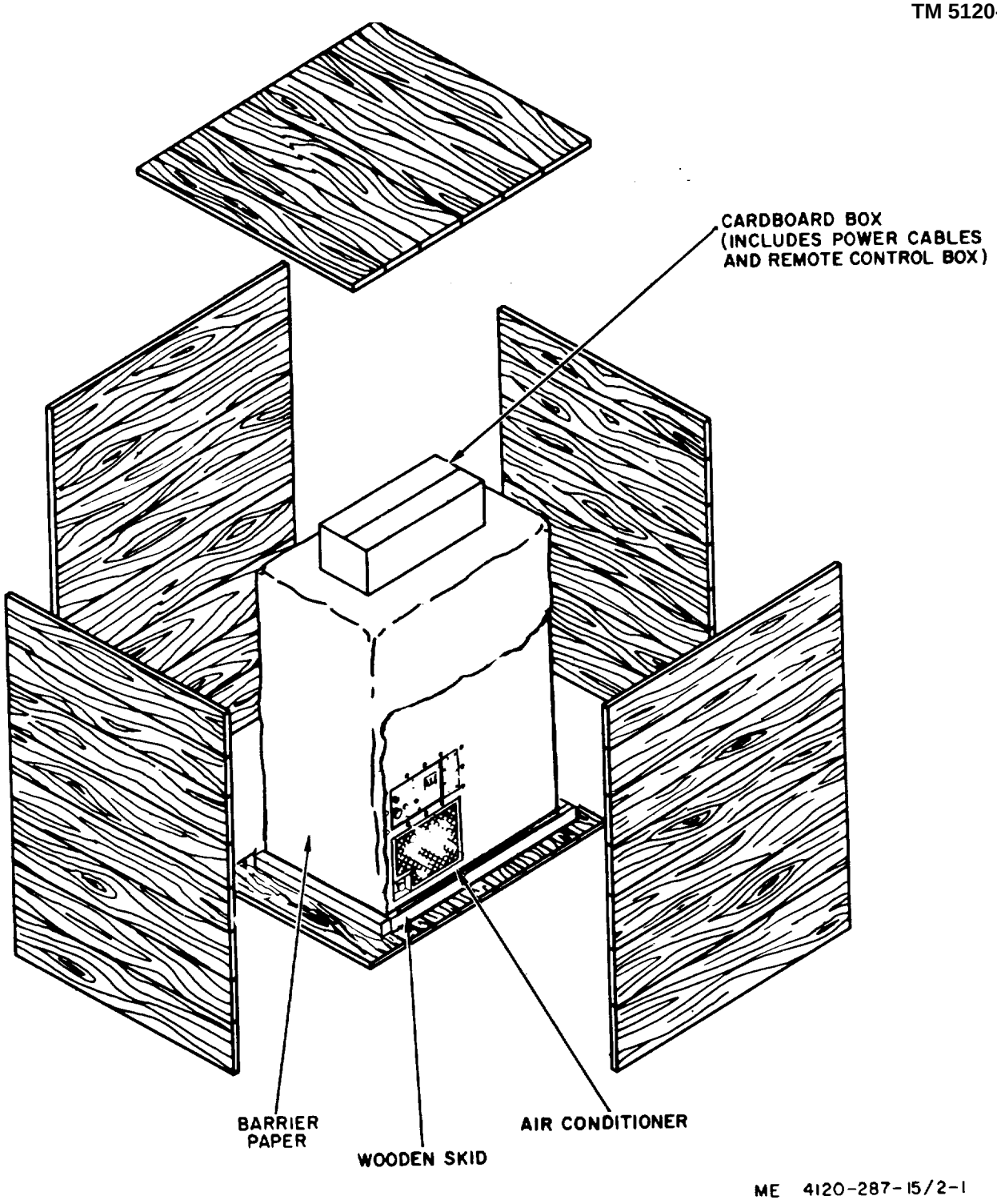


Figure 2 -1. Air conditioner shipping package.

(4) Examine the evaporator and condenser assembly air inlet filters for dirt, dust or other obstructions (para 3-10 and 3-11).

(5) Inspect the remote control box assembly air conditioning switch and temperature control rheostat for proper operation.

(6) Examine the remote control wiring harness for possible defects (para 3-38).

(7) Check the master circuit breaker for proper operation. Set master circuit breaker to OFF position.

(8) Make sure that a good fuse is in the electrical tray fuse holder (para 3-37).

(9) Inspect the air conditioner thermostat for physical damage and security of mechanical and electrical connections (para 3-39).

(10) Check all air conditioner components for security of attachment.

(11) Visually inspect the compressor area for indications of oil or refrigerant leaks.

(12) Correct all deficiencies or report them to direct support maintenance.

(13) Install all air conditioner housing panels and close the condenser discharge door (para 3-23 thru 3-30).

b. When using the air conditioner perform daily preventive maintenance services in accordance with paragraph 3-6.

2-4. Installation Instructions

a. Due to conditions which may vary at the worksite detailed installation instructions are not provided with this manual. Steps described in this paragraph are minimum installation requirements necessary for efficient operation of the air conditioner. Adaptations should be made to conform with ductwork existing at the installation site. See figure 1-10 for installation and base plan space requirements.

(1) Using the lifting method described in paragraph 2-2c (1) or (2), position the airconditioner in the appropriate location on the shelter (or trailer) so that the conditioned air outlet and recalculating air inlet ports line up with the provided ducting at the installation site.

(2) Make sure that unobstructed outdoor ambient air flow is available at the condenser air inlet, condenser air discharge, and vent air inlet ports.

(3) Secure the air conditioner to its mounting base using the eight mounting holes provided in the base of the air conditioner (fig. 1-10). When necessary, ruse shilms to level air conditioner.

Note. An air tight seal must be maintained between external ducting and the air conditioner for efficient operation. Make certain that the ducting and air conditioner are properly aligned after leveling air conditioner.

Mount the remote control box assembly on a wall or panel at a convenient level for operation.

Note

Remove electrical tray assembly panel (para 3-25) and store for future use.

(5) Connect remote control wiring harness *pl*ug P103 to remote control box assembly receptacle J103 (figs. 1-3 and 2-2). Connect remote control wiring harness plug P102 to electrical tray remote control receptacle J102(figs. 1-3 and 2-3)

3).

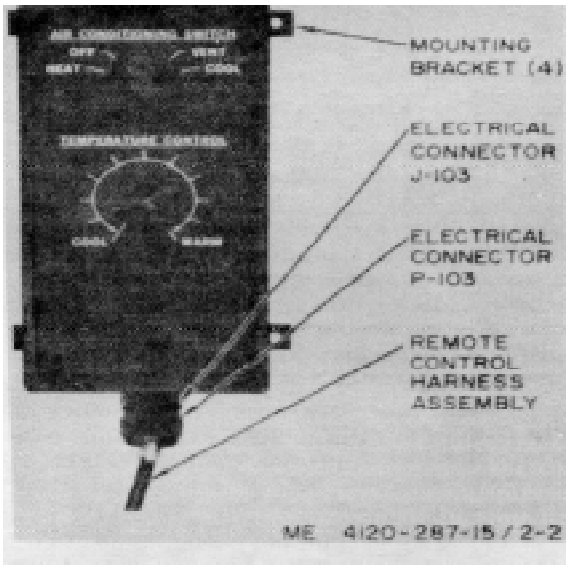


Figure 2-2. Remote control box. assembly.

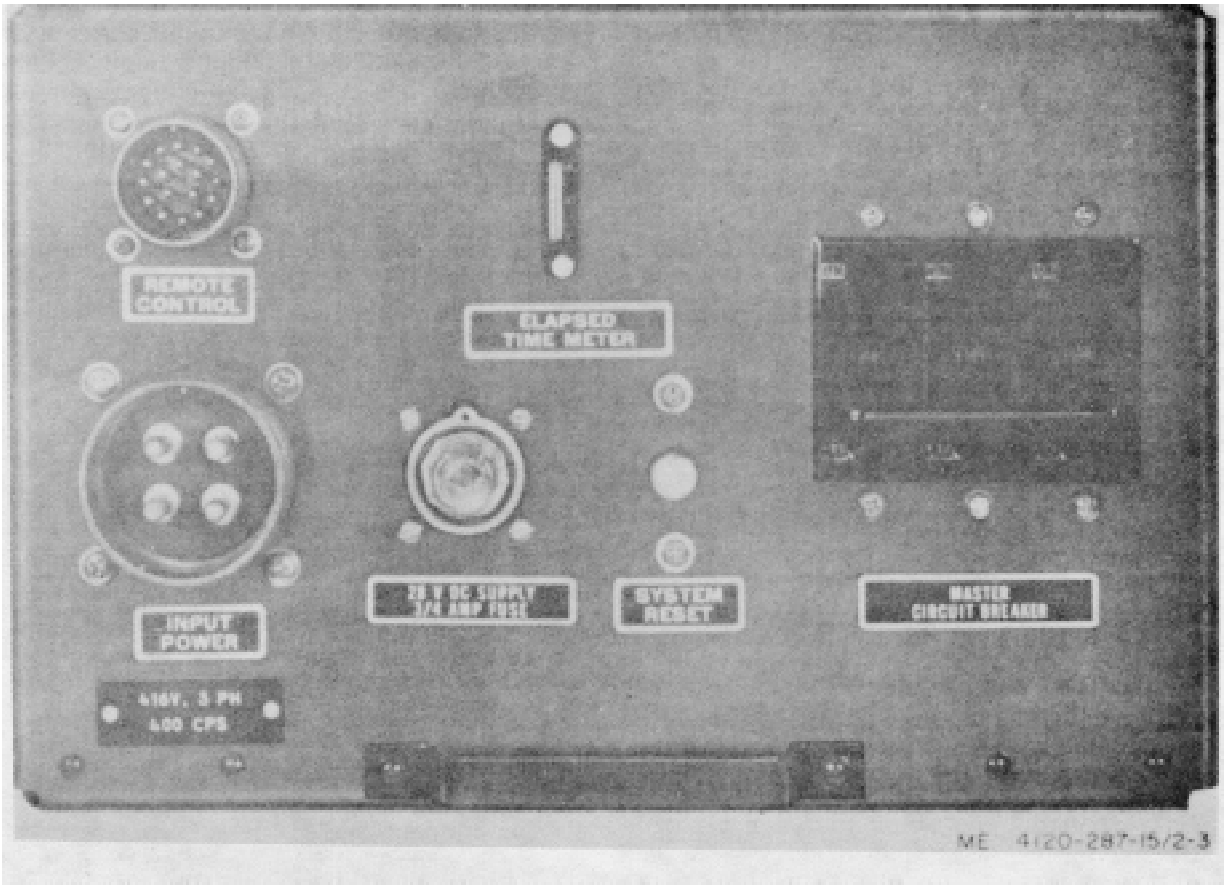


Figure 2-3. Electrical tray assembly control panel.

Warning

Make sure Master circuit Breaker is set to Off Position before Connecting P102 to J102.

(6) Connect input power plug P101 to a 416-volt, 3-phase, 400-sycle, 4-wire power soured. Make sure ground wire of 4-wire source is connected to plug P101 terminal D. Connect wire carrying phases 1,2,and 3 to plug P102 terminals A, B, and C, respectively.

Warning

Make sure main power supply is disconnected before attempting to wire P101. Make sure master circuit breaker is set to OFF position before connecting P101 to J101.

(7) Connect input power plug P101 to electrical tray input power receptacle j101(gig. 2-3).

Caution:

The air conditioner is wired to operate from a 416-volt, 3-phase, 400-cycle, 4-wire power source. Make sure ower source supply is correct before attempting start up.

(8) Check phase relationship by starting air conditioner in accordance with paragraph 2-10. If the air conditioner does not start operating (as evidenced by no airflow from conditioned air outlet duct) perform the following:

(a) Set master circuit breaker to OFF position, and disconnect main power supply.

(b) Disconnect plug P101 from input power receptacle J101 and mainpower supply.

(c) Switch any two"hot"leads at input power plug P101.

(d) Reconnect main power supply. Make sure master circuit breaker is et to OFF position; then connect plug P101 to electrical tray input power receptaclej101.

(e) Restart air conditioner; if the air conditioner still does not operate refer to paragraph 3-12.

(9) In the event that pre-filtered, de-contaminated fresh air is required for air conditioning, the shelter's fresh air supply must first be passed though a special filtering and de-contaminating unit which is an integral part of the shelter's equipment(mounted under the air conditioning unit and connected with a flexible duct to the air conditioner filtered air inlet(fig. 1-10). This prefiltered air supply is the discharged to the filtered fresh air intake, located beneath the evaporator fan. The fresh air door control handle must e turned counter-clockwise to the closed position, when de-contaminated fresh air is required.

(b) When installing Model VEA4-3A air conditioning unit indoors perform all steps specified in paragraph 2-4a. Additional ductwork must be provided as follows:

(1) Provide suitable ductwork to carry condenser discharge air away from area being cooled.

(2) Provide suitable ductwork to supply fresh air to the condenser inlet and fresh air inlet(fig. 1-10).

SECTION II MOVEMENT TO NEW WORKSITE

2-5. Dismantling for Movement

a. Short Distance. When moving the air conditioner to a new worksite which is a short distance away, perform the following:

(1) Set air conditioning switch, located on remote control box assembly, to OFF position. Set the master circuit breaker switch to OFF position.

(2) Turn off main power supply. Disconnect power plug (P101) from input power receptacle (J101) at electrical tray front panel.

(3) Disconnect remote control wiring harness plug (P102) from electrical tray remote control receptacle (J102) and from base of remote control box.

(4) Remove the remote control box assembly from its mounting.

(5) Close and secure the condenser air discharge door. Replace panel over electrical tray front panel. Make sure all panels are secure.

(6) Release the eight mounting bolts securing air conditioner to mount.

(7) Using the lifting method described in paragraph 2-2c (1) or (2_, place the air conditioner on rolls or a skid.

b. Long Distance. When moving the air conditioner to a new worksite which is a long distance away, perform steps 2-5a (1) through (4); then perform the following:

(1) Place a shipping plug on the high-pressure relief valve outlet port.

(2) Close and secure the condenser air inlet door. Replace panel over electrical tray front panel. Make sure all panels are secure.

(3) Release the eight Mounting bolts securing air conditioner to mount.

(4) Inspect the air conditioner to determine its condition. Correct deficiencies before placing equipment in limited storage. Perform technical inspections on unboxed items in accordance with AR 743-505.

(5) Using a cloth dampened with an approved solvent clean the air conditioner. Dry thoroughly.

(6) Paint all surfaces as needed. Refer to TM9-213.

(7) Coat machined surfaces with preservative, or cover with barrier material. Coat exposed metal surfaces with preservative.

(8) Using pressure tape, seal all openings.

(9) Wrap air conditioner in two layers of barrier paper and pack it in a wood crate. Provide a separate container for remote control box and wiring harness; pack items firmly in cellulose wadding or other protective material.

(10) Securely nail wooden crate closed, and wrap with steel handling strips.
(11) Using the lifting method describe in paragraph 2-2c (1) or (2), place air conditioner on bed of carrier.
(12) Securely block or tie the crated air conditioner on the carrier. If the carrier has a wooden floor, spike the crated airconditioner to the carrier bed.
(13) Store air conditioner in a room maintained at an even temperature and relatively low humidity. Cover entire air conditioner with a tarpaulin when no suitable storage facility is available.

2-6. Reinstallation after Movement

a. Short Distance. Reinstall air conditioner according to paragraph 2-4, after moving air conditioner a short distance(para 2-5a).
b. Long Distance. Reinstall airconditioner according to paragraphs 2-3 and 2-4, after moving air conditioner a long distance (para 2-5b).
(

Section III. CONTROLS AND INSTRUMENTS

2-7. General
This section describes, locates, illustrates, and furnishes operator, crew, or organizational maintenance personnel sufficient informational maintenance personnel sufficient information about various controls and instruments for proper operation of the air conditioner.

2-8. Controls and Instruments
a. Remote Control Box. The air conditioning switch and the continuously variable temperature control resistor (fig2-2) are flush mounted on the front of the remote control box assembly. The switches function as follows:
.

(1) Air conditioning switch. The four position heat off vent cool, five deck air conditioning switch controls the air conditioner mode of operation. When in the HEAT position the evaporator fan is place in operation and the heater circuit is closed and controlled by the temperature control variable resistor. When in the OFF position all relays are deenergized, and the air conditioner dows not condition the shelter air. When in the VENT position the air conditioner recirculates the shelter air with the evaporator fan; freshair may be drawn into the shelter by turning the fresh air contl handle, located in lower left hand front section of air conditioner, to OPEN position. When in the COOL position the motor compressor circuit is closed, the evaporator and condenser fans are energized, and the cooling system starts to function—cooling the shelter air.

(2) Temperature control. The continuously variable temperature control resistor controls the air conditioner return air temperature. The temperature range on the cooling cycle is from 60° G to 90° F. The temperature range on the heating cycle is from 60° F to 90° F.

b. *Electrical Tray Panel*. The system reset switch, elapsed time meter, 2bV DC supply ¾ amp fuse indicator light and fuse holder, and the master circuit breaker (fig. 2-3) are flush mounted on the front panel of the electrical tray assembly. The control and instrument functions as follows:
(1) *System reset switch*. This push button-type switch must be reset (depressed) in the event that the low ambient temperature switch, or the compressor motor thermal overload contacts in the refrigerant circuit are tripped.
(2) *Elapsed time meter*. Culminate air conditioner operating is registered on the elapsed time meter. Total operating time is read by locating the black bubble in the meter's mercury column and noting the bubble height on the graduated scale along side of the mercury column. The scale meter range is from 0 to 10,000 hours, each scale division being equivalent to 100 hours operating time.
(3) *Master circuit breaker*. This circuit breaker controls the power supplied to the air conditioner through the power input receptacle P101. This switch has ON (up) and OFF(down) positions.

(4) 28V DC Supply 3/4 amp fuse indicator and fuse holder. This indicator lamp lights when the 28-volt dc supply line overloads and blows the 28-volt dc fuse.

c. Monitoring Instruments. The liquid refrigerant sight indicator and moisture indicator, and the evaporator and condenser section filter clean indicators, continuously monitor the air conditioner air circulation system and vapor cycle system. The daily and quarterly prevefrtive maintenance services (pama 3-6 and 3-7) must be performed as indicated by the monitoring instrument readings for the air conditioner to 'operate at its rated capacities.

(1) Refrigerant liquid line sight glass and moisture indicator. The refrigerant liquid sight indicator (fig. 2-4) flush mounted beneath the evaporator rear access panel, allows visual observation of the refrigerant-12 flow. Bubbles, or a milky appearance in the sight glass indicate a shortage of refrigerant or a restricted liquid line. The moisture indicator, located within the refrigerant liquid sight indicator, indicates moisture level in the vapor cycle system by changing color from green to yellow. Notify field maintenance should the moisture indicator turn yellow, or bubbles appear in the sight glass.

(*2) Evaporator filter clean indicator.* The evaporator filter clean indicator (fig. 2-4) flush mounted beneath the evaporator rear access panel, monitors the velocity of air passing through the evaporator filter screen. When the indicating ball rises to the upper arrows (fig. 2-4) service the evaporator inlet filter (para 3-11).

(*3) Condenser filter clean indicator.* The condenser filter clean indicator (fig. 2-5.) flush mounted on the air conditioner rightside panel, monitors the velocity of air passing through the condenser filter screen. When the indicating ball rises to the upper arrows (fig. 2-5.) service the condenser air inlet filter (para 3-10).

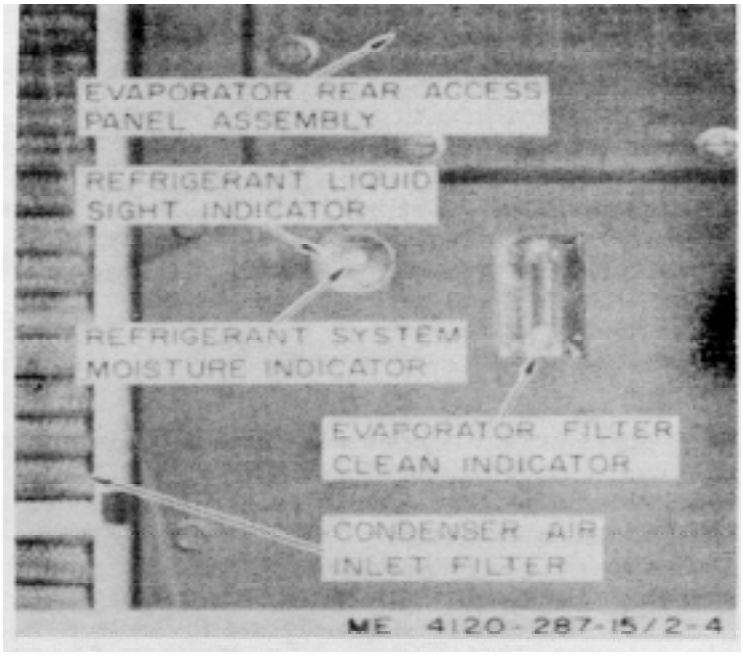


Figure2-4. Refrigerant liquid sight indicator and evaporator filter clean indicator.

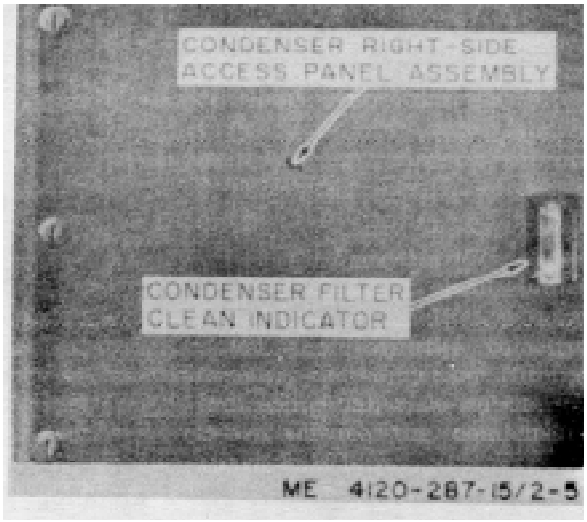


FIGURE 2-5. Condenser filter clean indicator.

Section IV. OPERATION OF EQUIPMENT

2-9. General

a. Instructions in this section are published for 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 and stopping the air conditioner, in setting the air conditioner mode of operation.

2-10. Starting

a. Preparation for Starting.

(1) Perform necessary daily preventive maintenance services(para 3-6).

(2) Check air conditioning requirements to determine necessary mode of operation.

b. Starting. When starting the air conditioner perform the following:

(1) Set the air conditioning switch and master circuit breaker switch to their OFF position(fig. 2-2 and 2-3).

(2) Turn the fresh air control knob 9fig. 1-3) to the OPEN or CLOSE position, depending on shelter air conditioning requirements as determined in step a(2) of this paragraph.

(3) Set the air conditioner switch to either the HEAT, VENT, or COOL mode of operation position s determined in step a (2) of this paragraph.

4) Open condenser air discharge door when air conditioning switch is set for COOL mode of operation.

(5) Place the master circuit breaker in the ON (up) position (fig. 2-3).

(6) Set the temperature control variable resistor as necessary to achieve the desired shelter air temperature range.

NOTE

The temperature control variable resistor setting has no effect when the air conditioning switch is set in the VENT position.

2-11. Stopping

a. Stopping procedure. When stopping the airconditioner perform the following steps:

(1) Set the air conditioning switch to the OFF position.

(2) Set the master circuit breaker switch to the OFF (down) position.

b. Perform the necessary daily preventive maintenance services 9para 3-6).

2-12. Operating under Unusual Conditions

a. When starting the air conditioner under unusual conditions perform the following steps:

(1) Perform necessary daily preventive maintenance services(para3-6).

(2) Check air conditioning requirements to determine necessary ode of operation.

(3) Set the air conditioning switch to the OFF position.

(4) Turn the fresh air control knob (fig. 1-3) to the OPEN or CLOSE position, depending on air conditioning requirements determined in step (2) above.

(5) Make sure the condenser air outlet door (fig.1-5) is open.

(6) connect the remote control wiring harness plug (P102) to the remote control receptacle (J102) located on the electrical tray front panel.

(7) Connect the main power cable to the input power plug P101 in accordance with paragraph 2-4a(6). Connect plug P101 to power input receptacle j101.

(8) set the air conditioner switch and temperature control switch in accordance with paragraph 2-10 b (3) and (6).

(9) Place the master circuit breaker in the ON(up) position (fig.2-3) to start air conditioner.

b. When stopping the air conditioner perform the following:

(1) Set the air conditioning switch in the OFF position.

(2) Place the master circuit breaker in the OFF(down) position.

(3) Perform the necessary daily preventive maintenance services (para 3-6).

2-13. Operation in Dusty or Sandy Areas

CAUTION

When operating the air conditioner in sandy or dusty areas, install a screen or porous cloth over the condenser air inlet metal grill (fig. 1-1) and the inlet opening of the fresh air door (fig. 1-1). Clean the evaporator and condenser assemblies and filters frequently (para 3-10 and 3-11). Provide a frequeriU3, (pal!L X40 and 3-Ul Provide a structure to protect the air conditioner from abrasion damage; arrange for adequate ventilation; paint all surfaces that have chipped or peeled.

2-14. Operation Under Rainy or Humid Conditions

CAUTION

When operating the air conditioner under rainy or humid conditions or in direct sunshine, provide a structure to protect the air conditioner from rain and moisture or direct sunshine. Provide adequate ventilation oectiaentsa keep electrical components dry and clean; paint all surfaces that have chipped or peeled.

Section V. OPERATION OF AUXILIARY MATERIAL

USED IN CONJUNCTION WITH THE AIR CONDITIONER

2-15. Fire Extinguisher (Monobromotrifluoromethane Type)

a. Description. The monobrlomrifluoromethane type fire extinguisher is generally suitable for all types of fire, except fires involved with LOX (liquid oxygen) generating equipment. The fire extinguisher is furnished with a disposable type cylinder.

b. Operation. To operate the fire extinguisher perform the following:

(1) Remove fire extinguisher from its location.
(2) Break seal by pulling safety pin from handle.
(3) Point horn at base of flame.
(4) Press trigger for discharge and direct stream at base of flame.
(5) Replace cylinder immediately after using.

c. Replacement of Cylinder. To replace cylinder, perform the following:

(1) Press lever to release pressure from used cylinder.
(2) Loosen swivel valve coupling nut and remove valve assembly from cylinder.
(3) Remove instruction band from used cylinder.
(4) Place new cylinder through instruction band.
(5) Replace safety pin in valve and seal pin with sealing wire.
(6) Attach valve assembly and tighten swivel coupling nut on the new cylinder and place fire extinguisher in mounting bracket.
(7) Adjust instruction band on cylinder to show maintenance and operating instructions.

d. Maintenance. Weigh fire extinguisher every 3 months and replace cylinder if gross weight has decreased 4 ounces or more. Lubricate cylinder neck threads with one drop of OE 30 oil before reassembly.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR AND ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT

3-1. Special Tools and Equipment

No special tools or equipment is required by operator or organizational maintenance of the air conditioner.

3-2. Basic Issue Tools and Equipment

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

Section II. LUBRICATION

3-3. General Lubrication Information

a. During normal operation and maintenance procedures the air conditioner requires no lubrication.

b. Lubricant is added to the refrigerant system only when recharging the air conditioner with refrigerant. Refer to support and depot maintenance.

3-4. Detailed Lubrication Information

a. General. Keep lubricant in closed container and store in a clean, dry place away from external heat. Allow no dust, dirt, or other foreign material to mix with the lubricant. Keep all lubrication equipment clean and ready to use.

b. Lubrication. Lubricant is added to the refrigerant system in accordance with paragraph 7-10. Refer to field maintenance.

Section III PREVENTIVE MAINTENANCE SERVICES

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. Item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 at the earliest possible opportunity.

3-6. Daily Preventive Maintenance Services

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. Quality Preventive Maintenance Services

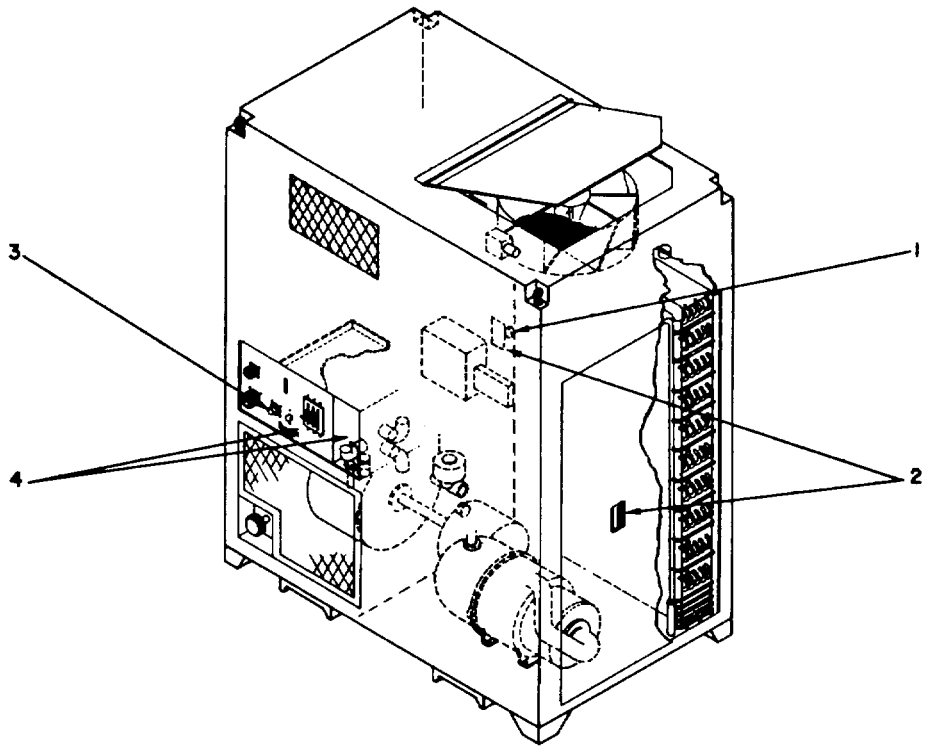
a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 1800 hours of operation, whichever occurs first.

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

NOTE

The motor compressor will be replaced and overhauled at 4000 hours of operation (para 5-20).

PREVENTIVE MAINTENANCE SERVICES
DAILY



ITEM		PAR REF
1	REFRIGERANT LIQUID SIGHT GLASS. Inspect refrigant liquid sight glass while the unit is operating. Milky flow indicates moisture; bubbles indicate low charge—report either condition to organizational maintenance.	2-9. c. (1) 5-19. a., b.
2	FILTER CLEAN INDICATORS. Inspect the filter clean indicators while the air conditioner is operating. Clean or replace the evaporator and/or condenser air inlet filter when indicator ball rises to SERVICE position.	2-9. c. (2) 2-9. c. (3) 3-10. 3-11.

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

ITEM			PAR REF
3	FUSE. Inspect the fuse holder. If the indicator light is glowing, fuse is defective. Replace a defective fuse.		2-9. b. (4) 3-9.
4	CONTROLS AND INSTRUMENTS. Inspect for damage. With unit operating, inspect for improper operation.		2-10. 2-11. 2-12.
	NOTE 1. MIST ELIMINATIOR.	The mist eliminator will generally not require servicing as only filtered air reaches it. Also, cleaning the evaporator assembly core (paragraph 3-34) effectively cleans the mist eliminator.	
	NOTE 2. OPERATION.	During operation, observe for any unusual noise or vibration. Notify organizational maintenance of erratic operation.	

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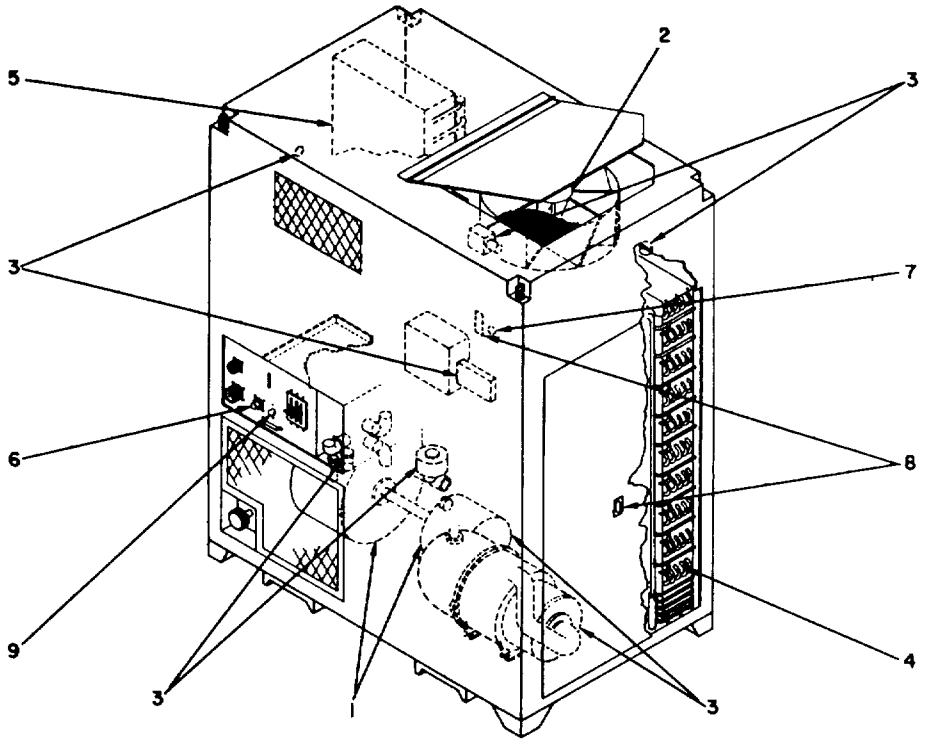
Figure 3-1(2)-Continued.

PREVENTIVE MAINTENANCE SERVICES
QUARTERLY



ITEM		PAR REF
1	EVAPORATOR FAN MOTOR. Inspect for damage and freedom of movement.	6-11.
2	CONDENSER FAN MOTOR. Inspect for damage and freedom of movement.	6-11.
3	ELECTRICAL WIRING. Inspect the wiring for loose connections and cracked insulation.	2-3. a. (2), (3), (6)
4	CONDENSER. Inspect for leaks, corrosion, dust and dirt.	3-10. 5-21.

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

ITEM		PAR REF
5	EVAPORATOR. Inspect for leaks, corrosion, dust and dirt	3-11. 5-21. 5-20.
6.	FUSE. Inspect the fuse holder. If the indicator light is flowing, fuse is defective. Replace a defective fuse.	2-9. b. (4) 3-37.
7.	REFRIGERANT LIQUID SIGHT GLASS. Inspect the refrigerant liquid sight glass while the unit is operating. Milky flow indicates moisture in the refrigerant system; bubbles indicate low charge.	2-9..c (1) 5-19. 5-21. 5-20
8.	FILTER CLEAN INDICATORS. Inspect the filter clean indicators while the air conditioner is operating. Clean or replace the evaporator and/or condenser air inlet filter when indicator ball rises to SERVICE position.	2-9. c. (2) 3-32. 2-9. c. (3) 3-33. 3-34 3-35
9.	CONTROLS AND INSTRUMENTS Inspect for damage. With air conditioner operating, inspect for improper operation.	2-10. 2-11 2-12.
	NOTE 1. OPERATIONAL TEST. During operational test, observe for any unusual noise or vibration.	

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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. Fuse Replacement
When the fuse holder indicator lights, refer to figure 3-3 and replace the fuse.

3-10. Condenser Air Inlet Filter Service
Refer to figure 3-4 and service the condenser air inlet filter.

3-11. Evaporator Air Inlet Filter Service
Refer to figure 3-5 and service the evaporator air inlet filter.

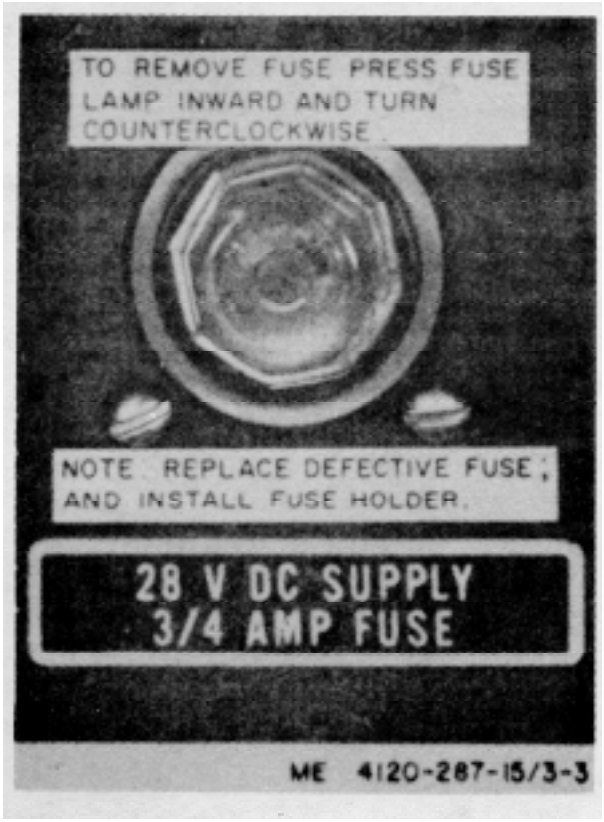


Figure 3-3. Fuse replacement.

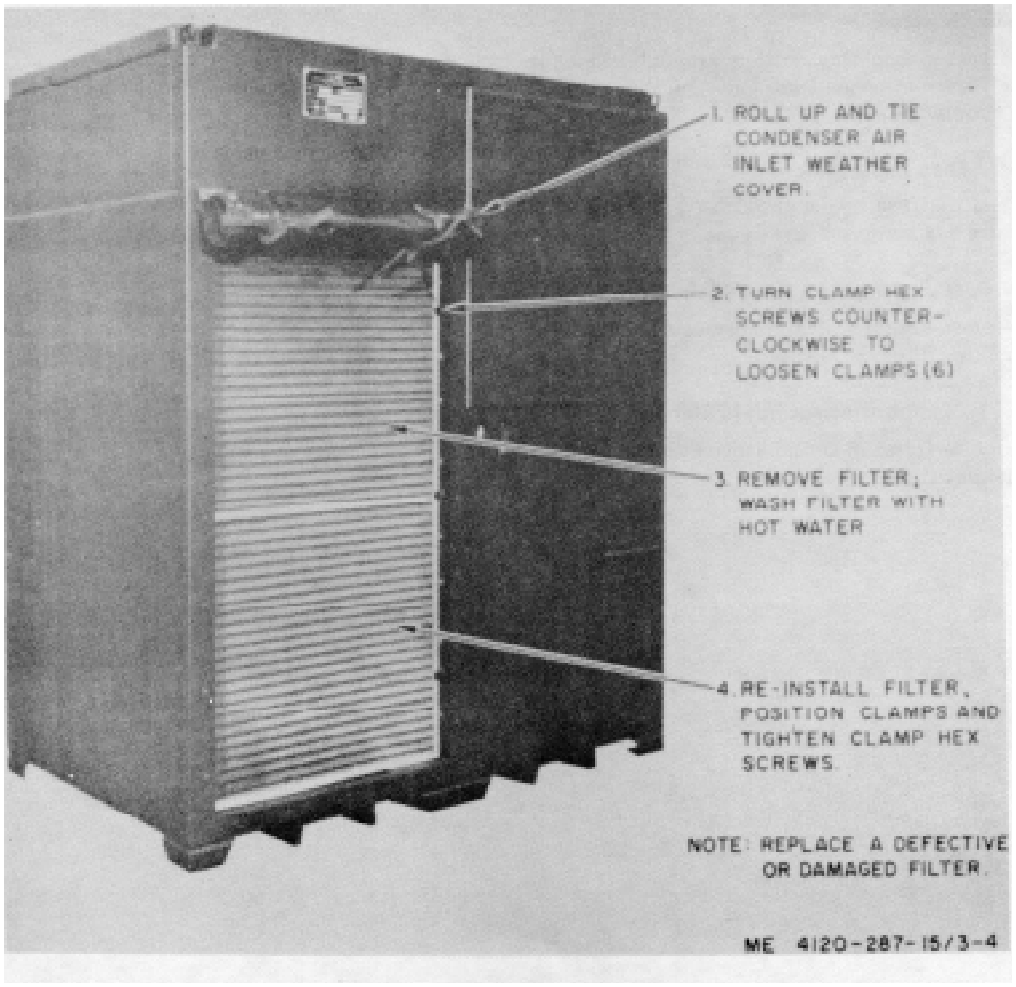


Figure 3-4. condenser air inlet filter service.

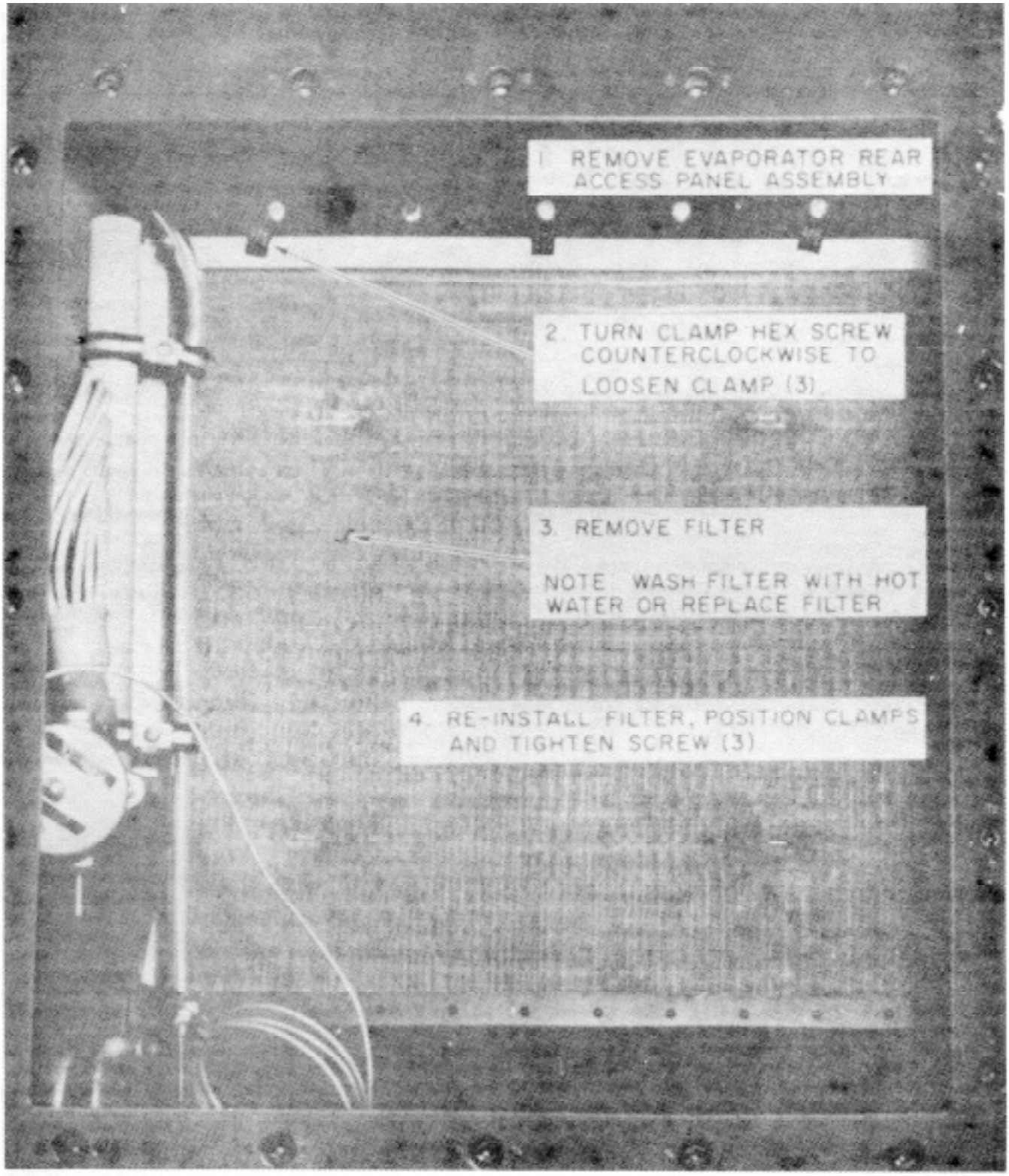


Figure 3-5. Evaporator air inlet filter services.

Section V TROUBLESHOOTING

3-12. General

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

3-13. Air Conditioner Fails to Start

No operation in any control position.

Probable cause	Possible remedy
Interrupted power supply	Check line side of power cable. If not reading, check main power supply.
Main power cable not properly secured, *or* cable damaged.	Check power input cable and check (J101 and P101) for Continuity and positive connection.
Fuse Blown	Replace fuse (para 309).
Power supply our of phase.	Correct phasing of power supply (para 2-4a(6)).

3-14. Insufficient Cooling

Air conditioner operating with air conditioning switch in COOL position.

Probable cause	Possible remedy
Remote control box temperature control variable resistor set above ambient	Move variable resistor further down the scale toward COOL position .
Condenser assembly, or inlet filter obstructing air flow	Check condenser section filter clean indicator; service condenser assembly and inlet filter as required (para 3-33, and 3-35).
Evaporator air inlet filter obstructing air flow	Check evaporator filter clean indicator; service evaporator assembly and inlet filter as required (para 3-32 and 3-34).
Low refrigerant-12 charge.	Check refrigerant liquid sight indicator; notify direct support maintenance if flow through indicator appears milky or contains bubbles (para 2-9c(1).
Compressor and/or condenser drive motors shut down	Allow a few minutes for motor windings to cool down; then press system reset switch.
Condenser or evaporator fan motors shut down	Internal motor overload relay tripped. Motor will start up automatically when cooled. Notify direct support maintenance if motor does not restart in a few minutes.
Defective thermostat	Replace thermostat (para 3-39)
Defective remote control	Replace remote control box assemble and/or wiring harness.

3-15. Air conditioning stops

Probable cause	Possible remedy
Power failure	Inspect power source cable for defects or external power source for proper operation.
Fuse blown	Replace fuse (para 3-9)
Master circuit breaker tripped	Set master circuit breaker to OFF position; after a few minutes set to ON position. If air conditioner does not start notify direct support maintenance.
Trip relay K101 energized.	Press system reset switch.

3-16. Compressor Noisy

Probable cause	Possible remedy
Insufficient oil or refrigerant supply, or defective compressor.	Notify direct support maintenance.

3-17. Compressor Stops

Probable cause	Possible remedy
Condenser or condenser air inlet filter dirty.	Check condenser section filter clean indicator; service or replace filter and clean condenser and sub-cooler assembly as required (para 3-33).
Air in refrigerant system	Check refrigerant liquid sight indicator; if refrigerant flow appears milky or contains bubbles notify direct support maintenance.

3-18. Excessive Cooling

Probable cause	Possible remedy
Temperature control variable resistor set too low.	Adjust variable resistor for higher temperature.
Thermostat defective	Replace thermostat (para. 3-39).

3-19. Excessive Heating

Probable cause	Possible remedy
Temperature control variable resistor set too high	Adjust variable resistor for lower temperature.
Thermostat defective	Replace thermostat (para. 3-39)

3-20. No Temperature Regulation in any Control Position

Probable cause	Possible remedy
Thermostat faulty	Replace thermostat (para. 3-39).
Temperature control variable resistor (located in remote control box) defective.	Replace temperature control variable resistor
Defective remote control box wiring harness.	Replace wiring harness connecting remote control box assembly to electrical tray panel (para. 3-41).

Section VI. HOUSING PANELS

3-21. General

The air conditioner is enclosed with sheet aluminum panels mounted to the frame with either quarter-turn stud fasteners, or phillip-head bolts. Evaporator section housing panels are insulated with layers of sponge rubber cemented directly to the interior face of the panels. All panel contact edges are sealed with a continuous strip of ribbed gasket material. The air inlets and outlets have removable expanded metal screens spot-welded to their respective panel assemblies.

3-22. General Maintenance Procedures

The following procedures pertain to all panel assemblies installed on the air conditioner. Procedures peculiar to a particular panel assembly are included within the paragraph dealing with that panel assembly.

CAUTION

Before removing or installing any panel assembly disconnect the power source from the air conditioner.

a. Cleaning. Clean all parts with an approved cleaning solvent.

b. Inspection.

(1) Inspect the panel assembly for dents, cracks, and other signs of structural damage.

(2) Inspect insulation and gaskets for security, damage, and deterioration.

(3) Check the stud fasteners for broken, bent, or missing cross pins, washers, springs, and seals.

(4) Inspect the panel assembly for chipped and worn paint.

c. Repair and Replacement.

(1) Panel assemblies. Repair or replace a damaged panel assembly if the damage is such that the assembly does not seal properly against the frame assembly; permitting the air conditioner interior to be contaminated by foreign matter or the elements. Refer damage beyond scope of organizational maintenance to direct support maintenance.

(2) Insulation and Gaskets. Panel assemblies which have damaged insulation and/or gaskets must be repaired, see maintenance allocation chart for scope of organizational maintenance. If the insulation or gasket is loose, it can be fastened with cement, MIL Spec MIL-C-4003.

(3) Quarter-turn fastener assembly. Replace damaged stud fasteners (fig. 3-6) as follows:

(*a*) Compress the stud fastener and remove it from the panel grommet assembly.

(*b*) Remove the stud assembly seal from the stud fastener grommet.

(*c*) Install a new seal on the stud assembly spring cup.

(*d*) Compress the stud fastener and install it in the panel grommet assembly.

(4) Repaint worn, chipped, or peeling paint as follows:

(*a*) Remove loose paint with a wire brush.

(*b*) Clean the area to be repainted.
(*c*) Paint the area with zinc chromate primer, MIL Spec MIL-P-6889A, type I.
(*d*) After the primer dries, paint with one coat of semi-gloss olive drab per MIL Spec MIL-T-704, Type A. Color to be in accordance with Federal Specification TT-E-485C, Type II, Color Number X24087.

3-23. Evaporator Left-side Access Panel Assembly

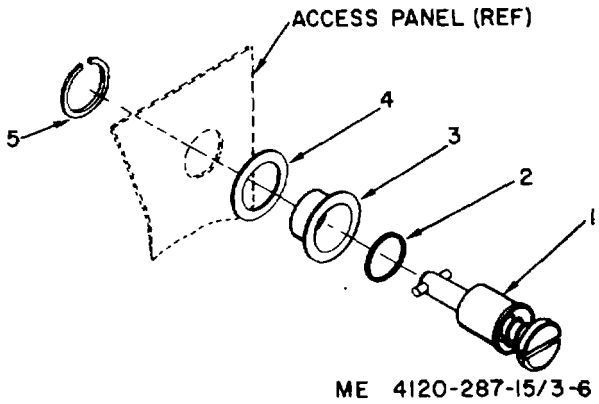
a. Removal. Remove the eighteen phillips head screws (8, fig. 3-7) securing the panel assembly (5) to the cabinet; then remove the panel assembly from the air conditioner frame.
b. Inspection, Cleaning, Repair and Replacement. Perform the applicable procedures of paragraph 3-22.
c. Installation. Secure the panel assembly (5) to the air conditioner frame with the phillips head screws (8).

3-24. Evaporator Blower Access Panel Assembly

a. Removal. Remove the eighteen phillips head screws (4, fig. 3-7) securing the panel assembly (1) to the cabinet; then remove the panel assembly from the air conditioner frame.
b. Inspection, Cleaning, Repair and Replacement. Perform the applicable procedures of paragraph 3-22.
c. Installation. Secure the panel (1) to the air conditioner frame with the phillips head screws (4).

3-25. Electrical Tray Access Panel Assembly

a. Removal. Remove the twelve phillips head screws (11, fig. 3-7) securing the panel assembly (9) to the cabinet; then remove the panel assembly from the air conditioner frame.
b. Inspection, Cleaning, Repair and Replacement. Perform the applicable procedures of paragraph 3-22.
c. Installation. Secure the panel assembly (5) to the air conditioner frame with the phillips head screws (11).



1 Stud assembly
2 Preformed packing
3 Grommet
4 Washer
5 Snap ring

Figure 3-6. Quarter-turn fastener assembly

3-26. Thermostat Access Panel

a. *Removal*
(1) Remove the electrical tray access panel according to paragraph 3-25a.
(2) Remove the seven phillips head screws (13, fig. 3-7) securing the thermostat access panel (12) to the cabinet; then remove the thermostat access panel from the air conditioner frame.
b. Inspection, Cleaning, Repair and Replacement. Perform the applicable procedures of paragraph 3-22.
c. Installation. Secure the panel (12) to the air conditioner frame, using the phillips head bolts (13).

3-27. Evaporator Rear Access Panel

a. Removal. Loosen the panel's twenty quarter-turn fasteners by depressing fasteners and rotating one-quarter turn counterclockwise; then remove the panel assembly (7, fig. 3-8) from the air conditioner frame.
b. Inspection, Cleaning, Repair and Replacement. Perform the applicable procedures of paragraph 3-22.
c. Installation. Secure the panel (7, fig. 3-8) to the air conditioner frame with the quarter-turn fasteners.

3-28. Condenser Air Inlet Weather Cover

a. Removal. Remove the three phillips head screws (9, fig. 3-8) securing the weather cover 8) to the air conditioner frame; then remove the weather cover.

b. Inspection, Cleaning, Repair and Replacement.
(1) Perform the applicable procedures of paragraph 3-22.
(2) Replace weather cover when material thins due to weathering.
(3) Small tears may be patched with canvas until a new cover can be obtained.

c. Installation. Secure the weather cover (8, fig. 3-8) to the air conditioner frame with phillips head screws(9)

3-29. Condenser Right-side Access Panel Assembly

a. Removal. Loosen the panel's twenty-eight quarter-turn fasteners by depressing fasteners and rotating one quarter-turn counterclockwise; then remove panel assembly (1, fig 3-8) from the air conditioner frame.

b. Inspection, Cleaning, Repair and Replacement. Perform the applicable procedures of paragraph 3-22.

c. Installation. Secure the panel assembly (1, fig. 3-8) to the air conditioner frame with the quarter-turn fasteners.

3-30. Condenser Air Discharge Door Assembly

a. Removal. Remove the hinge pin (6, fig. 3-8) from the condenser door hinge. Loosen the door's four quarter-turn fasteners by depressing fasteners and rotating one-quarter turn counterclockwise; then remove the door (5, fig. 3-8) from the air conditioner.

NOTE

Do not remove condenser air discharge door assembly unless repairing or replacing door. Sufficient access is gained to components beneath door by loosening the four quarter-turn fasteners and opening door.

b. Inspection, Cleaning, Repair and Replacement.
(1) Perform the applicable procedures of paragraph 3-22.
(2) Inspect the door hinges for damage and security. Inspect the hinge area for defective spot welds.
(3) Inspect the honeycomb assembly for damage and security.

c. Installation.
(1) Secure the door (5, fig. 3-8) to the air conditioner frame with quarter-turn fasteners.
(2) Replace condenser door hinge pin (6, fig. 3-8) if it was removed.

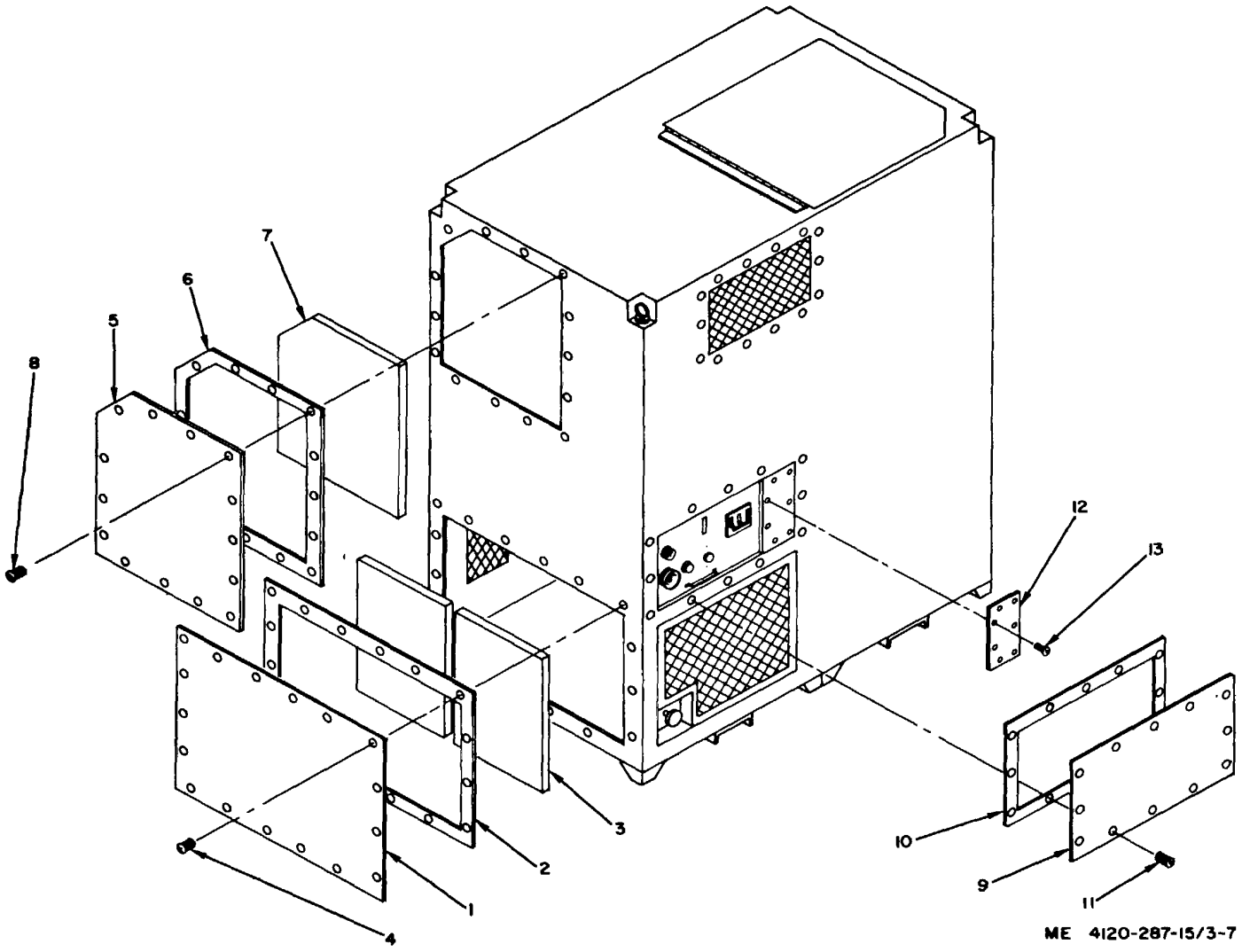
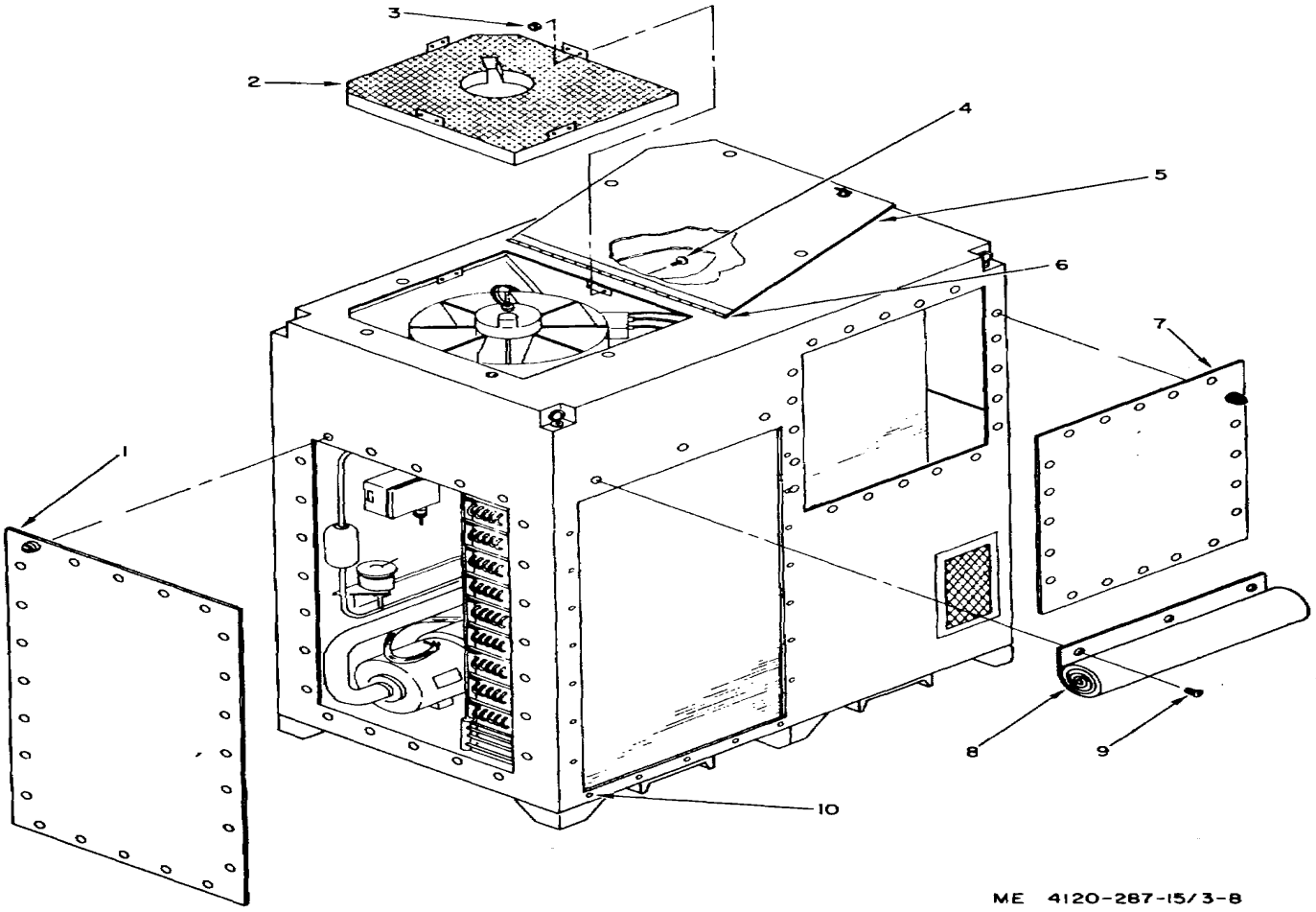


Figure 3-7. Front and left-side panel assemblies, exploded view.

1	Evaporator blower left-side access panel	6	Gasket	11	Phillip screw (12)
2	Gasket	7	Insulation	12	Thermostat access panel
3	Insulation	8	Phillips screw (18)	13	Phillips screw (7)
4	Phillips screw (18)	9	Electrical tray access panel		
5	Evaporator left-side access panel	10	Gasket		

Figure 3-7--Continued.



1	Condenser right-side access panel assembly	6	Hinge pin
2	Honeycomb	7	Evaporator rear access panel assembly
3	Nut (8)	8	Condenser air inlet weather cover assembly
4	Screw (8)	9	Screw (3)
5	Condenser air discharge door assembly	10	Snap fastener button (19)

Figure 3-8. Air conditioner right-side and rear panel assemblies and top door assembly. exploded view.

Section VII. AIR CIRCULATION SYSTEM

3-31. General

a. Operator and Organizational Maintenance Services. Operator and organizational maintenance of the air circulation system is limited to cleaning the evaporator and condenser assemble core fins, cleaning or replacing the evaporator and condenser section inlet air filters, and maintaining the evaporator outlet duct assembly.

b. Evaporator Section. The evaporator blower (fan) circulation system is integral with the evaporator recirculating air intake and conditioned air delivery ductwork. The delivery side of the blower distributes cooled, heated, or ambient recirculating air to the shelter area as determined by the mode in which the air conditioner is operating. The total evaporator blower discharge (delivered) air flow passes through the evaporator inlet air filter before being conditioned and passed on to the conditioned air duct leading into the shelter.

c. Condenser Section. The condenser circulation fan, located in the top of the condenser section, exhausts warm air from the condenser assembly enclosure; thus drawing outdoor ambient air through the condenser inlet filter. The condenser inlet air filter protects the condenser and subcooler assembly core fins, and various other vapor cycle components located in the condenser section from dirt and foreign particles.

d. Filter Clean Indicator. The filter clean indicators measure the air flow through the air filters. When air flow through either the condenser or evaporator section is restricted sufficiently to affect air conditioning capacity the filter clean indicator ball rises to the SERVICE pointer. When a service condition exists the effected air filter and/or core assembly must be serviced.

3-32. Evaporator Air Inlet Filter

a. Removal.
(1) Remove the evaporator rear access panel assembly (para. 3-27*a*).
(2) Remove the three air filter retaining clip hex nut fasteners (fig. 3-5); then remove the air filter retaining clips.
(3) Remove the air filter from the evaporator section air conditioner frame assembly.

b. Cleaning, Inspection, and Replacement.
(1) Clean the air filter with an approved cleaning solvent; and dry with compressed air.
(2) Inspect the air filter for cracks, breaks, and distortion. Replace a damaged air filter.
(3) Inspect the air filter retaining clips and hex nut fasteners for serviceability. Replace defective clips.

c. Installation.
(1) Position the air filter in the air conditioner evaporator section (fig. 3-5).
(2) Place the three air filter retaining clips in position against the air filter and tighten the three hex nut fasteners.
(3) Install the evaporator rear access panel assembly (para. 3-27).

3-33. Condenser Air Inlet Filter

a. Removal.
(1) Roll up and tie the condenser air inlet weather cover to provide unobstructed access to the air filter.
(2) Remove the six air filter retaining clip hex nut fasteners (fig. 3-4); then remove the air filter retaining clips.
(3) Remove the air filter from the condenser section air conditioner frame assembly.

b. Cleaning, Inspection, and Replacement.
(1) Clean the air filter with an approved cleaning solvent; and dry with compressed air.
(2) Inspect the air filter for cracks, breaks, and distortion. Replace a damaged air filter.
(3) Inspect the air filter retaining clips and hex nut fasteners for serviceability. Replace defective clips.

c. Installation.
(1) Position the air filter in the air conditioner condenser section (fig. 3-4).
(2) Place the six air filter retaining clips in position against the air filter and tighten the six hex nut clip fasteners.

(3) Roll down condenser air inlet weather cover; then using the snap fasteners (fig. 3-4) secure weather cover; to air conditioner frame.

3-34. Evaporator Assembly

a. Remove the evaporator rear access panel and air inlet filter (para. 3-22*a*).
b. Clean the core fins of the evaporator assembly with compressed air.
c. Install the air filter and evaporator rear access panel (para. 3-32*c*).

3-35. Condenser Assembly

a. Roll up condenser air inlet weather cover and remove air inlet filter (para. 3-33*a*).
and remove air inlet filter (para. 3-33*a*).
b. Remove the condenser right-side access panel assembly (para 3-9*a*).
c. Clean the accumulated dust and dirt from the core fins of the condenser assembly and the subcooler assembly with compressed air.
d. Install the condenser right-side access panel assembly (para. 3-25*c*).
e. Install the air inlet filter and secure the weather cover to the air conditioner frame (para. 3-33*c*)

Section VIII. AIR CONDITIONER ELECTRICAL SYSTEM

3-36. General

Operator and organizational maintenance of the electrical system consists of replacing the fuse, fuse holder, remote control box, variable resistor, switch, harness assembly, and temperature control thermostat.

3-37. Electrical Tray Panel Fuse

a. Removal.

Note. If the lamp in the fuse holder (fig. 3-3) glows, it indicates that the fuse is blown and must be replaced.

(1) Push inward on fuse holder (fig. 3-3) and rotate it counterclockwise. Remove the fuse and the fuse holder.
(2) Remove fuse from fuse holder.
b. Cleaning, Inspection, and Testing.
(1) Wipe the fuse holder and fuse clean with a dry cloth
(2) Inspect the fuse holder for cracks and distortion. Test the fuse for continuity with a test lamp. Replace an unserviceable fuse or fuse holder.
c. Installation. Insert fuse holder (fig, 3-3) with a 3/4 ampere 600 volt fuse installed, into the electrical tray panel. Press the fuse holder and turn it clockwise to secure it in position.

3-38. Remote Control Box Assembly and Wiring Harness

a. Removal.
(1) See that the main power source is disconnected.
(2) Disconnect wiring harness from remote control box assembly (J103) and from electrical tray remote control receptacle (J102).
b. Cleaning, Inspection, and Repair.
(1) Wipe the wiring harness assembly and the box assembly with a clean, dry cloth (fig. 2-2).
(2) Inspect the wiring harness assembly or broken terminals.
(3) Inspect the box assembly for cracks, a defective switch, and for loose or missing hardware.
(4) Repair or replace an unserviceable wiring harness assembly.
(5) Replace a damaged or unserviceable remote control box assembly.
c. Installation.
(1) Connect remote control wiring harness plug (P103) to remote control bolt assembly receptacle (J103).
(2) Connect remote control wiring harness plug (P102) to electrical panel remote. Control receptacle (J102).
(3) Connect main power supply plug (P101) to electrical tray panel power input receptacle (J101).

3-39. Thermostat

a. Removal.
(1) Remove the thermostat access panel (para. 3-26*a*).

(2) Loosen terminal board (TB2) lug screws 1, 2, and 3 (2, 3 and 4, fig. 3-9); and remove thermostat leads from terminal board

(3) Remove the two thermostat hold down phillip screws (6) by turning counterclockwise; then remove the thermostat (5) from the air conditioner frame.

b. Cleaning, Inspection, and Replacement

(1) Wipe the thermostat, thermostat leads, and terminal board with a clean, dry cloth.

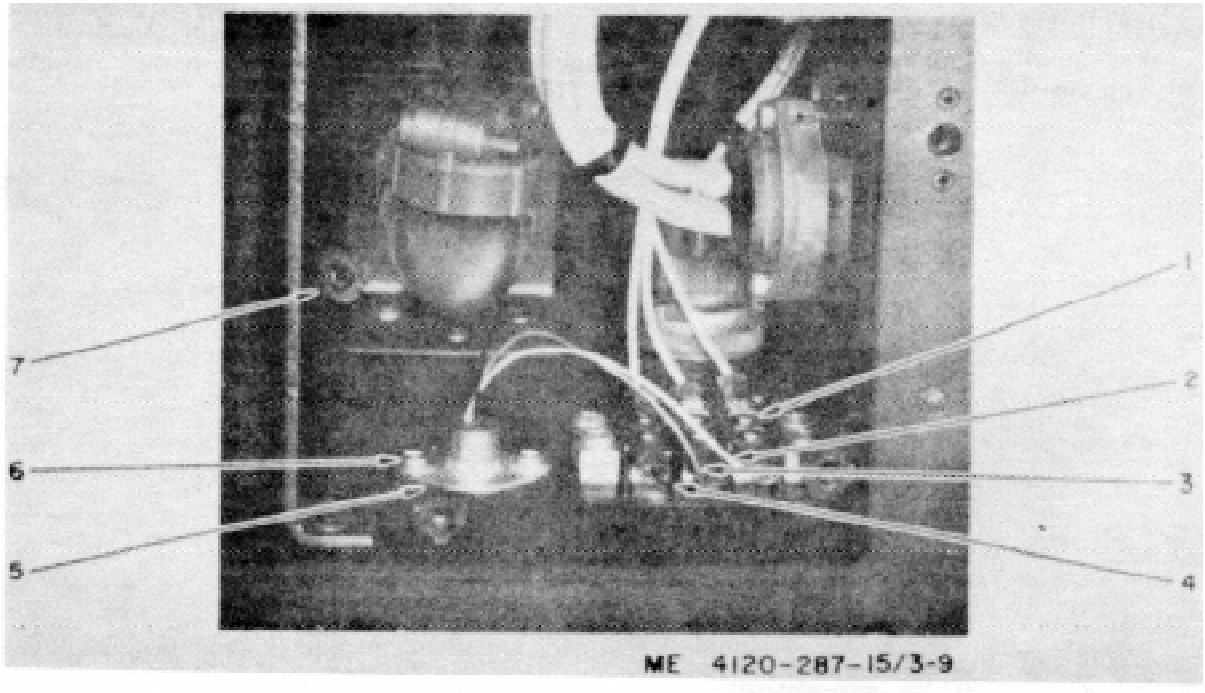
(2) Inspect the thermostat for cracks breaks, and distortion. Check for integrity of thermostat lead insulation. Replace a defective thermostat.

c. Installation.

(1) Install thermostat (5, fig. 3-9) using the two phillips head screws (6).

(2) Connect thermostat black, red, and white leads to terminal board TB2 connectors 1, 2, and 3 (4, 3, and 2, fig. 3-9) respectively.

(3) Install thermostat access panel (para. 3-26*c*).



1 Terminal board TB-2
2 White thermostat lead
3 Red thermostat lead
4 Black thermostat lead
5 Thermostat
6 Phillips head bolt (2)
7 Arbor nut plate (7)

Figure 3-9. Thermostat replacement

Section IX. TEMPERATURE CONTROL SYSTEM

3-40. General

The temperature control system consists of the remote control box containing the air conditioning switch (para. 2-8*a*) and temperature control variable resistor (para. 2-8*a*), current limiting resistor, cycling resistor, cycling capacitor, temperature control relay and the temperature control thermostat.

3-41. Remote Control Box Wiring Harness

a. Removal.

(1) Make sure input power plug P101 is disconnected from electrical tray panel input power receptacle J101.

(2) Disconnect remote control box harness from the remote control box and from the electrical tray panel remote, control receptacle.

b. Inspection and Testing

(1) Inspect remote control box harness assembly for physical defects in accordance with paragraph 3-38*b*. Replace a defective harness assembly.

(2) Test for electrical defects as follows:

(*a*) Using a multimeter or test lamp, test for continuity of individual harness wires by placing one test lead on harness plug P102, prong a; and the other test lead on plug P103, prong A. Continue testing P102 and P103 positions B, C, D, E, F, G, H, J, K, and L, in this manner. Make sure that the test leads are on plug P102's and P103's associated prongs (A-A, B-B, C-C thru L-L) while observing for multimeter needle deflection or test lamp glow. Replace the remote control harness assembly should the multimeter or test lamp indicate discontinuity in one or more of the above tests.

c. Installation.

(1) Connect the harness to the remote control box and electrical tray panel remote control receptacle.

(2) Connect input power plug P101 to electrical tray panel input power receptacle J101.

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 air conditioner. They provide information on the maintenance of the equipment, which is beyond the scope of tools, equipment, personnel, or supplies normally available to using organizations.

4-2. Record and Report Forms

For other 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 operator, shall be kept in a canvas bag mounted on equipment.

Section II. DESCRIPTION AND TABULATED DATA

4-3. Description

For a complete description of the air conditioner see paragraph 1-3.

4-4. Tabulated Data

Refer to paragraph 1-4*b* for tabulated data.

CHAPTER 5

GENERAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND EQUIPMENT

5-1. Special Tools and Equipment

No special equipment is required by direct and general support and depot maintenance personnel for performing maintenance on the air conditioner.

5-2. Specially Designed Tools and Equipment

No specially designed tools or equipment are required by direct and general support and depot maintenance personnel for performing maintenance on the air conditioner.

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. Unit Inoperative (No operation in any control position)

Probable Cause	Possible Remedy
Fuse F1 blown, or no fuse in 28 VDC circuit	Check fuse for continuity; replace if necessary (para 3-37). Recurrent fuse failure indicates a short in 28 VDC circuit. Check wiring for continuity and shorts. (para6-9*b*(1)).
Trip relay K101 tripped (energized).	Press system reset switch. Restart according to paragraph 2-10. Check trip relay (para 6-9*c*(1)).
Main power cable not properly secured, or cable damaged.	Check power input cable and connector (J101 and P101) for continuity and positive connection.
Interrupted power supply	Check line side of power cable; if not reading check main power supply.
Remote control cable not properly secured, or cable damaged.	Check cable connectors J102 and J103 for continuity and positive connection.
Remote control box inoperative	Check temperature control switch and air conditioning switch repair or replace control box as necessary (para 6-1 through 6-4).
Master circuit breaker (CB1) defective	Check circuit breaker; replace if necessary (para6-9*a*).
Defective silicon rectifier (CR1).	Check rectifier for opens, shorts and proper output; replace if necessary (para 6-*9b*(4)).
Power supply connected out of phase.	Check phase; correct as necessary (para 2-4*a*(8)).
Defective power transformer (T1)	Check transformer for opens, shorts and proper output; replace if necessary (para 6-9*b*(3)).
No primary input at power transformer.	Phase sequence relay (K108) defective, or wrong relay installed. Check relay; replace as necessary (para6-9*b*(2))

5-5. Air Conditioner Stops

Probable Cause	Possible Remedy
Refer to probable cause column of paragraph 5-4.	Refer to possible remedy column of paragraph 5-4.

5-6. No (or insufficient) Heating

Probable Cause	Probable Remedy
Temperature control variable resistor set below ambient.	Turn variable resistor knob toward WARM.
Refer to probable cause column of paragraph 5-4.	Refer to possible remedy column of paragraph 5.4.
Defective or damaged thermostat (S106).	Substitute new component in place of suspected faulty thermostat (para. 6-6*e*).
Heater line contactor relay (K107) defective.	Checkline contactor relay; replace if defective (para. 6-9*c*(4)).
Defective temperature control relay (K103).	Substitute new component in place of suspected faulty thermo relay (para. 6-9c(3)).
Heater temperature switch (S104) defective	With ambient temperature below 125°F, check terminal B and D of plug P112 for continuity. Replace switch S104 if defective. If heaters cut-out below 125°F substitute new component for S104 (para. 6-6*d*).
Evaporator blower not functioning, causing S104 to trip.	Check evaporator blower line contactor relay (K106); replace if defective (para. 6-9*c*(4)).
Current limiting fixed resistor (R1) shorted, causing K103 coil to energize at excessively low temperatures—cutting off heaters.	Check resistor R1 for open or short condition. Check for 350 ohms resistance across R1; replace resistor R1 if defective (para. 6-10, and fig. 1-9).

5-7. No (or insufficient) Cooling

Probable Cause	Possible Remedy
Condenser discharge door closed, or defective microswitch (S101).	Open condenser door, make sure microswitch is operative; replace a defective microswitch (para. 6-6*a*).
Condenser-subcooler assembly core and/or filter dirty.	Check condenser filter clean indicator; service as required (para. 3-33 and 3-35).
Evaporator assembly core and/or filter dirty.	Check evaporator filter clean indicator; service as required (para. 3-32 and 3-34).
Low refrigerant charge.	Check refrigerant charge level (para. 2-8*c*(1)). If necessary, add refrigerant-12 to system (para. 7-5).
Condenser or evaporator motor internal overload relay tripped.	Motor restart automatically when cooled. No action necessary. If condition recurs frequently, determine cause and correct. Test motors as necessary (para. 6-13).
Defective evaporator fan line contactor relay (K106)	Check line contactor relay. Replace if necessary (para. 6-9*c*(4)).
Defective condenser fan line contactor relay (K106).	Check line contactor relay. Replace if necessary (para. 6-9c(4)).
Defective compressor motor line contactor relay (K104).	Check line contactor relay. Replace if necessary (para. 6-9*c*(4)).
Defective time delay relay (K102).	Check time relay (K102); replace if defective (para. 6-9*c*(2)).
Current limiting fixed resistor (R1) open, preventing temperature control relay (K103) coil from energizing.	Check R1 for open or short condition and for 350 ohm value. Replace resistor R1 if defective (para. 6-10, and fig. 1-9).
Temperature control variable resistor defective.	Check R3 (fig. 1-9) for open or short condition and resistance range. Replace if defective (para. 6-3*a*).
Defective or damaged thermostat (S105).	Replace thermostat (para. 3-39).
Defective motor compressor.	Refer to paragraphs 6-12*c*, 6-13, and 6-14*c*.
Defective condenser fan.	Refer to paragraphs 6-12*b*, and 6-14*b*.
Defective evaporator blower.	Refer to paragraphs 6-12*a*, 6-13, and 6-14*a*.
Defective refrigerant solenoid valve coil (L101) or no voltage applied to coil.	Check coil (L101). Check for 28vdc across terminals N and P of jack J108. Replace a defective coil (para. 6-6*f*).
Defective solenoid valve.	Check sight glass for refrigerant flow (para. 2-8*c*(1)). Check to see if tubing near valve outlet is cooler than tubing adjacent to inlet (indicating partially blocked valve) (para. 7-8).
Low ambient switch (S102) defective, causing trip relay K101 to maintain tripped condition.	Check lines 109 and 111 for open condition. Replace S102 if defective (para. 6-6*b*).

Probable Cause	Possible Remedy
High-low pressure switch	Check switch; replace if necessary (para 6-6c).
Filter drier clogged	Replace filter drier (para 7-8 and 7-15a).
Defective thermoexpansion valve.	Replace thermoexpansion valve (para 7-21).
Defective hot gas bypass valve.	Replace bypass valve (para 7-20).
Defective liquid quench valve.	Replace quench valve (para 7-19).
Defective charge valve.	Replace charge valve (para 7-14 and 7-16).
Defective pressure release valve.	Replace pressure relief valve (para 7-15).
Defective evaporator.	Replace evaporator (para 5-27).
Defective condenser-subcooler assembly.	Replace condenser-subcooler assembly (para 5-24).

5-8. Excessive Cooling

Probable Cause	Possible Remedy
Defective thermostat (S105).	Check thermostat. Replace if necessary (para 3-39and 6-6e).
Defective liquid refrigerant solenoid valve. Solenoid valve passes refrigerant after coil (L101) is deenergized.	Check for 28vdc across terminals 4 and 5 of terminal board TB1. Disconnect solenoid coil at TB1. Start up air conditioner and observe liquid refrigerant sight glass if flow is evident, replace solenoid valve (para 7-18).

5-9. Motor Compressor Excessively Noisy

Probable Cause	Possible Remedy
Defective thermoexpansion valve (allowing liquid carryover).	Replace thermoexpansion valve (para 7-21).
Defective liquid quench valve (allowing liquid carryover).	Replace liquid quench valve (para 7-19)
Defective motor compressor.	Replace motor compressor (para 5-20).

5-10. Motor Compressor and Condenser Fan Inoperative (All of the components functioning)

Probable Cause	Possible Remedy
Trip relay K101 tripped (energized).	Press SYSTEM RESET switch (S1) (paragraph 6-9c (1)
Condenser discharge door closed.	Open condenser discharge door.
Defective condenser discharge door microswitch (S101)	Check microswitch S101; replace if necessary (para 6-6a).
Remote control harness assembly defective.	Check for continuity between identically marked terminals of plugs P102 and P103. Repair or replace a defective harness (para 3-41b).
Low ambient temperature switch closed. High-low pressure switch closed. Compressor thermal overload switch closed.	Isolate faulty switch by continuity check at terminals 1 and 2 of terminal board TB1 (fig. 1-9).
Defective remote control box assembly.	Check remote control box assembly. Replace or repair a defective remote control box assembly (paragraph 6-3).
Defective trip relay (K101).	Check trip relay (K101), replace if defective (para 6-9c(1)).

5-11. Motor Compressor Inoperative (All other components functioning)

Probable Cause	Possible Remedy
Defective line contactor relay (K104).	Check contactor; replace if necessary (para 6-9c(4)).
Connectors P105 and J105 and/or P113 and J113 And/or motor terminals not properly secured; connector or wiring harness damaged.	Check for security of attachment and integrity of connector. Check harness. Replace a damaged connector or harness assembly.
Defective time delay relay (K102).	Operate air conditioner in cooling mode. After 3 seconds check for 28vdc across relay K104 terminals X1 and X2. Replace a defective time relay (para 6-9c (2)).
Defective motor compressor.	Replace motor compressor (para 6-12c, 6-13, and 6-14c).

5-12. Condenser Fan Inoperative (All other components functioning)

Probable Cause	Possible Remedy
Defective line contractor relay (K105).	Check contactor; replace if necessary (para 6-9c(4), and 6-10).
Connectors P106 and J106 and/or P108 and J108 and/or P111 not properly secured or connectors damaged.	Check for security of attachment and integrity of connectors. Replace a damaged connector.
Defective condenser fan motor.	Check condenser fan assembly; replace if necessary (para 6-11b, 6-13, and 6-14b).

5-13. Evaporator Blower Inoperative (All other components functioning)

Probable Cause	Possible Remedy
Defective line contactor relay (K106).	Check contactor; replace if defective (para 6-9c (4) and 6-10).
Connectors P107 and J107 and/or P109 and J109 and/or P110 not properly secured; connector, or wiring harness damaged.	Check for security of attachment and integrity of connector. Check harness. Replace or repair a damaged connector or harness assembly.
Defective evaporator blower motor.	Check evaporator blower motor; replace if necessary, (para 6-12a, 6-13, and 6-14a).

5-14. Trip Relay K101 Recurrently Trips

Probable Cause	Possible Remedy
Defective high-low pressure switch (S103).	Adjust or replace as necessary (para 6-6c).
Defective compressor motor thermal overload.	Replace motor compressor assembly (para 5-20).
Defective low ambient temperature switch (S102).	Replace low ambient temperature switch (para 6-6b).
Intermittent short between lines 19 and 20.	Check terminal board TB1, connectors P106, J106, P108 terminals E and D. Replace or repair defective components as necessary (fig. 1-9).
Defective trip relay (K101).	Internal intermittent short across relay K101 terminals 6 and 7. Replace if damaged (para 6-9c (1).

Section III. REFRIGERANT SYSTEM MAINTENANCE

5-15. Precautions When Handling Refrigerant

Although refrigreant-12 is one of the safest refrigerants to handle, it is important that personnel observe the following precautions in handling the refrigerant.

a. Do not discharge refrigerant-12 into areas having exposed flames. A heavy concentration of refrigerant in contact with a live flame produces a gas which is toxic and attacks bright metal surfaces.

b. Do not expose the eyes to the refrigerant. If refrigerant-12 comes in contact with the eyes, observe the following instructions.

(1) Do not rub the eye(s).

(2) Arrange at once to take the affected person to an eye specialist.

(3) Put drops of sterile mineral oil into the eyes to remove the excess refrigerant.

(4) Wash the eyes with either a weak solution of boric acid or a sterile salt solution (not to exceed 2 percent sodium chloride).

c. Do not expose the skin to the liquid refrigerant. If the liquid comes in contact with the skin, treat the injury the same as though the skin has been frostbitten or frozen. If a person is overcome in an area which lacks oxygen because of the presence of a high concentration of refrigerant-12, treat the person by applying artificial respiration produced manually or by a pulmotor.

5-16. Refrigerant Service Cylinder Handling Procedures

The following precautions must be observed when handling refrigerant bottles.

a. Do not leave the refrigerant bottle uncapped. All refrigerant bottles are shipped with a metal screw cap to protect the valve and safety plug from damage. Replace the cap after each use of the refrigerant bottles.

b. Do not carry or otherwise transport a refrigerant bottle in the passenger compartment of a vehicle or carrier. Do not expose the refrigerant bottle to radiant heat from the sun because the resulting increase in pressure can cause the safety plug to release or the bottle to burst.

c, Never subject the refrigerant bottle to high temperature when adding refrigerant to the air conditioning system. A bucket of hot water (not over 125 F), or hot wet rags around the bottle provides all the heat required to raise the refrigerant in the bottle to a pressure higher than the pressure in the system when adding refrigerant.

5-17. Checking Refrigerant Charge Level

a. Check the refrigerant liquid sight indicator (para 2-8 c. (1)). If the refrigerant system requires additional charge bubbles or a milky flow will be present in the refrigerant liquid sight indicator.

b. Operate the air conditioner for approximately 5 minutes. If the bubbles or milky flow in the refrigerant liquid eight indicator are not eliminated add refrigerant in accordance with paragraph 7-5.

Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

5-18. General

Procedures necessary for the removal and installation of all major units are described and illustrated in this section. The following major components are discussed:

a. Electrical tray assembly (para 1-3 b)
b. Motor compressor (para 1-3 d)
c. Condenser fan assembly (par 1-3 g)
d. Evaporator blower (para 143 q).
e. Evaporator blower motor (para 1-3 q).
f. Condenser-subcooler assembly (para 1-3 h).
g. Heater assemblies (para 1-3 t).
h. Mist eliminator (para 1-3 u).
i. Evaporator assembly (para 1-3 p).

5-19. Electrical Tray Assembly

a. Removal.
(1) Remove electrical tray access panel assembly (para 3-25a).
(2) Refer to figure 5-1 and remove the electrical tray assembly.
b. Installation.
(1).Refer to figure 5-1 and install electrical tray assembly by performing steps in reverse order.
(2).Inspect and install electrical tray access panel assembly (para 3-25 b and c).

5-20. Motor Compressor

a. Removal.
(1) Remove air conditioner right-side access panel assembly (para 3-29a).
(2) Discharge refrigerant system (para 7-7).
(3) Refer to figure 5-2 and remove the motor compressor.
b. Installation
(1) Refer to figure 5-2 and install the motor compressor by repeating the steps in reverse order.
(2) Charge the refrigerant system (para 7-8 and 7-9).
(3) Install air conditioner right-side access panel (para 3-29 b and c).

5-21. Condenser Fan Assembly

a. Removal. Refer to figure 5-3 and remove the condenser motor fan assembly.

b. Installation. Refer to figure 5-3 and install the condenser motor fan assembly by performing steps in reverse order.

5-22. Evaporator Blower

a. Removal.
(1) Remove evaporator blower left-side access panel assembly (para 3-24a).
(2). Refer to figure 5-4 and remove the evaporator blower motor.
b. Installation.
(1) Refer to figure 5-4 and install evaporator blower by performing steps in reverse order.
(2) Install evaporator blower left-side access panel assembly (para 3-24 b and c).

5-23. Evaporator Blower Motor

a. Removal.
(1). Refer to figure 5-5 and remove evaporator blower motor.
b. Installation. Refer to figure 5-5 and install evaporator blower motor by performing steps in reverse order.

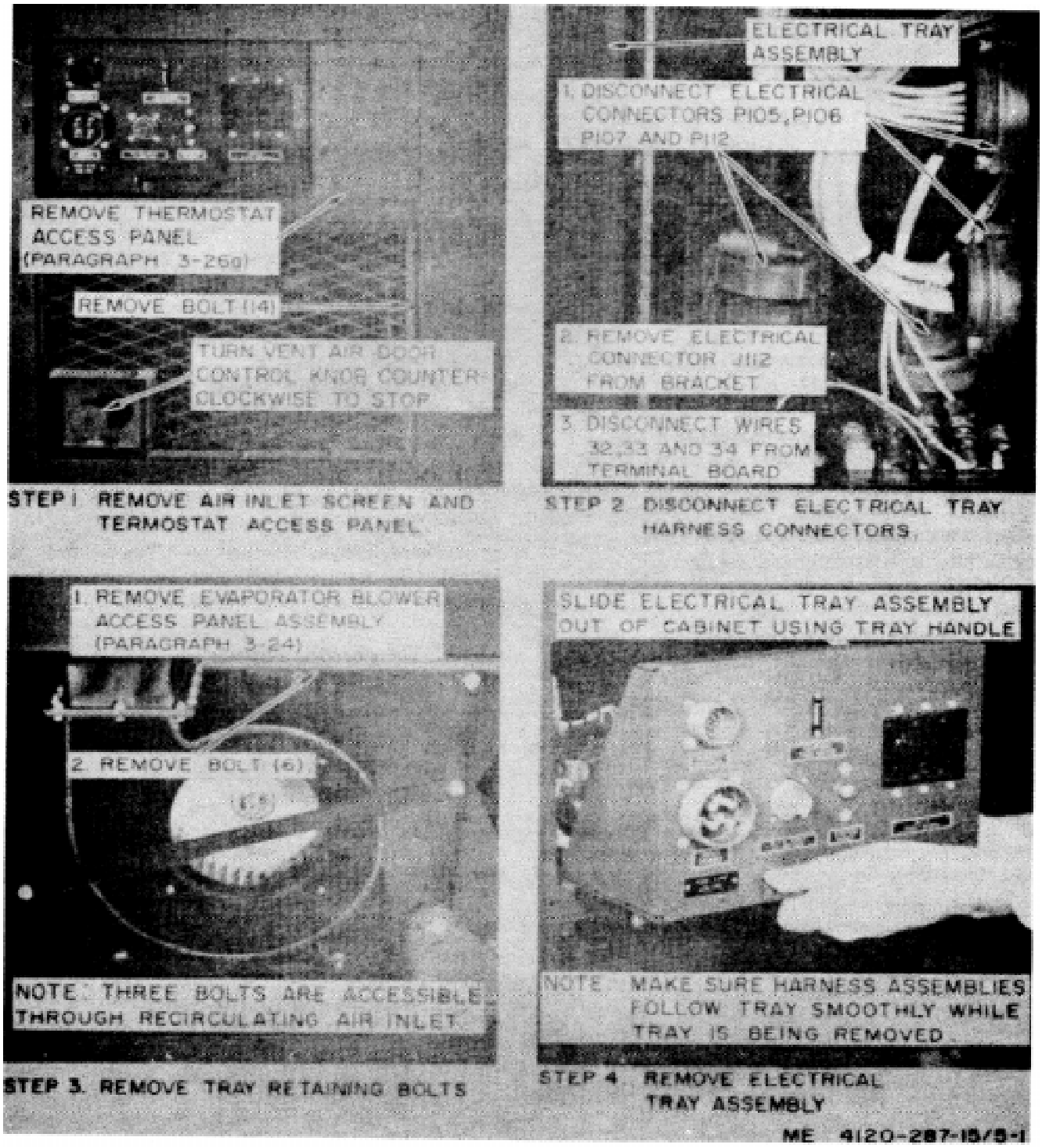


Figure 5-1. Electrical tray assembly removal and installation-

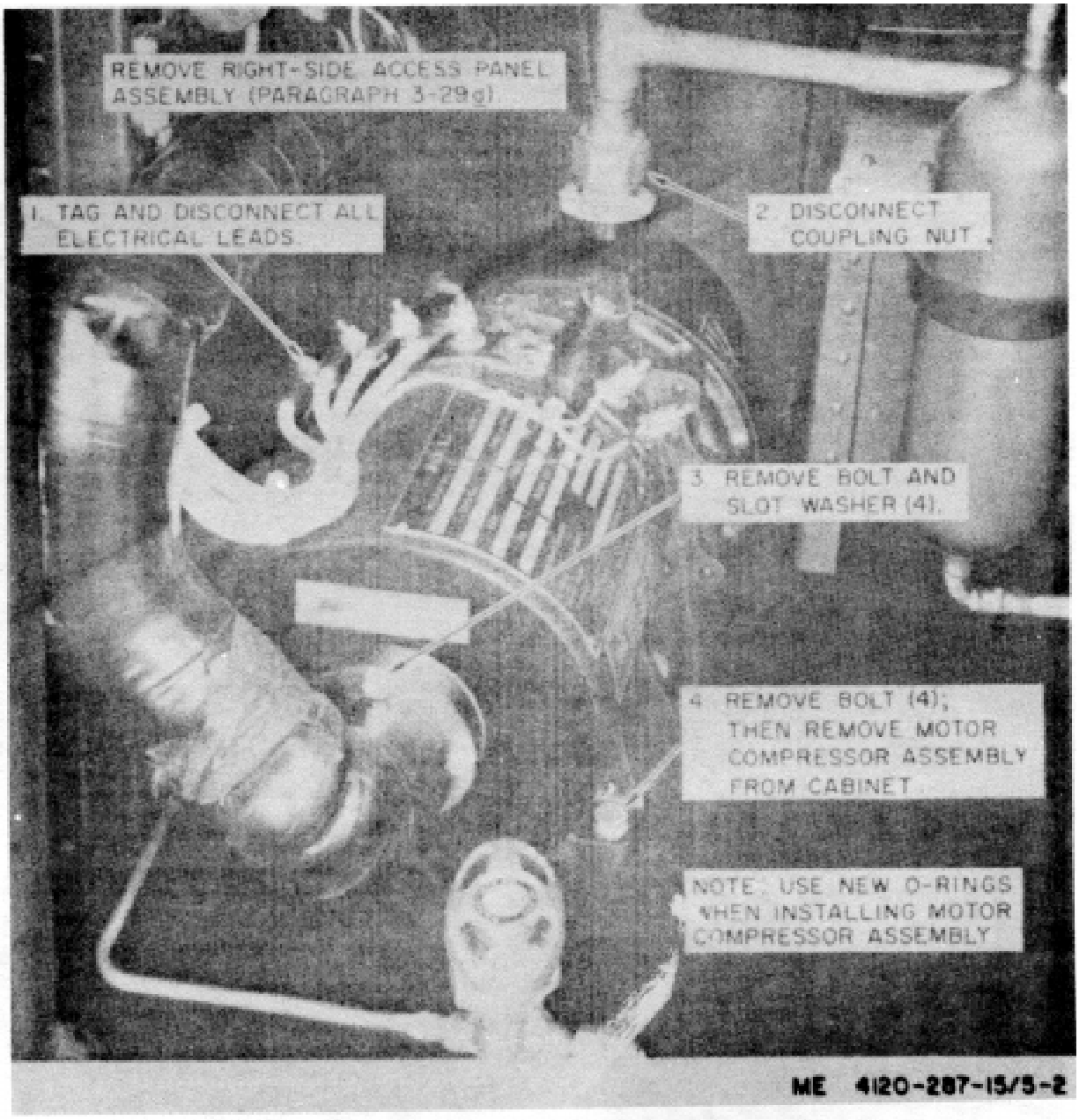


Figure 5-2. Motor compressor assembly removal and installation

5-24. Condenser-subcooler Assembly

a. Removal.

(1). Remove air conditioner right-side access panel (para 3-29a).
(2). Discharge refrigerant system (para 7-7).
(3). Refer to figure 3-4 and remove condenser air inlet filter.

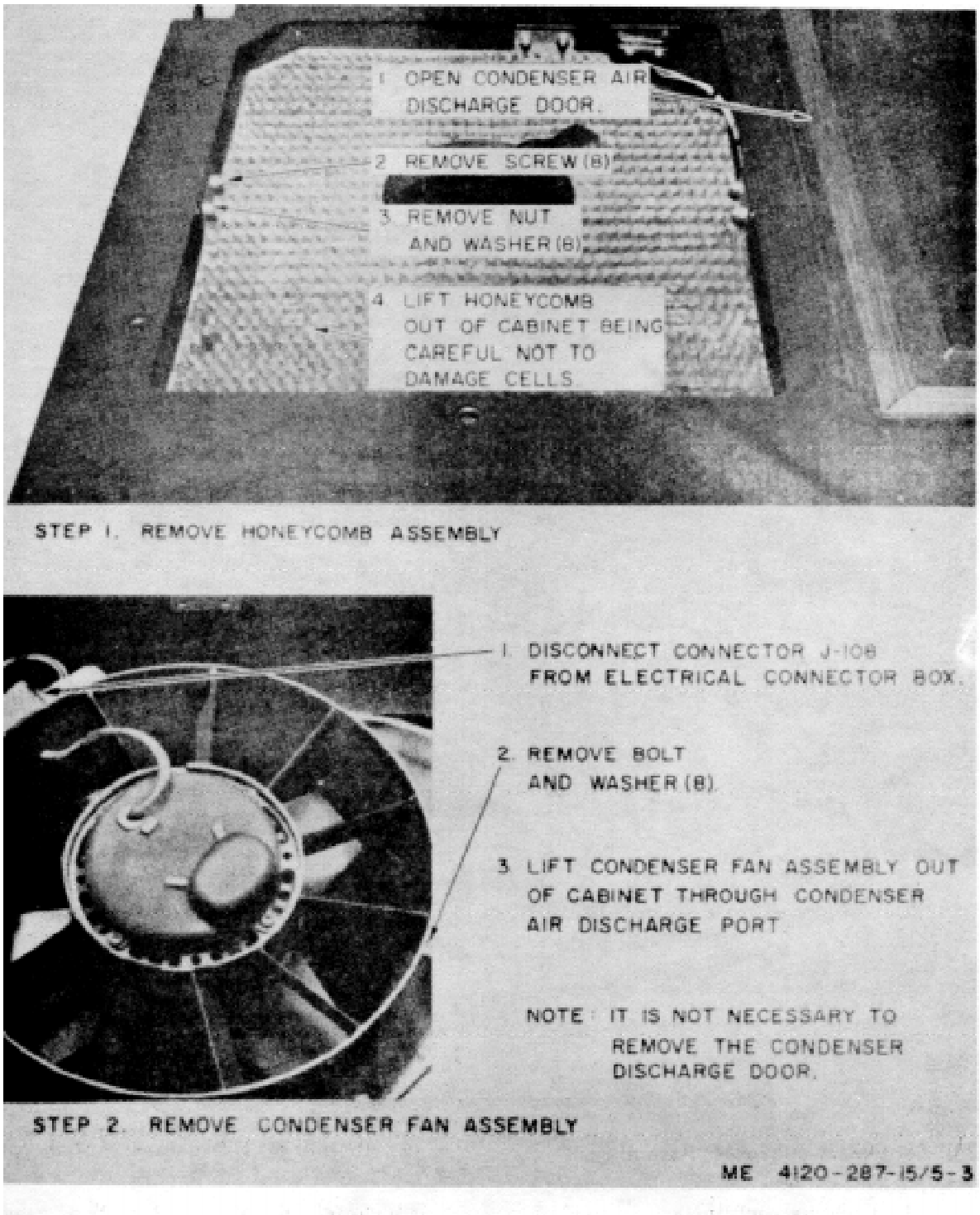


Figure 5-3. Condenser fan assembly removal and installation

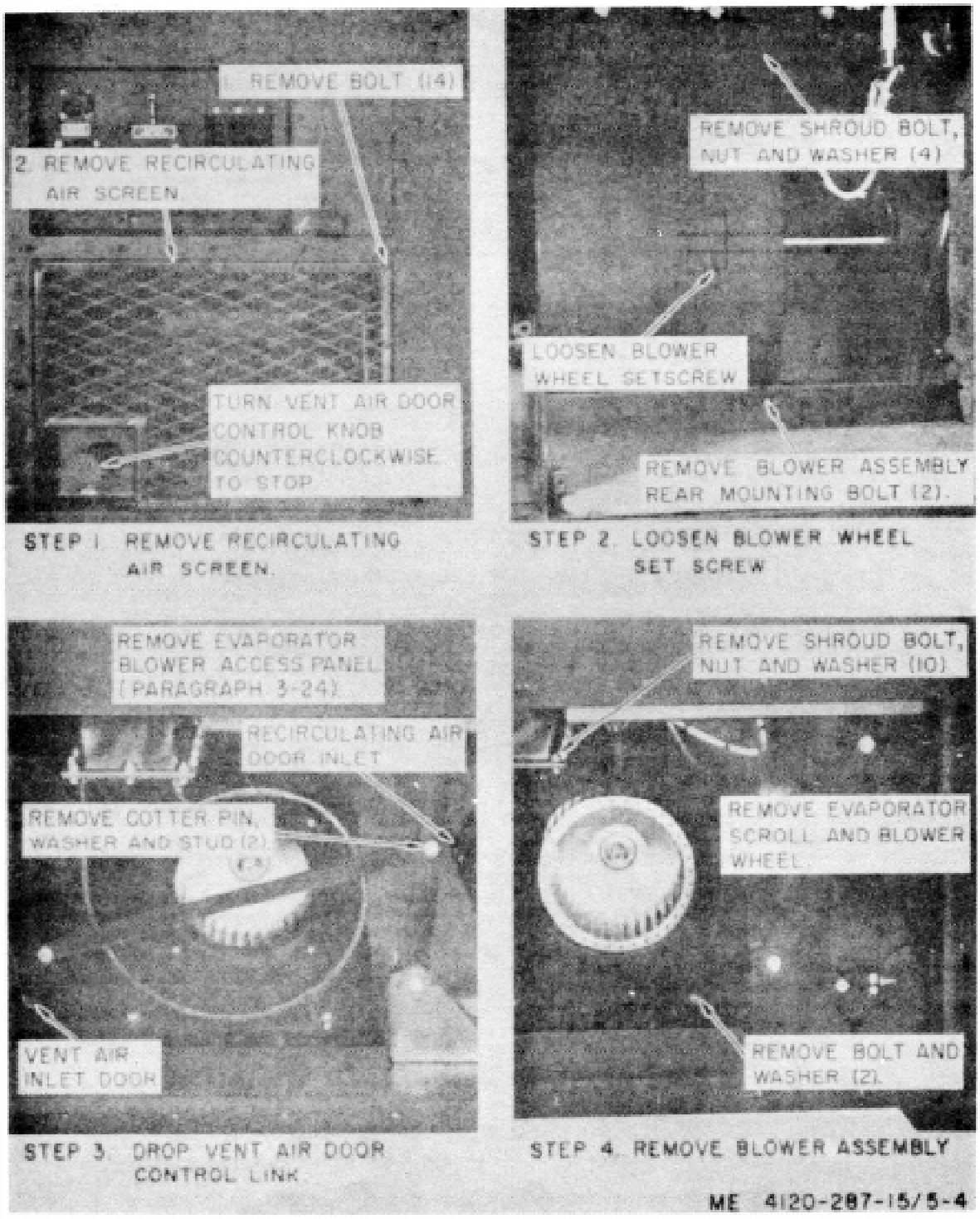


Figure 5-4. Evaporator blower removal and installation

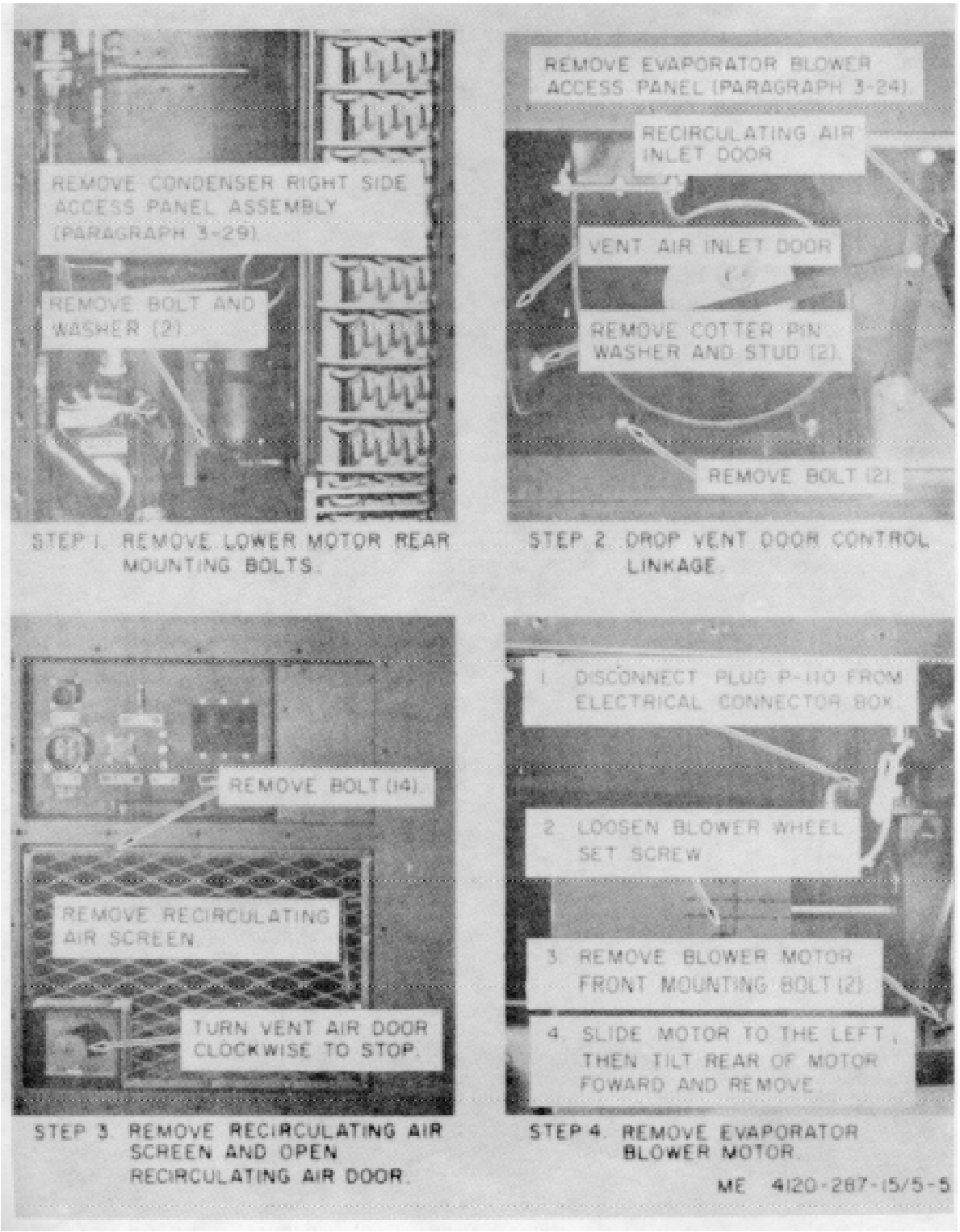


Figure 5-5 Evaporator blow motor removal and installation.

(4) Refer to figure 5-6 and remove condenser assembly.

b. Installation.

(1) Refer to figure 5-6 and install condenser assembly by performing steps in reverse order.

(2) Charge the refrigerant system (para 7-8 and 7-9).

(3) Refer to figure 34 and install condenser air inlet filter.

(4) Install air conditioner right-side access panel assembly (para 3-29 b and c).

5-25. Heater Assemblies

a. Removal. Refer to figure 5-7 and remove heater assemblies.

b. Installation. Refer to figure 5-7 and install heaters by performing steps in reverse order.

5-26. Mist Eliminator Assemblies

a. Removal.

(1) Remove heater assemblies (para 5-25 a).

(2) Refer to figure 58 and remove mist eliminator assemblies.

b. Installation.

(1) Refer to figure 58 and install mist eliminator by performing steps in reverse order.

(2) Install heater assemblies and conditioned air outlet screen (para 5-25 b).

5-27. Evaporator Assembly

a. Removal.

(1) Discharge and purge the refrigerant system (para 7-7 and 7-8).

(2) Remove evaporator air inlet filter (para 3-32 a).

(3) Remove mist eliminator (para 5-26 a).

(4) Remove electrical tray assembly (para 5-19 a).

(5) Remove the four evaporator assembly base retaining bolts, located at the rear top wall of the electrical tray recessed cabinet chamber.

(6) Refer to figure 5-9 and remove the evaporator assembly.

b. Installation.

(1) Refer to figure 5-9 and install evaporator assembly by performing steps in reverse order.

(2) Install the four evaporator assembly base retaining bolts through the electrical tray recessed cabinet chamber.

(3) Install electrical tray assembly (para 5-19 b).

(4) Install mist eliminator (para 5-26 b).

(5) Install evaporator air inlet filter (para 3-32 a).

(6) Charge the refrigerant system (para 7-9).

5-28. Refrigerant System Components

Refer to chapter 7 for removal and installation instructions of refrigerant system components.

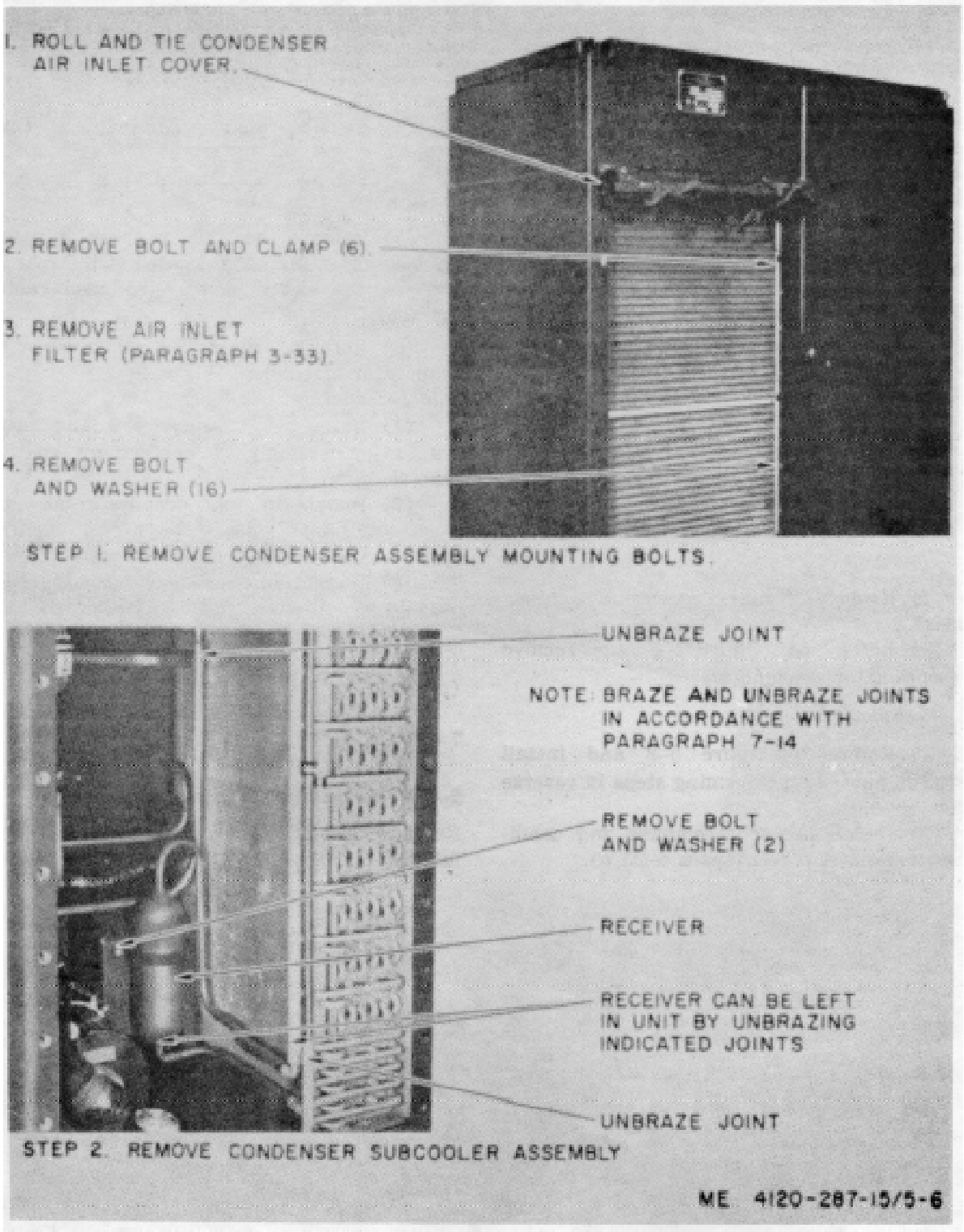


Figure 5-6. Condenser-subcooler assembly removal and installation.

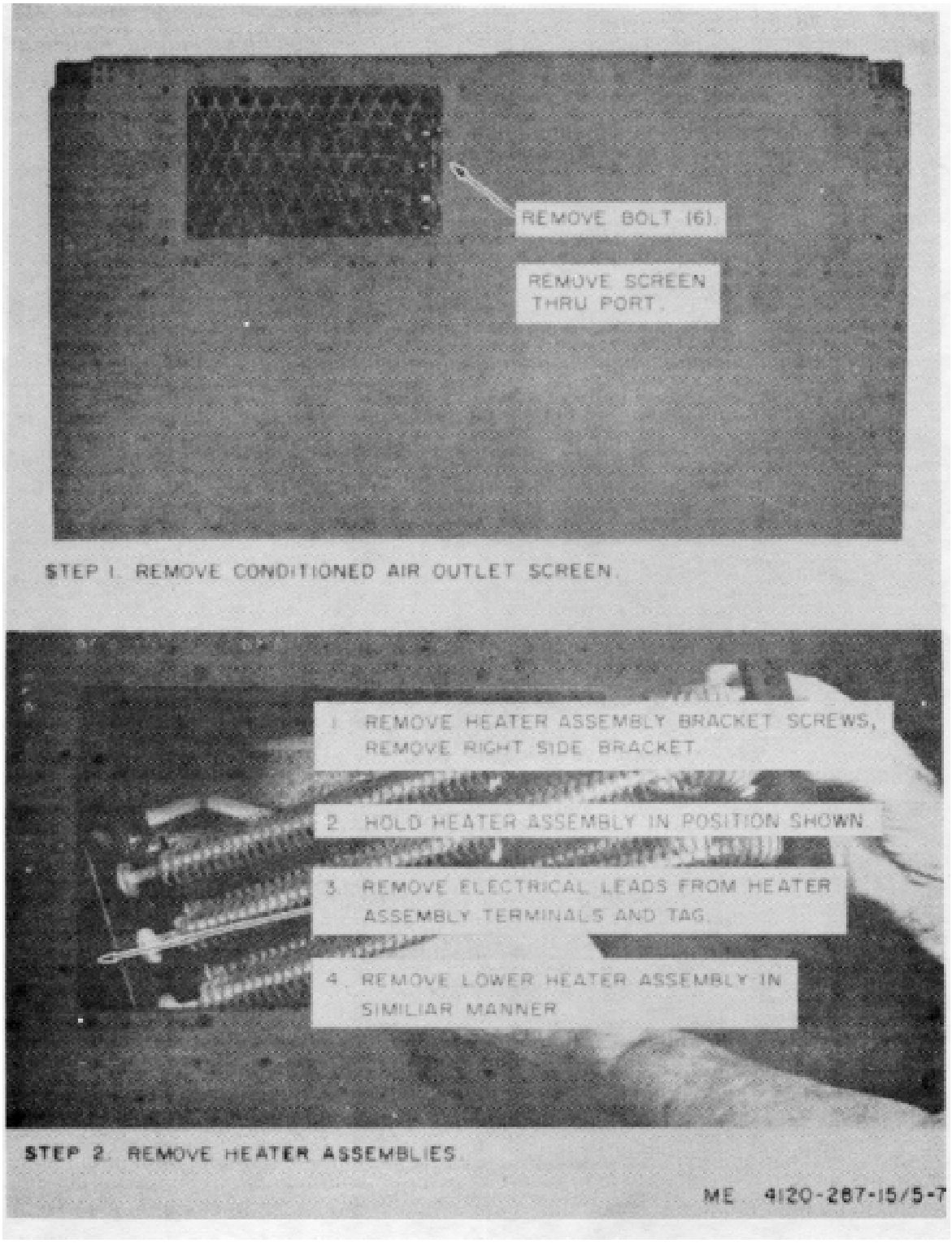
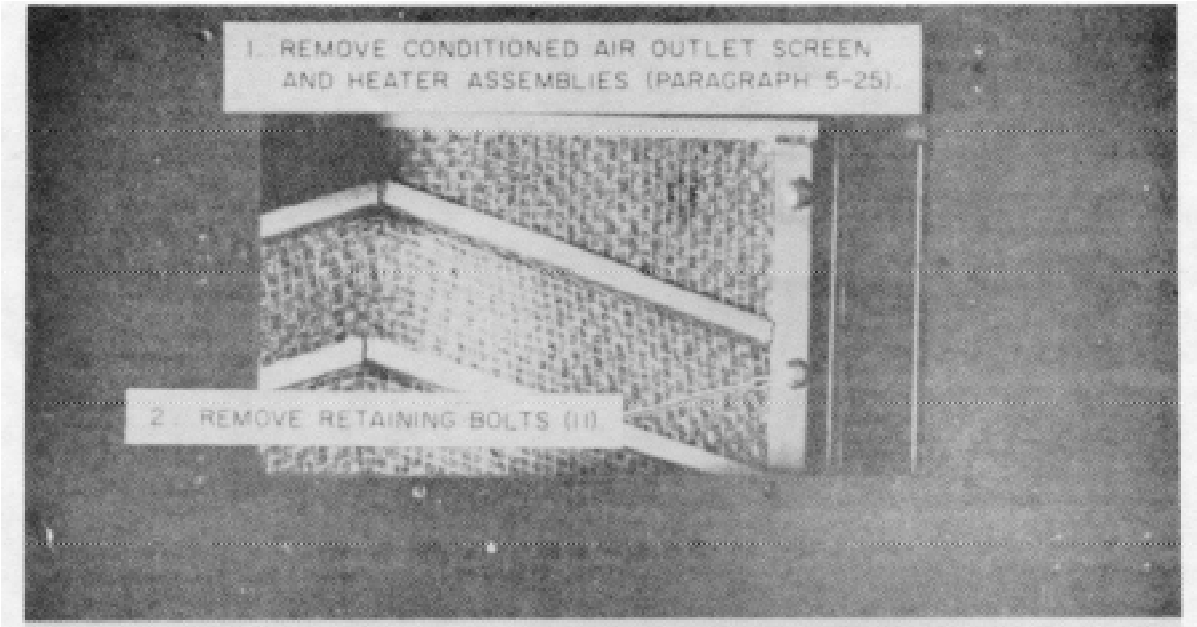
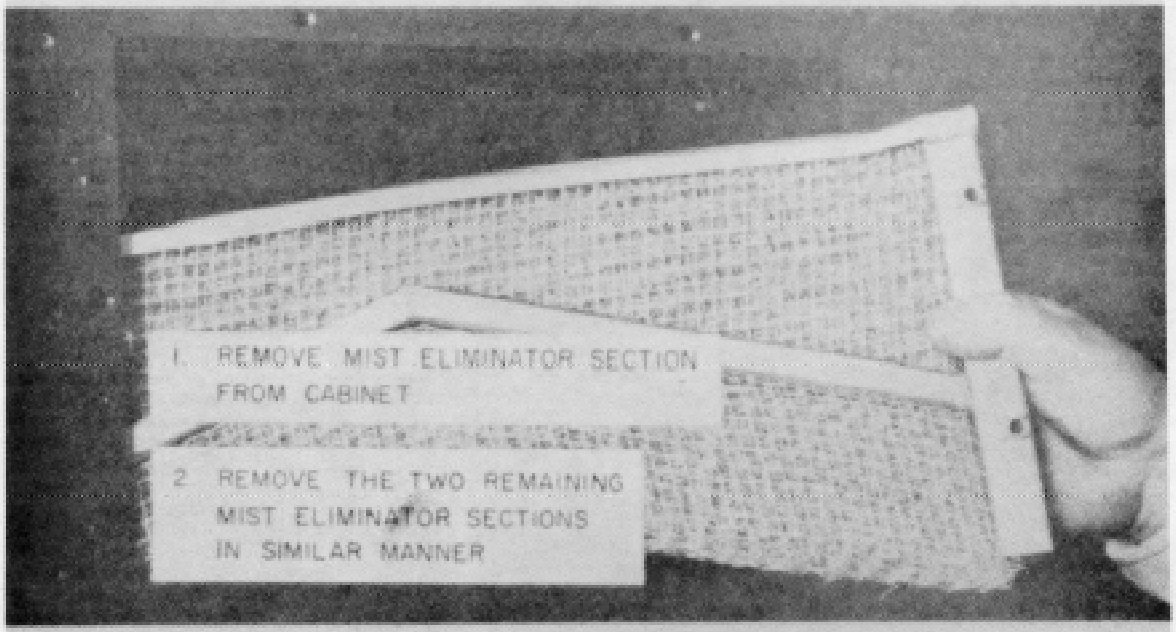


Figure 5-7. Heater assemblies removal and installation.



STEP 1. REMOVE RETAINING BOLTS.



STEP 2. REMOVE MIST ELIMINATOR.

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Figure 5-8. Mist eliminator removal and installation.

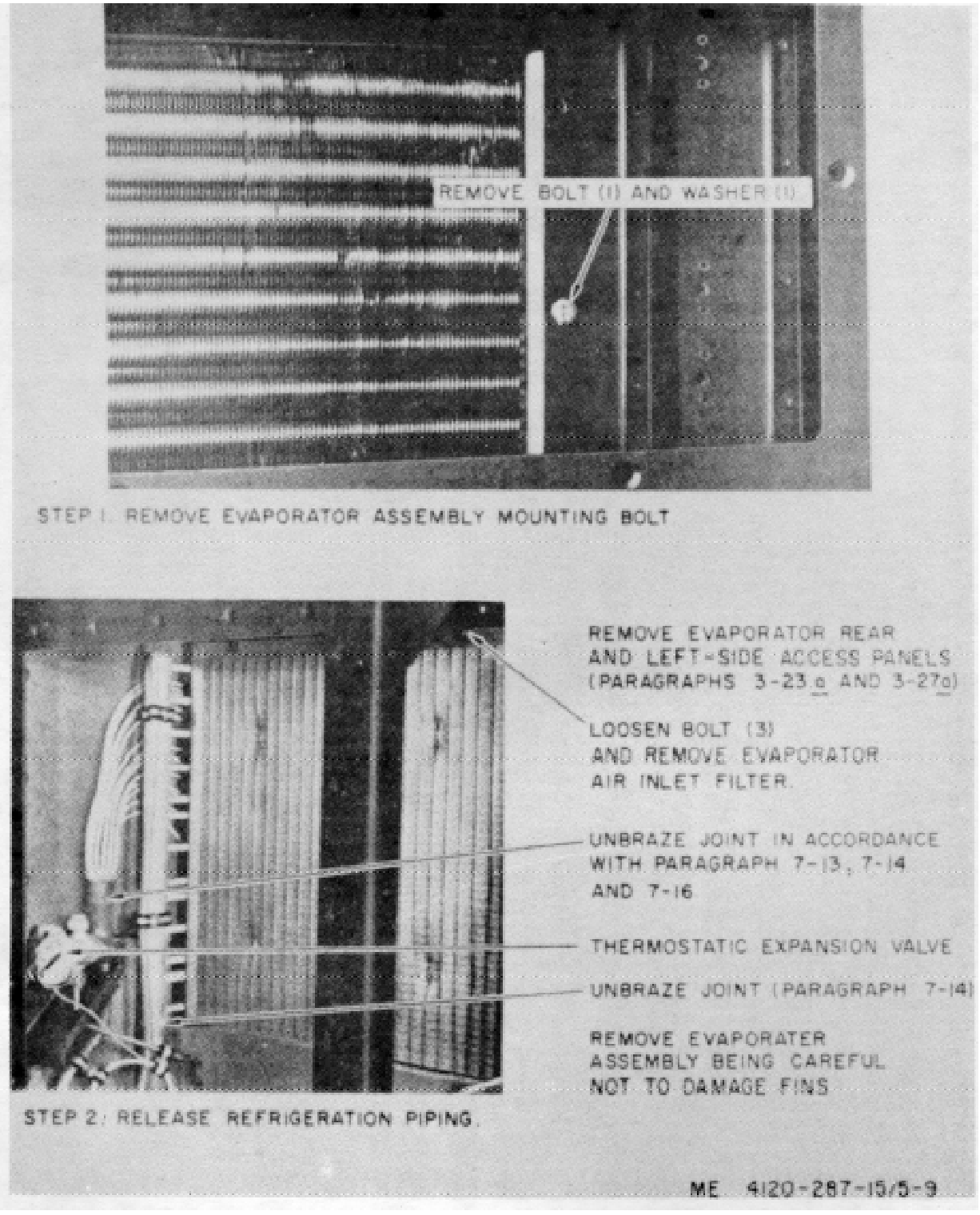


Figure 5-9. Evaporator assembly removal and installation

CHAPTER 6
ELECTRICAL SYSTEM REPAIR INSTRUCTIONS

Section I. REMOTE CONTROL BOX ASSEMBLY

6-1. General

The remote control box assembly (figs. 2-2 and 6-1) consists of a 5-gang, 4-posrtion selector switch (air conditioning switch) and a 5000-ohm variable resistor (temperature control), as described in paragraph 2-8 a.

6-2. Removal

a. Set master circuit breaker to OFF position.

b. Remove remote control wiring harness plugs P102 and P103 from electrical tray remote control receptacle J102 and remote control box assembly receptacle J103, respectively.

c. Remove remote control box assembly from mounting site (para 338 a).

6-3. Testing

Using a multimeter set to read 10,000-ohms resistance, test the remote control box as follows:

a. Temperature Control Variable Resistor. When testing the temperature Control Variable Resistor perform the following:

(1) Turn temperature control knob to COOL position.

(2) Connect multimeter test leads to remote control box receptacle J103 terminals B and H.

(3) Slowly turn temperature control knob to warm position; observe that multimeter indicating pointer moves smoothly from 0 to 5000-ohms reading.

(4) If resistance range is not 0 thru 5000-ohms, or if pointer moves erratically through range, the temperature control variable resistor (R3) is defective and must be replaced.

b. Air Conditioning Switch. When testing the air conditioning switch perform the following:

(1) Turn temperature control knob to COOL position.

(2) With multimeter test leads connected to remote control box assembly receptacle J103 terminal sets listed in table 6-1., check air conditioning switch in WARM, OFF, VENT, and COOL positions for conditions listed in tablt 6-1.

Table 6-1. Air Conditioning Switch rest

Multimeter test leads at J103 terminal sets	Air conditioning switch net to			
	Warm	Off	Vent	Cool
A-E	0	0	0	0
A-F	C	0	0	0
B-D	C	0	0	C
B-H	V	V	V	V
C-J	0	0	0	C
C-L	C	0	0	0
D-H	V 0	0	V	
D-K	0	0	C	C

0-Multimeter indicates open circuit between terminal set
C-Multimeter indicates continuity between terminal 9t
V-Multimeter Indicates continuity between terminal sets when temperature control dial is in COOL position. and SOOG-ohms resistance when temperature control dial is In W ARM position.

(3) If any one of the terminal sets tested in the four switch positions does not give a multimeter reading as indicated in table 6-1, the air conditioning switch (S2) is defective and must be replaced.

6-4. Remote Control Box Assembly Repair

a. Disassembly. Disassemble remote control box assembly in the numerical sequence as illustrated in figure 6-1. Remove hardware only as required to replace defective part.

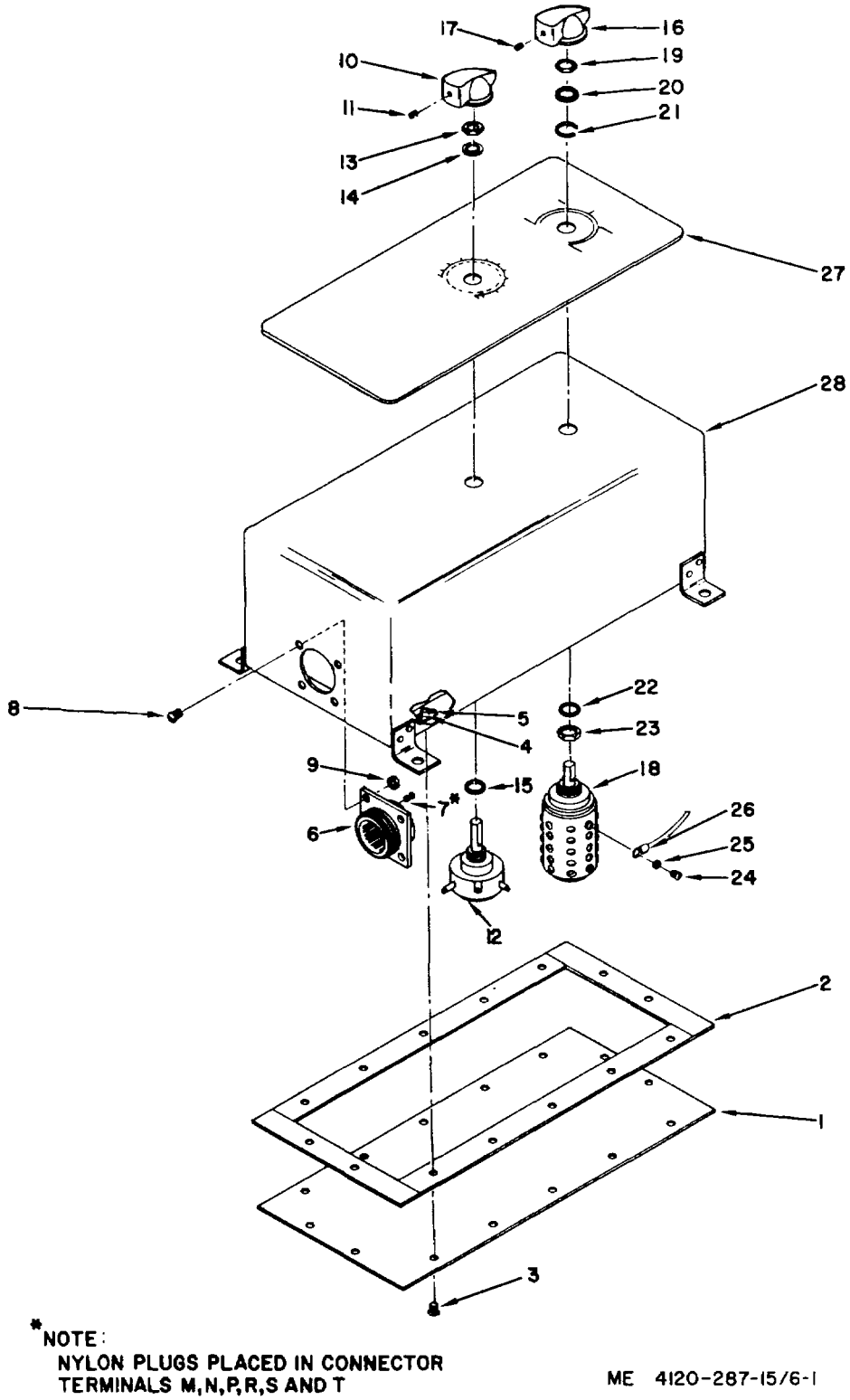


Figure 6-1. Remote control box assembly.

1 Cover
2 Gasket
3 Screw (14)
4 Plate nut (14) 14
5 Rivet (28)
6 Electrical connector (J103)
7 Nylon plug (6)
8 Screw (4)
9 Nut (4)
10 Knob
11 Screw
12 Rheostat, 5000 ohms (R3)
13 Nut
Locking ring washer
15 Mounting seal
16 Knob
17 Screw
18 Switch (S2)
19 Nut
20 Lockwasher
21 Locking ring washer
22 Bushing seal
23 Nut
24 Screw
25 Washer
26 Terminal lug
27 Switch identification plate
28 Box

Figure 6-1-Continued.

b. Repair and Inspection.

(1) Using a light stream of clean, dry compressed air remove all dirt and dust from remote control box.

(2) Replace defective parts with new parts.

(3) Recheck remote control box in ace cordance with paragraph 63.

c. Reassembly. Reassemble remote control box assembly in reverse of numerical sequence as illustrated in figure 6-1.

Section II. SENSING SWITCHES AND SOLENOID VALVE COIL

6-5. General

Note. Disconnect air conditioner from power source before performing any maintenance or inspection of electrical system, other than operation tests. The operating voltage of this air conditioner is dangerous; severe, possibly fatal shock may result from coming in contact with any part of the electrical system.

The sensing switches and solenoid valve are located throughout the air conditioner unit as shown in fig. 6-2. The sensing switches and solenoid valve control the operating parameters and operation of the air conditioner. The following are discussed:

a. Condenser fan discharge door micro switch, S101.

b. Low ambient switch, S102.

c. high-low pressure switch, S103.

d. Heater temperature switch, S104; thermostat, S105.

e. Solenoid valve oil, L101.

6-6. Sensing Switches and Solenoid Valve Coil

a. Condenser Fan Discharge Door Microswitch S101. Using a multimeter check condenser fan discharge door microswitch, S101 as follows:

(1) Connect multimeter test leads to plug P108 terminals M and L.

(2) Open the condenser fan discharge door and check for continuity between P108 terminals M and L.

(3) Depress the microswitch operator and check for an open circuit between P108 terminals M and L.

(4) If the condenser fan discharge door switch does not make and break as indicated in a (2) and (3) of this paragraph, the switch is defective and must be replaced.

(5) Repeat step a (3) of this paragraph, closing the condenser door to depress the microswitch. If the microswitch does not open when depressed by the door adjust switch position.

b. Low Ambient Switch (S102). Using a multimeter check low ambient switch S102 as follows:

(1) Remove wires 109 and 111 from terminal board TB1 (fig. 6-2); and connect multimeter test leads to wires 109 and 111.

(2) Check to determine that low ambient switch S102 is closed when ambient temperature is 40 + 50F or below.

(3) Check to determine that low ambient switch S102 is open when ambient temperature is 50 + 56F or above.

(4) Replace low ambient switch S102 if criteria established in steps b (2) and (3) of this paragraph are not met.

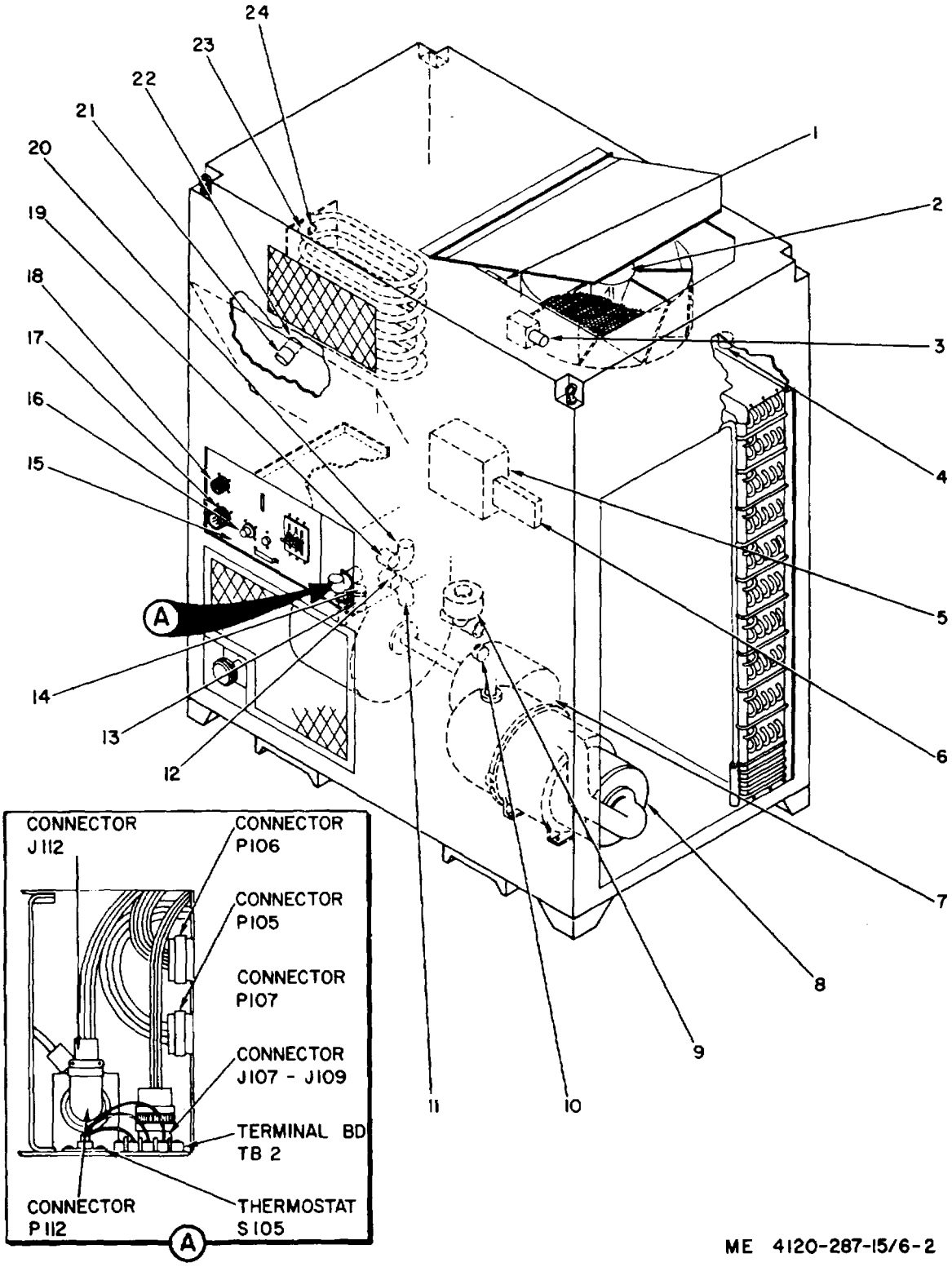


Figure 6-2. Electrical component location

1 Microswitch S101
2 Condenser fan motor B10
3 Voltage conversion connector P111
4 Low ambient switch S102
5 High-low pressure switch S103
6 Terminal board TB-1
7 Evaporator blower motor R102
8 Compressor motor R10
9 Solenoid valve coil L101
10 Voltage conversion connector P110
11 Electrical connector plug P111
12 Thru-bulkhead electrical connector J105J113
13 Electrical connector plug P109
14 Thru-bulkhead electrical connector J107-J109
15 Electrical tray assembly
16 Fuse holder and fuse F1
17 Electrical connector jack J101
18 Electrical connector jack J102
19 Thru-bulkhead electrical connector J106-JL108
20 Electrical connector plug P108
21 Electrical connector plug P104
22 Electrical connection jack J104
23 Heater bank (2)
24 Heater temperature switch S104

Figure 6-2. Continued

(5) Reconnect wires 109 and 111 to terminal board TB1.

c. High-low Pressure Switch (S103). Isolate leads 110 and 112 from Terminal Board TB1; and check for continuity. If continuity exists replace switch. There is no practical method for checking high-low pressure switch operation in the air conditioner under operating conditions. It is recommended that a suspected high-low pressure swi'cbh be replaced.

d. Heater Temperature Switch (Si04). Using a multimeter, check heater temperature switch S104 as follows:

(1) Remove power input plug.

(2) Connect the multimeter test leads between J112-B and J112-D terminals.

(3) Check to determine that heater temperature switch is closed.

(4) Disconnect P107 from J107.

(5) Place a thermometer thru conditioned air outlet screen so that thermometer bulb is near heater temperature switch.

(6) Connect power supply plug to Input Power receptacle J101.

(7) Start air conditioner. Set air conditioning switch to HEAT position; then turn temperature control rheostat dial clockwise to WARM position.

(8) Observe that heater temperature switch opens when thermometer reads 126 t 5°F and closes when temperature falls to 105 +5°F.

(9) If heater temperature switch does not open at 125 + 5°F and close at 105 ± 50F, the switch is defective and must be replaced.

(10) Remove multitester test leads, connect P107 to J107 and remove thermometer.

e. Thermostat (S105). Using a multimeter check thermostat S105 as follows:

(1) Remove thermostat S105, (para 3-39) leaving thermostat leads attached to terminal board TB1.

(2) Connect multimeter test leads to terminal board TB2 contacts I and 2.

(3) Run air conditioner with air conditioning switch in HEAT position and temperature control switch set to maximum WARM position.

(4) Set thermostat bulb in water having a temperature of 40 + 5°F. Determine that heaters are operating and that multimeter indicates continuity between TB2 control 1 and 3.

(5) Set thermostat bulb in water having a temperature of 105 + 10°F; then set temperature control switch to maximum COOL position. Determine that heaters deenergize and that multimeter indicates an open circuit between TB2 contacts 1 and 3.

(6) Set the air conditioning switch to COOL position.

(7) Immerse thermostat bulb in water having a temperature of 40 + 50F.

(8) Rotate temperature control switch to maximum WARM position and note that multimeter indicates an open circuit across TB2 contacts 1 and 3. Also note that refrigerant ceases to flow through refrigerant liquid sight indicator.

(9) Set master circuit breaker to OFF position and disconnect power input plug from J101.

(10) If thermostat does not meet criteria established in e (4), (5) and (8) of this paragraph, it is defective and must be replaced.

f. Solenoid Valve Coil L101. Test solenoid valve coil as follows:

(1) With air conditioner running in COOL mode and Temperature control switch set to maximum warm, place thermostat S105 in water having a temperature of 40 + 50F.

(2) Disconnect solenoid valve coil leads from terminal Board TB1.

(3) Apply 28VDC across solenoid valve coil leads and note refrigerant flowing through refrigerant liquid sight indicator. Remove 28VDC supply and note that refrigerant flow ceases.

(4) Replace a defective solenoid valve coil with a new part.

SECTION III. ELECTRICAL TRAY ASSEMBLY

6-7. General

The electrical tray assembly consists of the following items (figs. 23 and 6-3): Master circuit breaker, CB1; 28-volt, 3/4 amp fuse holder, Fl; system reset switch, S1; elapsed time hourmeter, M1; power transformer, T1; silicon rectifier, CR1; control relays and line contactor relays, K101 thru K108; and associated wiring harness assemblies.

6-8. Removal

Remove electrical tray assembly (para 5-19).

6-9. Testing

Warning: Make sure master circuit breaker is set to OFF position and power supply is disconnected from POWER INPUT receptacle J101 when preparing for tests and connecting test leads.

a. Master Circuit Breaker (CB1).

(1) Check power supply "hot" leads for 240-vac volts alternating current potential to ground.

(2) Connect power supply to input power receptacle J101.

(3) Set master circuit breaker to ON position.

(4) Using a multimeter check for 240 vac potential between ground and each of the three CB1 terminals, marked B.

(5) If reading is not obtained circuit breaker CB1 is defective and should be replaced.

b. 28-volt Power Supply.

(1) Fuse (F1).

(a) Check fuse and fuse holder (para 337).

(b) Replace a defective fuse and/or fuse holder.

(2) Phase sequence relay (K108).

(a) Using a multimeter, check for 416 vac across relay K108 terminals L1 and A2.

(b) If reading is not obtained, the phase sequence relay K108 is defective and must be replaced.

(3) Power Transformer (T1).

(a) Shunt transformer terminals 6 and 7 with a 25-ohm resistor rated at 50 watts.

(b) Using a multimeter, check for 30.2 + I across transformer terminals 6 and 7.

(c) Remove shunt.

(d) Shunt transformer terminals 5 and 6 with a 25-ohm resistor rated at 50 watts.

(e) Using a multimeter, check for 30.2 +1 vac across transformer terminals 5 and 6.

(f) Remove shunt.

(g) If readings specified in b(3)b and (e) are not obtained power transformer T1 is defective and must be replaced.

(4) Rectifier (CR1).

(a) Shunt rectifier (CR1) terminal C and transformer (T1) terminal 6 with a 25-ohm resistor rated at 50 watts.

(b) Using a multimeter, check for a nominal value of 28 vdc (volts direct current) across transformer terminal 6 and rectifier terminal C.

(c) If reading is not obtained, rectifier CR1 is defective and must be replaced.

c. Control Relays. The control relays are as follows: trip relays K101; time delay relay K102; temperature control relay K103; and line contactor relays K104, K105, K106 and K107.

WARNING

Set master circuit breaker to OFF position and disconnect power supply from power input receptacle (J101) when testing the relays

(1) Trip Relay (K101)

(a) Connect the positive side of a 28 vdc power supply to rectifier (CR1) terminal C; and connect the negative side to transformer (T1) terminal 6.

(b) Press system reset switch.

(c) Using a multimeter, check for continuity across K101 terminals 5 and 3, and 2 and 11.

(d) If terminal 5 and 3, and 2 and 11, are open, trip relay K101 is defective and must be replaced.

(e) Using a jumper, momentarily connect K101 terminal 7 and 1; then remove jumper.

(f) Check K101 terminals 5 and 3, and 2 and 11 for an open circuit.

(g) If terminals 5 and 3, and/or 2 and 11 exhibit continuity, trip relay K101 is defective and must be replaced.

(h) Press system reset switch. Terminals 5 and 3, and 2 and 11 should now exhibit continuity; if not, either trip relay K101 or system reset switch S1 is defective and must be replaced.

(i) Set master circuit breaker to OFF position.

(j) Connect to K101 terminals 1 and 7, and test for continuity.

(k) Press system reset switch S1; if multimeter shows continuity while S1 is depressed then switch S1 is defective and must be replaced.

(l) If multimeter indicates switch S1 opens when depressed, then trip relay K101 is defective and must be replaced.

(2) Time delay relay (K102).

(a) Connect multimeter test leads to relay K102 terminals 5 and 7.

(b) Apply 28 vdc across relay K102 terminals 2 and 3.

(c) Observe that after 2.25 seconds have elapsed and before 3.75 seconds have elapsed, multimeter reads 28 vdc

(d) If multimeter reading is not obtained within specified time range, then time delay K102 is defective and must be replaced.

(e) Check for an open condition across K103 terminals 1 and 7.

(f) If K103 terminals 1 and 7 exhibit continuity either relay K103 or capacitor C2 is defective and must be replaced.

1. Check capacitor C2 for shorted condition.
2. Replace capacitor C2 if defective (shorted).
3. Replace relay K103 if capacitor C2 is not shorted.

(g) Disconnect jumper T (fig. 1-9) from K103 terminal 8; then apply 28 vdc across relay K103 terminals 4 and 8.

(h) Check that K103 terminals 5 and 3 and 1 and 7 exhibit continuity.

(i) If continuity is not exhibited, relay K103 is defective and must be replaced.

(j) Check for an open condition across K103 terminals 2 and 5.

(k) If relay K103 terminals 2 and 5 exhibit continuity, relay K103 is defective and must be replaced.

(l) Check for an open condition across K103 terminals 1 and 6.

(m) If K103 terminals 1 and 6 exhibit continuity either relay K103 or capacitor C3 is defective and must be replaced.

1. Check capacitor C3 for shorted condition.
2. Replace capacitor C3 if defective (shorted).
3. Replace relay K103 if capacitor C3 is not shorted.

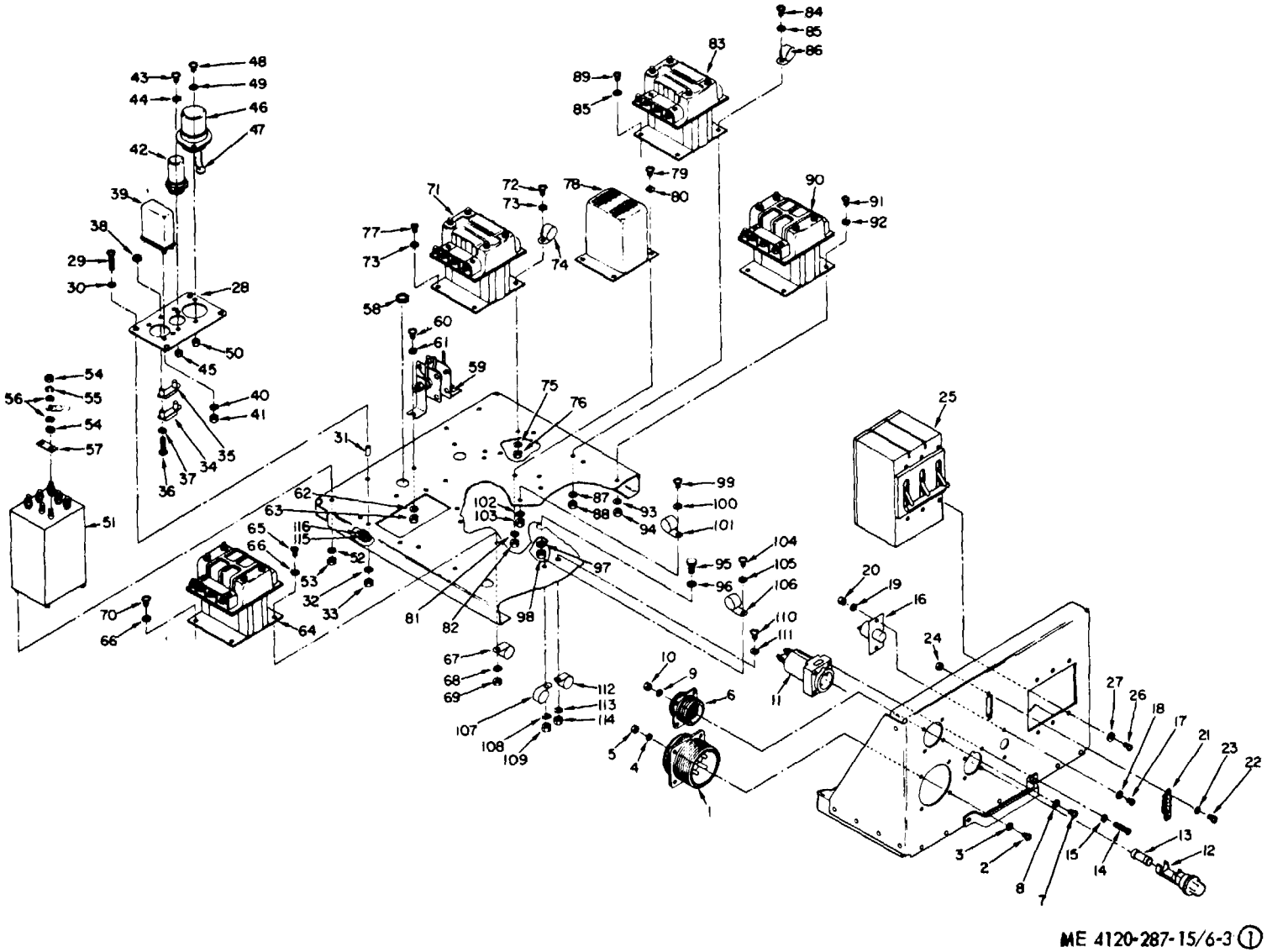


Figure 6-3 (1). Electrical tray assembly and associated wiring harness exploded view

1 Circuit breaker harness
2 Screw (4)
3 Flat washer (4)
4 Lock washer (4)
5 Nut (4)
6 Remote control tray harness assy
7 Screw (4)
8 Flat washer (4)
9 Lock washer (4)
10 Nut (4)
11 Fuse clip
12 Fuse (F1) 3/4 amp, 600v maximum
13 Fuse holder
14 Screw (4)
15 Washer (4)
16 Switch (S1)
17 Screw (2)
18 Flat washer (2)
19 Lock washer (2)
20 Nut (2)
21 Elapsed time meter (M1)
22 Screw (2)
23 Lock washer (2)
24 Nut (2)
25 Circuit breaker (CB1)
26 Screw (6)
27 Lock washer (6)
28 Electrical component assy channels
29 Screw (4)
30 Flat washer (4)
31 Stand off (4)
32 Lock washer (4)
33 Nut (4)
34 Current limiting resistor, 350 ohms(R1)
35 Cycling resistor, 1200 ohms (R2)
36 Screw (2)
37 Lock washer (2)
38 Nut (2)
39 Trip relay (K101)
40 Lock washer (8)
41 Nut (3)
42 Time delay relay (K102)
43 Screw (2)
44 Lock washer (2)
45 Nut(2)
46 Temperature control relay (1100)
47 Cycling capacitor (8)
48 Screw (2)
49 Lock washer (2)
50 Nut (2)
51 Power transformer, low voltage supply (T1)
52 Lock washer ()
53 Nut (4)
54 Nut (4)
55 Lock washer (7)
56 Flat washer (14)
57 Jumper (shorting link) (2)
58 Grommet (4)
59 Rectifier
60 Screw (2)
61 Flat washer (2)
62 Lock washer (2)
63 Nut (2)
64 Heater relay (K107)
65 Screw (2)
66 Lock washer (4)
67 Clamp (2)
68 Flat washer (4)
69 Nut (4)
70 Screw (2)
71 Evaporator fan motor relay (K106)
72 Screw
73 Lock washer (4)
74 Clamp
75 Flat washer (4)
76 Nut (4)
77 Screw (3)
78 Phase sequence relay (K108)
79 Screw (4)
80 Lock washer (4)
81 Flat washer (4)
82 Nut (4)
83 Condenser fan motor relay (K105)
84 Screw
86 Lock washer(4)
86 Clamp
87 Flat washer (4)
88 Nut (4)
89 Screw ()
90 Compressor motor relay (K104)
91 Screw (4)
92 Lock washer (4)
93 Flat washer (4)
94 Nut (4)
95 Bolt
96 Flat washer
97 Lock washer
98 Nut
99 Screw
100 Lock washer
101 Clamp
102 Flat washer
103 Nut
104 Screw
105 Lock washer
106 Clamp
107 Clamp
108 Flat washer
109 Nut
110 Screw
111 Lock washer
112 Clamp
113 Flat washer
114 Nut
115 Plate nut (6)
116 Blind rivet (12)
117 Tray assembly
118 Compressor relay harness assy
119 Evaporator relay harness- assy
120 Terminal board (TB2) harness assembly’
121 Condenser harness assembly
122 Heater cable harness assembly

Figure 6-3(1)—Continued.

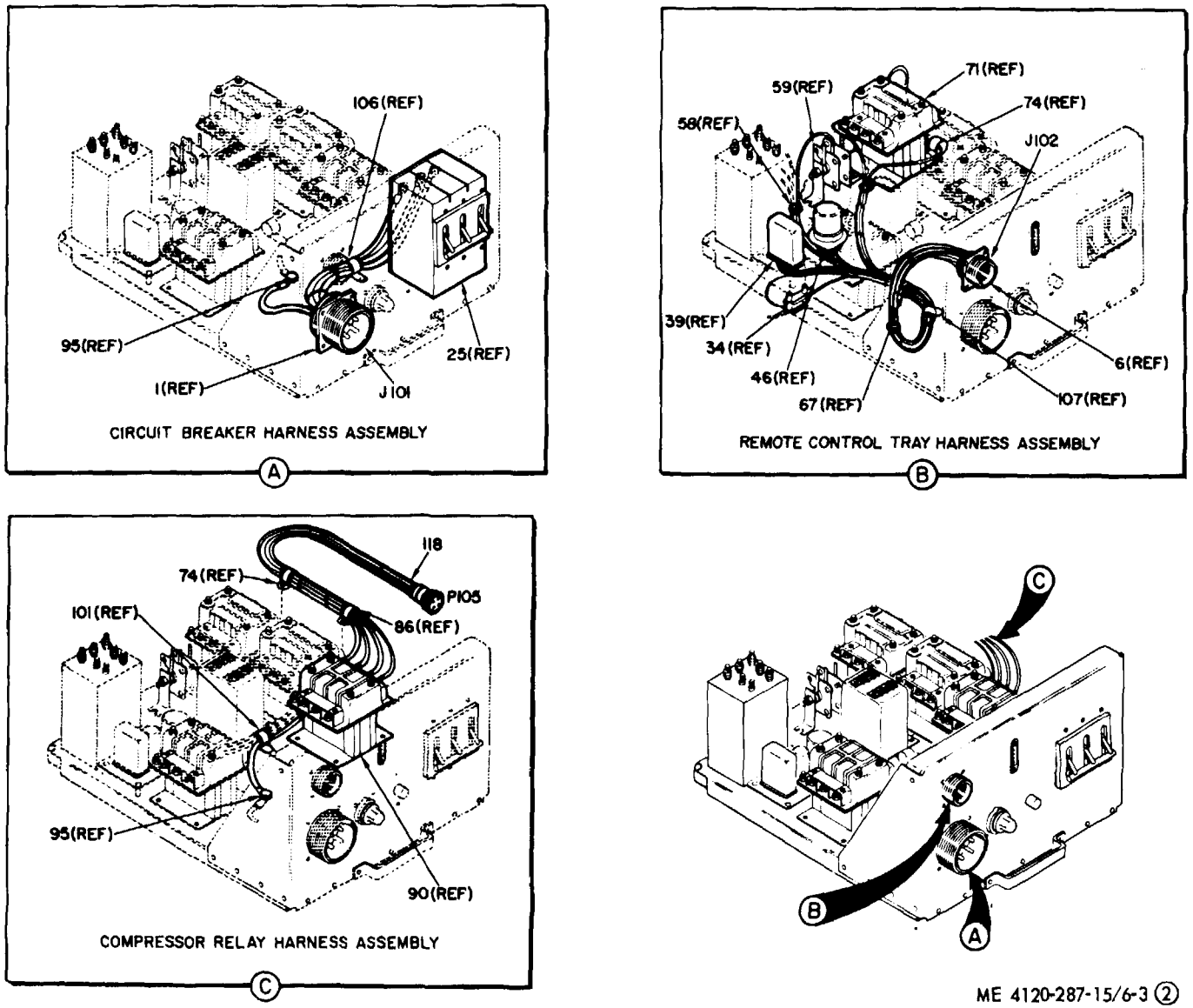


Figure 6-3(2)—Continued

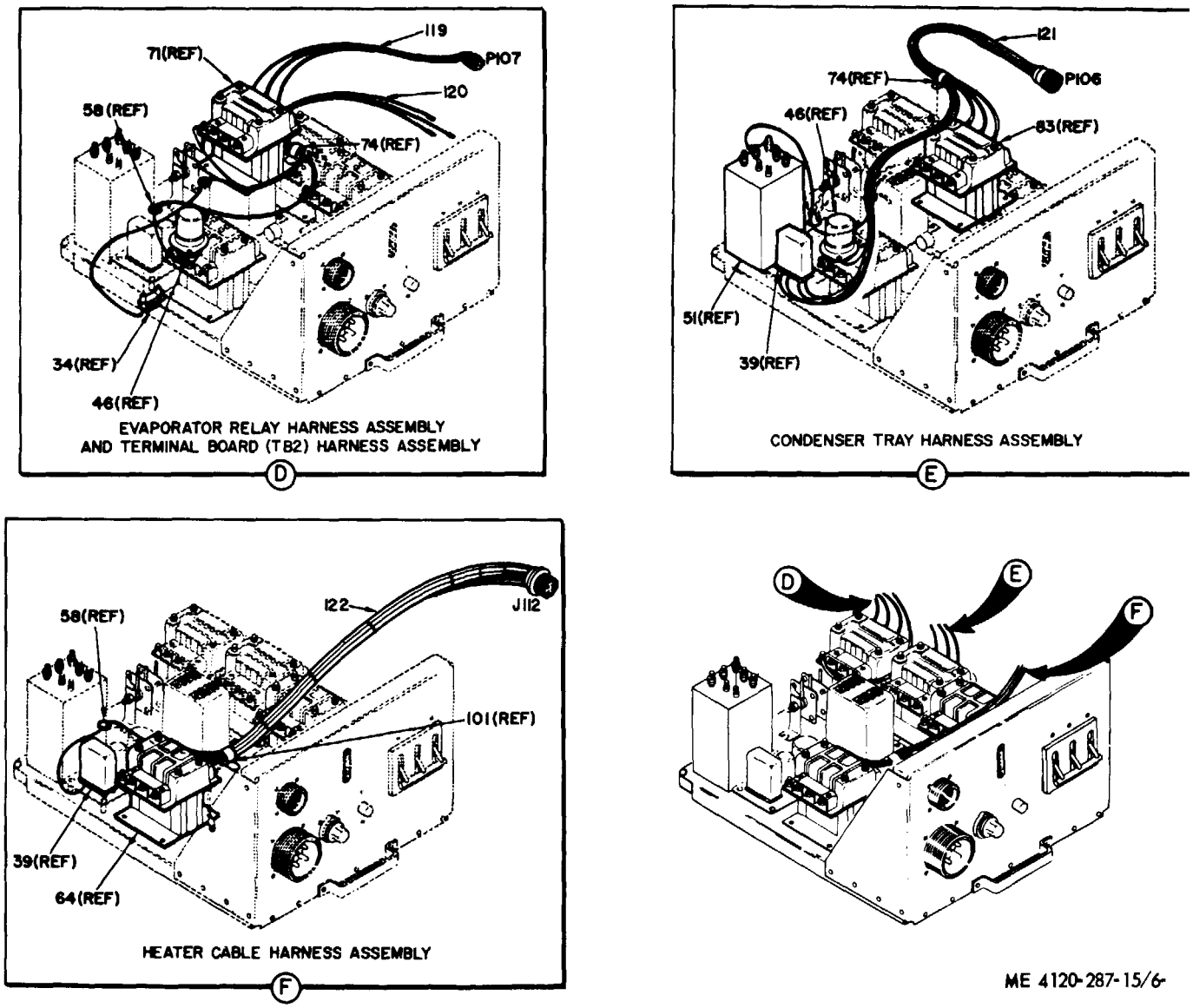


Figure 6-3(3)—Continued.

(n) Remove 28 vdc power supply from K103 terminals 4 and 8; then replace jumper J (fig. 1-9).

(4) Line contactor relays (K104, K105, K106 and K107).

NOTE

The operation of the four line contactor relays are identical; therefore one set of instructions are given to cover all line contactor relays.

(a) Remove 28 vdc power supply leads from rectifier (CR1) terminal C and transformer (T1) terminal 6.
(b) Check for an open condition across relay terminals Al and A2, B1 and B2, and C1 and C2.
(c) If continuity is exhibited across any one of the three terminal sets, the relay is defective and must be replaced.
(d) Apply 28 vdc across relay terminals 1 and 2.
(e) Check for continuity across relay terminals Al and A2, B1 and B2, and C1 and C2.
(f) If continuity is not exhibited across any one of the three terminal sets the relay is defective and must be replaced.

6-10. Electrical Tray Assembly Repair

a. Disassembly. Disassemble electrical tray assembly in numerical sequence as illustrated in figure 6-3. Remove hardware only as required to replace defective part.
b. Repair and Inspection.
(1) Using a light stream of clean, dry compressed air remove all dirt and dust from electrical tray assembly.
(2) Replace defective parts with new parts.
(3) Check replaced electrical tray assembly component in accordance with paragraph 6-9.
c. Reassembly. Reassemble electrical tray assembly in reverse of numerical sequence as illustrated in figure 6-3.

Section IV. MOTORS AND HEATER ASSEMBLY

6-11. General

The motors and heater assembly operate at line voltage. Remove and test only the suspected faulty component.

6-12. Removal

a. Remove evaporator motor (para 5-23 a).
b. Remove condenser fan motor assembly (para 5-21 a).
c. Remove motor compressor assembly (para 5-20 a).
d. Remove heater assembly (para 5-25 a).

6-13. Testing

NOTE

The Testing of the three motors and the heater assembly is identical, therefore only one set of instructions are given.

a. Place the motor, or heater assembly to be tested on a workbench.
b. Apply working voltage directly to motor or heater assembly.
c. If the motor, or heater assembly does not function, it must be replaced with a new unit.

6-14. Replacement

a. Replace evaporator motor (para 5-23 b).
b. Replace condenser fan motor assembly (para 5-21 b).
c. Replace motor compressor assembly (para 5-20 b).
d. Replace heater assembly (para 5-25 b).

CHAPTER 7

REFRIGERANT SYSTEM REPAIR INSTRUCTIONS

Section I. CHARGING THE REFRIGERANT SYSTEM

7-1. General

a. This section describes the methods used to charge, discharge and add oil to the refrigerant system; and to check the system for refrigerant leakage.

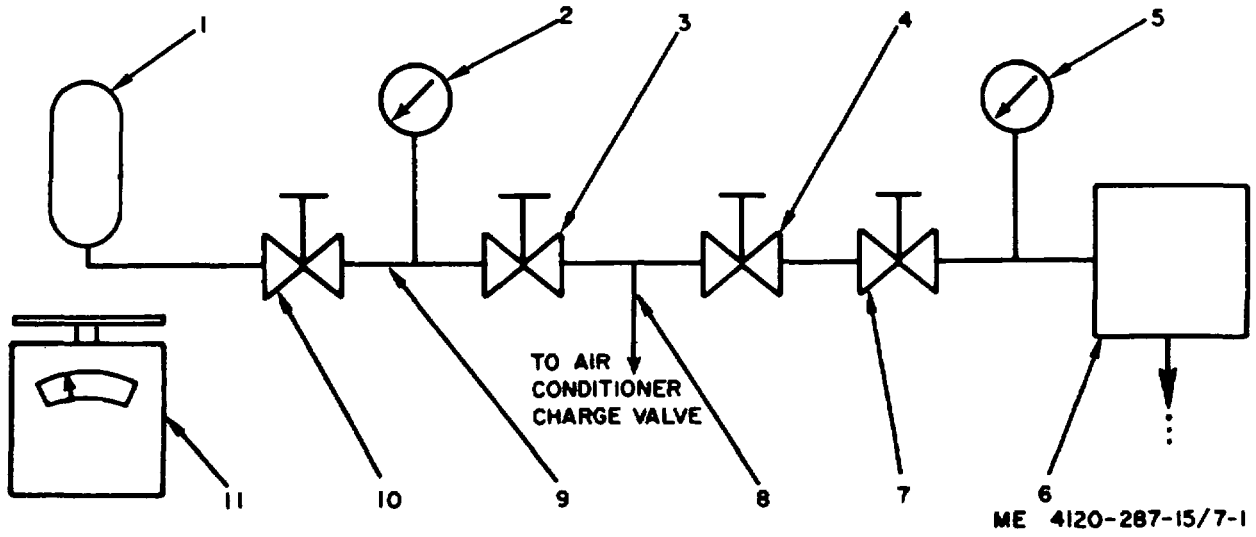
b. Make sure the refrigerant charging apparatus (fig. 7-1) is clean and in operational condition.

c. When adding oil use a clean, moisture-free oil container. Cap oil container immediately after use to eliminate moisture contamination of the oil.

7-2. Precautions When Handling Refrigerant

Although refrigerant-12 is one of the safest refrigerants to handle, it is important that personnel observe the following precautions in handling the refrigerant.

a. Do not discharge refrigerant-12 into areas having exposed flames. A heavy concentration of refrigerant in contact with a live flame produces a gas which is toxic and attacks bright metal surfaces.



1	Rarigeran-12 bottle	5	Vacuum gage	9	Refrigerant pressure hose
2	Pressure gage	6	Vacuum pump	10	Refrigerant-12 bottle valve
3	Refrigerant control valve	7	Vacuum pump shutoff valve	11	Platform scale
4	Vacuum control valve	8	Evacuation and charge hose		

Figure 7-1. Refrigerant charging apparatus.

b. Do not expose the eyes to the refrigerant. If refrigerant-12 comes in contact with eyes, observe the following instructions.

(1) Do not rub the eye(s).

(2) Arrange at once to take the effected person to an eye specialist.

(3) Put drops of sterile mineral oil into the eyes to remove the excess refrigerant.

(4) Wash the eyes with either a weak solution of boric acid or a sterile salt solution (not to exceed 2 percent sodium chloride).

c. Do not expose the skin to the liquid refrigerant. If the liquid comes in contact with the skin treat the injury the same as though the skin has been frostbitten or frozen. If a person is overcome in an area which lacks oxygen because of the presence of a high concentration of refrigerant-12, treat the person by applying artificial respiration produced manually or by a pulmotor.

7-3. Refrigerant Service Cylinder Handling Procedures

The following precautions must be observed when handling refrigerant bottles.

a. Do not leave the refrigerant bottle uncapped. All refrigerant bottles are shipped with a metal screw cap to protect the valve and safety plug from damage. Replace the cap after each use of the refrigerant bottles.

b. Do not carry or otherwise transport a refrigerant bottle in the passenger compartment of a vehicle or carrier. Do not expose refrigerant bottle to radiant heat from the sun because the resulting increase in pressure can cause the safety plug to release or the bottle to burst.

c. Never subject the refrigerant bottle to high temperature when adding refrigerant to the air conditioning system. A bucket of hot water (not over 125°F), or hot wet rags around the bottle provides all the heat required to raise the refrigerant in the bottle to a pressure higher than the pressure in the system when adding refrigerant.

7-4. Checking Refrigerant Charge Level

a. Check the refrigerant liquid sight indicator after the unit has been operating in the cooling cycle for five or more minutes (2-8-c (1)). If the refrigerant system requires additional refrigerant, bubbles or milky flow will appear in the liquid sight indicator glass.

b. Set Master Circuit breaker to OFF position.-

7-5. Adding Refrigerant

a. Remove the air conditioner right-side panel access assembly (para 3-29 a).

b. Set up the refrigeration system charging apparatus, (fig. 7-1) near the condenser stage section.

c. Close the refrigerant control valve and vacuum control valve.

d. Connect the refrigerant supply hose to a refrigerant-12 bottle.

WARNING

Wear protective gloves and goggles when handling refrigerant-12 service cylinders.

e. Remove the air conditioner charge valve cap and connect the evacuation and charge hose to the charge valve. Do not tighten the coupling on the hose at the air conditioner charge valve.

f. Open the charging unit refrigerant control valve to permit refrigerant-12 to escape from the coupling at the charge valve.

g. When the refrigerant-12 has displaced the air trapped in the evacuation and charge hose, tighten the coupling on the hose, and close the refrigerant charge valve.

h. Unlock the scale lock and invert the refrigerant-12 bottle on the platform scale.

i. Open the air conditioner charge valve.

NOTE

The maximum weight of the refrigerant-12 bottle shall not exceed 55 pounds

j. Use three or four quarter-turn fasteners to mount the right-side panel assembly to the cabinet, allowing the evacuation and charge hose to pass between the panel assembly and the cabinet.

k. Operate the air conditioner in the cooling mode.

I. Open the refrigerant-12 bottle valve.

m. While observing the liquid sight indicator, admit small quantities of refrigerant-12, using the refrigerant control valve to meter the flow. When the bubbles or milky flow in

the liquid sight glass have been eliminated, close the refrigerant control valve. Observe the liquid refrigerant sight indicator for three to four minutes after flow clears to ascertain that sufficient refrigerant-12 has been added to the system.

CAUTION

Do not overcharge the refrigerant system. After each small quantity of refrigerant-12 has been added to the refrigerant system, allow three to four minutes for the refrigerant to circulate before adding more refrigerant. Do not attempt to meter the flow of refrigerant-12 with the air conditioner charge valve.

n. Set master circuit breaker to OFF position,
o. Note scale reading and add one additional pound of refrigerant-12 to refrigerant system.
p. Remove the air conditioner right-side access panel assembly.
q. Close air conditioner charge valve.
r. Close the refrigerant-12 bottle valve.
s. Disconnect the refrigerant supply hose from the refrigerant-12 bottle.
t. Disconnect the evacuation and charge hose from the air conditioner charge valve and cap the charge valve.

WARINING

High pressure refrigerant is trapped in the charging line. Caution should be used in releasing this pressure.

u. Inspect the refrigerant system for leaks (para 7-6).
v. Install the air conditioner right-side access panel assembly (para 3-29 *c).*

7-6. Inspection Refrigerant System for Leaks

a. An electronic type halogen leak detector is used to detect refrigerant system leaks. The leak detector is a very sensitive device, and to some extent dangerous to use. It incorporates a sensing element that operates at approximately 1472°F which is sufficiently hot to cause ignition. This device can be best utilized to detect small leaks because a large area contaminated with leakage makes it difficult to pinpoint a leak.

(1) Leak test. Remove the access panel assemblies (para 3-23 a, 3-27 a and 3-29 a).

WARNING

Do not use this leak detector in the presence of explosive or flammable gases. The area in which the leak detector is to be used must always be checked first with an explosimeter. If the atmosphere of the compartment area causes any indication on the scale of the explosimeter, the compartment area must be purged or cleared of all explosive vapor before the leak detector can be utilized.

CAUTION

Do not expose the leak detector probe to large leaks that can be detected without the use of the leak detector. This will prevent damage to the leak detector probe.

(2) Pass the leak detector probe over all refrigerant lines, fittings, couplings, brazed joints and valves.

NOTE

To obtain good leak detection, avoid using the leak detector in a draft, also, avoid exposing the leak detector probe to refrigerant leakage for a long period of time.

(3) Pass the leak detector probe over all accessible welded joints on components such as the condenser and evaporator assemblies. Check the compressor housing and the refrigerant liquid sight indicator.

(4) Mark all leaks and repair them upon completion of leak test (para 7-14 and 7-15).

b. *A* Halide torch leak detector can be utilized in much the same manner as the electronic type Halogen leak detector. The same precautions concerning the utilization of the electronic type Halogen leak detector in the presence of explosive or flammable gases is equally applicable to the utilization of the Halide torch.

(1) The Halide torch, when ignited gives off a greenish flame in the presence of a small refrigerant leak. It will give off a dense blue flame with a reddish tip or it may be extinguished in the presence of a large leak.

(2) The Halide torch is extremely sensitive. The presence of refrigerant-12 in the air due to changing refrigerant bottles or making repairs may interfere with a test by coloring the flame regardless of the position of the searching tube. In this case, it will be necessary to ventilate the compartment thoroughly.

(3) The exploring tube of this detector should be run over all sweat fittings, all mechanical couplings, and all valves. All portions of the system under refrigerant pressure should be methodically checked with this device.

(4) Check the refrigerant charge level (para 2-9 c (1)).

(5) Install the housing panels (para 3-23 c, 3-27 c and 3-29 c).

7-7. Discharging Refrigerant System

a. Remove air conditioner right-side access panel assembly (para 3-29 a).

b. Remove the air conditioner charge valve cap.

c. Attach a hose to the charge valve outlet and place the other end of the hose into a 500 ml (milliliter) graduated cylinder.

d. Discharge refrigerant by opening charge valve.

NOTE

Bleed the refrigerant slowly to prevent blowing oil out of the motor compressor assembly.

e. Remove hose from charge valve when refrigerant discharge ceases. Note the amount of oil collected in the 500 ml graduated cylinder.

7-8. Evacuating Refrigerant System

NOTE

Replace the filter-drier unit before evacuating and charging the refrigerant system.

a. Connect charging apparatus evacuation and charge hose (fig. 7-1) to the charge valve. Connect the vacuum pump power cord to a suitable electrical power source.

b. Open the vacuum pump shut-off valve and the vacuum control valve. Check that the refrigerant control valve is closed.

c. Start the vacuum pump.

d. Evacuate the refrigerant system to 29 $\pm$ 1 inches of mercury on the vacuum gage for no less than 20 minutes; then close the air conditioner charge valve.

e. Close the vacuum pump shut-off valve and the vacuum control valve on the charging unit.

f. Shut down the vacuum pump.

g. Close the air conditioner charge valve.

h. Disconnect the evacuation and charge hose from the air conditioner charge valve; and replace the valve cap.

i. Disconnect the vacuum pump power cord.

j. Install the air conditioner right-side panel assembly.

7-9. Charging Refrigerant System

NOTE

Replace the filter-drier unit before charging refrigerant system.

a. Discharge and evacuate the refrigerant system according to paragraphs 7-7 and 7-8.

b. Connect the refrigerant supply hose to a refrigerant-12 bottle, and open the refrigerant control valve to evacuate the refrigerant supply hose. Close the refrigerant control valve when system pressure returns to 29 $\pm$ 1 inches of mercury vacuum.

WARNING

Wear protective gloves and goggles when handling refrigerant-12 bottles.

c. Release the scale beam lock to free the platform scale. Adjust zero set knob to obtain a zero scale reading.

d. Invert the refrigerant-12 bottle, and place it on the platform scale. Record the weight of the refrigerant-12 bottle.

Note. The refrigeration system charges more rapidly when the refrigerant-12 bottle is placed in an inverted position. If the refrigerant-12 has been stored in a cold area, the pressure within the cylinder may not be sufficient to charge the system. Place the base of the refrigerant-12 bottle in a pail of warm water (approx. 120°F.

WARNING

Do not heat the tank with an open flame or apply heat in excess of 125° F.

e. Close the vacuum control valve.

f. Shut down the vacuum pump.

g. Open the refrigerant-12 bottle valve.

h. Open the charging unit refrigerant control valve, and observe the scale. When the scale reading is 10.0 pounds less than the reading recorded in d, above, close the refrigerant control valve.

CAUTION

The refrigerant charge is critical within 1 lb. of the required amount. Extreme care must be taken when admitting refrigerant into the system since it is possible to admit large quantities of refrigerant in a very short time. Weigh the refrigerant bottle at frequent intervals to determine when the correct amount of refrigerant has been admitted into the system.

i. Close the air conditioner charge valve.
j. Close the refrigerant-12 bottle valve.
k. Disconnect the evacuation and charge hose from the charge valve.
l. Disconnect the refrigerant supply hose from the refrigerant-12 bottle, and remove the platform scale of the charging unit.
m. Lock the platform scale beam lock.
n. Disconnect the vacuum pump power cord from power source.
o. Inspect the refrigerant system for leaks (para 7-6).
p. Install the air conditioner right-side panel assembly (para 3-29 c).

7-10. Adding Compressor Oil

a. General. Oil is added to the refrigerant system only when oil is lost due to discharging the refrigerant system or replacing a major component. Oil is added after the refrigerant system is discharged and evacuated (para 7-7 and 7-8) and prior to charging (para 7-9).
b. Adding Oil. Using the apparatus shown in figure 7-2, add oil to the refrigerant system as follows:
(1) Discharge refrigerant (para 7-7).
(2) Evacuate refrigerant system according to paragraph 7-8, steps a through i.
(3) Place oil (FED SPEC VV-L-825 RCO-3 Type III), in sufficient quantity to make up the oil needed (as noted in paragraph 7-7, step e) into the graduated cylinder. In addition add sufficient oil to graduated cylinder to make up for any oil drained from a removed refrigerant system component.
(4) Open oil flow control valve (fig. 7-2) and place dip tube into graduated cylinder; then close oil flow control valve.
(5) Connect oil delivery tube to air conditioner charge valve.
(6) Open air conditioner charge valve.
(7) Using the oil flow control valve, allow sufficient oil to enter the refrigerant system to make up for lost oil; then close oil flow control valve.

NOTE

Do not permit the graduated cylinder to drain below the immersed tip of the dip tube. Close the (oil flow control valve, and add more oil to the graduated cylinder if required.

(8) Close air conditioner charge valve.
(9) Remove oil delivery tube from air conditioner charge valve.
(10) Evacuate refrigerant system (para 7-8).

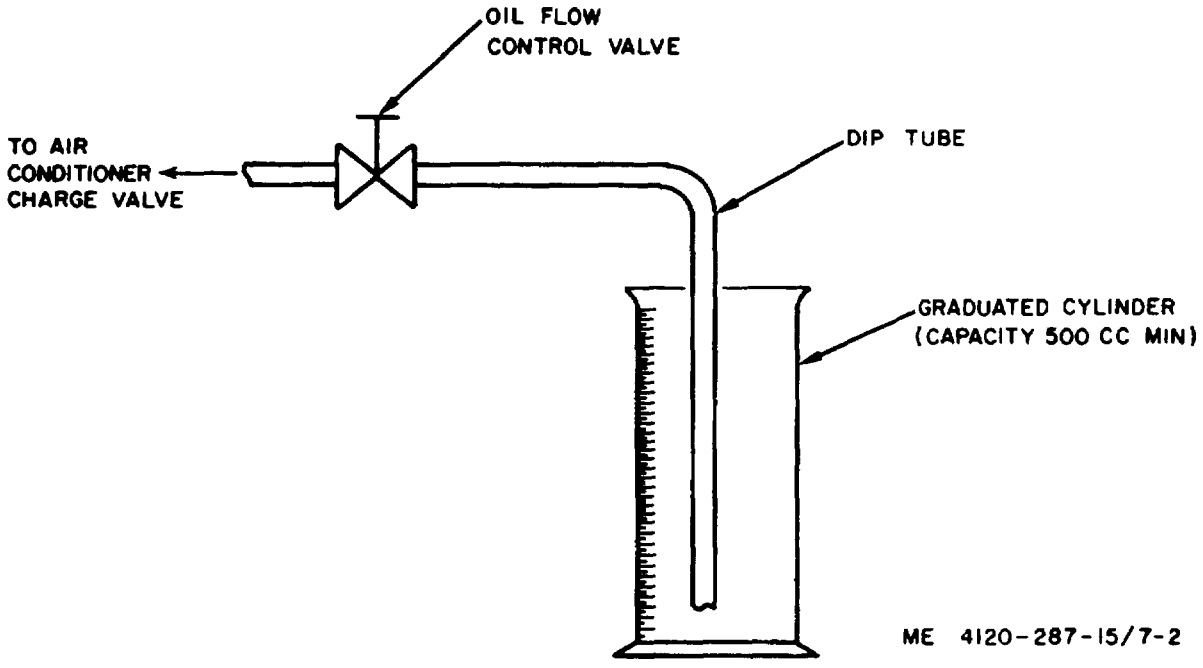


Figure 7-2. Apparatus for adding oil to refrigerant system.

Section II. REFRIGERANT TUBING SERVICE

7-11. General

a. This section describes the methods used to clean and replace the refrigerant carrying tubing in the air conditioner.
b. The maintenance area should be equipped with such standard items of equipment as suitable air and electrical outlets and work benches. It is important that the maintenance area be clean and dust-free. Keep hardware and small parts together in trays to prevent them from being mislaid. Cover parts which are to stand for any period of time with clean paper or suitable coverings.
c. Discard all lockwashers, tab lockwashers, preformed packings, and composition gaskets as they are removed. When removing preformed packings, be careful not to damage the preformed packings cavities and/or adjacent surfaces involved in sealing.

7-12. Maintenance of Refrigerant System in Air Conditioning Unit

The refrigerant system piping must be absolutely clean and the joints properly connected in order to eliminate contamination or leakage of the refrigerant.
a. Keep all tubing sealed. When a refrigerant line is disconnected, seal it immediately with masking tape or plug it depending on the type of connection.
b. Keep all installation and servicing tools, test gauges, and replacement parts clean.
c. Do not keep the air conditioning unit open longer than necessary. When a system must be opened, the servicing tools and other equipment must be ready for use so that minimum time is required to perform the operation.

7-13. Refrigerant Tubing

a. General. Copper tubing is utilized to carry the refrigerant through the vapor cycle system (fig. 1-11 and 7-3). The wall thickness of the copper tubing, depending on the required refrigerant pressure and capacity in a particular copper tube air conditioner operation, ranges from 0.030 inches to 0.050 inches.
b. Fittings. Brazed fittings (sweated joints) are used at tube junctions to assure against the possibility of refrigerant leakage.

7-14. Brazed Connections

a. Opening a Brazed Joint. When opening a brazed joint perform the following steps:
(1) Discharge and purge the refrigerant from the air conditioner (para 7-7 and 7-8). Purge the area around the joint with nitrogen to assure that any refrigerant due to leakage has been expelled from the area.

(2) Using an oxy-acetylene torch, heat the joint beyond the melting point of the filler material.
(3) Using well-insulated gloves, and/or other appropriate hand tools separate the joined tubes before the filler material temperature drops below the melting point.

CAUTION

Using masking tape or plugs, immediately seal any lines opened to the atmosphere. This is requisite for preventing moisture and/or dirt from entering the vapor cycle system -

b. Joining Brazed Fittings.
(1) Braze fittings in accordance with Military Specification MIL-B-7883.
(2) Use class 4 or 6A silver solder filler material as designated in QQ-S-561d.

7-15. Flared Joints

a. General. The compressor discharge assembly with a flared end, mates with a fitting machined to accommodate an 0 ring when the coupling nut on the tube assembly is threaded on to the fitting. The combination of the mating flares and the compressed 0 ring ensure a leak proof connection (fig. 7-4). The filter-drier SAE flared nuts do not require an O-ring.

NOTE

New 0 rings are required every time a flared tube assembly is removed and rejoined.

b. Torque Requirements. When installing tube assemblies it is essential that the coupling nut be tightened to the torque requirements shown in table 1-1, torque requirements.

7-16. Maintenance of Chemical Stability in Air Conditioning System

a. General. In order to ensure maximum cleanliness of the air conditioning unit's internal components which, in turn, will be reflected by a higher standard of system performance, the following notations must be followed:

(1) Keep all tubing sealed. When it becomes necessary to disconnect a refrigerant line, it should be immediately sealed with masking tape or plugged depending on the type of connections. It must be remembered that all air contains moisture and air that enters any part of the system will carry moisture with it and the exposed surfaces will collect moisture quickly.

(2) Keep all installation and servicing tools, test gauges, and replacement parts clean.

(3) Use a clean dry oil container for lubrication requirements. When adding oil, the container should be exceptionally clean and dry. The oil container should be kept capped immediately after use.

(4) Do not keep the air conditioning unit open longer than necessary. When it is necessary to open a system the servicing tools and other equipment to be utilized must be ready for use so that minimum time is required to perform the operation.

(5) A vacuum pump should be utilized after performing service operations to remove any air that might have entered the system.

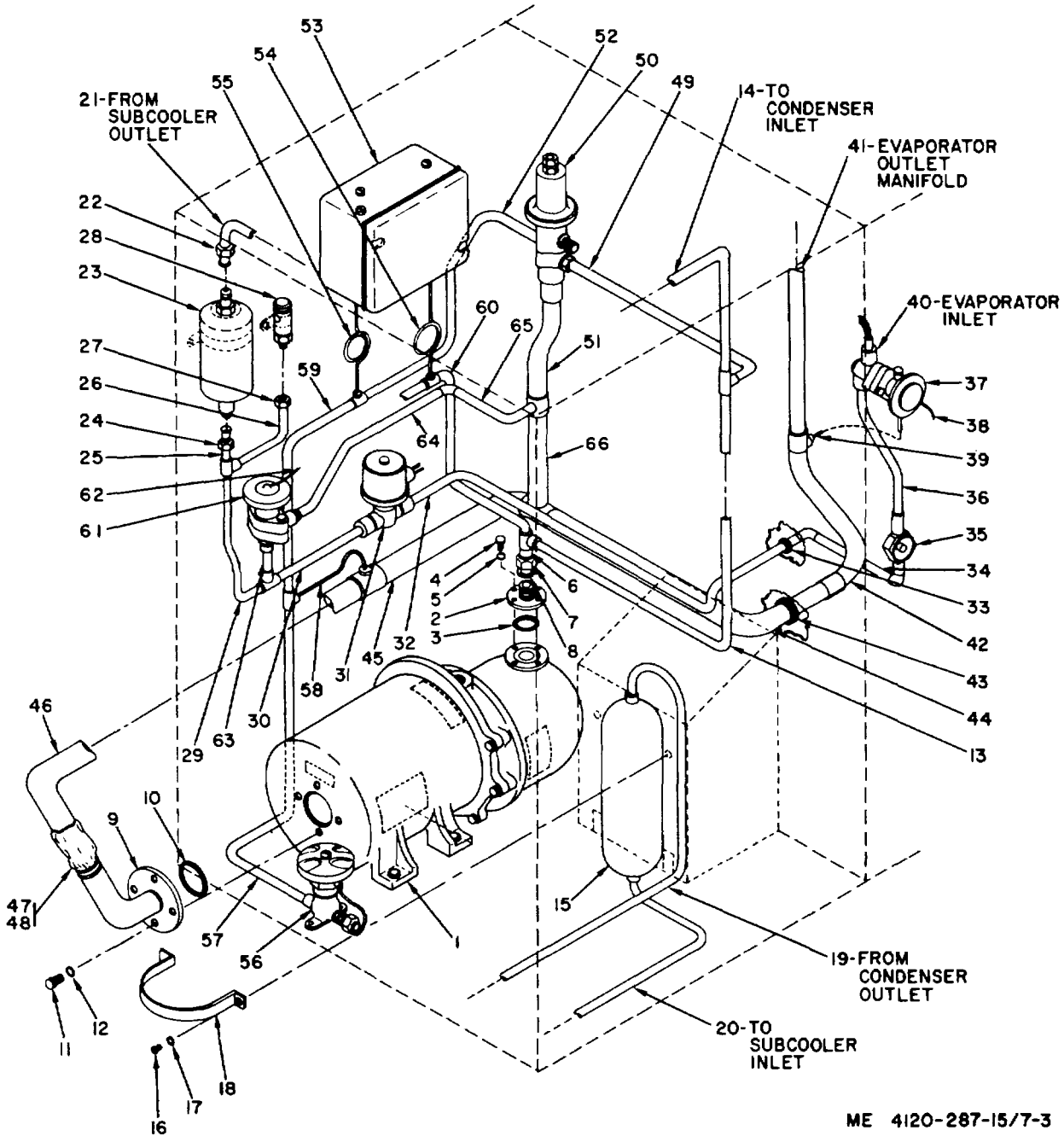
b. Cleaning Tubing. Wherever refrigerant tubing has been repaired, replaced or otherwise altered the following procedures are recommended:

(1) A clean, lintless cloth should be drawn through the tubing by means of wire or an electricians tape. This will remove all the course particles of dirt and dust.

(2) A clean, lintless cloth saturated with carbon tetrachloride should be pulled through the pipe. This procedure is continued until the saturated cloth is not discolored by dirt.

(3) A clean cloth saturated with compressor oil, squeezed dry, is drawn through the tubing again. This is to remove any lint. If possible, visual inspection should be made to see that tubing is perfectly clean.

(4) The cleaning job is completed by pulling through a clean dry lintless cloth. The cloth must be lintless as an accumulation of lint will cause almost as much trouble as scale.



1	Motor compressor assembly	6	Compressor assembly outlet tube
2	Adapter	7	Coupling nut
3	Adapter O-ring	8	Coupling nut
4	Screw (4)	9	Compressor inlet fitting
5	Flat washer (4)	10	Compressor inlet fitting O-ring

Figure 7-3. Refrigerant system components and associated tubing.

11 Bolt (4)
12 Flat washer (4)
13 Compressor outlet to condenser inlet tube
14 Condenser inlet tube
15 Receiver
16 Screw (2)
17 Flat washer (2)
18 Bracket
19 Receiver inlet tube
20 Subcooler inlet tube
21 Subcooler outlet tube
22 Refrigeration flare nut
23 Filter-drier
24 Refrigeration flare nut
25 Filter-drier outlet tube
26 Pressure relief valve inlet tube
27 Solder joint to straight pipe thread adapter
28 Pressure relief valve
29 Filter-drier to liquid quench valve tube
30 Solenoid valve inlet tube
31 Solenoid valve
32 Solenoid valve outlet tube
33 Gronmmet
34 Refrigerant liquid sight indicator inlet tube
35 Refrigerant liquid sight indicator
36 Thermostatic expansion valve inlet tube
37 Thermrostatic expansion valve
38 Thermostatic expansion valve remote bulb tubing
39 Thermostatic expansion valve external equalizer tube
40 Evaporator inlet distributor
41 Evaporator outlet manifold tube
42 Evaporator outlet tube
43 Grommet
44 Refrigerant return thru-bulkhead tube
45 Refrigerant return tube
46 Compressor inlet tube
47 Insulation tubing
48 Insulation tape
49 Hot gas by pass valve inlet tube
60 Hot gas by pass valve
51 Hot gas by pass valve outlet tube
52 Hot gas by pass valve pilot tube
53 High-low pressure switch
54 High-low pressure switch high pressure pilot tube
55 High-low pressure switch low pressure pilot tube
56 Charge valve
57 Charge valve outlet tube
58 Compressor inlet pilot tube
59 Pilot tube to low pressure pilot lines tube
60 Compressor outlet to high pressure pilot line tube
61 Liquid quench valve
62 Liquid quench valve remote bulb tubing
68 Liquid quench inlet tube
64 Liquid quench valve outlet tube
65 Liquid quench valve and hot gas by pass valve to compressor inlet refrigerant return tube

Figure 7-3--Continued.

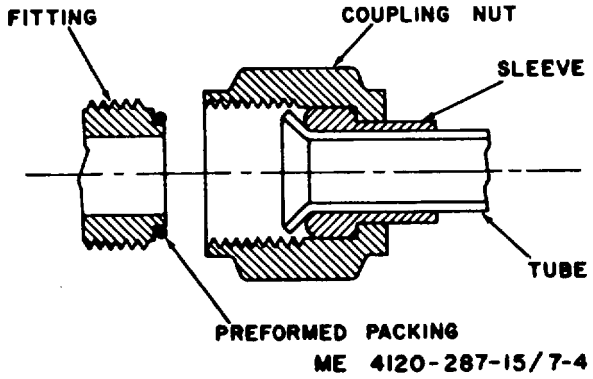


Figure 7-4. Preformed packing application in flared joints.

Section III. REPAIR OF REFRIGERANT SYSTEM VALVES

7-17. General

a. The rebuilding and/or replacement of the refrigerant control valves and high-low pressure switch are discussed in this section. The valves discussed are: the solenoid valve, liquid quench valve, hot gas bypass valve, the thermostatic expansion valve, and pressure relief valve.

b. Since the valve bodies do not generally require replacement, the valves are rebuilt in

the air conditioner; thus precluding the necessity of unbrazing and brazing the valve bodies from their associated air conditioner tubing.

7-18. Solenoid Valve

a. Discharge refrigerant system in accordance with paragraph 7-7.
b. Disassemble solenoid valve (31, fig. 7-3) in numerical sequence as illustrated in figure 7-5.
c. Reassembly solenoid valve, using new components, in reverse of numerical sequence as illustrated in figure 7-5.
d. Recharge refrigerant system in accordance with paragraph 7-8 and 7-9.
e. Check for refrigerant leakage in accordance with paragraph 7-6.

7-19. Liquid Quench Valve

a. Discharge refrigerant system in accordance with paragraph 7-7.
b. Disassemble liquid quench valve (61, fig. 7-3) in numerical sequence as illustrated in figure 7-6.

NOTE

Remove tape insulation and clamps, holding remote sensing bulb to refrigerant return tube (45, fig. 7-3) and remove bulb and its associated tubing with valve power head.

c. Reassemble liquid quench valve, using new components, in reverse of numerical sequence as illustrated in figure 7-6.

d. Clamp, insulate and tape remote sensing bulb to refrigerant return tube (45, fig. 7-3) and clamp remote sensing bulb tubing, using existing clamps.
e. Recharge refrigerant system in accordance with paragraphs 7-8 and 7-9.
f. Check for refrigerant leakage in accordance with paragraph 7-6.

7-20. Hot Gas Bypass Valve

a. Discharge refrigerant system in accordance with paragraph 7-7.
b. Disassemble hot gas bypass valve (50, fig. 7-3) in numerical sequence as illustrated in figure 7-7.
c. Reassemble the hot gas bypass valve, using new components, in reverse of numerial sequence as illustrated in figure 7-7.
d. Recharge refrigerant system in accordance with paragraphs 7-8 and 7-9.
e. Check for refrigerant leakage in accordance with paragraph 7-6.

7-21. Thermostatic Expansion Valve

a. Discharge refrigerant system in accordance with paragraph 7-7.
b. Disassemble thermostatic expansion valve (37, fig. 7-3) in numerical sequence as illustrated in figure 7-8.

NOTE

Remove tape insulation and clamps holding remote sensing bulb to evaporate outlet tube (42, fig. 7-3) and remove bulb with valve power head.

c. Reassemble thermostatic expansion valve, using new components, in reverse of numerical sequence as illustrated in figure 7-8.
d. Clamp, insulate and tape remote sensing bulb to evaporator outlet tube (42, fig. 7-3) and clamp remote sensing bulb tubing using existing clamps.
e. Recharge refrigerant system in accordance with paragraphs 7-8 and 7-9.
f. Check for refrigerant leakage in accordance with paragraph 7-6.

7-22. Pressure Relief Valve

a. Discharge refrigerant system in accordance with paragraph 7-7.
b. Remove pressure relief valve (28, fig. 7-3) and replace with a new valve in accordance with paragraph 7-15b.
c. Recharge refrigerant system in accordance with paragraphs 7-8 and 7-9.
d. Check for refrigerant leakage in accordance with paragraph 7-6.

7-23. Valve Body Replacement

When necessary to replace a valve body, perform the following:

a. Discharge and purge refrigerant system in accordance with paragraphs 7-7 and 7-8.

b. Disassemble valve so that only the valve body is connected to its associated tubing.
c. Unbraze valve body in accordance with paragraph 7-14a.
d. Install a new valve body in accordance with paragraph 7-14b.
e. Reassemble valve.
f. Charge refrigerant system in accordance with paragraphs 7-8 and 7-9.
g. Check for refrigerant leakage in accordance with paragraph 7-6.

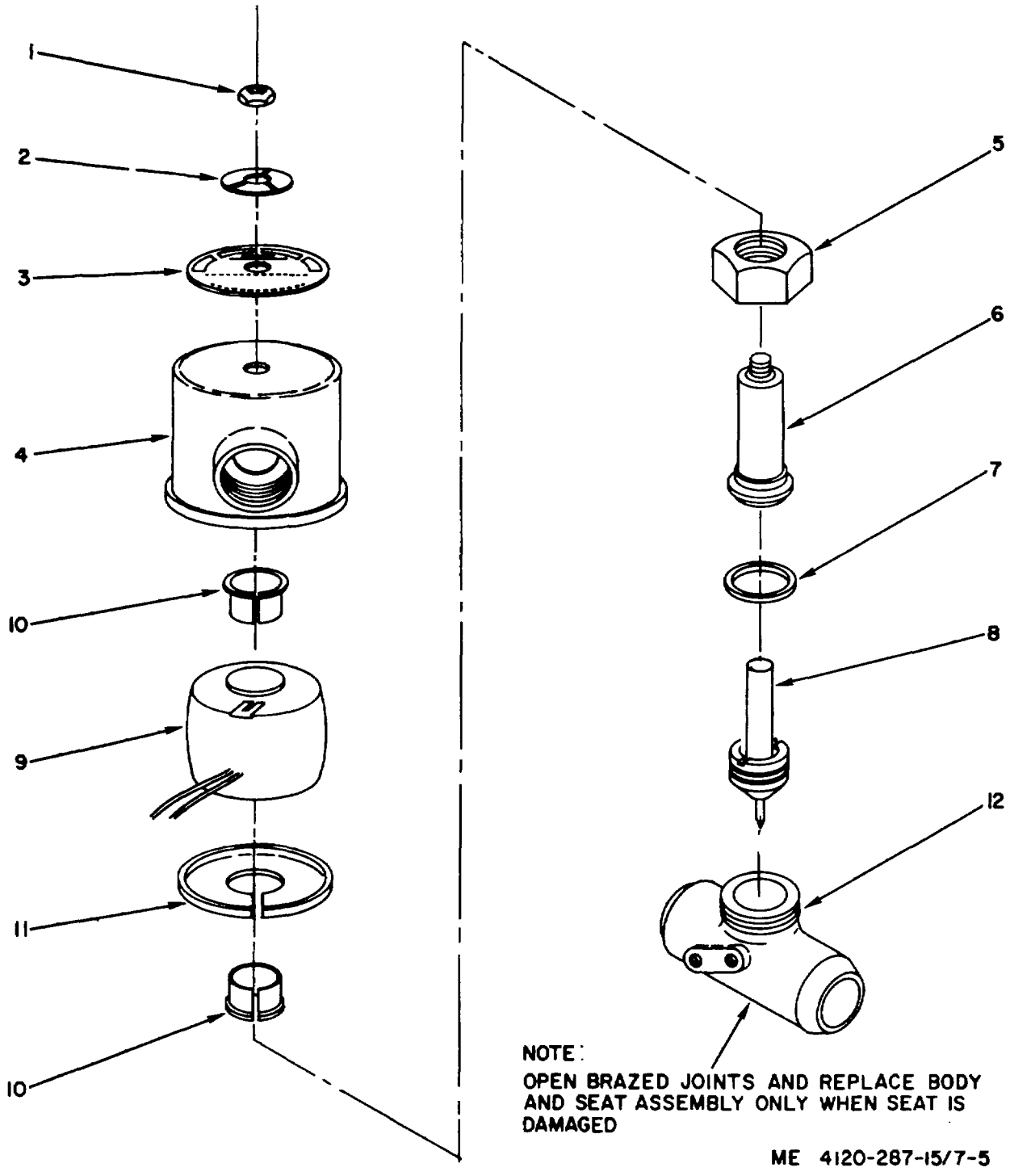
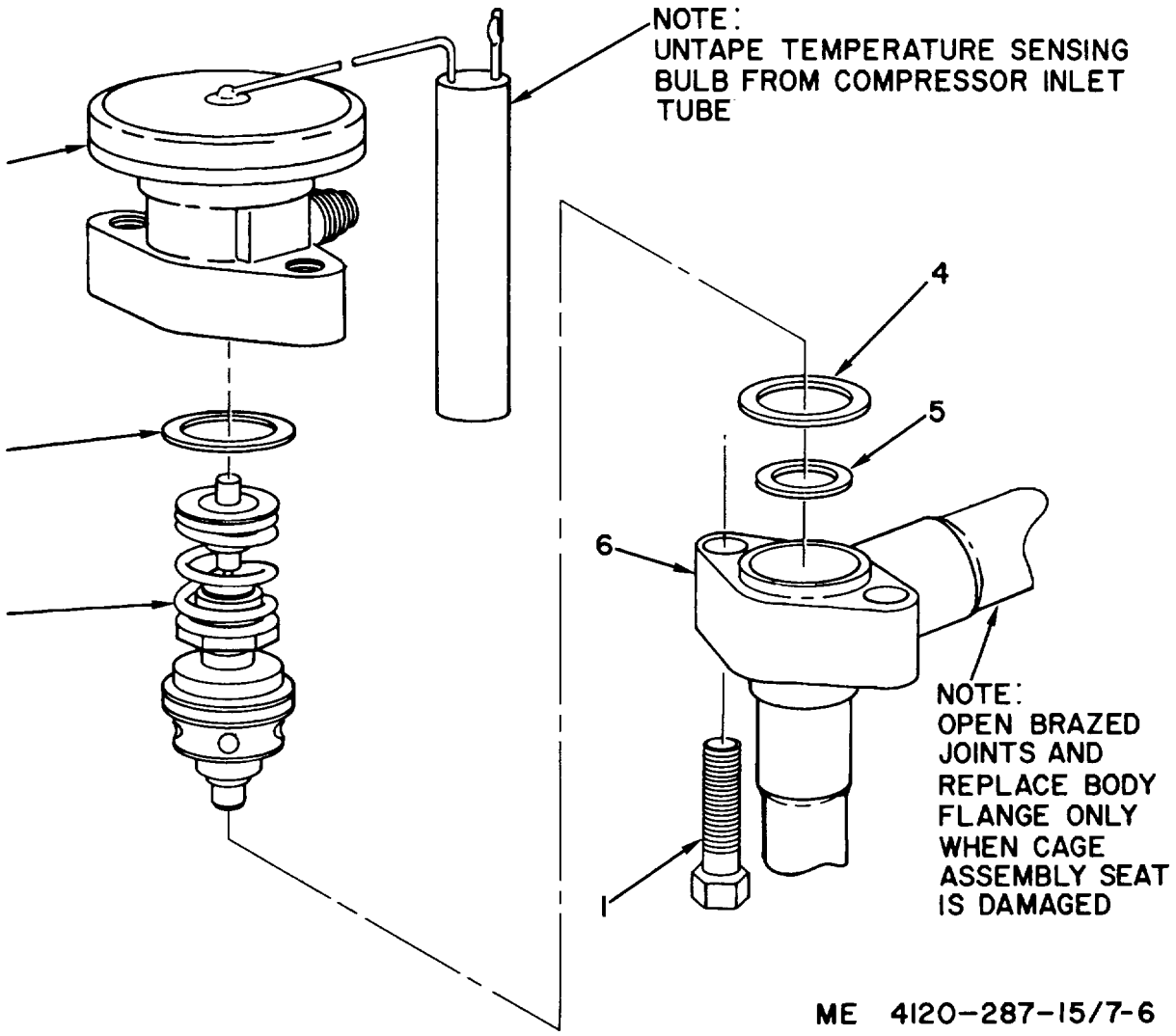


Figure 7-5. Solenoid valve disassembly, exploded view.

1 Coil housing nut
2 Coil name plate
3 Valve name plate
4 Coil housing assembly
5 Union nut
6 Enclosing tube assembly
7 Enclosing tube-to-body gasket
8 Plunger and piston assembly
9 Coil assembly
10 Coil sleeve (2)
11 Coilplate
12 Body and seat assembly

Figure 7-5--Continued.



1 Body flange cap screw (2)
2 Power assembly
3 Cage assembly
4 Body flange gasket (2)
5 Seat gasket
6 Body flange

Figure 7-6. Liquid quench valve disassembly, exploded view.

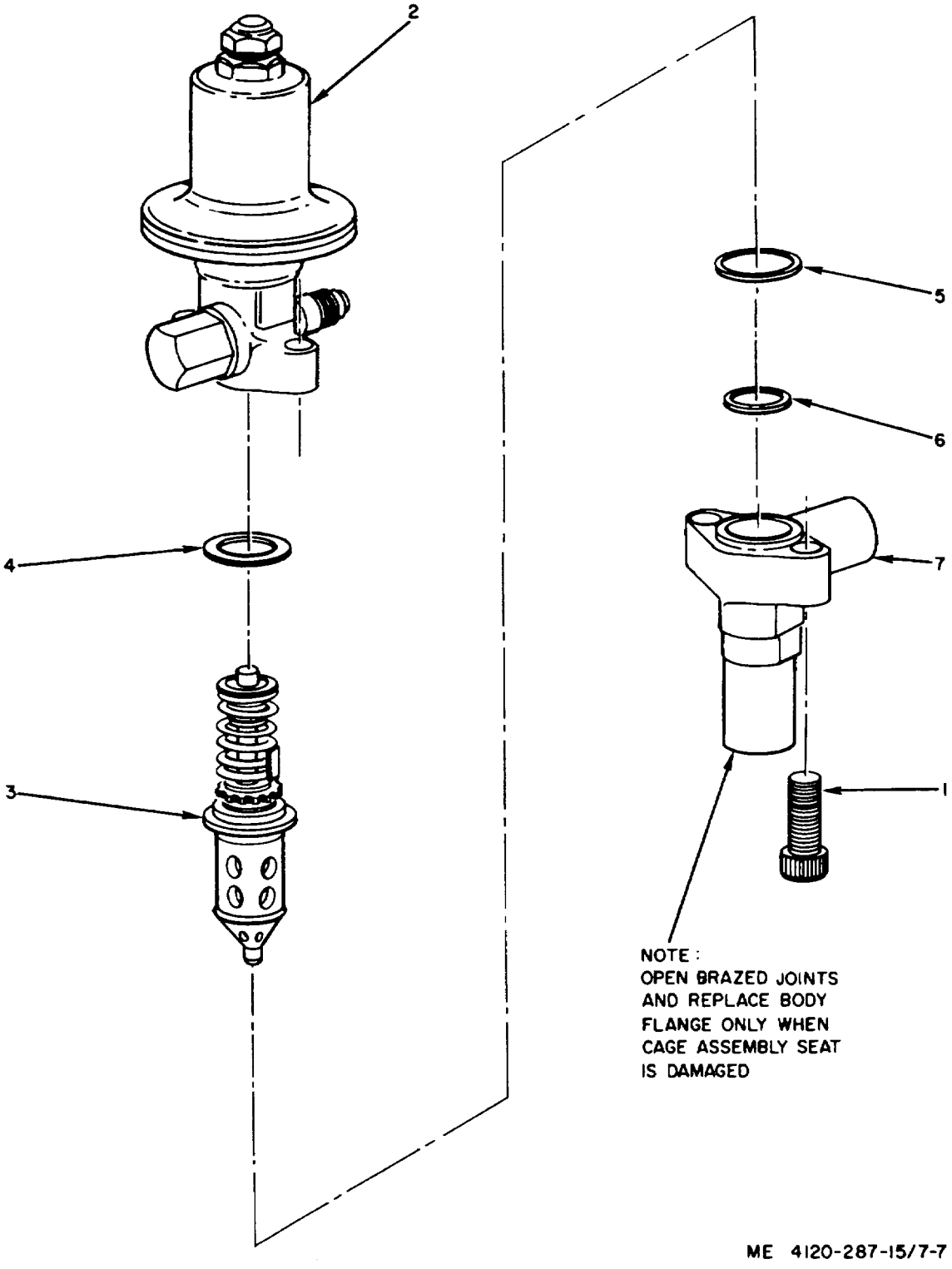
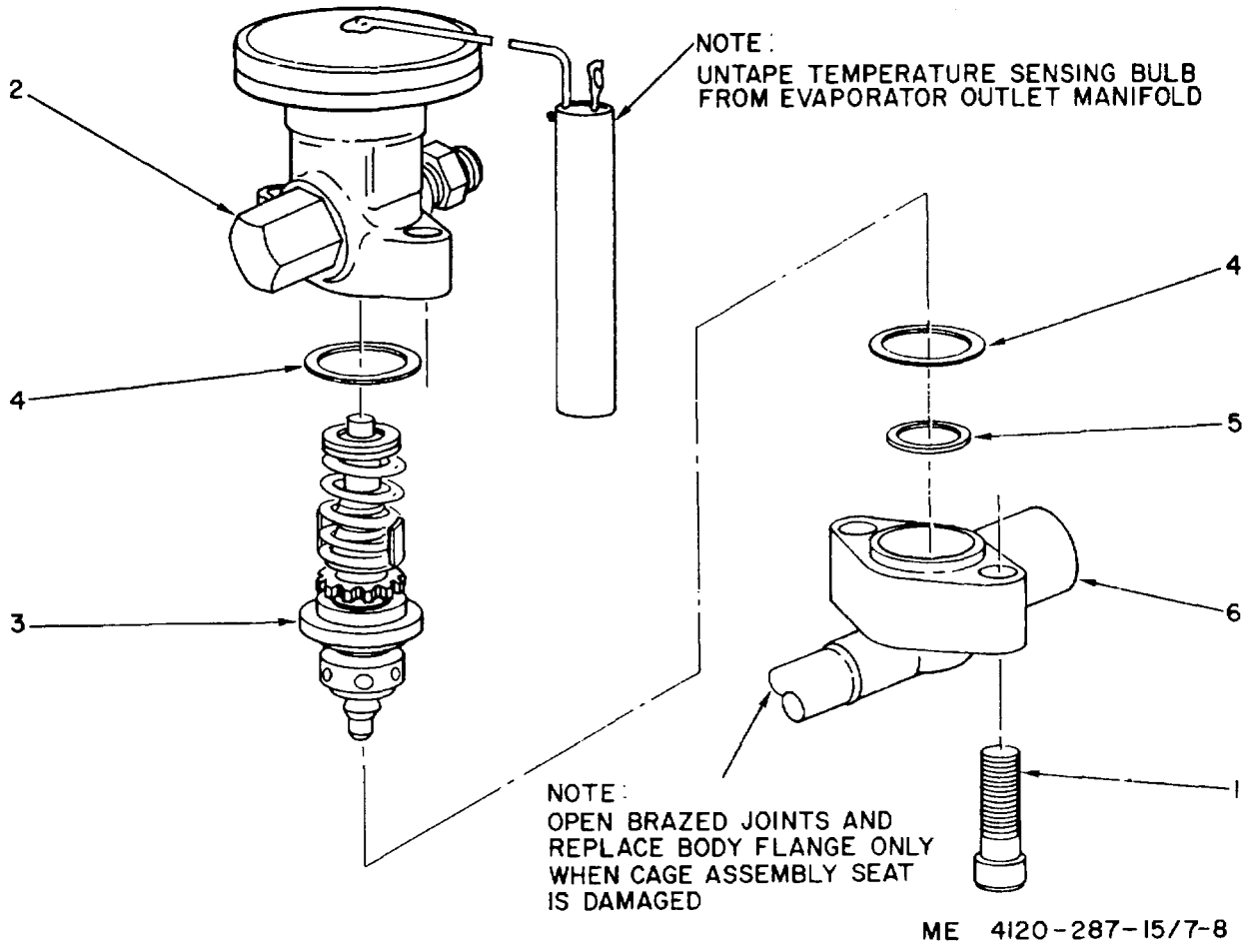


Figure 7-7. Hot gas bypass valve disassembly, exploded view.

1 Body flange cap screw (2)
2 Body and case assembly
3 Cage assembly
4 Body flange gasket
5 Body flange gasket
6 Seat gasket
7 Body flange

Figure 7-7-Continued.



1 Body flange cap screw (2)
2 Power assembly (includes external bulb)
3 Cage assembly
4 Body flange gasket (2)
5 Seat gasket
6 Body flange

Figure 7-8. Thermostatic expansion valve disassembly, exploded view.

APPENDIX A

REFERENCES

A-1. Fire Protection

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

A-2. Painting

TM 9-213	Painting Instructions for Field Use

A-3. Maintenance

TM 38-750	Army Equipment Record Procedures
TM 5-764	Electric Motor and Generator Repair
TM 5-4120-287-25P	Organizational, DS, GS, & Depot Maintenance Repair Parts and Special Tool List

A-4. Shipment and Storage

TB 740-93-2	Preservation of USAMEC Mechanical Equipment ,for Shipment and Storage
TB 740-93-3	Administrative Storage of USAMEC Mechanical Equipment

APPENDIX B

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

B-1. Scope

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

b. Maintenance Operating Supplies - Section, III. A listing of maintenance and operating supplies required for initial operation. (NOT APPLICABLE)

B--3. Explanation of Columns

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

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

NOTE

Common hardware items known to be readily available in Army supply will be assigned Maintenance Codes only. Source Codes, Recoverability Codes, and Quantity Authorized will not be assigned to this category of items.

(1) Source Code, indicates the selection status and source for the listed item. Source code is:

Code	Explanation
P	Applied to repair parts which are stocked in or supplied from GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.

(2) Maintenance Code, indicates the lowest category of maintenance authorized to install the listed item.

Code	Explanation
C	Operator/crew
O	Organizational maintenance

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

(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 of the item required. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parentheses. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

(d). Unit of Issue, Column (4). This column indicates the unit used as a basis for 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 functional group.

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

(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.

Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal Stock number	(3) Description	(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.
PC		GROUP 31--BASIC ISSUE ITEMS MANUFACTURER INSTALLED 3100--BASIC ISSUE ITEMS-MANUFACTURER OR DEPOT INSTALLED							
PC	7520-559-9618	CASE MAINTENANCE AND OPERATIONAL MANUAL: Cotton duck, water repellent, mildew resistant	--	--	--	1	1		
PC		DEPARTMENT OF THE ARMY OPERATOR, ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL TM 5-4120-287-15 3200-BASIC ISSUE ITEMS, TROOP INSTALLED OR AUTHORIZED	--	--	--	1	1		
PO	4130-860-0042	OIL, FILTER: Water soluble	--	--	--	--	1		
PO	8040-273-8717	ADHESIVE: 1 pt can	--	--	--	--	1		

APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

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

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. 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 illustrations required for a particular maintenance function.

C-2. Explanation of Columns in Section II

a. Group Number, Column (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 other.

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 indicates 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 - Lain. To adjust specified variable elements 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 to a standard as nearly as possible to original or new condition 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 tolerances and specifications, and subsequent 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 (sect. II).

e. Remarks, Column (5). This column is provided for referencing by code the remarks (sect. IV) pertinent to the maintenance functions.

C-3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T and 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 though K on the MAC.

b. Maintenance Level. 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 Stock 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.

Section II. MAINTENANCE ALLOCATION CHART

(1)	(2)	(3) MAINTENANCE FUNCTIONS											(4)	(5)
GROUP NO.	FUNCTIONAL GROUP	A INSPECT	B TEST	C SERVICE	D ADJUST	E ALIGN	F CALIBRATE	G INSTALL	H REPLACE	I REPAIR	J OVERHAUL	K REBUILD	TOOLS AND EQUIPMENT	REMARKS
18	BODY, CAB, HOOD HULL													
1801	Body, Cab, Hood, Hull Assy:													
	Cabinet.....	F								H				A
	Panel assemblies	F							F	F				B
	Panel air filter access	O						O	O	O				C
	Fresh air door linkage.....	O							F					
	Condenser air exhaust door.....	O								O				D

(1)	(2)	(3) MAINTENANCE FUNCTIONS											(4)	(5)
GROUP NO.	FUNCTIONAL GROUP	A INSPECT	B TEST	C SERVICE	D ADJUST	E ALIGN	F CALIBRATE	G INSTALL	H REPLACE	I REPAIR	J OVERHAUL	K REBUILD	TOOLS AND EQUIPMENT	REMARKS
22	BODY, CHASSIS OR HULL AND ACCESSORY ITEMS													
2210	Data Plates:													
	Plates data	O							F					
40	ELECTRIC MOTORS													
4000	Motor Assembly:													
	Motor evap fan		F						F	H				
4018	Terminal Block:													
	Clamps; connectors and grommets	F		F					F					
	Receptacle, remote control	O							F					
42	ELECTRICAL EQUIPMENT													
4202	Electrical Controls:													
	Tray, electrical	F	F						F	F				
	Control Box, remote	O	O						O	O				
4203	Circuit Breakers, Fuse and Fuse Holders:													
	Fuseholder	O							O					
	Circuit breakers	F	F						F					
	Switches, reset & overheat		F						F					
	Relays		F						F					
4205	Control Resistances:													
	Resistor, variable	O		O					O					
4211	Power Receptacles:													
	Main power receptacle	F	F						F					
4212	Heating Units:													
	Heater elements	F	F						F					
4213	Non-Rotating Rectifiers:													
	Converters:													
	Rectifier		F						F					
	Power transformer		F						F					
4216	Miscellaneous Wiring and Fittings:													
	Wiring harness	F	F						F					
	Wiring harness remote	O	O						O					
52	REFRIGERATION AND AIR CONDITIONING COMPONENT													
5200	Gas Compressor Assembly:													
	Motor compressor assy	F	F						F	D	D		1	E
5217	Refrigerant Piping:													
	Tube assemblies; valve, hot-gas bypass		F						F	F				F
	Valve, liquid quench; solenoid		F						F					
	Valve, pressure relief		F						F					
	Filter drier	F							F					
	Valve, thermoexpansion	F							F					
5230	Condenser:													
	Condenser subcooler	F	F	O					F	F				G
	Assembly	F	F	O					F	F				

(1)	(2)	(3) MAINTENANCE FUNCTIONS											(4)	(5)
GROUP NO.	FUNCTIONAL GROUP	A INSPECT	B TEST	C SERVICE	D ADJUST	E ALIGN	F CALIBRATE	G INSTALL	H REPLACE	I REPAIR	J OVERHAUL	K REBUILD	TOOLS AND EQUIPMENT	REMARKS
5241	Evaporator:													
	Evaporator assembly.....	F	F	O					F	F				H
5243	Blower Assembly:													
	Fan assemblies	F	F						F	H		D		
5244	Thermostatic Controls:													
	Thermostat		O											
5245	Air Filters:													
	Clip, mounting	O							O					
	Filter	O		O					O	O				
	Mist eliminator	F		F					F	F				

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

REFERENCE CODE	MAINTENANCE LEVEL	NOMENCLATURE	TOOL NUMBER
1-J	D	Holding fixture (96193) HF26664-T-11 Torque adapter (96193) TA26664-T-10 Holding fixture (96193) HF22395-T-3 Press rod (96193) PR26664-T-4 Press tool (96193) PT26664-T-2 Holding fixture (96193) HF26664-T-1 Holding fixture (96193) HF26664-T-3 Torque adapter (96193) TA26664-T-9	

Section IV. REMARKS

Reference code	Remarks
A-1	Straighten weld or patch pierced panels
B-1	Replace gasket or insulation
C-1	Replace gasket or insulation
D-1	Replace gasket or insulation
E-H	Replace motor compressor assembly after 4000 hours of operation. The motor compressor will be repaired when required and/or overhauled every 4000 hours by designated depots only. Report to USAMECOM for disposition. Seal all open ports of compressor being replaced immediately after removal from air conditioner, use sealing plugs (2), cap and plate removed from compressor being installed. Preformed packing (0-ring) on discharge and suction ports of replaced compressor will be used with cap and plate above. Fill out and attach DA Form 2402, exchange tag to motor compressor assembly
E-I	USAMECOM designated depots only
E-J	USAMECOM designated depots only
F-I	Repair leaks
G-I	Repair leaks, straighten fins
H-I	Repair leaks, straighten fins

INDEX

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
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Chief of Staff.

Official:

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