TECHNICAL MANUAL

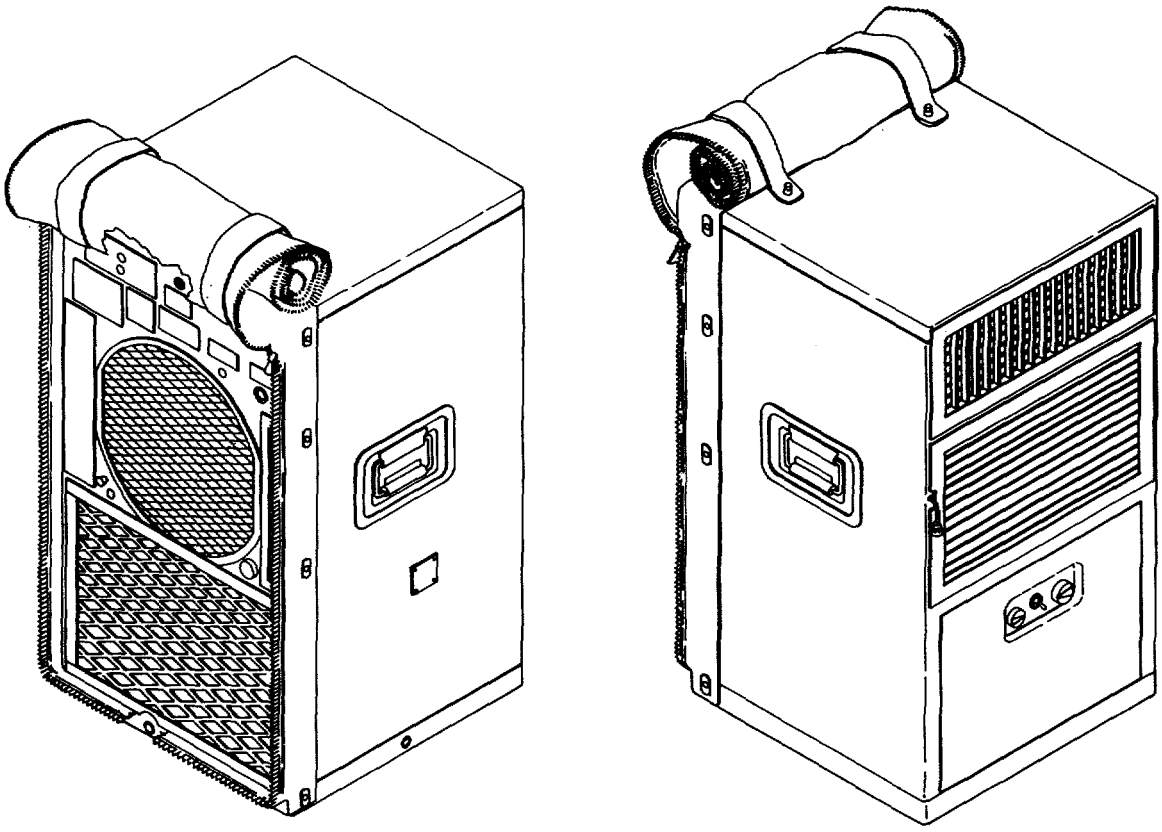
OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

This copy is a reprint, which includes current pages from Changes 1 though 3.

AIR CONDITIONER, VERTICAL COMPACT, 9,000 BTU/HR, 208 VOLTS, 3-PHASE, 50/60 HZ

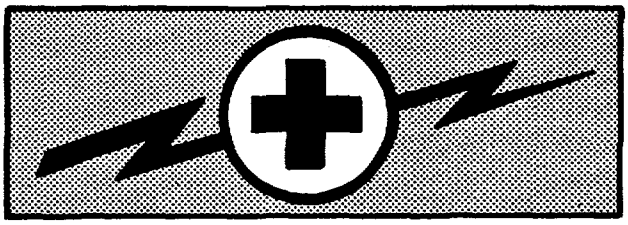
TIERNAY MODEL TM9KV-208-3-60

NSN 4120-01-091-9672



HEADQUARTERS, DEPARTMENT OF THE ARMY
23 OCTOBER 1981

WARNING



WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

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

WARNING

REFRIGERANT UNDER PRESSURE

is used in the operation of this equipment.

DEATH

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

WARNING

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

WARNING

Clean parts in a well-ventilated area. Avoid inhalation of solvent fumes and prolonged exposure of skin-to cleaning solvent. Wash exposed skin thoroughly. Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100F to 138F (38C to 59C). Wear eye protection when blowing solvent from parts. Air pressure should not exceed 30 psig ($2.1 Kg/cm^2$).

CHANGE

NO. 3

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND AIR FORCE
WASHINGTON, D.C., 1 JULY 1992

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

AIR CONDITIONER, VERTICAL COMPACT
9,000 BTU/HR, 208 VOLTS, 3 PHASE, 50/60 HZ
TIERNAY MODEL TM9KV-208-3-60
NSN 4120-01-091-9672

Approved for public release; Distribution is unlimited

TM 5-4120-339-14/TO 35E9-253-1, 23 October 1981 is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
4-9 through 4-14	4-9 through 4-14
B-7 and B-8	B-7 and B-8

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretaries of the Army and Air Force:

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

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
01625

MERRILL A. McPEAK
General, USAF
Chief Staff

Official:

CHARLES C. McDONALD
General, USAF
Commander, Air Force Logistics Command

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25E, (qty rqr block no. 0169).

TM 5-4120-339-14
TO 35E9-253-1
C2

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 25 October 1989

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

AIR CONDITIONER, VERTICAL COMPACT
9,000 BTU/HR, 208 VOLTS, 3-PHASE, 50/60 HZ
TIERNAY MODEL TM9KV-208-3-60
NSN 4120-01-091-9672

Approved for public release; distribution is unlimited.

TM 5-4120-339-14, 23 October 1981, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
B-7/B-8	B-7 and B-8

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

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

Official:

WILLIAM J. MEEHAN, II
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25A, Operator's, Unit, Direct Support and General Support Maintenance requirements for Air Conditioner, Vertical Compact, 9,000 BTU, 208V, 50/60HZ, 3PH, TM9KV-208-3-60.

CHANGE
NO. 1

HEADQUARTERS, DEPARTMENTS OF
THE ARMY AND THE AIR FORCE
WASHINGTON, D.C., 9 MAY 1988

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

**AIR CONDITIONER, VERTICAL COMPACT,
9,000 BTU/HR, 208 VOLTS, 3-PHASE, 50/60 HZ**

**TIERNAY MODEL TM-9KV-208-3-60 NSN 4120-01-091-9672
KECO MODEL F9000T3-2 NSN 4120-01-264-6295**

TM 5-4120-339-14, 23 October 1981, is changed as follows:

1. The U.S. Air Force Number TO 35E9-253-1, is being added to this manual. All future change pages or revisions will include the U.S. Air Force.

2. Title is changed as shown above.

3. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
---	1-2.1/1-2.2
3-15 and 3-16	3-15 and 3-16
3-19 through 3-22	3-19 through 3-22
----	3-22.1/3-22.2
4-17 through 4-20	4-17 through 4-20
A-1/A-2	A-1/A-2

4. Retain this sheet in front of manual for reference purposes.

By Order of the Secretaries of the Army and the Air Force:

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

Official:

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

LARRY D. WELCH, *General USAF*
Chief of Staff

Official:

ALFRED G. HANSEN
General, USAF, Commander, Air Force
Logistic Command

To be distributed in accordance with DA Form 12-25A, Operator's, Unit, Direct Support and General Support Maintenance requirements for Air Conditioner, Vertical Compact, 9,000 BTU, 208V, 50/60HZ, 3PH (TM9KV-208-3-60).

TECHNICAL MANUAL

No. 5-4120-339-14

HEADQUARTERS, DEPARTMENTS OF
THE ARMY AND THE AIR FORCE
WASHINGTON, D.C., 23 October 1981

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

Air Conditioner, Vertical Compact,
9,000 BTU/HR, 208 volt, 3-phase, 50/60 Hz.
MODEL TM9KV-208-3-60 NSN 4120-01-091-9672
MODEL F9000T3-2 NSN 4120-01-264-6295

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Reports shall be submitted as follows: A reply will be furnished to you. (A) Army - DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to Commander, U. S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798.
(F) Air Force - AFTO Form 22 directly to: Commander, Sacramento Air Logistics Center, ATTN: MMST, McClellan Air Force Base, CA 95652 in accordance with TO-00-5-1.

List of Illustrations

CHAPTER 1

INTRODUCTION

Section I. General

1-1. SCOPE.

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

b. Model Number and Equipment Name: TM9KV-208-3-60 or F9000T3-2 Air Conditioner, Multi-Purpose, 9000BTU/HR.

c. Purpose of Equipment: The Air conditioner can be used in temporary buildings, shelters, mobile vans and trailers. The unit accomplishes three functions cooling, heating and ventilation.

1-2. MAINTENANCE FORMS AND RECORDS.

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

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

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

1-4. PREPARATION FOR STORAGE OR SHIPMENT.

Seal all openings in the air conditioner cabinet with barrier material and sealing tape. Cover the entire cabinet with a protective barrier material. Store air conditioner in a dry, dust-free space. Storage of the air conditioner shall be in accordance with the following:

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

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

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

1-5. RADIO INTERFERENCE SUPPRESSION.

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

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRS).

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

1-7. HAND RECEIPT.

Hand receipts for Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) items are published in a Hand Receipt manual, TM 5-4120-339-14HR. This manual is published to aid in property accountability and is available through Commander, U.S. Army Adjutant General Publications Center, 2800 Eastern Blvd., Baltimore, MD 21220.

Section II. Equipment Description

1-8. EQUIPMENT PURPOSE.

The 9,000BTU/HR air conditioner is used primarily in van type enclosures. The unit accomplishes three functions: ventilating, cooling and heating.

1-9. CAPABILITIES AND FEATURES.

The air conditioner is semi-portable and has a capacity of 9,000 BTU/HR. The unit operates on 208 volts, 3-phase, 50/60 Hz power. Intake air for cooling and heating enters into the unit in either of two modes: 100 percent recirculated air, or partially recirculated air and partially fresh outside air. Air may be drawn directly from outside, or may be filtered if the unit is provided with a chemical biological filter unit. The unit is equipped with an air conditioner cover which is used for protection of the condenser coil and fan when the air conditioner is not in operation.

1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

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

1-11. DIFFERENCES BETWEEN MODELS.

This manual was prepared for the Tiernay Manufacturing model TM9KV-208-3-60 and Keco Industries, Inc. Model F9000T3-2 Air Conditioners. Differences between these two models are noted throughout this manual. Model TM9KV-208-3-60 has a condenser fan baffle and bracket that is not used on model F9000T3-2.

1-12. PERFORMANCE DATA.

Electrical Requirements:	208 volts, 50/60 Hz, 3-Phase	
Capacity:	9,000 BTU/HR	
Refrigerant Capacity:	3 pounds 5 ounces (1.48 kg) of refrigerant Specification BB-F-1421, Type 22	
Cabinet Dimensions:	Length:	17 inches (42cm)
	Width:	17 inches (42cm)
	Height:	32 inches (80cm)
	Weight:	180 pounds (81kg)

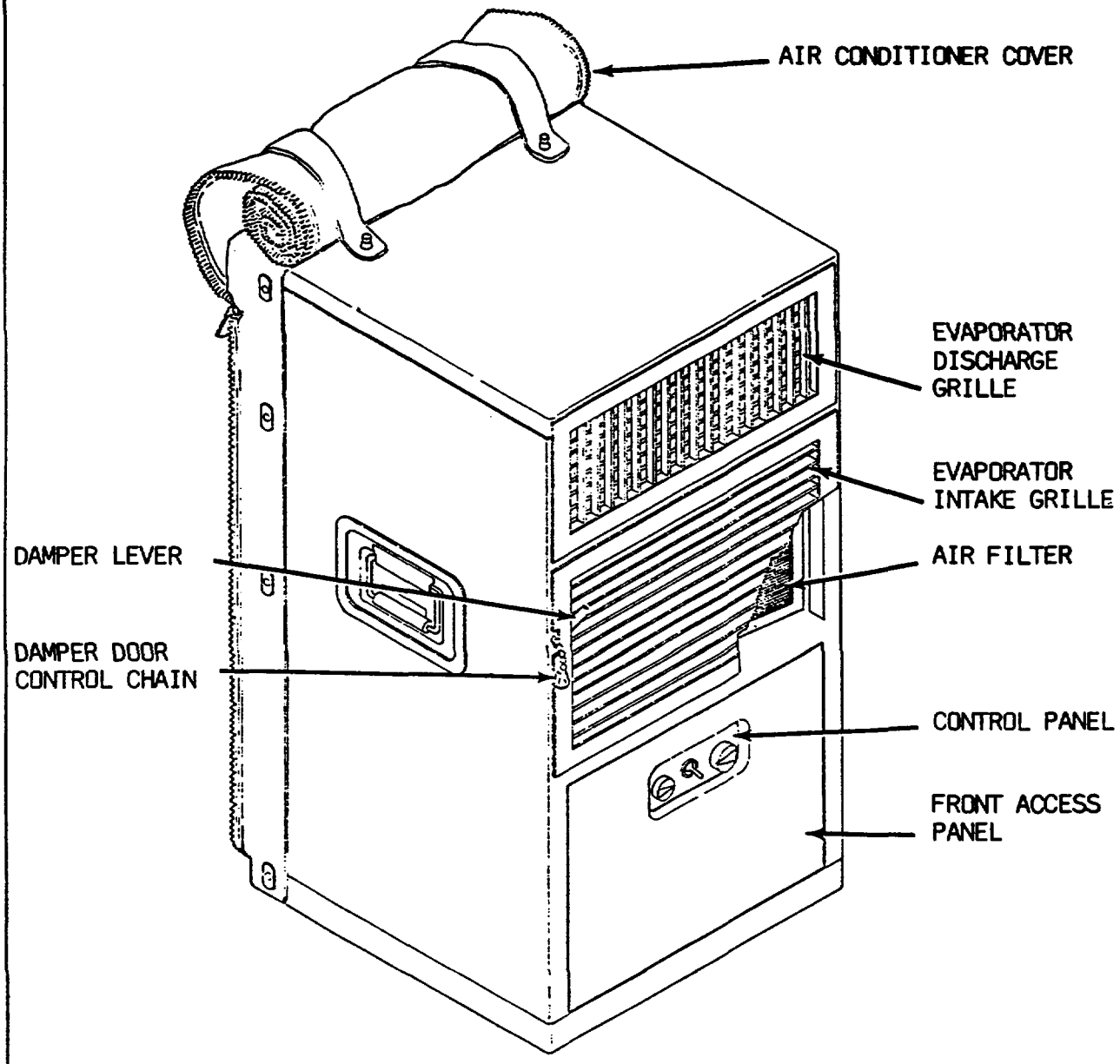


Figure 1-1. Right front three-quarter view of air conditioner

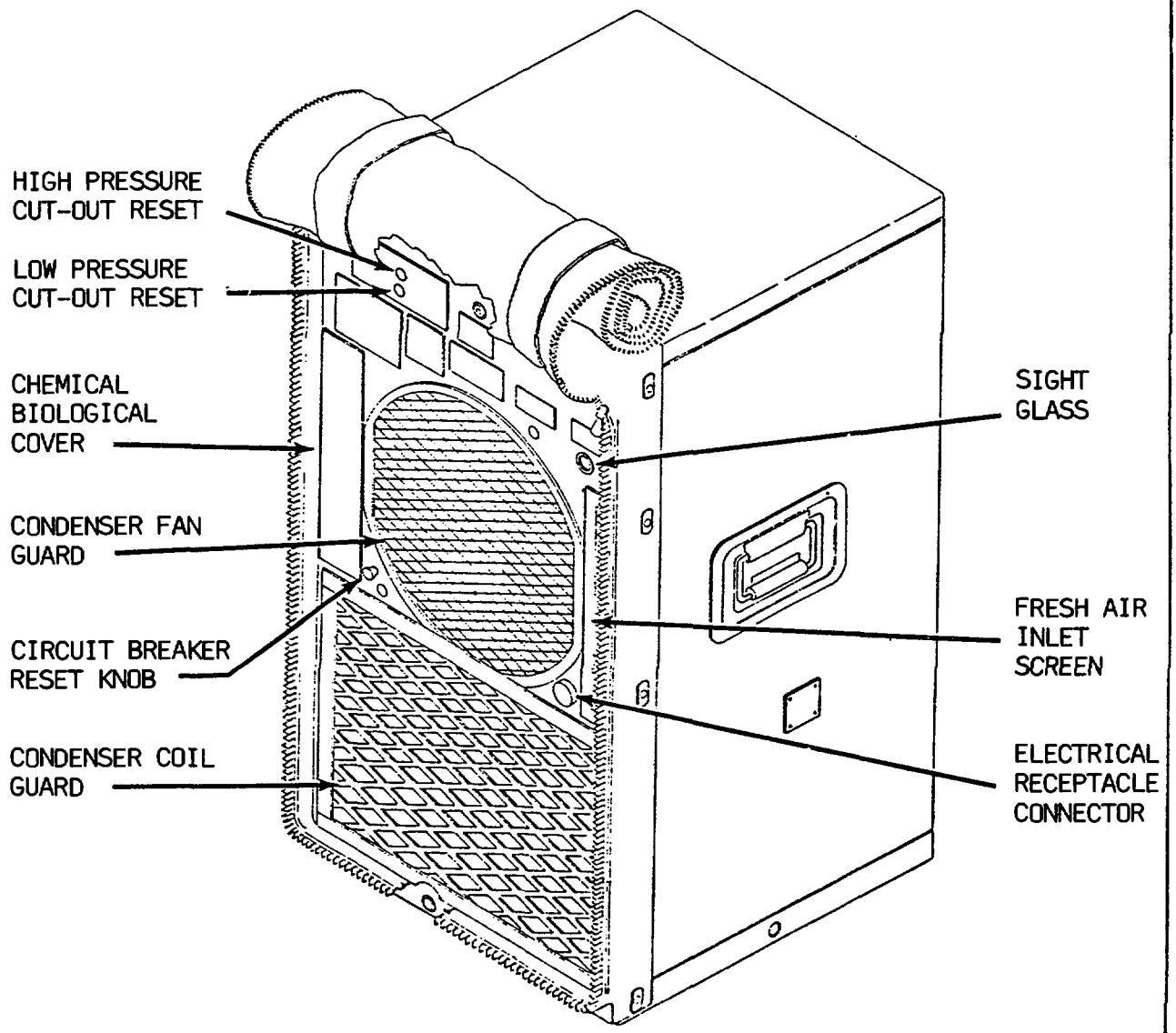
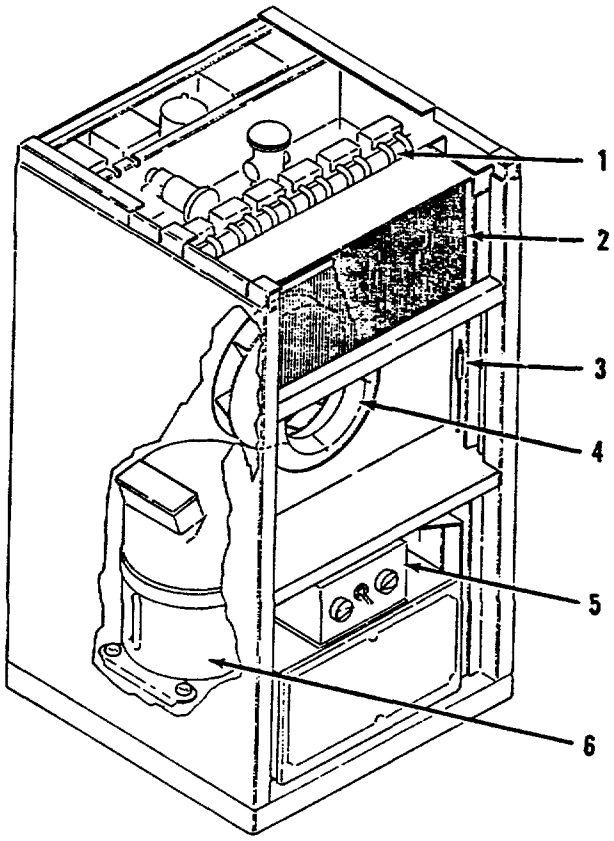


Figure 1-2. Right rear three-quarter view of air conditioner



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

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

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

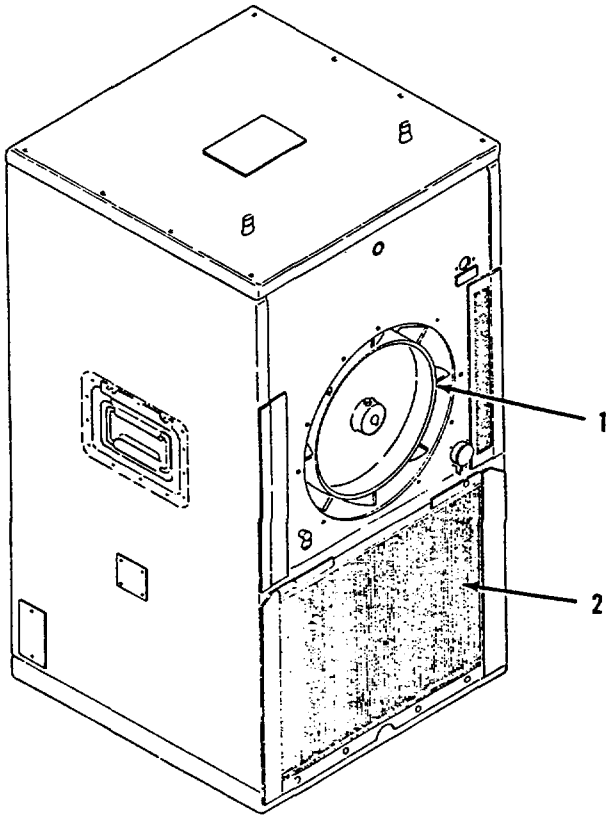
EVAPORATOR FAN (4). The evaporator fan draws air through an filter, over the evaporator coil mounted in the evaporator section, and exhausts it into the conditioned area.

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

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

TS5-4120-339-14/1-3

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



CONDENSER FAN (1). The condenser fan draws ambient air from outside. The air flow over the condenser coil and is exhausted to the outside.

CONDENSER COIL (2). Air drawn through the condenser coil by the condenser fan cools the refrigerant inside the condenser coil.

Figure 1-4. Right rear three-quarter view, location and description of major components

Section III. Technical Principles of Operation

1-13. PRINCIPLES OF OPERATION.

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

b. Cooling.

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

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

(3) The refrigerant, in a gaseous vapor state, is pumped by the compressor to the condenser coil. As the refrigerant flows through the condenser coil, the condenser fan draws outside air into the condenser coil area and exhausts it back outside. This action serves to change the refrigerant from the gaseous vapor state into the liquid state.

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

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

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

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

d. Ventilation. The fan motor starts when the selector switch is placed in the “VENTILATE” position. The evaporator fan draws air from the outside and blows it into the conditioned area.

CHAPTER 2

OPERATING INSTRUCTIONS

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

2-1. GENERAL.

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

Section II. Preventive Maintenance Checks and Services (PMCS)

2-2. GENERAL.

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

a. Before you operate: Perform your BEFORE (B) PMCS.

b. While you operate: Perform your DURING (D) PMCS.

c. If your air conditioner fails to operate, report it to Organizational Maintenance.

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

Perform weekly as well as before operations PMCS if:
(1) You are the assigned operator and have not operated the unit since the last weekly PMCS.
(2) You are operating the unit for the first time.

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B-BEFORE A-AFTER

D-DURING W-WEEKLY M-MONTHLY

ITEM NO.	INTERVAL					ITEM TO BE INSPECTED	PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	W	M			
1	●					Air Filter	Check for cleanliness	Clogged air filter restricting air flow
2		●				General Maintenance	Be alert for unusual noises or improper operation. If either condition is detected, notify organizational maintenance.	

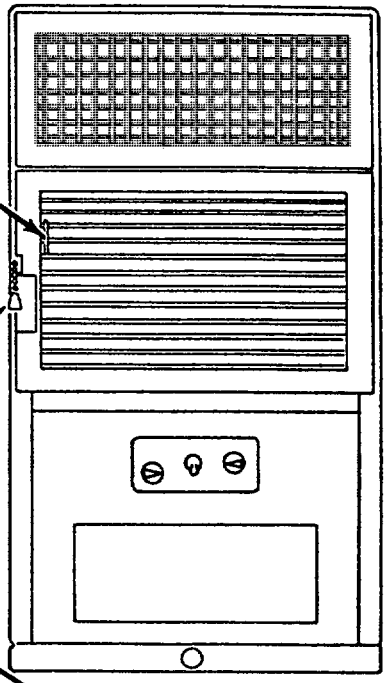
INTAKE GRILLE DAMPER
Controls flow of air from conditioned area to evaporator fan. Push damper down to limit to fully close intake grille. Damper may also be positioned between open and closed limits for partially opened intake grille.

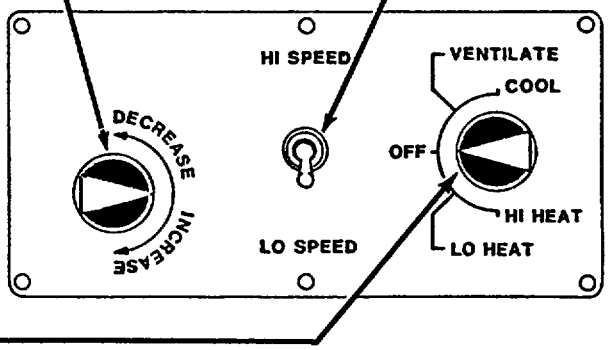
DAMPER DOOR CONTROL
Controls flow of outside air to evaporator fan. Door is spring-loaded open. Chain links latch in keyhole slot in panel. Pull chain out to close damper door. Release chain to open damper door. Door may be set at partially closed position by use of any of the chain links between open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

FAN SPEED SWITCH
Adjusts speed of fan motor to either high speed or low speed.

THERMOSTAT
Adjusts and maintains temperature of conditioned air entering conditioned space.

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





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

TO START UNIT:
1. FOR VENTILATION ONLY, TURN SELECTOR SWITCH TO "VENTILATE". ADJUST FAN SPEED SWITCH TO DESIRED SPEED. "HI-SPEED" OR "LO-SPEED".
2. FOR COOLING, TURN SELECTOR SWITCH TO "COOL" AND ADJUST THERMOSTAT TO DESIRED TEMPERATURE. ADJUST FAN SPEED SWITCH TO DESIRED SPEED, "HI-SPEED" or LO-SPEED"
3. FOR HEATING, TURN SELECTOR SWITCH TO EITHER "LO-HEAT" OR "HI-HEAT" AS DESIRED. ADJUST THERMOSTAT TO DESIRED TEMPERATURE. ADJUST FAN SPEED SWITCH TO DESIRED SPEED, "HI-SPEED" OR "LO-SPEED".
4. TO STOP UNIT, TURN SELECTOR SWITCH TO "OFF".

TS5-4120-339-14/2-1

Figure 2-1. Front view, operator's controls and indicators

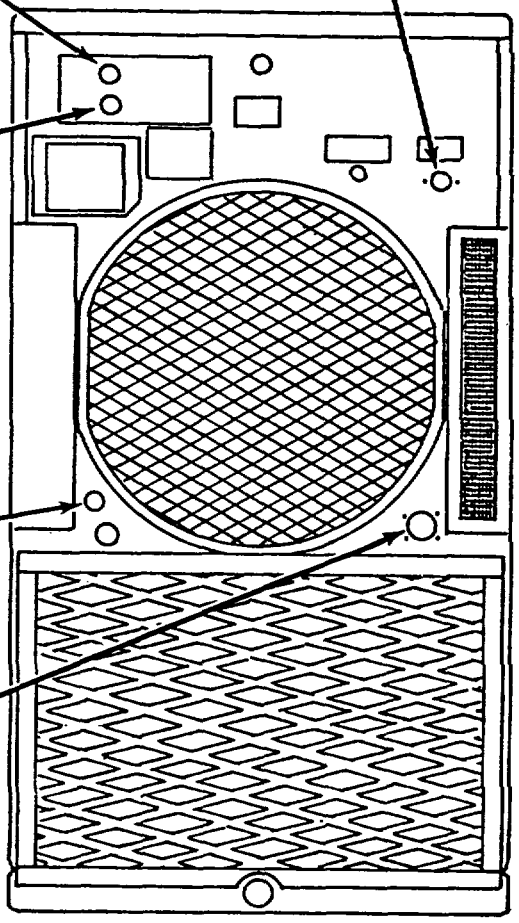
HIGH PRESSURE CUT-OUT RESET BUTTON
High pressure cut-out switch stops the unit if compressor discharge pressure rises above 460 psig (32.343 KS/Cm^2). To restart the unit, wait a few minutes for the pressure to decrease, then push the high pressure cut-out reset button.

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

LOW PRESSURE CUT-OUT REST BUTTON
Low pressure cut-out switch stops the unit if compressor suction pressure falls below 25 psig (1.758 KS/Cm^2). To restart the unit, wait a few minutes for the pressure to increase, then push the low pressure cut-out reset button.

CIRCUIT BREAKER KNOB
Circuit breaker cuts off electrical power to the unit in case of electrical power overload. To reset circuit breaker, first pull out, then push in circuit breaker knob.

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



TS5-4120-339-14/2-2

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

Section III. Operation Under Usual Conditions

2-3. GENERAL.

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

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

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

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

2-4. OPERATION.

a. Preparation for Starting.

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

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

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

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

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

(1) Cooling operation.

(a) Position thermostat for desired temperature.

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

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

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

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

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

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

(a) Position thermostat for desired temperature.

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

(c) Place selector switch on “L-HEAT" or “HI-HEAT" position.

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

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

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

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

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

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

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

NOTE

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

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

Section IV. Operation Under Unusual Conditions

2-5. OPERATION IN EXTREME COLD.

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

b. If cooling air is desired at ambient (outside) temperatures lower than 50°F (10°C), set the selector switch knob to “VENTILATE".

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

CAUTION

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

2-6. OPERATION IN EXTREME HEAT.

a. Extreme heat imposes an unusual load on the air conditioner. Do not set the selector switch to "COOL" if the ambient (outside) temperature is in excess of 120°F (49°C).

b. Extra precautions must be taken to assure that the condenser air flow is not hampered by obstructions of the air inlet grille. The condenser coil must be kept clean.

CAUTION

Do not restrict the flow of air at the intake and discharge openings of the unit. Restrictions of air flow at these openings may cause damage to the unit.

c. Excessive ambient (outside) heat can cause the high pressure cut-out switch to trip during initial pulldown. The reset button for the high pressure cut-out switch is located on the rear of the unit and is marked “HIGH PRESSURE CUTOUT". (Refer to figure 2-2.). A few minutes should be allowed to elapse before pushing the reset button to allow the system to cool down and lower the pressure.

2-7. OPERATION IN DUSTY OR SANDY AREAS.

a. In very dusty or sandy areas, care must be taken to keep the air filter, evaporator coil and condenser coil fins free of matter which would restrict the flow of air.

b. Coil fins should be inspected and cleaned when clogging is evident, using a fiber bristle brush.

c. The air filter should be removed from the unit and cleaned using a stream of fresh water.

2-8. OPERATION UNDER RAINY OR HUMID CONDITIONS.

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

2-9. OPERATION IN SALT WATER AREAS.

a. Exposure to salt water and air may cause corrosion of exposed metal surfaces.

b. Wash down the exterior of the unit with clean fresh water at frequent intervals. Take care not to damage electrical components with water.

c. Inspect the unit daily and clean the evaporator and condenser coil and the air filter as often as required to maintain proper operation.

2-10. OPERATION AT HIGH ALTITUDES.

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

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

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

3-1. COMMON TOOLS AND EQUIPMENT.

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

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

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

3-3. REPAIR PARTS.

Repair parts are listed and illustrated in the Repair Parts and Special Tools List TM 5-4120-339-24P covering Organizational Maintenance for this equipment.

Section II. Service Upon Receipt

3-4. ASSEMBLY AND PREPARATION FOR USE.

a. Unpacking.

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

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

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

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

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

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

(1) Remove the front, rear, and top panels from the unit and inspect

the air conditioner for physical damage to components and for oil leaks from the compressor. (Refer to paragraph 3-9 for panel removal.)

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

c. Installation.

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

(2) Position the unit in location desired.

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

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

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

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

3-5. PREPARATION FOR MOVEMENT.

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

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

Section III. Preventive Maintenance Checks and Services (PMCS)

3-6. GENERAL. Organizational Preventive Maintenance Checks and Services (PMCS) are contained in table 3-1.

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

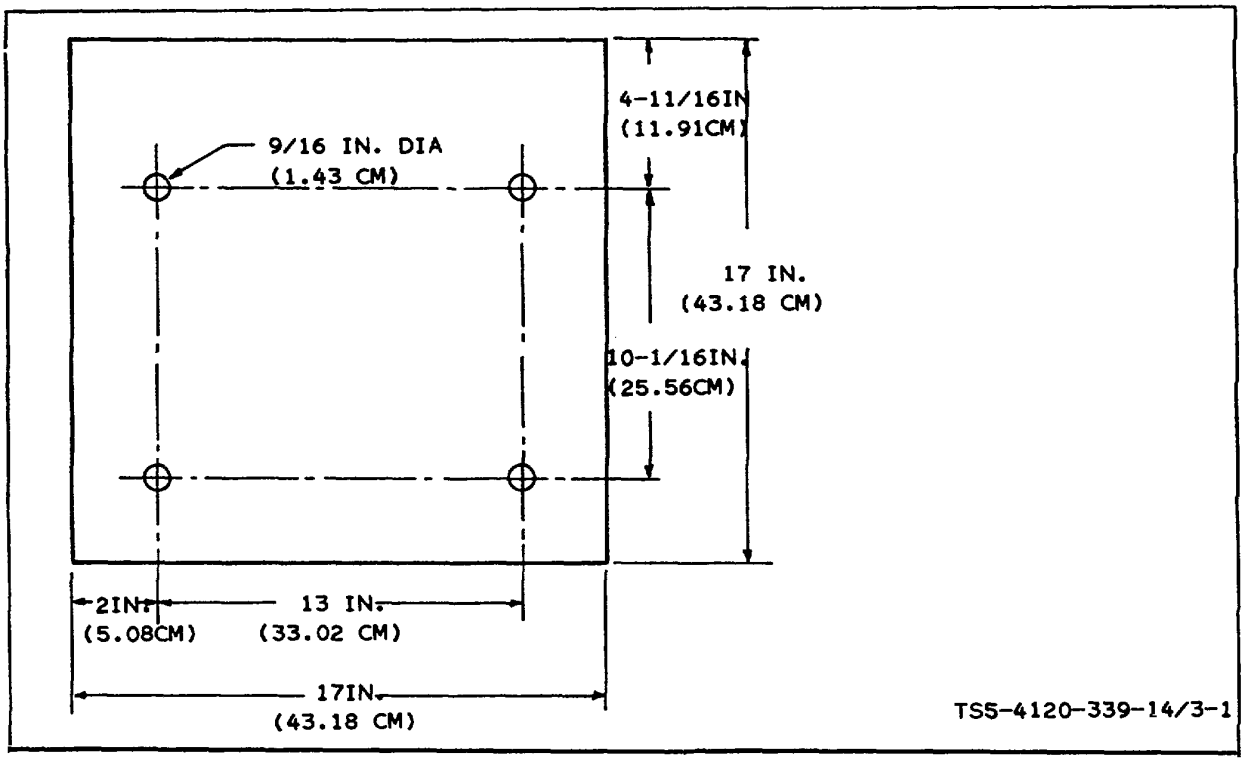


Figure 3-1. Base plan

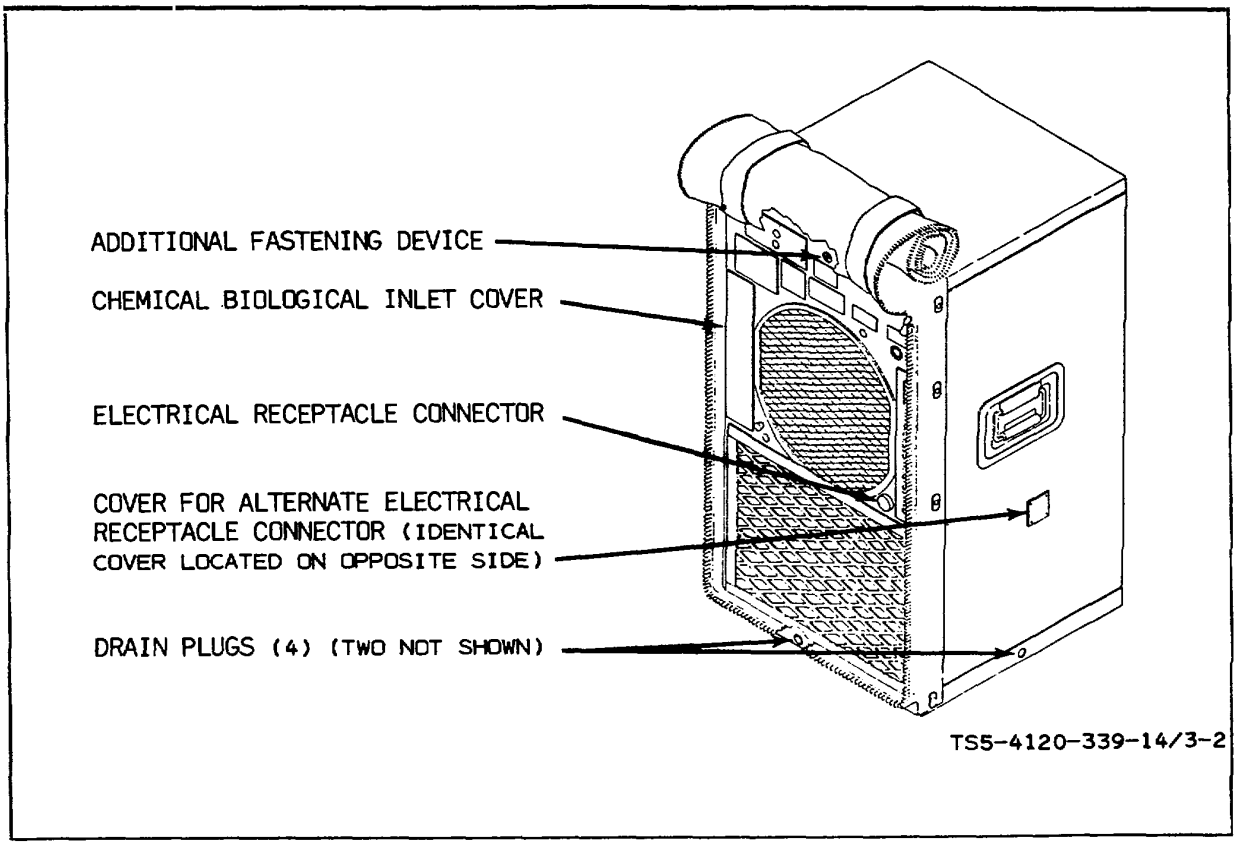


Figure 3-2. Right rear three-quarter view

Table 3-1. Organizational Preventive Maintenance Checks and Services

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

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

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

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

Section IV. Troubleshooting

3-7. TROUBLESHOOTING TABLE.

a. The troubleshooting table (table 3-2) lists the most common malfunctions which you may find during the operation or maintenance of the air conditioner or its components. You should perform the test/inspections and corrective actions in the order listed.

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

Table 3-2. Organizational Troubleshooting

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

Table 3-2. Organizational Troubleshooting (continued)

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

Table 3-2. Organizational Troubleshooting (continued)

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

Section V. Maintenance Procedures

3-8. GENERAL.

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

3-9. COVERS, PANELS AND GRILLES.

a. Air Conditioner Cover.

(1) Removal. (See figure 3-3.)

(2) Cleaning. Clean cover with a damp cloth and dry thoroughly.

(3) Inspection.

(a) Inspect cover for tears and other damage.
(b) Inspect zipper for proper operation.
(c) Inspect for missing or defective attaching hardware.

(4) Repair. Replace missing or defective attaching hardware.

(5) Replace. Replace air conditioner cover if damaged beyond repair.

(6) Installation. (See figure 3-3.)

b. Chemical Biological Inlet Cover.

(1) Removal. (See figure 3-3.)

(2) Cleaning. Clean cover with a damp cloth and dry thoroughly.

(3) Inspection.

(a) Inspect cover for bends, dents and other damage.
(b) Inspect for missing, damaged and loose insulation.
(c) Inspect for missing or defective attaching hardware.

(4) Repair.

(a) Straighten minor bends and dents in cover.
(b) Replace damaged or missing insulation with new insulation.
(c) Attach new or loose insulation to cover with adhesive.

(5) Replace. Replace cover if damaged beyond repair.

(6) Installation. (See figure 3-3.)

c. Front Access Panel and Top Panel.

(1) Removal. (See figure 3-3.)

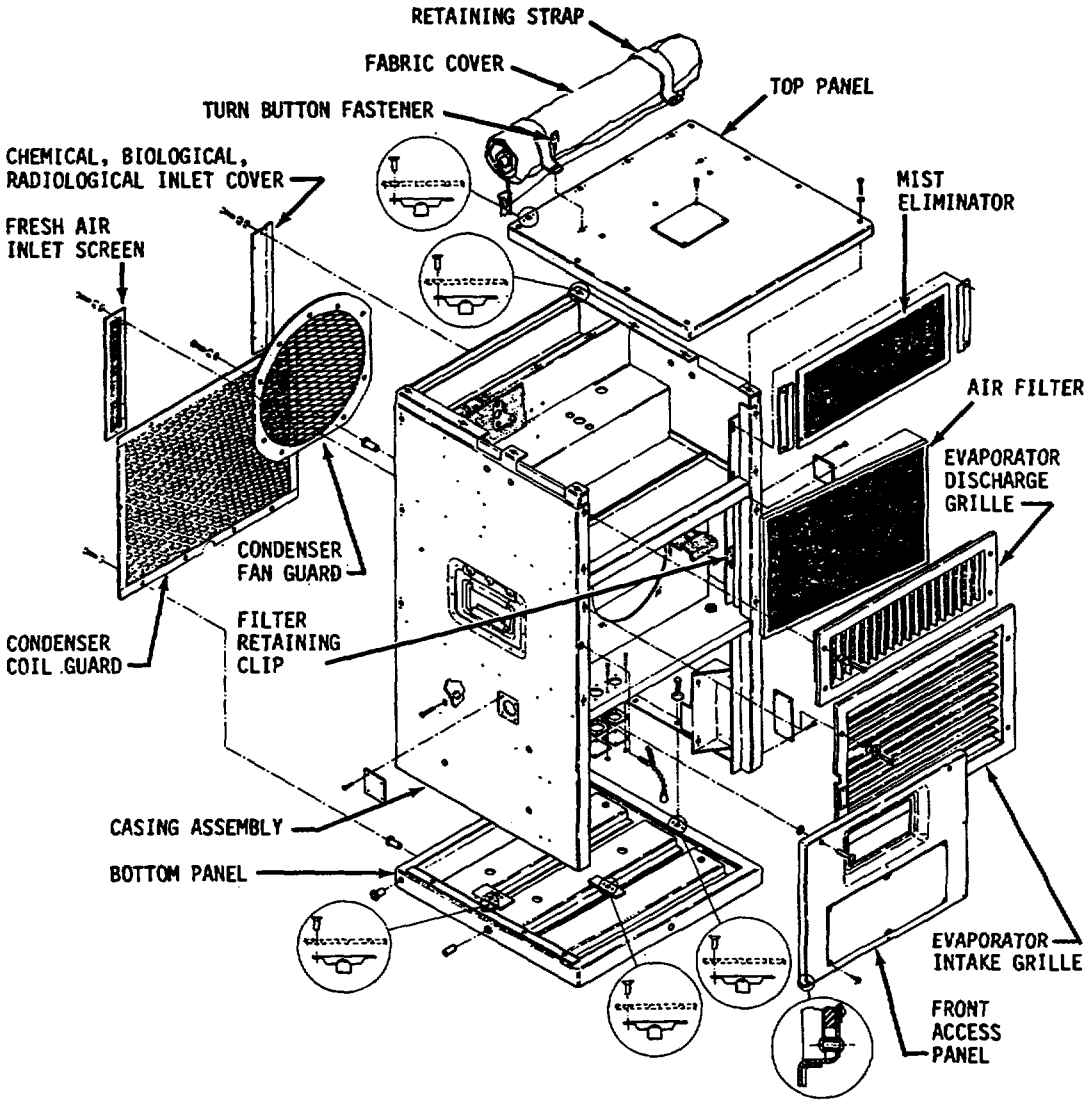


Figure 3-3. Covers, panels, grilles and filters (sheet 1 of 2)

AIR CONDITIONER COVER REMOVAL AND INSTALLATION

1. IF AIR CONDITIONER COVER IS ROLLED AND FASTENED AT THE TOP, TURN BOTH TURN BUTTON FASTENERS AND RELEASE RETAINING STRAPS.
2. REMOVE ALL ATTACHING SCREWS AND WASHERS FROM COVER AND REMOVE COVER.
3. PLACE COVER ON AIR CONDITIONER AND ATTACH WITH ATTACHING SCREWS AND WASHERS.
4. IF UNIT IS TO BE PUT INTO IMMEDIATE OPERATION, ROLL COVER UP AND ATTACH RETAINING STRAPS TO TURN BUTTON FASTENERS ON TOP PANEL OF UNIT.

CHEMICAL BIOLOGICAL INLET COVER AND FRESH AIR INLET SCREEN REMOVAL AND INSTALLATION

1. LOOSEN AND REMOVE ATTACHING SCREWS AND REMOVE COVER AND SCREEN.
2. POSITION COVER AND SCREEN ON AIR CONDITIONER AND SECURE WITH ATTACHING SCREWS.

FRONT ACCESS PANEL AND TOP PANEL REMOVAL AND INSTALLATION

1. LOOSEN AND REMOVE ATTACHING SCREWS AND REMOVE PANELS.
2. POSITION PANELS ON AIR CONDITIONER AND SECURE WITH ATTACHING SCREWS.

EVAPORATOR INTAKE AND DISCHARGE GRILLES REMOVAL AND INSTALLATION

1. LOOSEN AND REMOVE ATTACHING SCREWS AND REMOVE GRILLES.
2. POSITION GRILLES ON AIR CONDITIONER AND SECURE WITH ATTACHING SCREWS.

CONDENSER FAN GUARD AND CONDENSER COIL GUARD REMOVAL AND INSTALLATION

1. LOOSEN AND REMOVE ATTACHING SCREWS AND REMOVE GUARDS.
2. POSITION GUARDS ON AIR CONDITIONER AND SECURE WITH ATTACHING SCREWS.

AIR FILTER REMOVAL AND INSTALLATION

1. REMOVE ATTACHING SCREWS FROM EVAPORATOR INTAKE GRILLE AND REMOVE GRILLE.
2. PUSH FILTER RETAINING CLIP TO THE RIGHT AND SLIDE FILTER OUT OF UNIT.
3. PUSH FILTER RETAINING CLIP TO THE RIGHT AND SLIDE FILTER INTO THE UNIT.
4. POSITION EVAPORATOR INTAKE GRILLE ON UNIT AND SECURE WITH ATTACHING SCREWS.

MIST ELIMINATOR REMOVAL AND INSTALLATION

1. REMOVE AIR CONDITIONER COVER AND TOP PANEL.
2. PULL MIST ELIMINATOR STRAIGHT UP UNTIL IT IS FREE FROM ITS MOUNTING.
3. SLIDE MIST ELIMINATOR INTO MOUNTING AND REPLACE COVER AND TOP PANEL.

TS5-4120-339-14/3-3

Figure 3-3. Cover, panels, grilles and filter removal and installation (sheet 2 of 2)

(2) Cleaning. Clean panels with a damp cloth and dry thoroughly.

(3) Inspection.

(a) Inspect panels for bends, dents and other damage.
(b) Inspect for missing, damaged and loose insulation and gaskets.
(c) Inspect for missing or defective attaching hardware.

(4) Repair.

(a) Straighten minor dents and bends in panels.
(b) Replace damaged or missing insulation with new insulation.
(c) Attach new or loose insulation to panels with adhesive.
(d) Replace defective or missing gaskets. New gaskets are installed by removing the strip from the gasket adhesive backing and pressing the gasket in place.
(e) Replace missing or defective attaching hardware.

(5) Replace. Replace panels which are damaged beyond repair.

(6) Installation. (See figure 3-3.)

d. Evaporator Intake Grille.

(1) Removal. (See figure 3-3.)

(2) Cleaning. Clean grille with a damp cloth and dry thoroughly.

(3) Inspection.

(a) Inspect grille for bent, dented or broken parts.
(b) Inspect for missing, damaged or loose insulation and gaskets.
(c) Inspect for missing or defective attaching hardware.

(4) Adjust. Operate damper lever to make sure that louvers open and fully close without sticking or binding.

(5) Repair.

(a) Straighten minor bends and dents in grille.
(b) Replace damaged or missing insulation with new insulation.
(c) Attach new or loose insulation to panels with adhesive.
(d) Replace defective or missing gaskets. New gaskets are installed by removing the strip from the gasket adhesive backing and pressing the gasket into place.
(e) Replace missing or defective attaching hardware.

(6) Replace. If grille is damaged beyond repair, or if louvers do not operate properly and cannot be repaired, replace grille.

(7) Installation. (See figure 3-3.)

e. Evaporator Discharge Grille.

(1) Removal. (See figure 3-3.)

(2) Cleaning.

(a) Wash grille with a stream of fresh water.

WARNING

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

(b) Dry grille with compressed air.

(3) Inspection.

(a) Inspect grille for bent, dented or broken parts.
(b) Inspect grille for missing, damaged or loose gasket.
(c) Inspect grille for missing or defective attaching hardware.

(4) Repair.

(a) Straighten minor bends and dents in grille.
(b) Replace defective or missing gasket. New gaskets are installed by removing the strip from the gasket adhesive backing and pressing the gasket into place on the grille.
(c) Replace missing or defective attaching hardware.

(5) Replace. Replace grille if damaged beyond repair.

(6) Installation. (See figure 3-3.)

f. Fresh Air Inlet Screen.

(1) Removal. (See figure 3-3.)

(2) Cleaning.

(a) Wash screen with a stream of fresh water.

WARNING

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

(b) Dry inlet screen with compressed air.

(3) Inspection.

(a) Inspect inlet screen for bent, dented or broken parts.
(b) Inspect for missing or defective attaching hardware.

(4) Repair.

(a) Straighten minor bends and dents in inlet screen.
(b) Replace missing or defective attaching hardware.

(5) Replace. Replace fresh air inlet screen if damaged beyond repair.

(6) Installation. (See figure 3-3.)

g. Condenser Fan Guard and Condenser Coil Guard.

(1) Removal. (See figure 3-3.)

(2) Cleaning.

(a) Wash guards with a stream of fresh water.

WARNING

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

(b) Dry guards with compressed air.

(3) Inspection.

(a) Inspect guards for bent, dented or broken parts.
(b) Inspect guards for missing or defective attaching hardware.

(4) Repair.

(a) Straighten minor bends and dents in guards and guard screens.
(b) Replace missing or defective attaching hardware.

(5) Replace. Replace either or both guards if damaged beyond repair.

(6) Installation. (See figure 3-3.)

h. Air Filter.

(1) Removal. (See figure 3-3.)

(2) Inspection.

(a) Inspect air filter for bent, dented or broken parts.
(b) Inspect air filter for clogged air passages.

(3) Service.

(a) Wash air filter with a stream of fresh water.

WARNING

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

(b) Dry air filter with compressed air.

(4) Replace. Replace air filter if extent of damage would impair serviceability.

(5) Installation. (See figure 3-3.)

i. Mist Eliminator.

(1) Removal. (See figure 3-3.)

(2) Inspection.

(a) Inspect the mist eliminator for bent, dented or broken parts.
(b) Inspect the mist eliminator for clogged air passages.

(3) Service.

(a) Wash the mist eliminator with a stream of fresh water.

WARNING

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

(b) Dry mist eliminator with compressed air.

(4) Replace. Replace the mist eliminator if extent of damage would impair serviceability.

(5) Installation. (See figure 3-3.)

3-10. FAN MOTOR AND FANS.

a. Evaporator Fan.

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

(2) Inspection.

(a) Inspect for missing or defective attaching hardware.
(b) Inspect fan and ring for evidence of damage which would impair serviceability.

(3) Repair. Replace defective or missing attaching hardware.

(4) Replace. Replace fan and/or ring if damaged to an extent which would impair serviceability.

(5) Installation. (See figure 3-4.)

b. Condenser Fan.

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

(2) Inspection.

(a) Inspect for missing or defective attaching hardware.
(b) Inspect condenser fan, baffle (model TM-9KV-208-3-60 only) and bracket (model TM-9KV-208-3-60 only) for evidence of damage which would impair serviceability.

(3) Repair. Replace defective or missing attaching hardware.

(4) Replace. Replace condenser fan and/or baffle (model TM-9KV-208-3-60 only) and/or bracket (model TM-9KV-208-3-60 only) if damage would impair serviceability.

(5) Installation. (See figure 3-4.)

c. Fan Motor. The fan motor operates both the condenser fan and the evaporator fan and is a 1.1 HP, 208 volt, 3-phase, 50/60 Hz electric motor. The motor is equipped with a double ended shaft, permanently lubricated ball bearings, and an overload protector which will reset itself automatically after cooling.

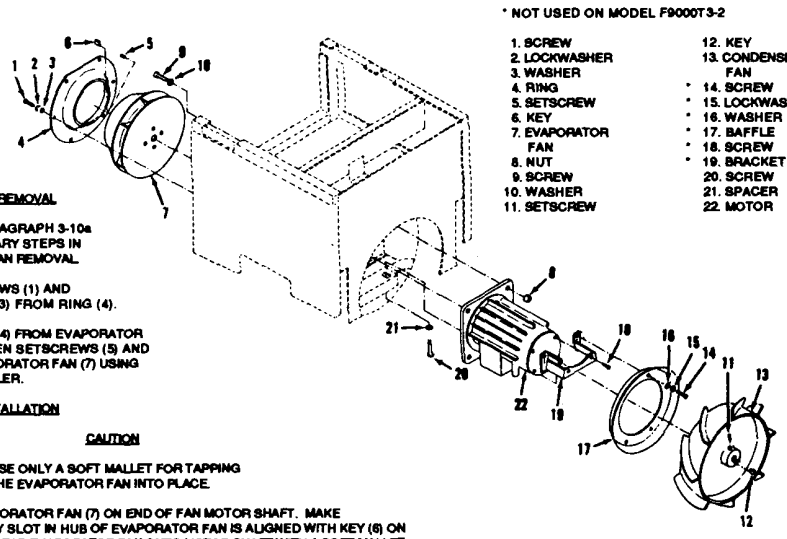
WARNING

Disconnect the air conditioner from the electrical power source before removing the fan motor.

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

(2) Inspection.

(a) Inspect for broken, damaged or burned electrical leads and loose wire connections.



* NOT USED ON MODEL F9000T3-2

1. SCREW
2. LOCKWASHER
3. WASHER
4. RING
5. SETSCREW
6. KEY
7. EVAPORATOR FAN
8. NUT
9. SCREW
10. WASHER
11. SETSCREW
12. KEY
13. CONDENSER FAN
* 14. SCREW
* 15. LOCKWASHER
* 16. WASHER
* 17. BAFFLE
* 18. SCREW
* 19. BRACKET
20. SCREW
21. SPACER
22. MOTOR

EVAPORATOR FAN REMOVAL

1. REFER TO PARAGRAPH 3-10a FOR PERLIMINARY STEPS IN EVAPORATOR FAN REMOVAL.
2. REMOVE SCREWS (1) AND WASHERS (2, 3) FROM RING (4).
3. REMOVE RING (4) FROM EVAPORATOR FAN (7), LOOSEN SETSCREWS (5) AND REMOVE EVAPORATOR FAN (7) USING SUITABLE PULLER.

EVAPORATOR INSTALLATION

CAUTION

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

1. POSITION EVAPORATOR FAN (7) ON END OF FAN MOTOR SHAFT. MAKE SURE THAT KEY SLOT IN HUB OF EVAPORATOR FAN IS ALIGNED WITH KEY (6) ON MOTOR SHAFT. TAP EVAPORATOR FAN ONTO MOTOR SHAFT WITH A SOFT MALLET AND TIGHTEN SETSCREWS (5).
2. POSITION RING (4) ON FAN (7) AND ATTACH WITH SCREWS (1) AND WASHERS (2, 3).
3. REFER TO PARAGRAPH 3-10a FOR FINAL STEPS IN INSTALLATION OF EVAPORATOR FAN.

CONDENSER FAN REMOVAL

1. REFER TO PARAGRAPH 3-10b FOR PERLIMINARY STEPS IN CONDENSER FAN REMOVAL.
2. LOOSEN SETSCREWS (11) AND USING A SUITABLE PULLER, REMOVE FAN (13) FROM MOTOR SHAFT.
3. (MODEL TM-9KV-208-3-60 ONLY) REMOVE SCREWS (14) AND WASHERS (15, 16) FROM BAFFLE (17) THEN REMOVE BAFFLE FROM BRACKET.
4. (MODEL TM-9KV-208-3-60 ONLY) REMOVE SCREWS (18) AND REMOVE BRACKET (19) FROM MOTOR (22).

CONDENSER FAN INSTALLATION

1. (MODEL TM-9KV-208-3-60 ONLY) ATTACH BRACKET (19) TO MOTOR (22) WITH SCREWS (18).
2. (MODEL TM-9KV-208-3-60 ONLY) ATTACH BAFFLE (17) TO BRACKET (19) WITH SCREWS (14) AND WASHERS (15, 16).

CAUTION

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

3. POSITION CONDENSER FAN (13) ON END OF FAN MOTOR SHAFT. MAKE SURE THAT KEY SLOT IN HUB OF CONDENSER FAN IS ALIGNED WITH KEY (12) ON MOTOR SHAFT. TAP CONDENSER FAN ONTO MOTOR SHAFT WITH A SOFT MALLET AND TIGHTEN SETSCREWS (11).
4. REFER TO PARAGRAPH 3-10b FOR FINAL STEPS IN INSTALLATION OF CONDENSER FAN.

FAN MOTOR REMOVAL

1. REFER TO PARAGRAPH 3-10c FOR PRELIMINARY STEPS IN FAN MOTOR REMOVAL.
2. REFER TO ABOVE PROCEDURES AND REMOVE EVAPORATOR FAN AND CONDENSER FAN.
3. DISCONNECT ELECTRICAL CONNECTOR.
4. REMOVE SCREWS (20) FROM MOTOR (22) AND SPACERS (21) FROM MOTOR MOUNT.
5. REMOVE SCREWS (9), WASHERS (10), AND NUTS (8) FROM FAN MOTOR FLANGE.
6. REMOVE MOTOR FROM AIR CONDITIONER.

FAN MOTOR INSTALLATION

1. POSITION MOTOR IN AIR CON DITIONER AND SECURE WITH SCREWS 920), SPACERS (21), SCREWS (9), NUTS (8) AND WASHERS (10).
2. (MODEL TM-9KV-208-3-60 ONLY) ATTACH BRACKET (19) TO MOTOR (22) WITH SCREWS (18).
3. (MODEL TM-9KV-208-3-60 ONLY) ATTACH BAFFLE (17) TO BRACKET (19) WITH SCREWS (14) AND WASHERS (15, 16).
4. CONNECT ELECTRICAL CONNECTOR.
5. INSTALL CONDENSER FAN AND EVAPORATOR FAN.
6. REFER TO PARAGRAPH 3-10c FOR FINAL STEOS IN INSTALLATION OF FAN MOTOR.

TS5-4120-339-14/3-4

Figure 3-4. Removal and installation of fans and motor

(b) Inspect motor for damage which would impair serviceability.
(c) Refer to figure 3-5 and inspect for worn bearings.

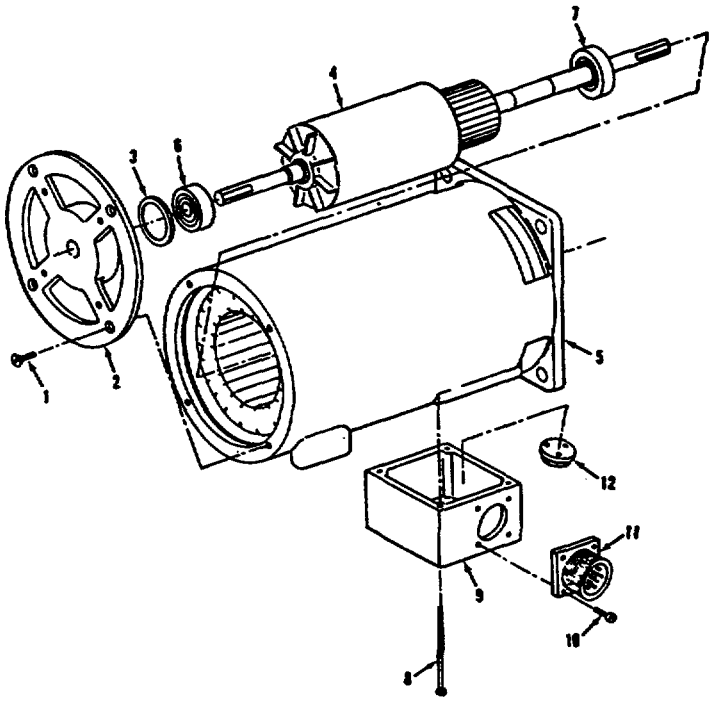
(3) Test. Check continuity of motor windings for open windings or windings shorted to motor frame. If any of these conditions are found, replace motor.

(4) Repair. Refer to figure 3-5 and repair fan motor if worn bearings are found during inspection.

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

(6) Installation. (See figure 3-4.)

1. SCREW
2. END BELL
3. WASHER
4. ROTOR
5. STATOR
6. BEARING
7. BEARING
8. SCREW
9. ENCLOSURE
10. SCREW
11. CONNECTOR
12. MOTOR PROTECTOR



FAN MOTOR REPAIR

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

TS5-4120-339-14/3-5

Figure 3-5. Fan motor repair

3-11. HEATING SYSTEM.

WARNING

Disconnect the air conditioner from the electrical power before performing the following procedures on the heating system.

a. Inspection.

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

(2) Refer to figure 3-3 and remove the air conditioner cover and top panel from the unit.

(3) Refer to figures 3-6 and 3-7 and inspect the six heater elements and thermostat for damaged or burned wiring, loose electrical connections, and other damage which would impair serviceability.

b. Test.

(1) Connect the air conditioner to a 208 volt, 3-phase, 50/60 Hz source of electrical power.

(2) Turn thermostat knob clockwise to its limit.

(3) Turn the selector switch to “LO-HEAT". Refer to figure 3-6 and observe heater elements. Elements 1 through 3 should become hot. Elements 4 through 6 should remain cold.

(4) Turn the selector switch to '"HI-HEAT". Refer to figure 3-6 and observe heater elements. Elements 1 through 6 should become hot.

(5) Turn the selector switch to “OFF” position.

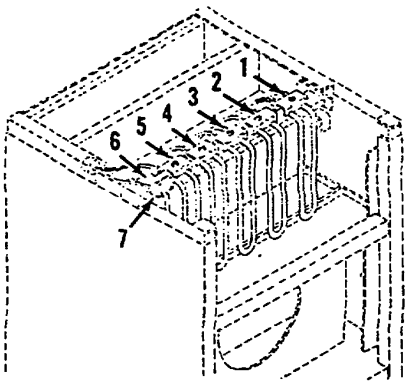
(6) If any heater element fails to function properly during the above test, disconnect electrical power to air conditioner. Refer to wiring diagram figure 3-8 and check wiring continuity for the improperly functioning heater element of elements. Repair or replace any defective wiring found.

c. Replace.

(1) Replace wiring, thermostat or any heater element which shows evidence of damage which would impair serviceability.

(2) If any heater element fails to function properly during test, and wiring checks OK, refer to step d and replace defective heater element.

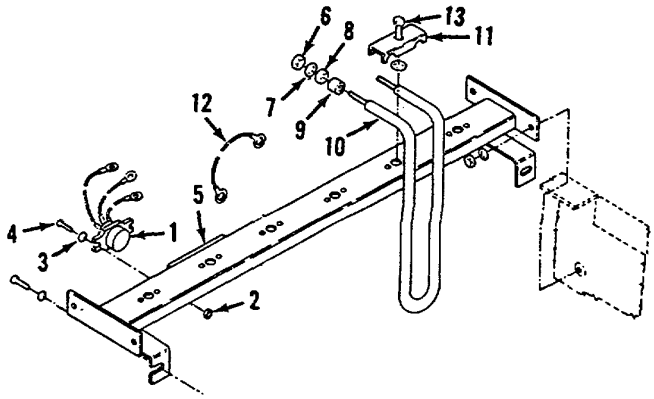
d. Removal and Installation. (See figure 3-7.)



1. HEATER ELEMENT (HR1)
2. HEATER ELEMENT (HR2)
3. HEATER ELEMENT (HR3)
4. HEATER ELEMENT (HR4)
5. HEATER ELEMENT (HR5)
6. HEATER ELEMENT (HR6)
7. HEATER THERMOSTAT

TS5-4120-339-14/3-6

Figure 3-6. Heater element location



1. THERMOSTAT
2. NUT
3. WASHER
4. SCREW
5. BRACKET
6. NUT
7. WASHER
8. NUT
9. SPACER
10. ELEMENT, HEATER
11. CLAMP
12. ELECTRICAL LEAD
13. SCREW

REMOVAL

1. TURN OFF UNIT AND DISCONNECT FROM ELECTRICAL POWER SOURCE.
2. REFER TO FIGURE 3-3 FOR PRELIMINARY STEPS.
3. TAG AND DISCONNECT ELECTRICAL LEADS ON HEATER THERMOSTAT (1).
4. REMOVE NUT (2), WASHER (3) AND SCREW (4) FROM THERMOSTAT (1) AND REMOVE THERMOSTAT FROM BRACKET.
5. TAG ELECTRICAL LEADS (12) ON BOTH THREADED ENDS OF ELEMENT (10) AT ALL SIX LOCATIONS.
6. LOOSEN SCREW (13) AND REMOVE CLAMP (11) FROM ELEMENT (10) AT ALL SIX LOCATIONS.
7. REMOVE ELEMENT (10) FROM BRACKET (5) AND REMOVE NUTS (6, 8), WASHER (7), ELECTRICAL LEAD (12) AND SPACER (9) FROM BOTH THREADED ENDS OF ELEMENT (10) AT ALL SIX LOCATIONS.

INSTALLATION

1. INSTALL SPACER (9), ELECTRICAL LEAD (12), WASHER (7) AND NUTS (6, 8) ON BOTH THREADED ENDS OF THE SIX ELEMENTS. REMOVE TAGS FROM ELECTRICAL LEADS (12).
2. POSITION SIX ELEMENTS (10) IN SIX LOCATIONS SHOWN IN FIGURE 3-6 AND SECURE WITH CLAMPS (11) AND SCREWS (13).
3. POSITION THERMOSTAT (1) ON BRACKET (5) AND SECURE WITH SCREWS (4), WASHER (3) AND NUT (2).
4. CONNECT THERMOSTAT (4), ELECTRICAL LEADS AND REMOVE TAGS.
5. REFER TO FIGURE 3-3 FOR FINAL STEPS.

TS5-4120-339-14/3-7

Figure 3-7. Heater removal and installation

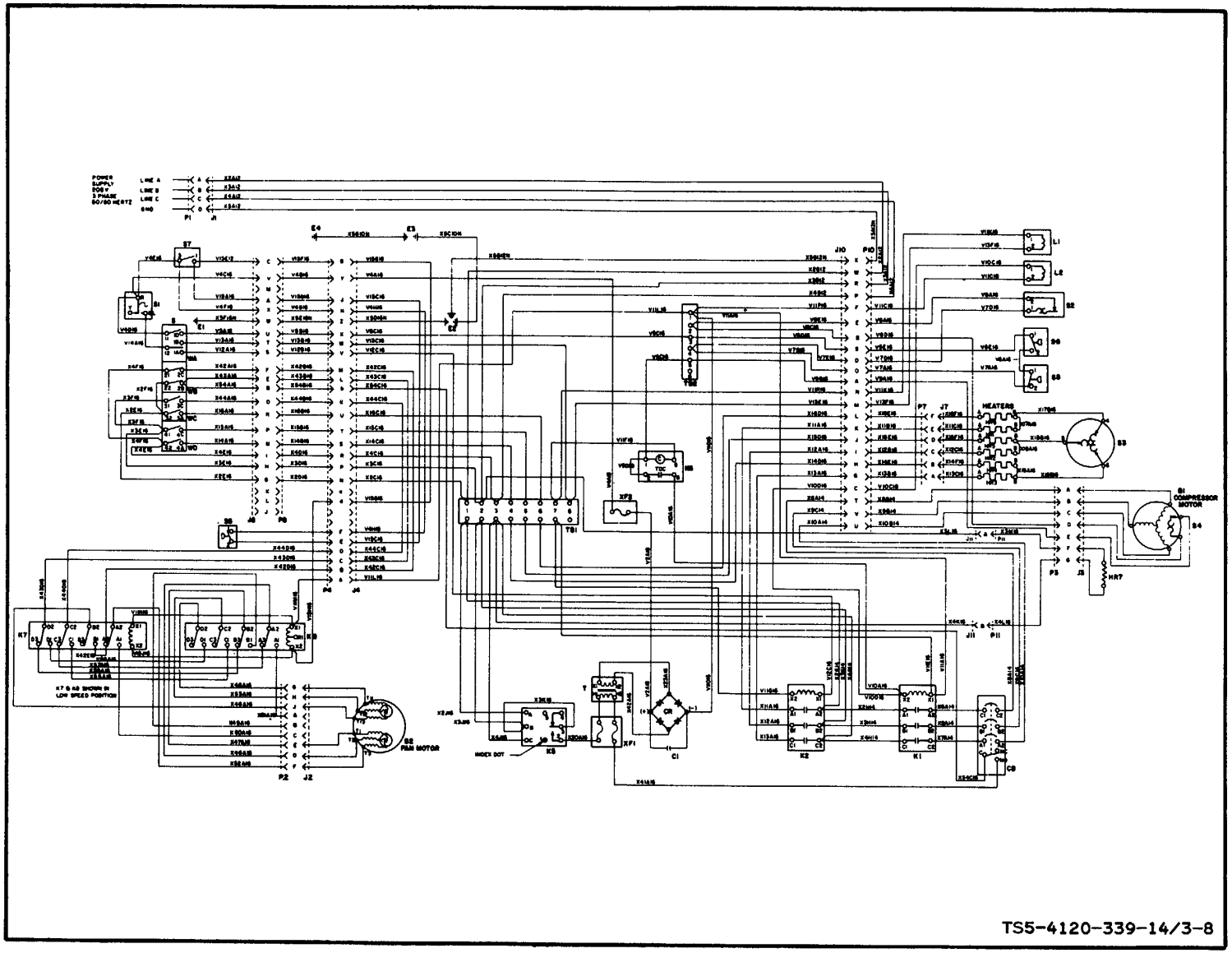


Figure 3-8. Wiring diagram (sheet 1 of 3)
Model TM9KV-208-3-60 only

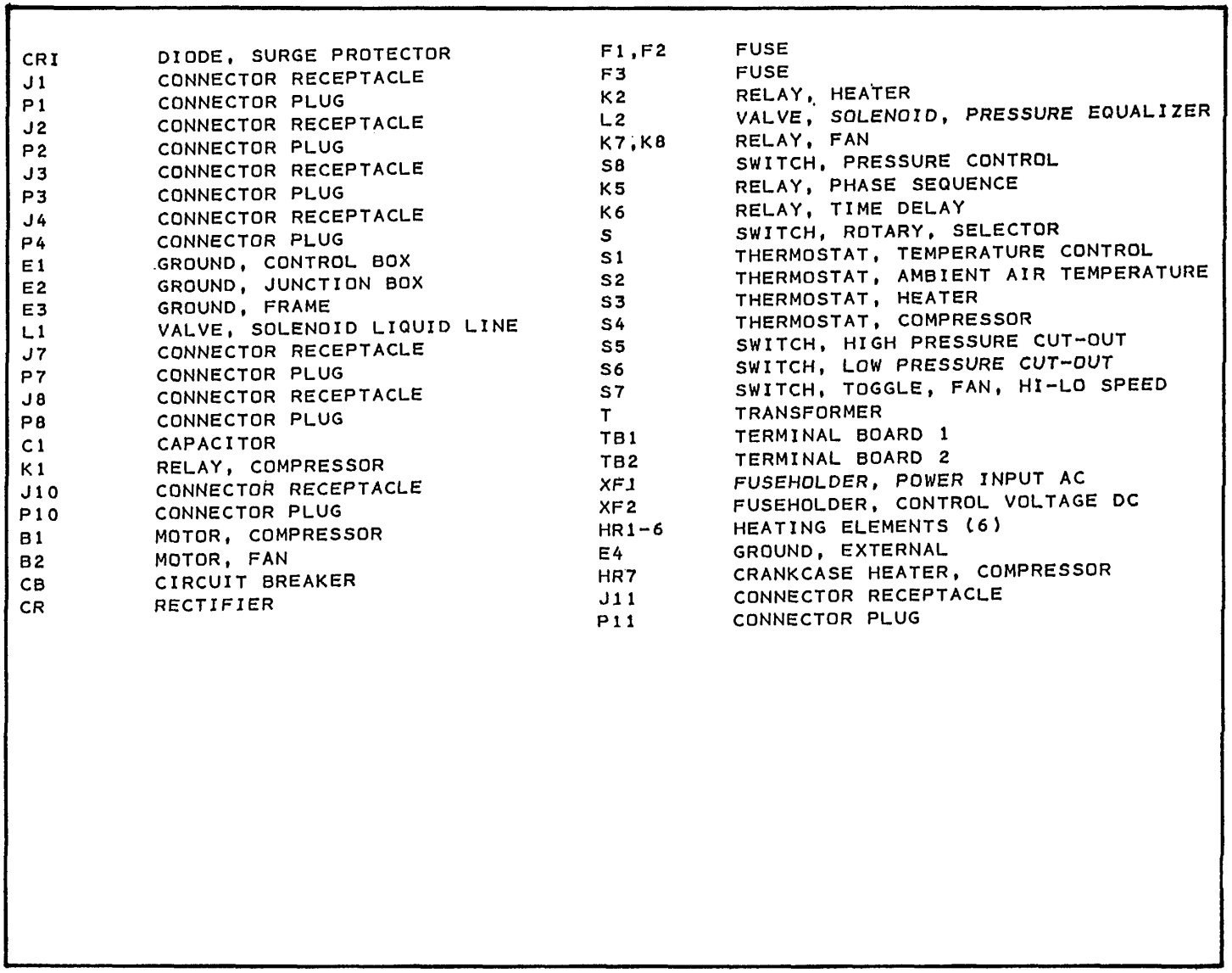


Figure 3-8. Wiring diagram (sheet 2 of 3)
Models TM9KV-208-3-60 and F9000T3-2

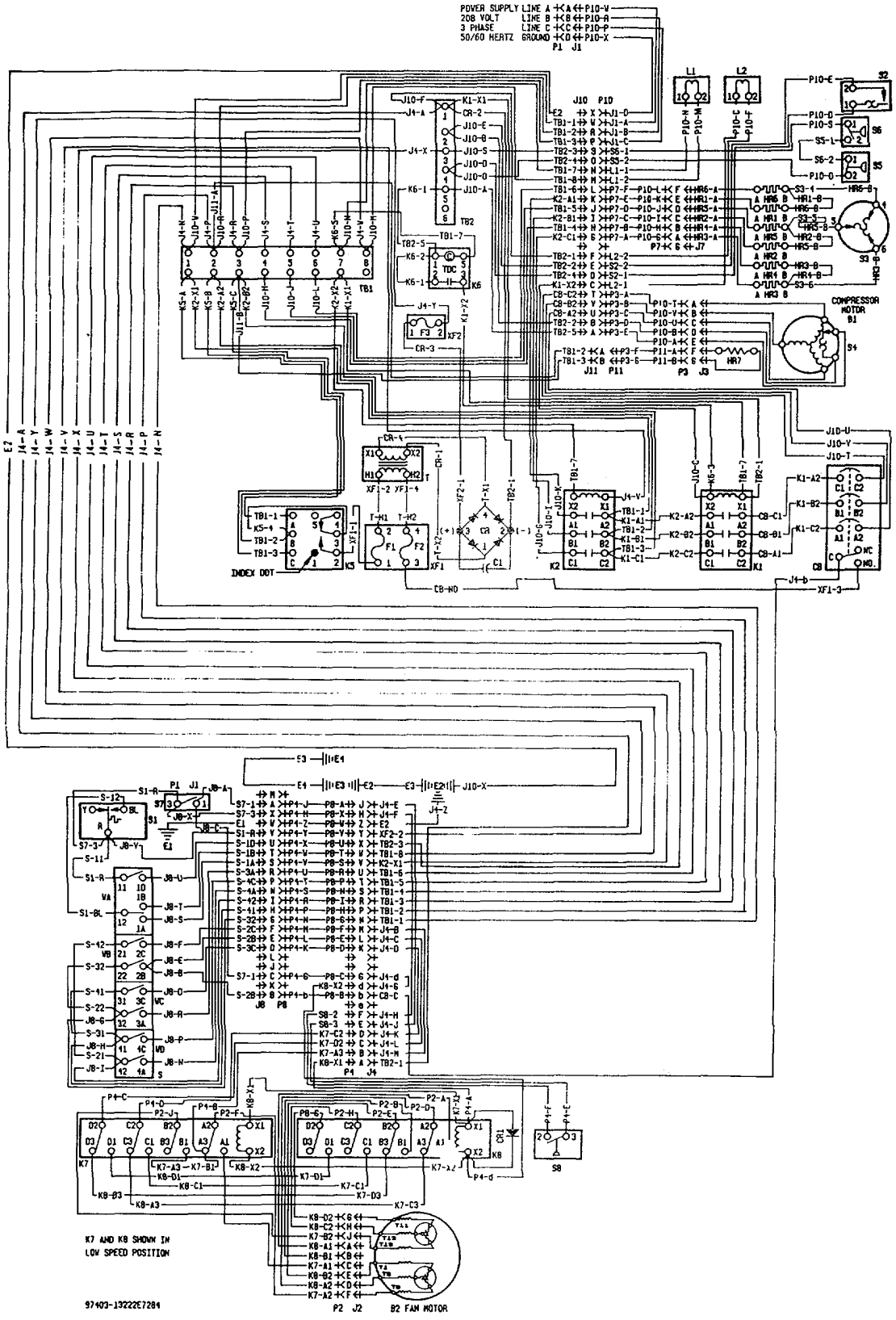


Figure 3-8. Wiring diagram (sheet 3 of 3)
Model F9000T3-2

3-12. ELECTRICAL SYSTEM.

a. Control Box.

WARNING

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

(1) Removal. (See figure 3-9.)

(2) Inspection.

(a) Inspect the control box for defective or missing attaching hardware and for damage which would impair serviceability.
(b) Inspect inside of control box for defective or burned wiring.

(3) Repair.

(a) Replace defective or missing attaching hardware.
(b) If practical, replace defective or burned wiring.

(4) Replace. Replace control box if extent of damage would impair serviceability.

(5) Installation. (See figure 3-9.)

b. Selector Switch.

WARNING

Disconnect air conditioner from the electrical power before removing the selector switch.

(1) Removal. (See figure 3-10.)

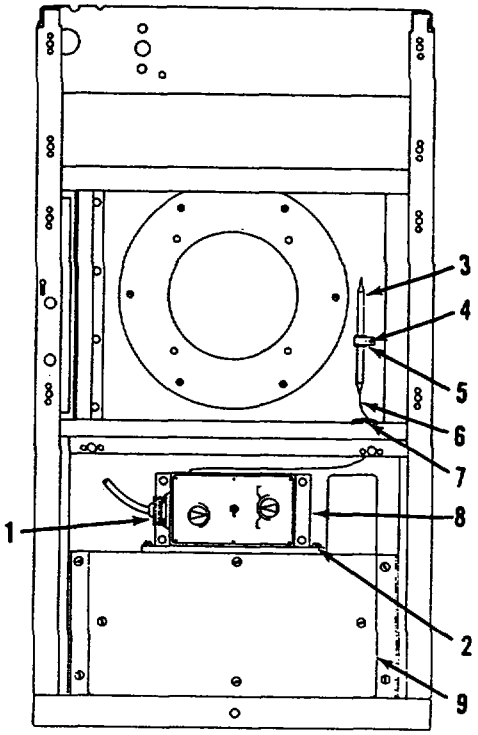
(2) Inspection. Refer to figure 3-11 and inspect the selector switch and electrical leads for evidence of damage which would impair serviceability.

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

(4) Replace. Replace the selector switch if evidence is found of damage which would impair serviceability, or if any failure occurs during testing.

(5) Installation. (See figure 3-10.)

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



CAUTION

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

PARTIAL REMOVAL OF CONTROL BOX

1. REFER TO FIGURE 3-3 FOR PRELIMINARY STEPS.
2. TURN SELECTOR SWITCH TO "OFF" POSITION.
3. DISCONNECT ELECTRICAL PLUG (1) FROM CONTROL BOX (8).
4. REMOVE FOUR ATTACHING SCREWS (2).
5. PULL CONTROL BOX (8) FREE FROM UNIT. SUPPORT CONTROL BOX SO THAT THERE IS NO STRAIN ON CAPILLARY TUBE.

REMOVAL OF CONTROL BOX

1. PERFORM STEPS 1 THROUGH 4 OF PARTIAL REMOVAL OF CONTROL BOX, ABOVE.
2. LOOSEN SCREW (4) IN CLAMP (5) AND SLIDE TEMPERATURE SENSING BULB (3) OUT OF CLAMP.
3. PEEL SEALER FROM OUTER EDGE OF GROMMET (7) AND REMOVE GROMMET FROM MOUNTING HOLE. LEAVE GROMMET SEALED IN PLACE AROUND CAPILLARY TUBE.
4. CAREFULLY SLIDE TEMPERATURE SENSING BULB THROUGH GROMMET MOUNTING HOLE.
5. REMOVE CONTROL BOX FROM AIR CONDITIONER.

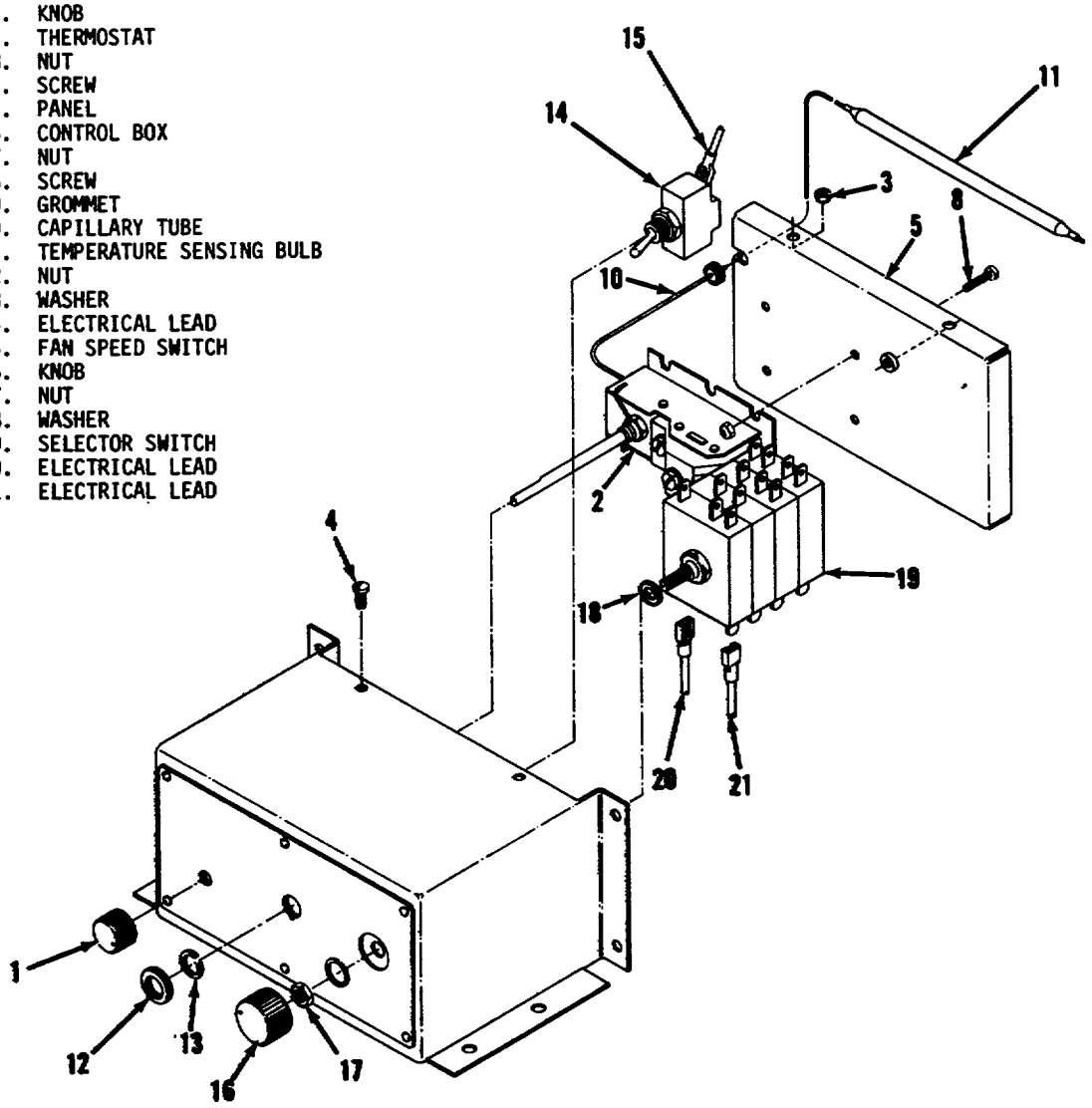
INSTALLATION OF CONTROL BOX

1. IF TEMPERATURE SENSING BULB HAS BEEN LEFT IN PLACE ON AIR CONDITIONER, PROCEED TO STEP 5. IF TEMPERATURE SENSING BULB HAS BEEN REMOVED FROM AIR CONDITIONER, PROCEED AS FOLLOWS:
2. CAREFULLY SLIDE THE TEMPERATURE SENSING BULB UP THROUGH THE GROMMET MOUNTING HOLE.
3. CAREFULLY PUSH THE GROMMET INTO THE GROMMET MOUNTING HOLE. SEAL GROMMET WITH SEALING COMPOUND MIL-C-14255 TYPE II.
4. SLIDE TEMPERATURE SENSING BULB INTO CLAMP (5) AND TIGHTEN SCREW (4).
5. PLACE CONTROL BOX IN MOUNTING POSITION AND SECURE WITH FOUR MOUNTING SCREWS (2)
6. CONNECT ELECTRICAL PLUG (1) TO CONTROL BOX (8).
7. REFER TO FIGURE 3-3 FOR FINAL STEPS IN INSTALLATION OF CONTROL BOX.

TS5-4120-339-14/3-9

Figure 3-9. Removal and installation of control box

1. KNOB
2. THERMOSTAT
3. NUT
4. SCREW
5. PANEL
6. CONTROL BOX
7. NUT
8. SCREW
9. GROMMET
10. CAPILLARY TUBE
11. TEMPERATURE SENSING BULB
12. NUT
13. WASHER
14. ELECTRICAL LEAD
15. FAN SPEED SWITCH
16. KNOB
17. NUT
18. WASHER
19. SELECTOR SWITCH
20. ELECTRICAL LEAD
21. ELECTRICAL LEAD



CONTROL BOX REAR PANEL REMOVAL

1. REFER TO FIGURE 3-9 FOR PRELIMINARY STEPS.
2. LOOSEN SETSCREW IN KNOB (1) AND REMOVE KNOB FROM SHAFT OF THERMOSTAT.
3. REMOVE NUTS (3) AND SCREWS (4) FROM PANEL (5) AND REMOVE PANEL FROM CONTROL BOX (6).

CONTROL BOX REAR PANEL INSTALLATION

1. POSITION PANEL (5) ON REAR OF CONTROL BOX (6) WHILE SLIDING SHAFT OF THERMOSTAT (2) THROUGH OPENING IN FRONT PANEL OF CONTROL BOX.
2. ATTACH PANEL (5) TO CONTROL BOX (6) WITH SCREWS (4) AND NUTS (3).
3. POSITION KNOB (1) ON SHAFT OF THERMOSTAT (2) AND TIGHTEN SETSCREW IN KNOB.
4. REFER TO FIGURE 3-9 FOR FINAL STEPS.

TS5-4120-339-14/3-10

Figure 3-10. Removal and installation of control box rear panel and switches (sheet 1 of 2)

FAN SPEED SWITCH REMOVAL

1. REFER TO FIGURE 3-9 FOR PRELIMINARY STEPS.
2. REMOVE NUT (12) AND WASHER (13) FROM SHAFT OF SWITCH (15).
3. PULL SWITCH (15) OUT FROM MOUNTING HOLE.
4. TAG AND DISCONNECT ELECTRICAL LEADS (14) FROM SWITCH.

FAN SPEED SWITCH INSTALLATION

1. ATTACH ELECTRICAL LEADS (14) TO SWITCH (15) AND REMOVE TAGS.
2. POSITION SWITCH (15) IN APPROPRIATE OPENING IN FRONT OF CONTROL BOX.
3. SECURE SWITCH (15) WITH WASHER (13) AND NUT (12).

SELECTOR SWITCH REMOVAL

1. REFER TO FIGURE 3-9 FOR PRELIMINARY STEPS.
2. LOOSEN SETSCREW IN KNOB (16).
3. REMOVE KNOB (16) AND NUT (17) FROM SHAFT OF SWITCH (19).
4. PULL SWITCH (19) OUT FROM MOUNTING HOLE AND REMOVE WASHER (18) FROM SHAFT.
5. TAG AND DISCONNECT ELECTRICAL LEADS (20, 21) FROM SWITCH.

SELECTOR SWITCH INSTALLATION

1. CONNECT ELECTRICAL LEADS (20, 21) TO SWITCH (19) AND REMOVE TAGS.
2. PLACE WASHER (18) ON SWITCH SHAFT (19) AND POSITION SWITCH IN APPROPRIATE OPENING IN FRONT PANEL OF CONTROL BOX.
3. SECURE SWITCH (19) WITH WASHER (13) AND NUT (12).
4. REFER TO FIGURE 3-9 FOR FINAL STEPS.

THERMOSTAT REMOVAL

1. REFER TO FIGURE 3-9 FOR PRELIMINARY STEPS.
2. DETACH GROMMET (9) AND CAPILLARY TUBE (10) FROM PANEL (5).
3. TAG AND DISCONNECT ELECTRICAL LEADS FROM THERMOSTAT (2).
4. REMOVE NUTS (7) AND SCREWS (8) AND REMOVE THERMOSTAT (2) FROM CONTROL BOX.

THERMOSTAT INSTALLATION

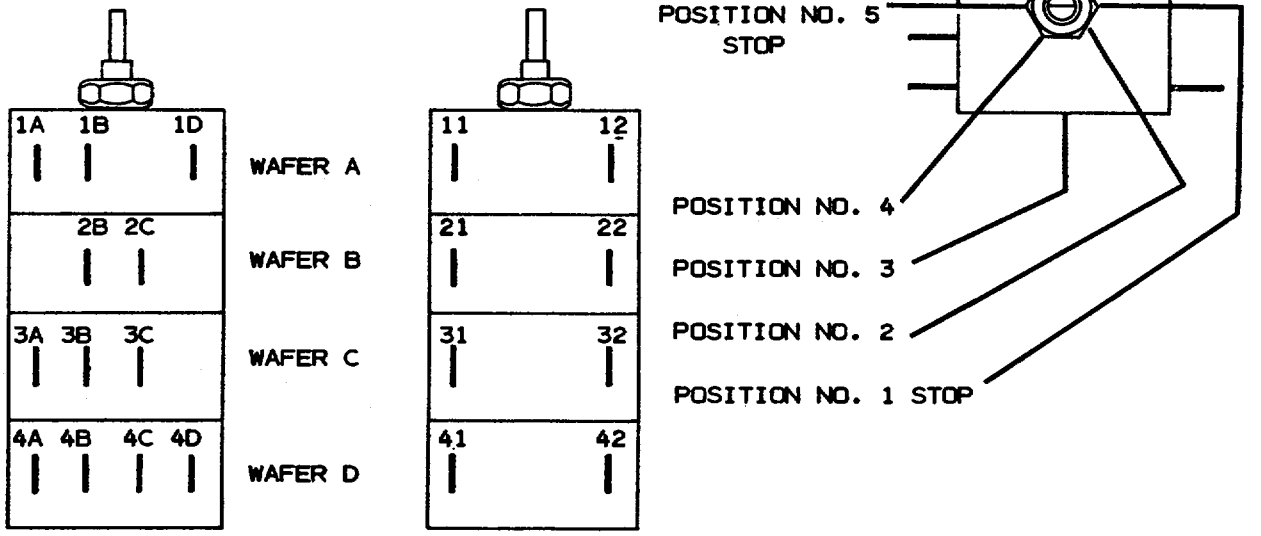
1. POSITION THERMOSTAT (2) ON PANEL (5) AND SECURE WITH SCREWS (8) AND NUTS (7).
2. CONNECT APPROPRIATE ELECTRICAL LEADS TO THERMOSTAT (2) AND REMOVE TAGS.
3. POSITION GROMMET (9) AND CAPILLARY TUBE (10) IN NOTCH ON PANEL (5).
4. REFER TO FIGURE 3-9 FOR FINAL STEPS.

TS5-4120-339-14/3-10

Figure 3-10. Removal and installation of control box panel and switches (sheet 2 of 2)

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

WIRING CHART



CONTINUITY CHECKING

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

TS5-4120-339-14/3-11

Figure 3-11. Test procedures for selector switch

c. Fan Speed Switch.

WARNING

Disconnect the air conditioner from the electrical power before removing the fan speed switch.

(1) Removal. (See figure 3-10.)

(2) Inspection. Refer to figure 3-12 and inspect fan speed switch and related electrical leads for evidence of damage which could impair serviceability.

(3) Test. (See figure 3-12.)

(4) Replace. Replace fan speed switch if evidence is found of damage which would impair serviceability, or if any failure occurs during testing.

(5) Installation. (See figure 3-10.)

d. Thermostat.

WARNING

Disconnect the air conditioner from the electrical power before removing the thermostat.

(1) Removal. (See figure 3-10.)

(2) Inspection. Inspect thermostat, capillary tube, temperature sensing bulb and thermostat electrical leads for evidence of damage which would impair serviceability.

(3) Test. (See figure 3-12.)

(4) Replace. Replace thermostat if evidence is found of damage which would impair serviceability, or if any failure occurs during testing.

(5) Installation. (See figure 3-10.)

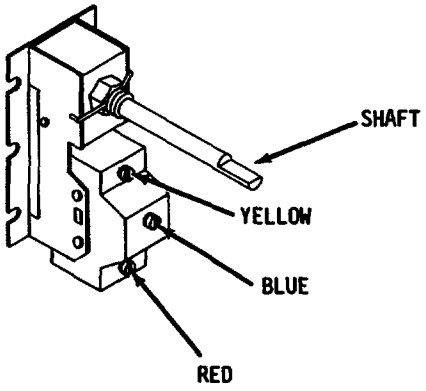
e. Junction Box.

WARNING

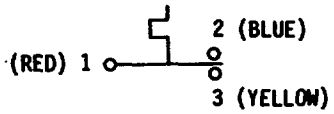
Disconnect the air conditioner from the electrical power before removing the junction box.

(1) Removal. (See figure 3-13.)

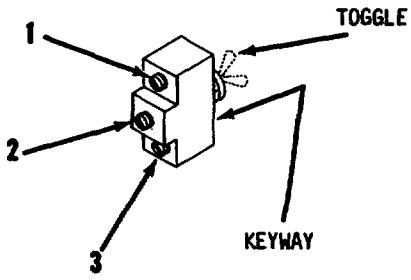
THERMOSTAT TEST



SCHEMATIC DIAGRAM



FAN SPEED SWITCH TEST



FAN SPEED SWITCH CONTINUITY CHECK

1. WITH KEYWAY IN DOWNWARD POSITION, PRESS TOGGLE DOWN. CHECK CONTINUITY BETWEEN TERMINALS 1 and 2.
2. WITH KEYWAY IN DOWNWARD POSITION, PRESS TOGGLE UP. CHECK CONTINUITY BETWEEN TERMINALS 2 and 3.

TEMPERATURE RISE CONTINUITY CHECK

1. PLACE TEMPERATURE SENSING BULB IN A CONTAINER OF WATER AT A TEMPERATURE OF 80°F to 90°F (28°C TO 32°C).
2. WHILE FACING SWITCH SHAFT, ROTATE SHAFT COUNTERCLOCKWISE TO LIMIT.
3. CHECK CONTINUITY BETWEEN TERMINAL 1 (RED) AND TERMINAL 3 (YELLOW).

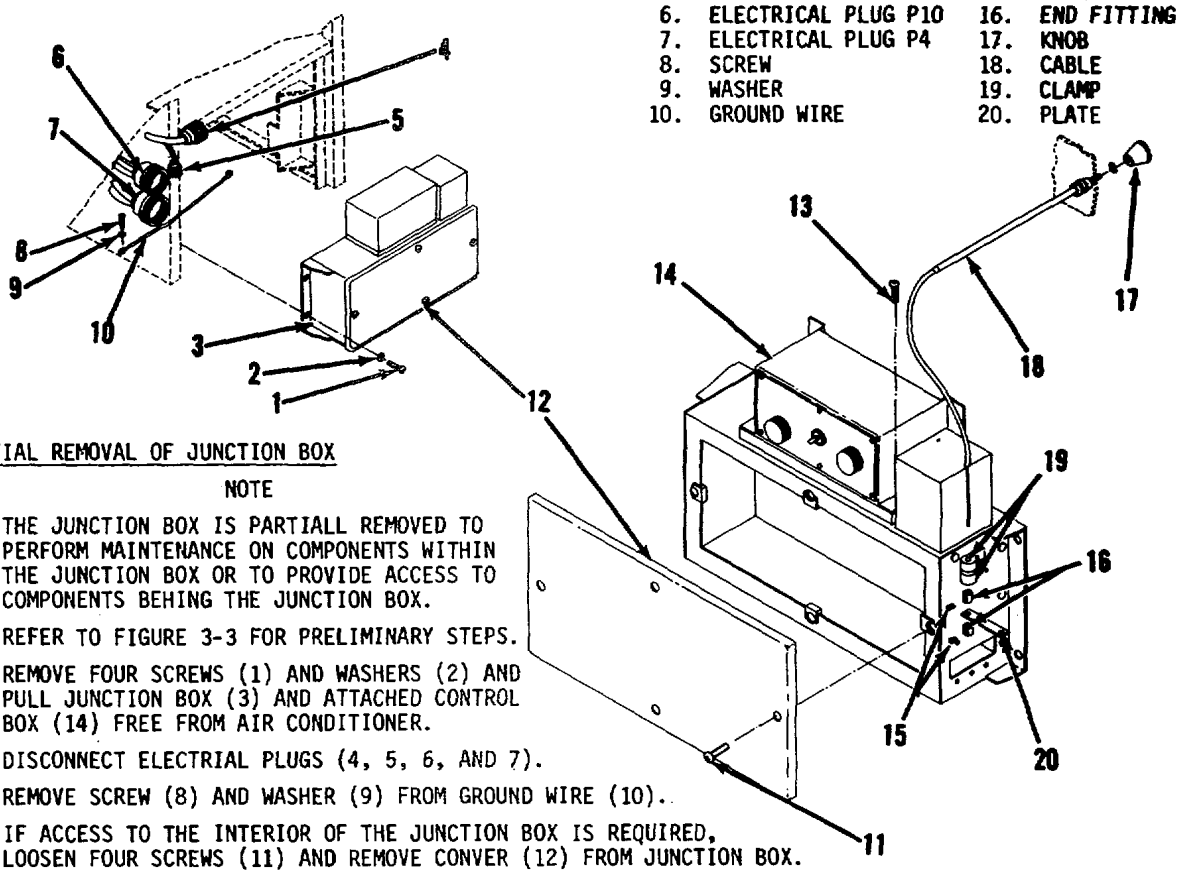
TEMPERATURE DROP CONTINUITY CHECK

1. PLACE TEMPERATURE SENSING BULB IN A CONTAINER OF WATER AT A TEMPERATURE OF 40°F to 50°F (4°C to 10°C).
2. WHILE FACING SWITCH SHAFT, ROTATE SHAFT CLOCKWISE TO LIMIT.
3. CHECK CONTINUITY BETWEEN TERMINAL 1 (RED) AND TERMINAL 2 (BLUE).

TS5-4120-339-14/3-12

Figure 3-12. Test procedures for thermostat and fan speed switch

1. SCREW
2. WASHER
3. JUNCTION BOX
4. ELECTRICAL PLUG P8
5. ELECTRICAL PLUG P11
6. ELECTRICAL PLUG P10
7. ELECTRICAL PLUG P4
8. SCREW
9. WASHER
10. GROUND WIRE
11. SCREW
12. COVER
13. SCREW
14. CONTROL BOX
15. SCREW
16. END FITTING
17. KNOB
18. CABLE
19. CLAMP
20. PLATE



PARTIAL REMOVAL OF JUNCTION BOX

NOTE

THE JUNCTION BOX IS PARTIALL REMOVED TO PERFORM MAINTENANCE ON COMPONENTS WITHIN THE JUNCTION BOX OR TO PROVIDE ACCESS TO COMPONENTS BEHING THE JUNCTION BOX.

1. REFER TO FIGURE 3-3 FOR PRELIMINARY STEPS.
2. REMOVE FOUR SCREWS (1) AND WASHERS (2) AND PULL JUNCTION BOX (3) AND ATTACHED CONTROL BOX (14) FREE FROM AIR CONDITIONER.
3. DISCONNECT ELECTRIAL PLUGS (4, 5, 6, AND 7).
4. REMOVE SCREW (8) AND WASHER (9) FROM GROUND WIRE (10).
5. IF ACCESS TO THE INTERIOR OF THE JUNCTION BOX IS REQUIRED, LOOSEN FOUR SCREWS (11) AND REMOVE CONVER (12) FROM JUNCTION BOX.

REMOVAL (FOR REPLACEMENT OF JUNCTION BOX)

1. PERFORM STEPS 1 THROUGH 5 OF PARTIAL REMOVAL PROCEDURE, ABOVE.
2. REMOVE FOUR SCREWS (13) AND SEPARATE CONTROL BOX (14) FROM JUNCTION BOX (3).
3. LOOSEN SCREWS (15) IN TO END FITTINGS (16) AND PULL ON KNOB (17) UNTIL CABLE (18) IS PULLED OUT OF CLAMPS (19).
4. REMOVE JUNCTION BOX FROM UNIT.

INSTALLATION OF JUNCTION BOX

1. IF JUNCTION BOX HAS BEEN ONLY PARTIALLY REMOVED, PROCEED TO STEP 4. IF JUNCTION BOX HAS BEEN FULLY REMOVED, PROCEED AS FOLLOWS:
2. POSITION JUNCTION BOX NEAR THE UNIT AND THREAD CABLE (18) THROUGH CLAMPS (19), UPPER END FITTING (16), PLATE (20), AND LOWER END FITTING (16). SECURE CABLE (18) TO END FITTINGS WITH TWO SCREWS (15).
3. POSITION CONTROL BOX (14) ON JUNCTION BOX (3) AND SECURE WITH FOUR SCREWS (13).
4. IF COVER (12) HAS BEEN REMOVED, POSITION COVER ON JUNCTION BOX AND SECURE WITH FOUR SCREWS (11).
5. POSITION GROUND WIRE (10) ON AIR CONDITIONER CASTING AND SECURE WITH WASHER (9) AND SCREW (8).
6. CONNNECT ELECTRICAL PLUGS (4, 5, 6, AND 7).
7. POSITION JUNCTION BOX IN AIR CONDITIONER AND SECURE WITH FOUR WASHERS (2) AND SCREWS (1).
8. REFER TO FIGURE 3-3 FOR FINAL STEPS.

TS5-4120-339-14/3-13

Figure 3-13. Removal and installation of junction box

(2) Inspection. Inspect the junction box for defective or missing attaching hardware and for damage which would impair serviceability.

(3) Repair.

(a) Replace defective or missing attaching hardware.
(b) If practical, replace defective or burned wiring.

(4) Replace. Replace the junction box if damaged to an extent which would impair serviceability.

(5) Installation. (See figure 3-13.)

f. Compressor Relay K1, Heater Relay K2 and Phase Sequence Relay K5.

WARNING

Disconnect the air conditioner from the electrical power before removing relays.

(1) Removal. (See figure 3-14.)

(2) Inspection. Inspect each relay for evidence of damage which would impair serviceability.

(3) Test. (See figure 3-15.)

(4) Replace.

(a) Replace any relay (K1, K2 or K5) which shows evidence of damage which would impair serviceability.
(b) Replace any relay (K1, K2 or E5) which fails any test procedure listed.

(5) Installation. (See figure 3-14.)

g. Fan Relays K7 and K8.

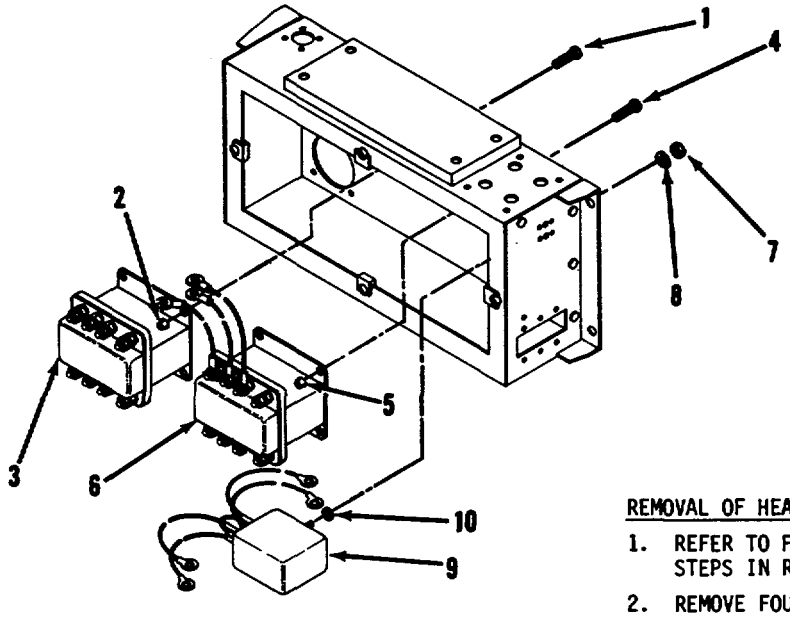
WARNING

Disconnect the air conditioner from the electrical power before removing relays.

(1) Removal. (See figure 3-16.)

(2) Inspection. Inspect each relay for evidence of damage which would impair serviceability.

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



1. SCREW
2. NUT
3. HEATER RELAY K2
4. SCREW
5. NUT
6. COMPRESSOR RELAY K1
7. NUT
8. WASHER
9. PHASE SEQUENCE RELAY K5
10. PACKING

REMOVAL OF HEATER RELAY K2

1. REFER TO FIGURE 3-13 FOR PRELIMINARY STEPS IN REMOVAL OF HEATER RELAY K2.
2. REMOVE FOUR SCREWS (1) AND NUTS (2) AND REMOVE RELAY K2 (3) FROM JUNCTION BOX.
3. TAG AND DISCONNECT ELECTRICAL LEADS FROM RELAY K2 (3).

INSTALLATION OF HEATER RELAY K2

1. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON RELAY K2 (3) AND REMOVE TAGS.
2. POSITION RELAY K2 (3) IN JUNCTION BOX AND SECURE WITH FOUR SCREWS (1) AND NUTS (2).
3. REFER TO FIGURE 3-13 FOR FINAL STEPS.

REMOVAL OF COMPRESSOR RELAY K1

1. REFER TO FIGURE 3-13 FOR PRELIMINARY STEPS.
2. REMOVE FOUR SCREWS (4) AND NUTS (5) AND REMOVE RELAY K1 (6) FROM JUNCTION BOX.
3. TAG AND DISCONNECT ELECTRICAL LEADS FROM RELAY K1 (6).

INSTALLATION OF COMPRESSOR RELAY K1

1. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON RELAY K1 (6) AND REMOVE TAGS.
2. POSITION RELAY K1 (6) IN JUNCTION BOX AND SECURE WITH FOUR SCREWS (4) AND NUTS (5).
3. REFER TO FIGURE 3-13 FOR FINAL STEPS.

REMOVAL OF PHASE SEQUENCE RELAY K5

1. REFER TO FIGURE 3-13 FOR PRELIMINARY STEPS.
2. TAG AND DISCONNECT RELAY K5 (9) ELECTRICAL LEADS FROM COMPONENTS IN JUNCTION BOX.
3. REMOVE THREE NUTS (7) AND WASHERS (8) AND REMOVE RELAY K5 (9) FROM JUNCTION BOX.
4. REMOVE THREE PACKINGS (10) FROM STUDS OF RELAY K5 (9).

INSTALLATION OF PHASE SEQUENCE RELAY K5

1. PLACE THREE PACKINGS (10) ON STUDS OF RELAY K5 (9).
2. POSITION RELAY K5 (9) IN JUNCTION BOX AND SECURE WITH THREE NUTS (7) AND WASHERS (8).
3. CONNECT RELAY K5 ELECTRICAL LEADS TO APPROPRIATE THERMINALS IN JUNCTION BOX AND REMOVE TAGS.
4. REFER TO FIGURE 3-13 FOR FINAL STEPS.

TS5-4120-339-14/3-14

Figure 3-14. Removal and installation of relays K1, K2 and K5

DE-ENERGIZED
CHECK FOR SHORT CIRCUIT BETWEEN
A1 AND A2
B1 AND B2
C1 AND C2

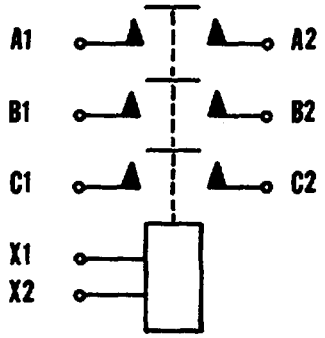
TABLE A

DE-ENERGIZED
CHECK FOR CONTINUITY BETWEEN
X1 AND X2

TABLE B

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

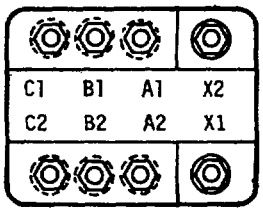
TABLE C



K1 AND K2 SCHEMATIC

TEST PROCEDURES FOR RELAYS K1 AND K2

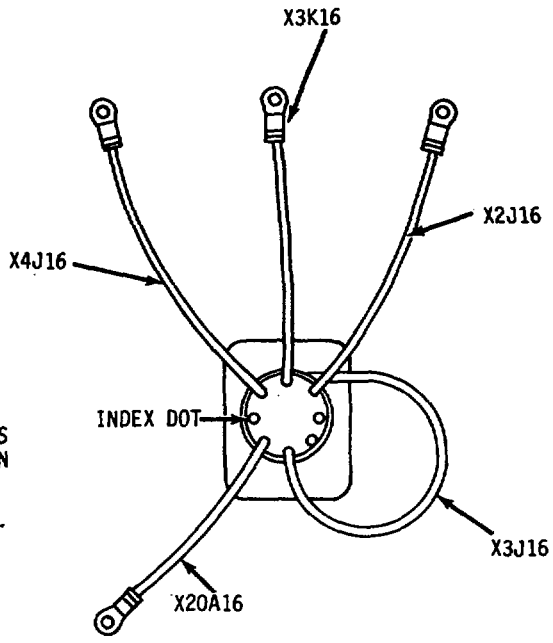
1. WITH RELAY DE-ENERGIZED, CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS SHOWN IN TABLE A. IF ANY SHORT CIRCUIT IS FOUND, REPLACE RELAY.
2. WITH RELAY DE-ENERGIZED, CHECK FOR CONTINUITY BETWEEN TERMINALS SHOW IN TABLE B IF ANY OPEN CIRCUIT IS FOUND, REPLACE RELAY.
3. ENERGIZE RELAY COIL BETWEEN TERMINALS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



K1 AND K2 TERMINAL LOCATION

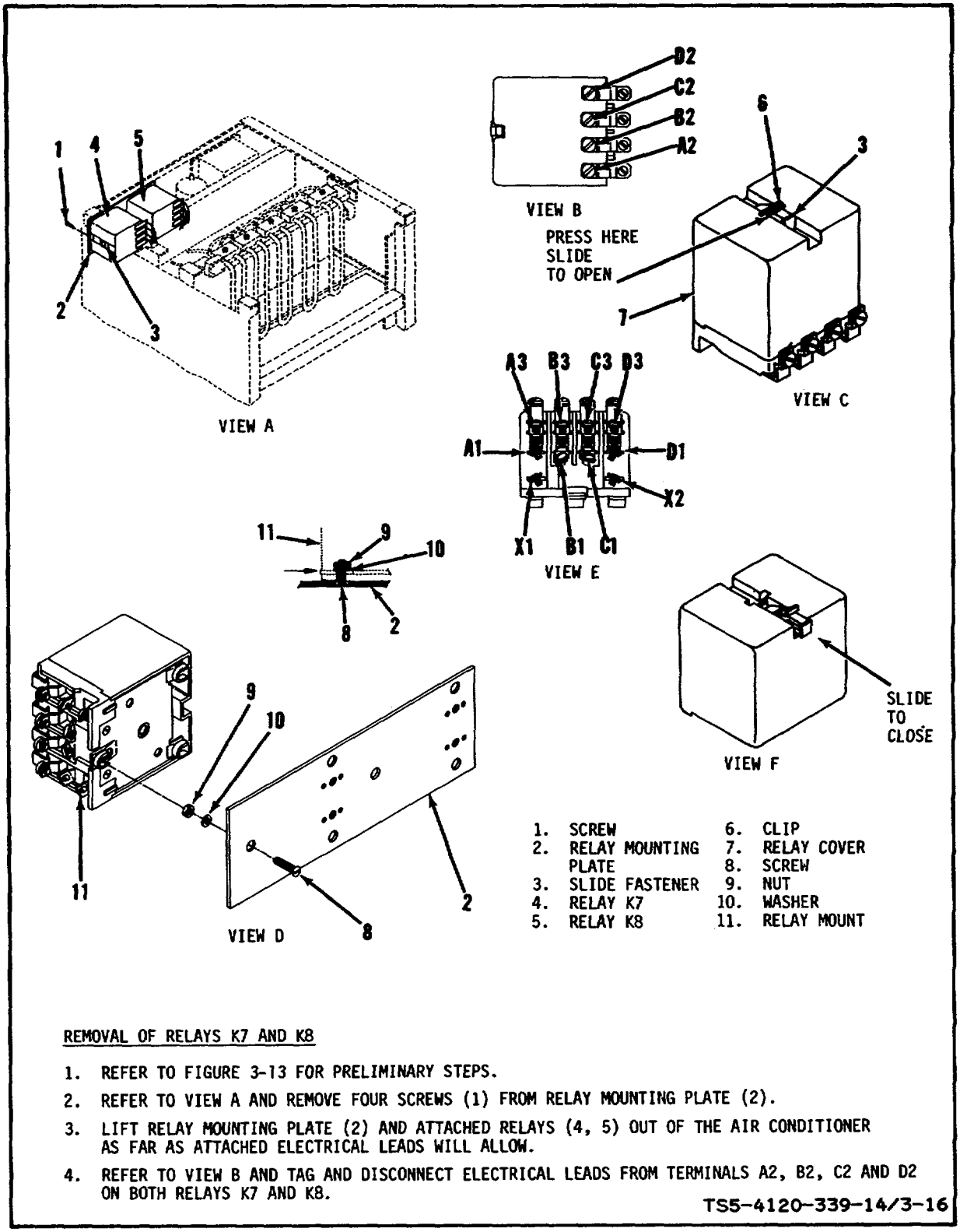
TEST PROCEDURE FOR RELAY K5

1. WITH RELAY DE-ENERGIZED, AND ELECTRICAL LEADS DISCONNECTED, CHECK FOR SHORT CIRCUIT BETWEEN WIRES X20A16, X4J16, X3J16 AND X2J16.
2. IF ANY SHORT CIRCUIT IS FOUND, REPLACE RELAY.



TS5-4120-339-14/3-15

Figure 3-15. Test procedures for relays K1, K2 and K5



REMOVAL OF RELAYS K7 AND K8

1. REFER TO FIGURE 3-13 FOR PRELIMINARY STEPS.
2. REFER TO VIEW A AND REMOVE FOUR SCREWS (1) FROM RELAY MOUNTING PLATE (2).
3. LIFT RELAY MOUNTING PLATE (2) AND ATTACHED RELAYS (4, 5) OUT OF THE AIR CONDITIONER AS FAR AS ATTACHED ELECTRICAL LEADS WILL ALLOW.
4. REFER TO VIEW B AND TAG AND DISCONNECT ELECTRICAL LEADS FROM TERMINALS A2, B2, C2 AND D2 ON BOTH RELAYS K7 AND K8.

TS5-4120-339-14/3-16

Figure 3-16. Removal and installation of relays K7 and K8 (sheet 1 of 2)

5. REFER TO VIEW C, AND ON RELAY K7, MOVE THE SLIDE FASTENER (3) IN THE DIRECTION INDICATED UNTIL DISENGAGED FROM CLIP (6).

6. SLIDE RELAY COVER (7) OFF RELAY K7.

7. REFER TO VIEW D AND LOOSEN THREE SCREWS (8) AND NUTS (9) ON RELAY K7.

8. REFER TO VIEW E AND, ON RELAY K7, TAG AND DISCONNECT ELECTRICAL LEADS FROM TERMINALS A3, B3, C3, D3, A1, B1, C1, D1, X1 AND X2.

9. PERFORM STEPS 5 THROUGH 8 ON RELAY K8.

INSTALLATION OF RELAYS K7 AND K8

1. REFER TO VIEW D AND SLIDE RELAY K8 ONTO THE RELAY MOUNTING PLATE (2) SO THAT THE THREE NUTS (9) AND WASHERS (10) ARE ABOVE RELAY MOUNT (11). THE SCREWS AND NUTS SHOULD BE LEFT LOOSELY ATTACHED TO EACH OTHER WHILE DOING THIS.

2. TIGHTEN THREE SCREWS (8) AND NUTS (9) ON RELAY K8.

3. REFER TO VIEW E AND, ON RELAY K8, ATTACH APPROPRAITE ELECTRICAL LEADS TO TERMINALS A3, B3, C3, D3, A1, B1, C1, D1, X1 AND X2. REMOVE TAGS FROM ELECTRICAL LEADS.

4. SLIDE THE RELAY COVER (7) ONTO RELAY K8.

5. REFER TO VIEW F AND, ON RELAY K8, MOVE THE SLIDE FASTENER (3) IN THE DIRECTION INDICATED UNTIL IT ENGAGES CLIP (6).

6. PERFORM STEPS 1 THROUGH 5 ON RELAY K7.

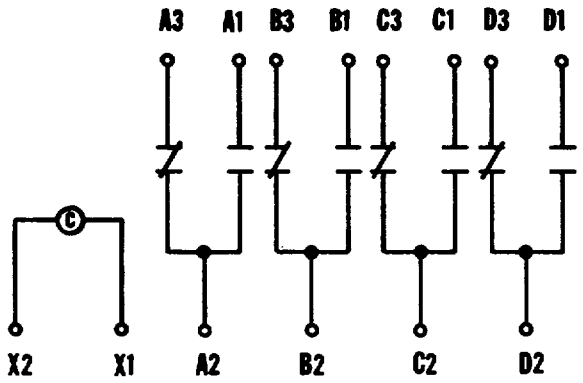
7. REFER TO VIEW B AND ATTACH APPROPRIATE ELECTRICAL LEADS TO TERMINALS A2, B2, C2, AND D2 ON BOTH RELAYS K7 AND K8. REMOVE TAGS FROM ELECTRICAL LEADS.

8. REFER TO VIEW A AND POSITION RELAY MOUNTING PLATE (2) AND ATTACHED RELAYS AGAINST THE REAR PANEL OF THE AIR CONDITIONER. SECURE RELAY MOUNTING PLATE WITH FOUR SCREWS (1).

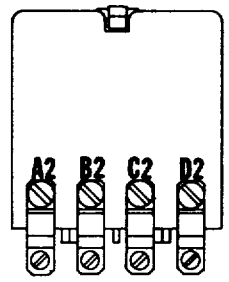
9. REFER TO FIGURE 3-13 FOR FINAL STEPS.

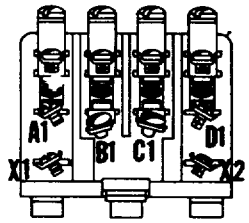
TS5-4120-339-14/3-16

Figure 3-16. Removal and installation of relays K7 and K8 (sheet 2 of 2)



SCHEMATIC DIAGRAM





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

TABLE A

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

TABLE B

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

TABLE C

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

TABLE D

TEST PROCEDURES FOR RELAYS K7 AND K8

1. WITH RELAY DE-ENERGIZED, CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN IN TABLE A. REPLACE RELAY IF ANY OPEN CIRCUIT IS FOUND.
2. WITH RELAY DE-ENERGIZED, CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS SHOWN IN TABLE B. REPLACE RELAY IF ANY SHORT CIRCUIT IS FOUND.
3. ENERGIZE RELAY COIL BETWEEN TERMINALS X1 AND X2 WITH $28^{\pm}$ 1 VDC.
4. WITH RELAY ENERGIZED, CHECK FOR CONTINUITY BETWEEN TERMINALS SHOWN IN TABLE C. REPLACE RELAY IF ANY OPEN CIRCUIT IS FOUND.
5. WITH RELAY ENERGIZED, CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS SHOWN IN TABLE D. REPLACE RELAY IF ANY SHORT CIRCUIT IS FOUND.
6. DE-ENERGIZE RELAY.

TS5-4120-339-14/3-17

Figure 3-17. Test procedures for relays K7 and K8

(4) Replace.

(a) Replace any relay (K7 or K8) which shows evidence of damage which would impair serviceability.
(b) Replace any relay (K7 or K8) which fails any test procedure listed.

(5) Installation. (See figure 3-16.)

h. Fuses F1, F2 and F3.

WARNING

Disconnect the air conditioner from the electrical power before removing fuses.

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

(2) Inspection. Inspect the fuses for evidence of damage which would impair serviceability.

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

(4) Replace.

(a) Replace fuse F1, F2 or F13 if evidence is found of damage which would impair serviceability.
(b) Replace any fuse (F1, F2 or F3) which does not check out for continuity during testing.

(5) Installation. (See figure 3-18.)

j. Rectifier.

WARNING

Disconnect the air conditioner from the electrical power before removing rectifier.

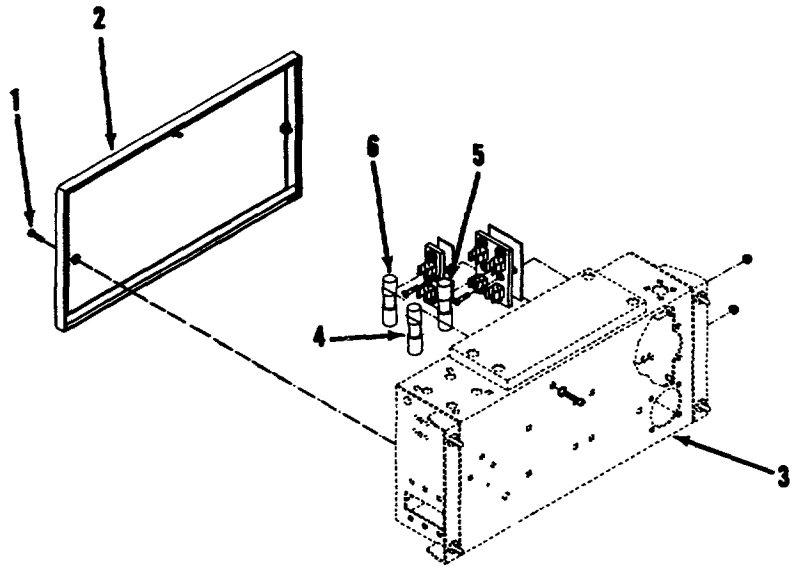
(1) Removal. (See figure 3-19.)

(2) Inspection. Inspect the rectifier for electrical burns and for any evidence of damage which would impair serviceability.

(3) Test. (See figure 3-19.)

(4) Replace.

(a) Replace the rectifier if evidence is found of damage which would impair serviceability.



1. SCREW
2. COVER
3. JUNCTION BOX
4. FUSE F1
5. FUSE F2
6. FUSE F3

REMOVAL OF FUSES F1, F2 AND F3

1. REFER TO FIGURE 3-3 FOR PRELIMINARY STEPS.
2. LOOSEN FOUR SCREWS (1) AND REMOVE COVER (2) FROM JUNCTION BOX (3).
3. GRASP FUSES (4, 5, 6) WITH FUSE PULLER AND PULL LOOSE FROM FUSE HOLDER.

TEST OF FUSES F1, F2 AND F3

1. USING A CIRCUIT TESTER, CHECK FOR CONTINUITY BETWEEN THE TWO ENDS OF EACH FUSE.
2. REPLACE ANY FUSE (F1, F2 OR F3) WHICH DOES NOT CHECK OUT FOR CONTINUITY.

INSTALLATION OF FUSES F1, F2 AND F3

1. USING FUSE PULLER, PRESS EACH FUSE (4, 5, 6) INTO THE APPROPRIATE FUSE HOLDER.
2. POSITION COVER (2) ON JUNCTION BOX (3) AND SECURE WITH FOUR SCREWS (1).
3. REFER TO FIGURE 3-3 FOR FINAL STEPS.

TS5-4120-339-14/3-18

Figure 3-18. Removal, testing and installation of fuses F1, F2 and F3

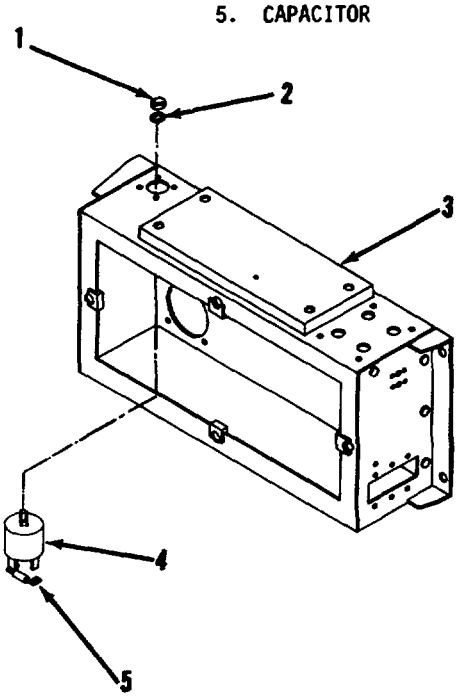
REMOVAL OF RECTIFIER

1. REFER TO FIGURES 3-3 AND 3-13 FOR PRELIMINARY STEPS.
2. REMOVE NUT (1) AND WASHER (2) FROM SHAFT OF RECTIFIER (4).
3. PULL RECTIFIER (4) OUT OF JUNCTION BOX (3).
4. TAG AND DISCONNECT ELECTRICAL LEADS FROM RECTIFIER TERMINALS.
5. IF RECTIFIER IS TO BE REPLACED, REMOVE CAPACITOR (5) FROM RECTIFIER TERMINALS.

INSTALLATION OF RECTIFIER

1. IF INSTALLING A REPLACEMENT RECTIFIER, CONNECT CAPACITOR (5) BETWEEN RECTIFIER TERMINALS 2(-) AND 3(+).
2. CONNECT ELECTRICAL LEADS TO APPROPRIATE RECTIFIER TERMINALS AND REMOVE TAGS.
3. POSITION RECTIFIER IN JUNCTION BOX AND SECURE WITH NUT (1) AND WASHER (2).
4. REFER TO FIGURES 3-3 AND 3-13 FOR FINAL STEPS.

1. NUT
2. WASHER
3. JUNCTION BOX
4. RECTIFIER
5. CAPACITOR



CONTINUITY CHECK

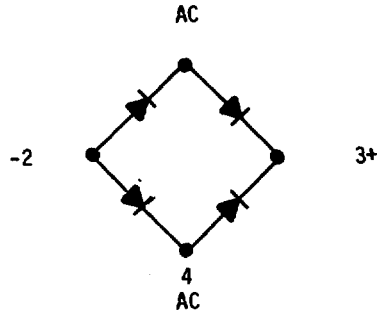
NEGATIVE PROBE ON TERMINAL	POSITIVE PROBE ON TERMINAL
2	4
4	3
2	1
1	3

TABLE A

SHORT CIRCUIT CHECK

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

TABLE B



SCHEMATIC DIAGRAM

RECTIFIER TEST

1. REMOVE THE RECTIFIER FROM THE CIRCUIT.
2. REFER TO TABLE A AND CONTINUITY CHECK THE RECTIFIER. REPLACE RECTIFER IF NO CONTINUITY BETWEEN TERMINALS SHOWN.
3. REFER TO TABLE B AND SHORT CIRCUIT CHECK THE RECTIFIER. REPLACE RECTIFIER IF ANY SHORT CIRCUIT IS FOUND.

TS5-4120-339-14/3-19

Figure 3-19. Removal, installation and testing of rectifier

(b) Replace the rectifier if any test failure occurs during continuity checking.
(c) Replace the rectifier if any short circuit is found during testing.

(5) Installation. (See figure 3-19.)

k. Transformer.

WARNING

Disconnect the air conditioner from the electrical power before removing the transformer.

(1) Removal. (See figure 3-20.)

(2) Inspection. Inspect the transformer for evidence of damage which could impair serviceability.

(3) Test. (See figure 3-20.)

(4) Replace.

(a) Replace the transformer if evidence is found of damage which could impair serviceability.
(b) Replace the transformer if any test failure occurs.

(5) Installation. (See figure 3-20.)

l. Junction Box Electrical Receptacles.

WARNING

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

(1) Removal. (See figure 3-21.)

(2) Inspection. Inspection junction box electrical receptacles for evidence of burned wires, frayed insulation or other damage which could impair serviceability.

(3) Repair. If receptacles are OK, replace any defective or damaged wires.

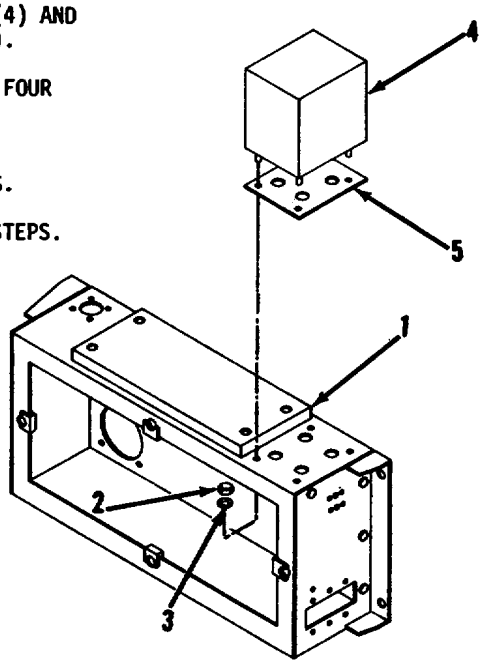
(4) Replace. If receptacles are damaged to an extent which could impair serviceability, replace receptacles.

REMOVAL OF TRANSFORMER

1. REFER TO FIGURES 3-3 AND 3-9 FOR PRELIMINARY STEPS.
2. TAG AND REMOVE ELECTRICAL LEADS FROM TRANSFORMER.
3. REMOVE FOUR NUTS (2) AND WASHERS (3) FROM TRANSFORMER MOUNTING STUDS.
4. REMOVE TRANSFORMER (4) AND INSULATION (5) FROM JUNCTION BOX (1).
5. SEPARATE INSULATION (5) FROM TRANSFORMER (4).

INSTALLATION OF TRANSFORMER

1. POSITION INSULATION (5) ON TRANSFORMER (4) AND POSITION TRANSFORMER ON JUNCTION BOX (1).
2. SECURE TRANSFORMER TO JUNCTION BOX WITH FOUR WASHERS (3) AND NUTS (2).
3. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON TRANSFORMER AND REMOVE TAGS.
4. REFER TO FIGURES 3-3 AND 3-9 FOR FINAL STEPS.

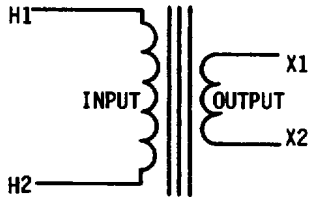


1. JUNCTION BOX
2. NUT
3. WASHER
4. TRANSFORMER
5. INSULATION

TRANSFORMER TEST

TS5-4120-339-14/3-20

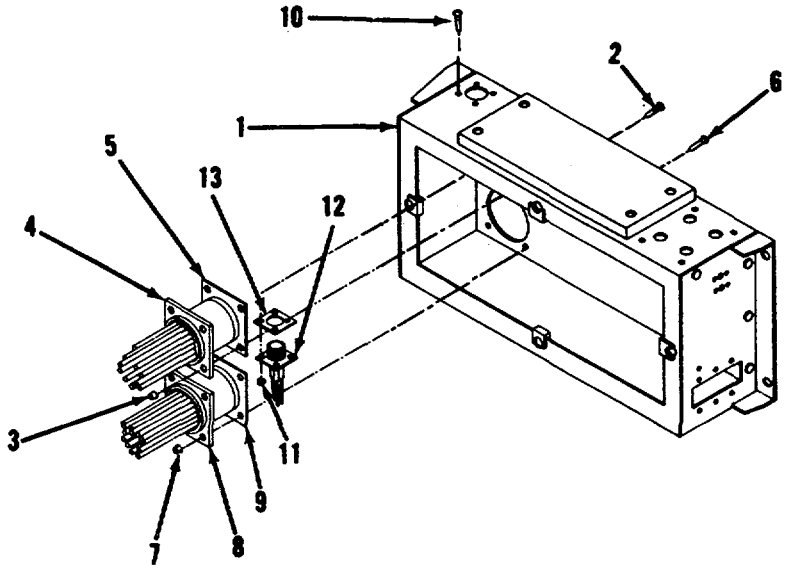
1. CHECK FOR CONTINUITY BETWEEN TERMINALS H1 AND H2. IF NO CONTINUITY, REPLACE TRANSFORMER.
2. CHECK FOR CONTINUITY BETWEEN TERMINALS X1 AND X2. IF NO CONTINUITY, REPLACE TRANSFORMER.
3. CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS H1 AND X1. IF TERMINALS ARE SHORTED, REPLACE TRANSFORMER.
4. CHECK FOR SHORT CIRCUIT BETWEEN H1 AND THE TRANSFORMER CASE. IF SHORT CIRCUIT IS FOUND, REPLACE TRANSFORMER.
5. CHECK FOR SHORT CIRCUIT BETWEEN X1 AND THE TRANSFORMER CASE. IF SHORT CIRCUIT IS FOUND, REPLACE TRANSFORMER.



TRANSFORMER SCHEMATIC DIAGRAM

Figure 3-20. Removal, installation and test of transformer

1. JUNCTION BOX
2. SCREW
3. NUT
4. RECEPTACLE J10
5. GASKET
6. SCREW
7. NUT
8. RECEPTACLE J4
9. GASKET
10. SCREW
11. NUT
12. RECEPTACLE J11
13. GASKET



NOTE

ELECTRICAL RECEPTACLES J10, J4 AND J11 ARE NORMALLY REMOVED FROM THE JUNCTION BOX ONLY TO PROVIDE ACCESS TO OTHER COMPONENTS. DO NOT DISCONNECT WIRE BUNDLE FROM JUNCTION BOX TERMINALS UNLESS THE RECEPTABLE IS TO BE REPLACED.

REMOVAL OF RECEPTACLE J10

1. REMOVE FOUR SCREWS (2) AND NUTS (3) FROM RECEPTACLE J10 (4).
2. PULL RECEPTACLE J10 AND ATTACHED WIRE BUNDLE OUT OF JUNCTION BOX (1) AT RECEPTACLE END ONLY. GASKET (5) MAY BE LEFT IN PLACE ON THE RECEPTACLE.

INSTALLATION OF RECEPTACLE J10

1. POSITION RECEPTACLE J10 (4) AND GASKET (5) IN JUNCTION BOX (1).
2. SECURE RECEPTACLE AND GASKET WITH FOUR SCREWS (2) AND NUTS (3).

REMOVAL OF RECEPTACLE J4

1. REMOVE FOUR SCREWS (6) AND NUTS (7) FROM CONNECTOR J4 (8).
2. *PULL RECEPTACLE J4 (8) AND ATTACHED WIRE BUNDLE OUT OF JUNCTION BOX (1) AT* RECEPTACLE END ONLY. GASKET (9) MAY BE LEFT IN PLACE ON THE RECEPTACLE.

INSTALLATION OF RECEPTACLE J4

1. POSITION RECEPTACLE J4 (8) AND GASKET (9) IN JUNCTION BOX (1).
2. SECURE RECEPTACLE J4 (8) AND GASKET WITH FOUR SCREWS (6) AND NUTS (7).

REMOVAL OF RECEPTACLE J11

1. REMOVE FOUR SCREWS (10) AND NUTS (11) FROM RECEPTACLE J11 (12).
2. PULL RECEPTACLE L11 (12) AND ATTACHED WIRE BUNDLE OUT OF JUNCTION BOX (1) AT RECEPTACLE END ONLY. GASKET (13) MAY BE LEFT IN PLACE ON THE RECEPTACLE.

INSTALLATION OF RECEPTACLE J11

1. POSITION RECEPTACLE J11 (12) AND GASKET (13) IN JUNCTION BOX (1).
2. *SECURE RECEPTACLE AND GASKET WITH FOUR SCREWS (10) AND NUTS (11).* TS5-4120-339-13/3-21

Figure 3-21. Removal and installation of junction box electrical receptacles

(5) Installation. (See figure 3-21.)

m. Circuit Breaker.

WARNING

Disconnect the air conditioner from the electrical power before attempting to remove the circuit breaker.

(1) Removal. (See figure 3-22.)

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

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

(4) Replace.

(a) Replace the circuit breaker if evidence is found of damage which could impair serviceability.
(b) Replace the circuit breaker if any test failure occurs during testing.

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

n. Terminal Boards TB1 and TB2.

WARNING

Disconnect the air conditioner from the electrical power before attempting to remove terminal boards.

(1) Removal. (See figure 3-23.)

(2) Inspection. Inspect the terminal boards for evidence of damage which would impair serviceability.

(3) Replace. Replace terminal board (TB1 and/or TB2) if evidence is found of damage which would impair serviceability.

(4) Installation. (See figure 3-23.)

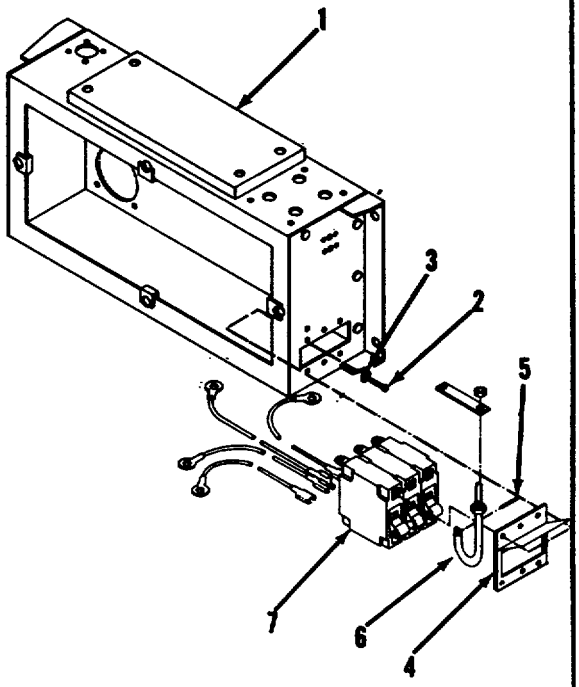
REMOVAL OF CIRCUIT BREAKER

1. REFER TO FIGURES 3-3 AND 3-9 FOR PRELIMINARY STEPS.
2. REMOVE SIX SCREWS (2) AND WASHERS (3) AND PULL COVER (4) LOOSE FROM JUNCTION BOX (1).
3. REMOVE PIN (5) FROM ARM (6) AND SEPARATE ARM FROM CIRCUIT BREAKER.
4. TAG AND DISCONNECT ELECTRICAL LEADS FROM CIRCUIT BREAKER (7).
5. REMOVE CIRCUIT BREAKER (7) FROM JUNCTION BOX.

INSTALLATION OF CIRCUIT BREAKER

1. POSITION CIRCUIT BREAKER IN JUNCTION BOX AND CONNECT ELECTRICAL LEANDS TO APPROPRIATE TERMINALS ON CIRCUIT BREAKER (7). REMOVE TAGS FROM ELECTRICAL LEADS.
2. INSERT END OF ARM (6) THROUGH HOLE IN COVER.
3. POSITION END OF ARM (6) ON CIRCUIT BREAKER SWITCH AND SECURE WITH PIN (5).
4. SECURE COVER (4) AND CIRCUIT BREAKER (7) TO JUNCTION BOX (1) WITH SIX SCREWS (2) AND WASHERS (3).
5. REFER TO FIGURES 3-3 AND 3-9 FOR FINAL STEPS.

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

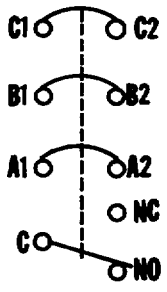


CIRCUIT BREAKER SWITCH TO "ON" POSITION: CHECK FOR CONTINUITY BETWEEN TERMINALS
C1 AND C2
B1 AND B2
A1 AND A2
C AND NO

TABLE C

CIRCUIT BREAKER SWITCH TO "OFF" POSITION: CHECK FOR SHORT CIRCUIT BETWEEN TERMINALS
C1 AND C2
B1 AND B2
A1 AND A2
C AND NO

TABLE D



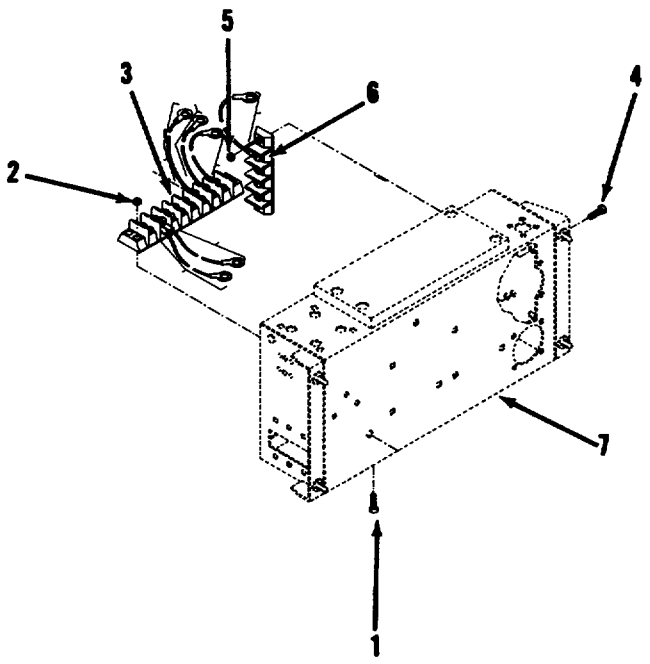
CIRCUIT BREAKER SCHEMATIC DIAGRAM

CIRCUIT BREAKER TEST

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

TS5-4120-339-14/3-22

Figure 3-22. Removal, installation and testing of circuit breaker



1. SCREW
2. NUT
3. TERMINAL BOARD TB1
4. SCREW
5. NUT
6. TERMINAL BOARD TB2
7. JUNCTION BOX

REMOVAL OF TERMINAL BOARD TB1

1. REFER TO FIGURES 3-3 AND 3-9 FOR PRELIMINARY STEPS.
2. REMOVE FOUR SCREWS (1) AND NUTS (2).
3. TAG AND DISCONNECT ELECTRICAL LEADS FROM TB1 (3).
4. REMOVE TB1 (3) FROM JUNCTION BOX (7).

INSTALLATION OF TERMINAL BOARD TB1

1. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON TB1 AND REMOVE TAGS.
2. POSITION TB1 (3) IN JUNCTION BOX AND SECURE WITH FOUR SCREWS (1) AND NUTS (2).
3. REFER TO FIGURES 3-3 AND 3-9 FOR FINAL STEPS.

REMOVAL OF TERMINAL BOARD TB2

1. REFER TO FIGURES 3-3 AND 3-9 FOR PRELIMINARY STEPS.
2. REMOVE TWO SCREWS (4) AND NUTS (5) FROM TERMINAL BOARD (6).
3. TAG AND DISCONNECT ELECTRICAL LEADS FROM TB2.
4. REMOVE TB2 (6) FROM JUNCTION BOX (7).

INSTALLATION OF TERMINAL BOARD TB2

1. CONNECT ELECTRICAL LEADS TO APPROPRIATE TERMINALS ON TB2 AND REMOVE TAGS.
2. POSITION TB2 (6) IN JUNCTION BOX AND SECURE WITH TWO SCREWS (4) AND NUTS (5).
3. REFER TO FIGURES 3-3 AND 3-9 FOR FINAL STEPS.

TS5-4120-339-14/3-23

Figure 3-23. Removal and installation of terminal boards

3-13. REFRIGERANT SYSTEM.

WARNING

Disconnect the air conditioner from the electrical power before performing maintenance on the refrigerant system.

CAUTION

Do not disconnect refrigerant lines from any air conditioner components while performing organizational maintenance procedures on the refrigerant system.

a. High and Low Pressure Cut-Out Switches. Organizational Maintenance is limited to inspecting the cut-out switches.

(1) Removal. (See figure 3-24.)

(2) Inspection.

(a) Inspect both cut-out switches, capillary tubes and connections and electrical leads for evidence of damage which would impair serviceability.
(b) If such damage is found, notify Direct Support Maintenance.
(c) If no such damage is found, proceed to step (3).

(3) Installation. (See figure 3-24.)

b. Pressure Control Switch.

NOTE

Do not remove pressure control switch.

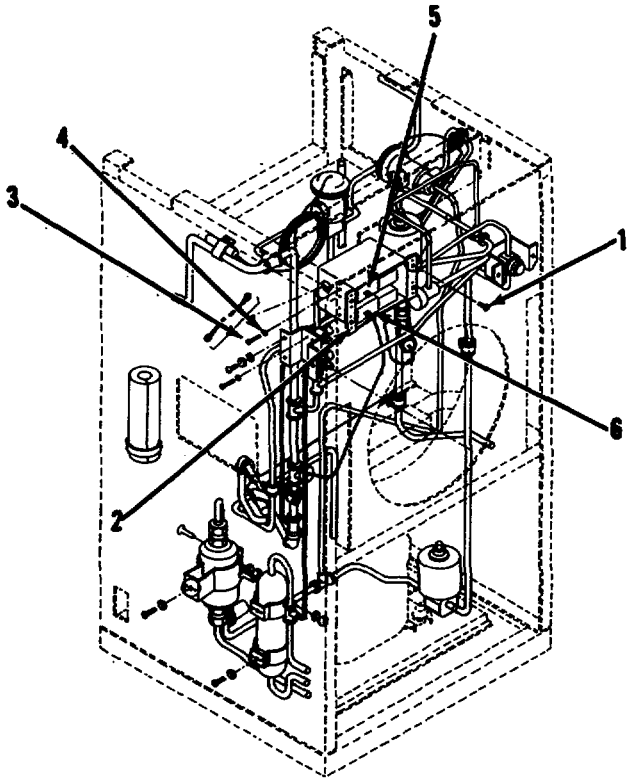
(1) Inspection.

(a) Turn the selector switch to the “OFF" position and disconnect the air conditioner from the electrical power supply.
(b) Refer to figure 3-4 and remove the condenser fan for access to the pressure control switch.
(c) Refer to figure 3-25 and inspect the pressure control switch for damage which would impair serviceability.
(d) If such damage is found, notify Direct Support Maintenance.
(e) If no such damage is found, refer to figure 3-4 and reinstall the condenser fan.

c. Pressure Equalizer Solenoid Valve V2.

(1) Inspection.

1. SCREW
2. ENCLOSURE
3. SCREW
4. WASHER
5. HIGH PRESSURE CUTOUT SWITCH
6. LOW PRESSURE CUTOUT SWITCH



REMOVAL OF CUTOUT SWITCHES

CAUTION

REMOVAL OF CUTOUT SWITCHES AT THE ORGANIZATIONAL MAINTENANCE LEVEL IS FOR INSPECTION PURPOSES ONLY. DO NOT DISCONNECT ELECTRIAL LEADS OR REFRIGERANT CONNECTIONS WHILE REMOVING THE CUTOUT SWITCHES.

1. REFER TO FIGURE 3-3 FOR PRELIMINARY STEPS.
2. REMOVE FOUR SCREWS (1) AND PULL ENCLOSURE (2) AWAY FROM PANEL.
3. REMOVE FOUR SCREWS (3) AND WASHERS (4) AND REMOVE CUTOUT SWITCHES (5, 6) FROM ENCLOSURE.

INSTALLATION OF CUTOUT SWITCHES

1. POSITION CUTOUT SWITCHES (5, 6) IN THE ENCLOSURE (2) AND SECURE WITH FOUR SCREWS (3) AND WASHERS (4).
2. POSITION THE ENCLOSURE ON THE INSIDE OF THE PANEL AND SECURE WITH FOUR SCREWS (1).
3. REFER TO FIGURE 3-3 FOR FINAL STEPS.

TS5-4120-339-14/3-24

Figure 3-24. Removal and installation of cut-out switches

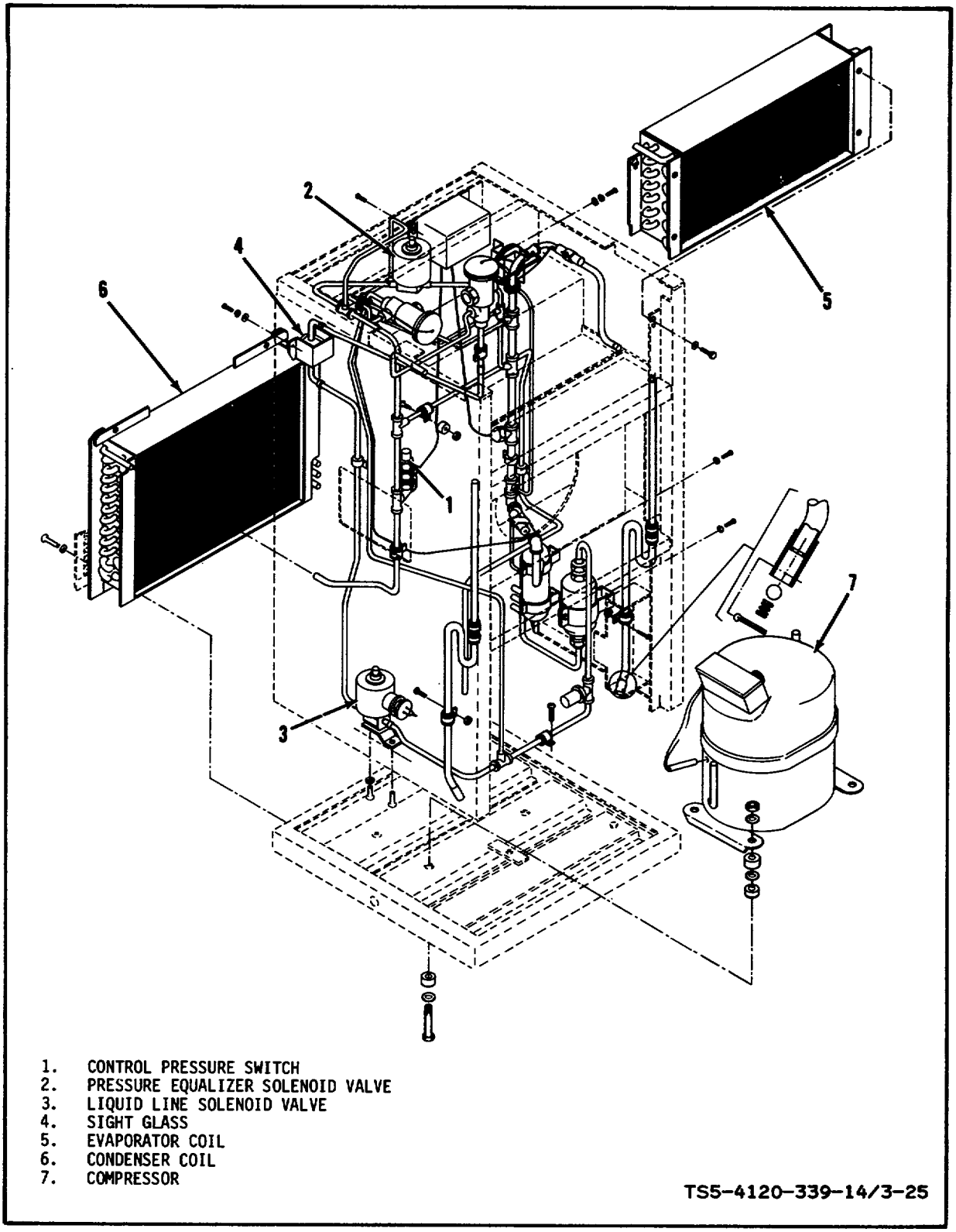


Figure 3-25. Air conditioner refrigerant system

(a) Turn the selector switch to the “OFF" position and disconnect the air conditioner from the electrical power supply.
(b) Refer to figure 3-3 and remove the air conditioner cover and the top panel.
(c) Refer to figure 3-25 and inspect the pressure equalizer solenoid valve for damage which would impair serviceability.
(d) If such damage is found, notify Direct Support Maintenance.
(e) If no such damage is found, proceed to step (2).

(2) Test.

(a) Refer to figure 3-13 and disconnect plug P10 from receptacle J10 on junction box.
(b) Connect a source of dc voltage (set at zero output) across pins "c" and "f" of plug P10.
(c) While listening for a click from the solenoid, slowly increase the output of the dc voltage source. The click should occur at or shortly before the time the voltage has been increased to 20.4 volts. If the test result is satisfactory, proceed to step (d). If the test result is not satisfactory, proceed to step (e).
(d) While listening for a click from the solenoid, slowly decrease the voltage. The click should occur at or shortly before the time the voltage has been decreased to 18 volts. If the test result is satisfactory, proceed to step (f). If the test result is not satisfactory, proceed to step (e).
(e) If pressure equalizer solenoid valve fails to respond properly during testing, notify Direct Support Maintenance.
(f) If pressure equalizer solenoid valve responds properly during testing, refer to figure 3-13 and reconnect plug P10 to receptacle J10 on the junction box.
(g) Refer to figure 3-3 and install the top panel and the air conditioner cover.

d. Liquid Line Solenoid Valve L1.

(1) Inspection.

(a) Turn the selector switch to the “OFF” position and disconnect the air conditioner from the electrical power supply.
(b) Refer to figure 3-3 and remove the front access panel.
(c) Refer to figure 3-25 and inspect the liquid line solenoid valve for damage which would impair serviceability.
(d) If such damage is found, notify Direct Support Maintenance.
(e) If no such damage is found, proceed to step (2).

(2) Test.

(a) Refer to figure 3-13 and disconnect plug P10 from receptacle J10 on junction box.
(b) Connect a source of dc voltage (set at zero output) across pins “m" and "n" of plug P10.
(c) While listening for a click from the solenoid, slowly increase the output of the dc voltage source. The click should occur shortly before the time the voltage has been increased to 20.4 volts. If the test result is satisfactory,

proceed to step (d). If the test result is not satisfactory, proceed to step (e).

(d) When listening for a click from the solenoid, slowly decrease the voltage. The click should occur at or shortly before the time the voltage has been decreased to 18 volts. If the test result is satisfactory, proceed to step (f). If the test result is not satisfactory, proceed to step (e).

(e) If the liquid line solenoid valve fails to respond properly during testing, notify Direct Support Maintenance.

(f) If the liquid line solenoid valve responds properly during testing, refer to figure 3-13 and connect plug P10 to receptacle J10 on the junction box.

(g) Refer to figure 3-3 and install front access panel.

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

f. Evaporator Coil.

(1) Inspection.

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

(b) Refer to figure 3-3 and remove the evaporator discharge grille and the mist eliminator.

(c) Refer to figure 3-25 and inspect the evaporator coil for damage which would impair serviceability. If such damage is found, report the condition to Direct Support Maintenance.

(2) Service.

(a) Clean the evaporator coil with a fiber bristle brush.

(b) Refer to figure 3-3 and install the evaporator discharge grille and the mist eliminator.

g. Condenser Coil.

(1) Inspection.

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

(b) Refer to figure 3-3 and remove the condenser coil guard.

(c) Refer to figure 3-25 and inspect the condenser coil for damage which would impair serviceability. If such damage is found, report the condition to Direct Support Maintenance.

(2) Service.

(a) Clean the condenser coil and fins with a fiber bristle brush.

(b) Refer to figure 3-3 and install the condenser coil guard.

h. Compressor. Maintenance of the compressor at the organizational level is limited to inspection of the compressor.

(1) Refer to figure 3-3 and remove the front access panel.

(2) Refer to figure 3-13 and partially remove the junction box.

(3) Refer to figure 3-25 and inspect the external area of the compressor for obvious defects. If such defects are found, report the condition to Direct Support Maintenance.

(4) If no such defects are found, refer to figure 3-13 and install the junction box and refer to figure 3-3 and install the front access panel.

3-14. CASING ASSEMBLY. Maintenance at the organizational level is limited to inspection of the casing assembly.

a. Refer to figure 3-3 and remove the front access panel, evaporator intake grille, evaporator discharge grille, air filter, air conditioner cover, top panel, condenser fan guard and condenser coil guard.

b. Inspect the casing assembly for damage which would impair serviceability.

c. If such damage is found, report the condition to Direct Support Maintenance.

d. If no such damage is found, refer to figure 3-3 and install the front access panel, evaporator intake grille, evaporator discharge grille, air filter, air conditioner cover, top panel, condenser fan guard and condenser coil guard.

CHAPTER 4

DIRECT SUPPORT MAINTENANCE

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

4-1. REPAIR PARTS.

Repair parts are listed and illustrated in the repair parts and special tools list TM 5-4120-339-24P covering direct support maintenance of this equipment.

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

Tool Kit, Service, Refrigeration Unit, LINW5362 is the only special tool required to perform Direct Support Maintenance on the air conditioner.

Section II. Troubleshooting

4-3. TROUBLESHOOTING TABLE.

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

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

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

Table 4-1. Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. COMPRESSOR WILL NOT START	Step 1. Inspect compressor for burnout (figure 4-18)	Replace burned out compressor (paragraph 4-22).
	Step 2. Inspect for burned out fuses (figure 3-18).	Replace burned out fuses.

Table 4-1. Troubleshooting (continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
COMPRESSOR WILL NOT START (continued)		
	Step 3. Inspect and test circuit breaker (paragraph 3-12m).	Replace damaged or defective circuit breaker.
	Step 4. Inspect and test thermostat (paragraph 3-12d).	Replace damaged or defective thermostat.
	Step 5. Inspect and test selector switch (paragraph 3-12b).	Replace defective or damaged selector switch.
	Step 6. Inspect and test compressor relay (paragraph 3-12f).	Replace defective or damaged compressor relay.
	Step 7. Inspect and test phase sequence relay (paragraph 3-12f).	Replace damaged or defective phase sequence relay.
	Step 8. Inspect for loose electrical connections and defective wiring (figure 3-8).	Tighten loose connections. Repair or replace defective wiring.
	Step 9. Inspect and test high and low pressure cut-out switches (paragraphs 3-13a and 4-12b).	Replace damaged or defective cut-out switch. Adjust cut-out switch if out of adjustment (paragraph 4-12b).
2. COMPRESSOR SHORT CYCLES		
	Step 1. Check air conditioner operating pressures for excessive refrigerant in system (table 4-3).	Release excess refrigerant from system until proper charge is attained (figure 4-2).
	Step 2. Inspect and test liquid line solenoid valve (paragraph 3-13d).	Repair or replace damaged or defective valve (paragraph 4-17).

Table 4-1. Troubleshooting (continued)

MALFUNCTION / TEST OR INSPECTION	CORRECTIVE ACTION
Step 3. Inspect and test pressure equalizer solenoid valve (paragraph 3-13c).	Repair or replace damaged or defective pressure equalizer solenoid valve (paragraph 4-17).
3. INSUFFICIENT COOLING	
Step 1. Check for insufficient refrigerant in system (bubbles in sight glass).	Add refrigerant (paragraph 4-11).
Step 2. If adding refrigerant to the system does not clear up bubbles in sight glass, there may be air in the system.	Open system and remove refrigerant (figure 4-2), purge system (paragraph 4-8), evacuate system (figure 4-4), and recharge the system with refrigerant (paragraph 4-10).
Step 3. Check for inoperative fans.	Perform corrective actions listed for malfunction 10 of this troubleshooting table.
Step 4. Check air conditioner operating pressures for excessive refrigerant in system (table 4-3).	Release excess refrigerant from system until the proper charge is attained (figure 4-2).
Step 5. Inspect expansion valve and check superheat (paragraph 4-15).	Repair or replace damaged or defective expansion valve. Adjust expansion valve if superheat is not correct (paragraph 4-15).
Step 6. Inspect quench valve and check superheat (paragraph 4-16).	Repair or replace damaged or defective quench valve. Adjust quench valve if superheat is not correct (paragraph 4-16).
Step 7. Inspect and test liquid line solenoid valve (paragraph 3-13d).	Repair or replace damaged or defective liquid line solenoid valve (paragraph 4-17).

Table 4-1. Troubleshooting (continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
INSUFFICIENT COOLING (continued)		
	Step 8. Inspect and test pressure equalizer solenoid valve (paragraph 3-13c).	Repair or replace damaged or defective pressure equalizer solenoid valve (paragraph 4-17).
	Step 9. Clogged dehydrator	Replace dehydrator (figure 4-16).
	Step 10. Restriction in liquid line.	Open system and remove refrigerant (figure 4-2), purge system (paragraph 4-8), evacuate system (figure 4-4), and recharge the system with refrigerant (paragraph 4-10).
4. REFRIGERANT SYSTEM CONTINUOUSLY LOOSING REFRIGERANT		
	Step 1. Using available leak detector, check refrigerant tubing and components for leaks.	Repair leaks if possible. Replace unrepairable tubing or components.
	Step 2. Check for defective pressure relief valve (paragraph 4-13).	Replace defective pressure relief valve.
5. AIR CONDITIONER NOISY DURING OPERATION		
	Step 1. Check air conditioner operating pressures for excessive refrigerant in system (table 4-3).	Release excess refrigerant from system until the proper charge is attained (figure 4-2).
	Step 2. Check for noisy compressor, indicating worn compressor bearings or insufficient clearance between rotating compressor components.	Replace compressor (paragraph 4-22).
	Step 3. Inspect expansion valve and check superheat (paragraph 4-15).	Repair or replace damaged or defective expansion valve.

Table 4-1. Troubleshooting (continued)

MALFUNCTION / TEST OR INSPECTION	CORRECTIVE ACTION
AIR CONDITIONER NOISY DURING OPERATION (continued)	
	Adjust expansion valve if superheat is not correct (paragraph 4-15).
Step 4. Inspect quench valve and check superheat (paragraph 4-16).	
	Repair or replace damaged or defective quench valve. Adjust quench valve if superheat is not correct (paragraph 4-16).
6. AIR CONDITIONER STOPS DUE TO HIGH PRESSURE SWITCH TRIPPING	
Step 1. Check air conditioner operating pressures for excessive refrigerant in system (table 4-3).	
	Release excess refrigerant from system until the proper charge is attained (figure 4-2).
Step 2. Check for restriction in condenser air flow.	
	Clean condenser coil and/or remove restriction.
7. AIR CONDITIONER OPERATES CONTINUOUSLY ON COOLING CYCLE.	
Step 1. Check for insufficient refrigerant in system (bubbles in sight glass).	
	Add refrigerant (paragraph 4-11).
Step 2. If adding refrigerant to system does not clear up bubbles in sight glass, there may be air in the system.	
	Open system and remove refrigerant (figure 4-2), purge system (paragraph 4-8), evacuate system (figure 4-4), and recharge the system with refrigerant (paragraph 4-10).
8. SIGHT GLASS APPEARS YELLOW INSTEAD OF GREEN	
Step 1. Yellow appearance of sight glass is caused by contamination in the refrigerant.	
	Open system and remove refrigerant (figure 4-2), remove dehydrator (figure 4-16), purge and dry system (paragraph 4-8), install new dehydrator (figure 4-16), evacuate system (figure 4-4) and recharge system with refrigerant (paragraph 4-10).

Table 4-1. Troubleshooting (continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
SIGHT GLASS APPEARS YELLOW INSTEAD OF GREEN (continued)		
	Step 2. Check for yellow in sight glass after system has been purged.	If the sight glass still shows yellow, remove compressor (figure 4-18) and dehydrator (figure 4-16), flush and purge system (paragraph 4-22), replace dehydrator (figure 4-16) and compressor (figure 4-18), evacuate system (figure 4-4) and recharge the system with refrigerant (paragraph 4-10].
9. AIR CONDITIONER WILL NOT START IN ANY MODE		
	Step 1. Check electrical power source.	Repair electrical power source.
	Step 2. Inspect for burned out fuse(s) (paragraph 3-12h and figure 3-18).	Replace burned out fuse(s).
	Step 3. Inspect and test circuit breaker (paragraph 3-12m).	Replace damaged or defective circuit breaker.
	Step 4. Inspect and test selector switch (paragraph 3-12b).	Replace damaged or defective selector switch.
	Step 5. Continuity check internal power circuit (figure 3-8).	Repair or replace defective wiring.
10. FANS DO NOT OPERATE		
	Step 1. Inspect and test fan motor (paragraph 3-10c).	Repair or replace damaged or defective fan motor.
	Step 2. Inspect and test fan relays (paragraph 3-12g).	Replace damaged or defective fan relay(s).
	Step 3. Inspect and test fan speed switch (paragraph 3-12c).	Replace damaged or defective fan speed switch.

Table 4-1. Troubleshooting (continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
FANS DO NOT OPERATE (continued)		
	Step 4. Continuity check fan motor circuit (figure 3-8).	Replace or repair defective wiring.
11. UNIT DOES NOT OPERATE IN HEATING MODE		
	Step 1. Continuity check heater circuit (figure 3-8).	Replace or repair defective wiring.
	Step 2. Inspect and test selector switch (paragraph 3-12b).	Replace damaged or defective selector switch.

Section III. Maintenance Procedures

4-4. GENERAL MAINTENANCE PROCEDURES.

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

b. Soldering and Brazing.

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

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

c. Checking for Refrigerant System Leaks.

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

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

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

(4) If refrigerant system has not been opened, check system static pressure on suction side and on discharge side of compressor. If pressure on both the suction side and the discharge side is at least 100 psig (7.0 ks/mc^2), proceed to step (6). If the pressure on both the suction and the discharge side is less than 100 psig (7.0 ks/mc^2), proceed to step (5).

(5) Add vaporized refrigerant to both the suction side and the discharge side of the compressor through the service valves until the suction pressure and the discharge pressure are at least 100 psig (7.0 ks/mc^2).

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

d. Repairing Refrigerant System Leaks.

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

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

(a) Connect a source of vaporized nitrogen to the service valve closest to the leak.
(b) Release the nitrogen into the system while brazing the leaking area.
(c) Disconnect the nitrogen source from the service valve.

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

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

CAUTION

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

(c) Apply high vacuum grease (National Stock Number 9150-00-965-2408) or equivalent to the seats of flare nut fittings.
(d) Apply leak lock (National Stock Number 4030-00-999-6313) to the threads of threaded fittings.
(e) Install and tighten the fitting and associated component.

(4) Repressurize the system with vaporized refrigerant to get 100 psig (7.0 ks/mc^2) on both sides (suction and discharge) of the compressor.

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

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

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

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

(2) Refer to paragraph 4-8 and purge the refrigerant system.

(3) Refer to paragraph 4-9 and evacuate the refrigerant system.

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

4-5. REFRIGERANT SYSTEM.

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

4-6. RELEASING REFRIGERANT FOR SERVICE.

Opening the refrigerant system for the replacement of components or other maintenance activities may require the release of refrigerant from the system using a recovery/recycling unit. Refer to figure 4-2 when releasing refrigerant.

4-7. REPLACEMENT OF DEHYDRATOR.

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

4-8. PURGING THE REFRIGERANT SYSTEM.

The refrigerant system must be purged each time the system is exposed to the atmosphere. Nitrogen purging cleans the system of residual moisture and contaminants and also removes any liquid refrigerant which may be left in the system. It is impossible to pull a vacuum if there is any liquid refrigerant left in the system. Refer to figure 4-3 and purge the refrigerant system with gaseous nitrogen at approximately 30 psig (2.11 ks/mc^2) as follows:

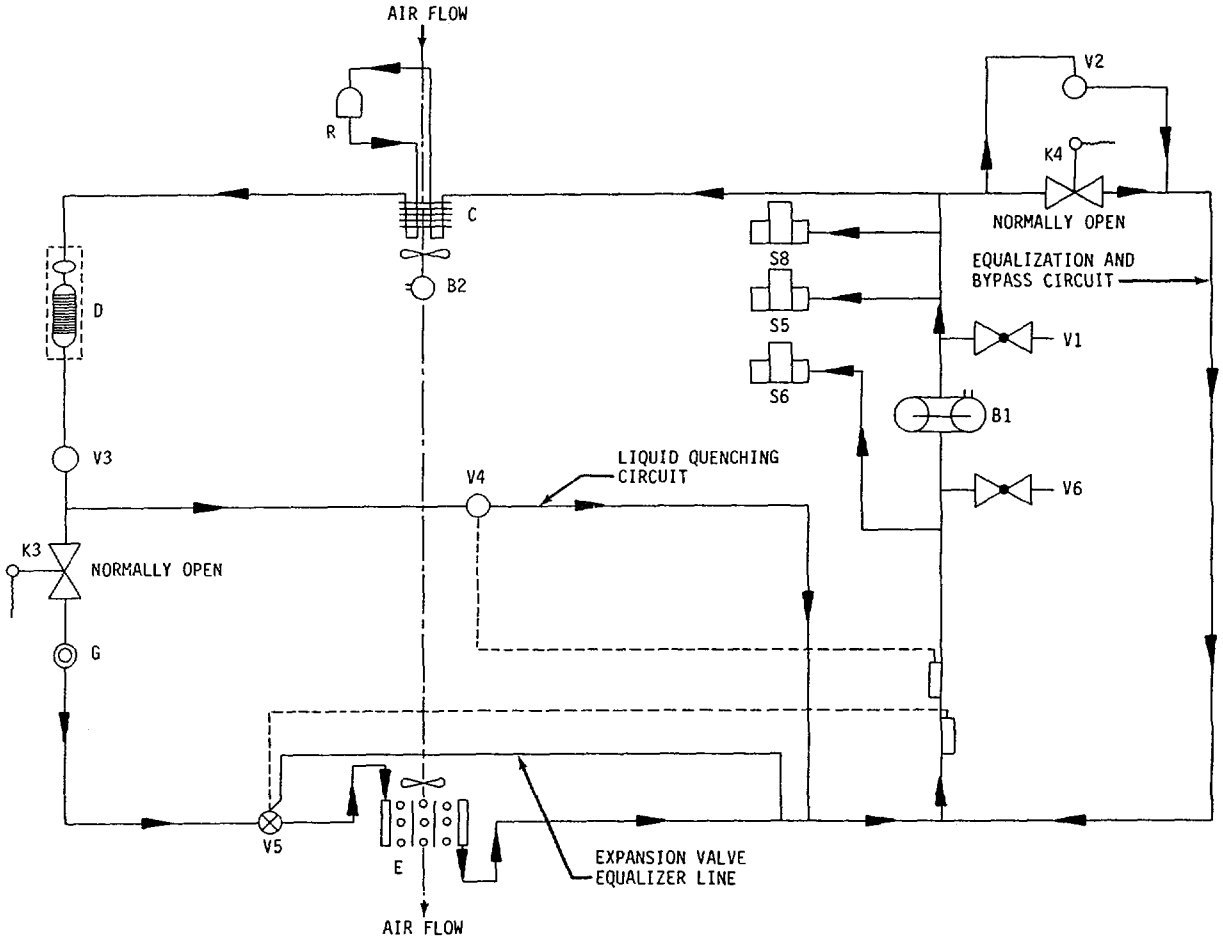
a. Refer to figure 4-2 and release refrigerant from the system.

b. Refer to figure 3-13 and partially remove the junction box from the air conditioner. It is not necessary to remove the junction box cover.

c. Refer to figure 3-13 and disconnect electrical plug P10 from the junction box.

d. Refer to figure 4-16 and remove the dehydrator. Do not replace with a new dehydrator at this time.

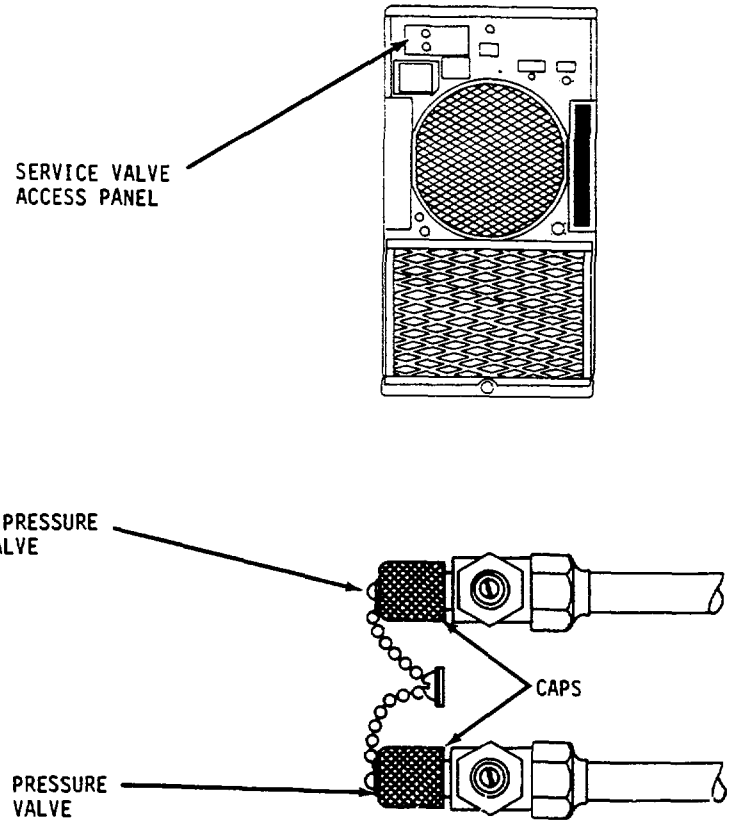
e. Perform all maintenance procedures required on the refrigerant system, including repairing leaks and inspecting, testing and replacing system components.



DESIGNATION	NAME	DESIGNATION	NAME
B1	COMPRESSOR	S8	PRESSURE CONTROL SWITCH
B2	FAN MOTOR	R	RECEIVER
C	CONDENSER COIL	V1	DISCHARGE PRESSURE SERVICE VALVE
D	DEHYDRATOR		
E	EVAPORATOR COIL	V2	FLUID PRESSURE REGULATOR
G	SIGHT GLASS	V3	PRESSURE RELIEF VALVE
K3	LIQUID LINE SOLENOID VALVE	V4	QUENCH VALVE
		V5	EXPANSION VALVE
K4	PRESSURE EQUALIZER SOLENOID VALVE	V6	SUCTION PRESSURE SERVICE VALVE
S5	HIGH PRESSURE CUT-OUT SWITCH	S6	LOW PRESSURE CUT-OUT SWITCH

TS5-4120-339-14/4-1

Figure 4-1. Refrigerant system flow diagram



RELEASING REFRIGERANT FOR SERVICE

1. REMOVE SERVICE VALVE ACCESS PANEL FROM THE AIR CONDITIONER.
2. ATTACH A CHARGING MANIFOLD TO THE AIR CONDITIONER SERVICE VALVES.

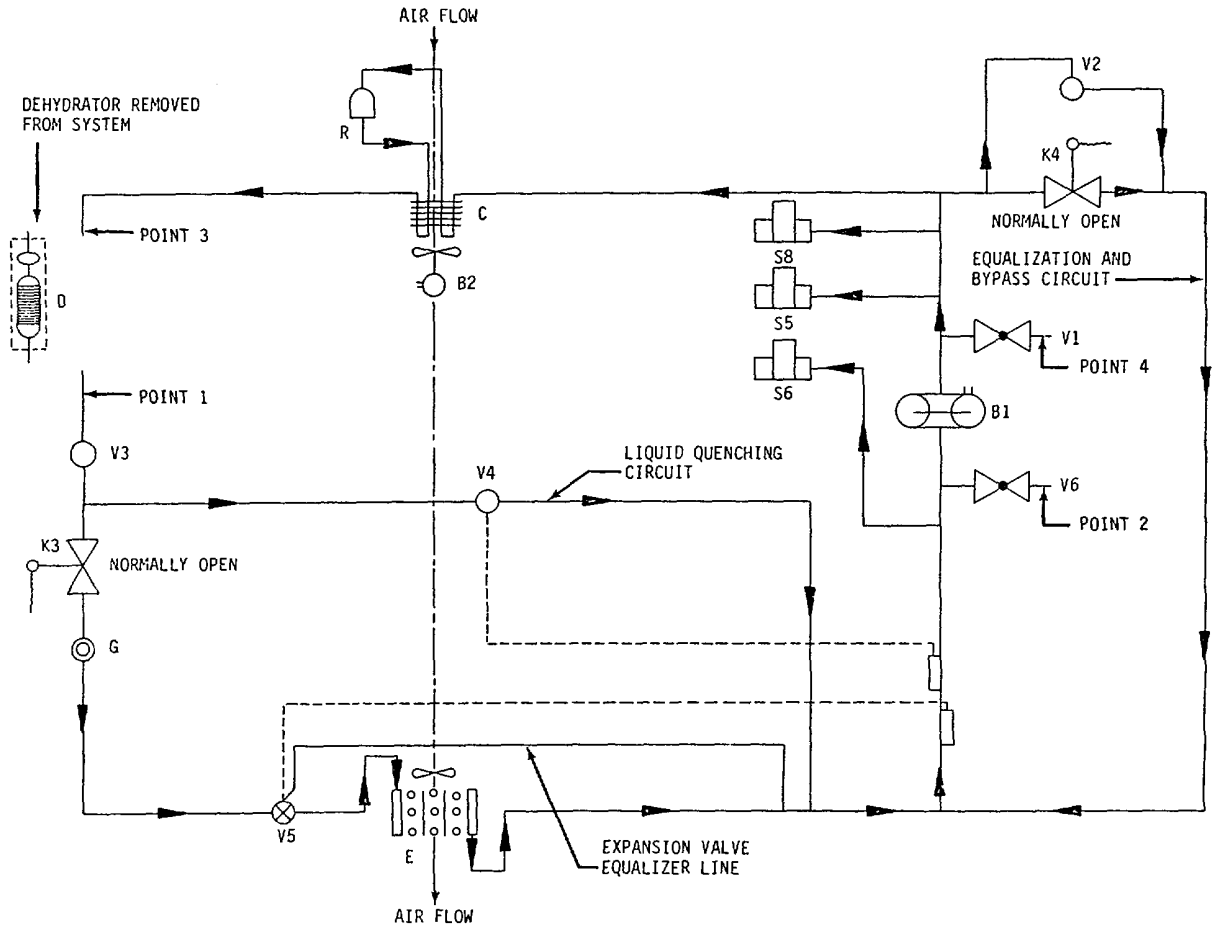
NOTE

IN ACCORDANCE WITH ENVIRONMENTAL PROTECTION AGENCY REGULATIONS REFRIGERANTS CANNOT BE DISCHARGED INTO THE ATMOSPHERE. A REFRIGERANT RECOVERY & RECYCLING UNIT MUST BE USED WHENEVER DISCHARGING THE REFRIGERANT SYSTEM.

OPERATION OF THE RECOVERY/RECYCLING UNIT MUST BE BY AUTHORIZED PERSONNEL ONLY

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

Figure 4-2. Releasing refrigerant for service



DESIGNATION	NAME	DESIGNATION	NAME
B1	COMPRESSOR	S8	PRESSURE CONTROL SWITCH
B2	FAN MOTOR	R	RECEIVER
C	CONDENSER COIL	V1	DISCHARGE PRESSURE SERVICE VALVE
D	DEHYDRATOR		
E	EVAPORATOR COIL	V2	FLUID PRESSURE REGULATOR
G	SIGHT GLASS	V3	PRESSURE RELIEF VALVE
K3	LIQUID LINE SOLENOID VALVE	V4	QUENCH VALVE
		V5	EXPANSION VALVE
K4	PRESSURE EQUALIZER SOLENOID VALVE	V6	SUCTION PRESSURE SERVICE VALVE
S5	HIGH PRESSURE CUT-OUT SWITCH	S6	LOW PRESSURE CUT-OUT SWITCH

TS5-4120-339-14/4-3

Figure 4-3. Refrigerant system flow diagram with dehydrator removed

f. Refer to figure 4-3 and open valve VA at point 4 and valve V6 at point 2.

g. Connect the nitrogen line to the tubing at point 1 and release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

h. Energize the liquid line solenoid valve by applying 24 volts dc across pins M and N of plug P10.

i. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

j. Remove the nitrogen line from the tubing at point 1 and connect it to the suction pressure service valve V6 at point 2.

k. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

l. De-energize the liquid line solenoid valve and release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

m. Remove the nitrogen line from the valve at point 2 and connect it to the discharge pressure service valve VA at point 4.

n. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

o. Energize the pressure equalizer solenoid valve K4 by applying 24 volts dc across pins C and F of plug P10.

p. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

q. Remove the nitrogen line from the valve at point 4 and connect it to the tubing at point 3.

r. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

s. De-energize the pressure equalizer solenoid valve and release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

t. Remove the nitrogen line from the tubing at point 3 and cap tubing at points 1 and 3 until installation of a new dehydrator.

u. Close valves V1 and V6.

v. Refer to figure 4-16 and install a new dehydrator.

4-9. EVACUATING THE REFRIGERANT SYSTEM.

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

4-10. CHARGING THE REFRIGERANT SYSTEM WITH A FULL CHARGE.

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

b. Connect the refrigerant charging hookup as shown in figure 4-5 with a full cylinder of refrigerant R-22. Weigh the cylinder so that 3 pounds 5 ounces (1.48kg) of refrigerant can be measured into the system.

NOTE

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

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

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

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

e. Open valve on refrigerant cylinder about 2 turns.

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

g. Start unit and run until 3 pounds 5 ounces (1.48kg) of refrigerant R-22 is added.

h. Backseat suction service valve.

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

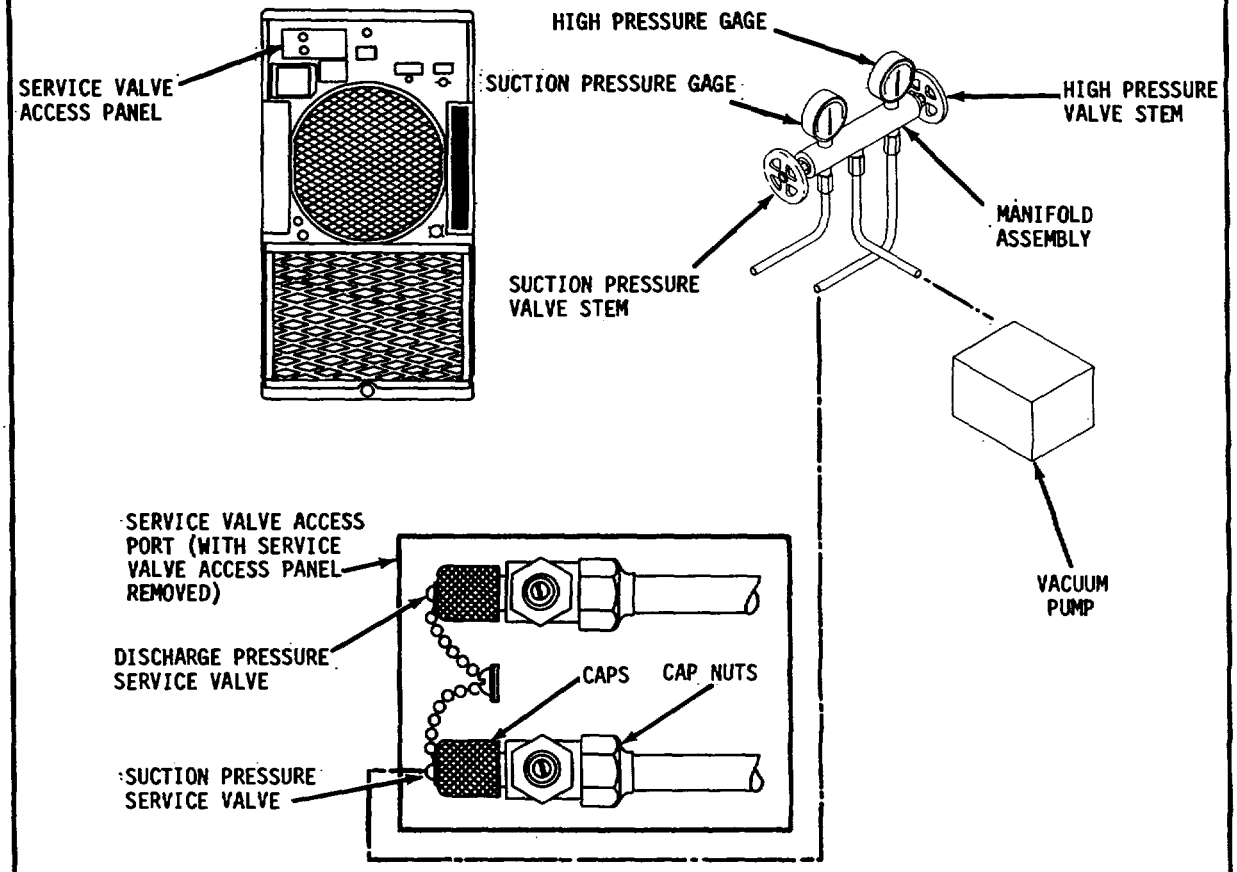
j. Remove manifold and gages (figure 4-5).

k. Turn selector switch to "OFF" position.

4-11. ADDING REFRIGERANT TO THE SYSTEM.

a. General. Bubbles or a milky or frothy appearance of the refrigerant passing the sight glass in normal operation is an indication that the system needs additional refrigerant. The normal refrigerant charge in the unit when shipped is 3 pounds 5 ounces (1.48kg) of R-22 refrigerant. If bubbles or a milky or frothy appearance of the refrigerant is visible in the sight glass, add refrigerant as follows:

b. Adding Refrigerant.



EVACUATING THE REFRIGERANT SYSTEM

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

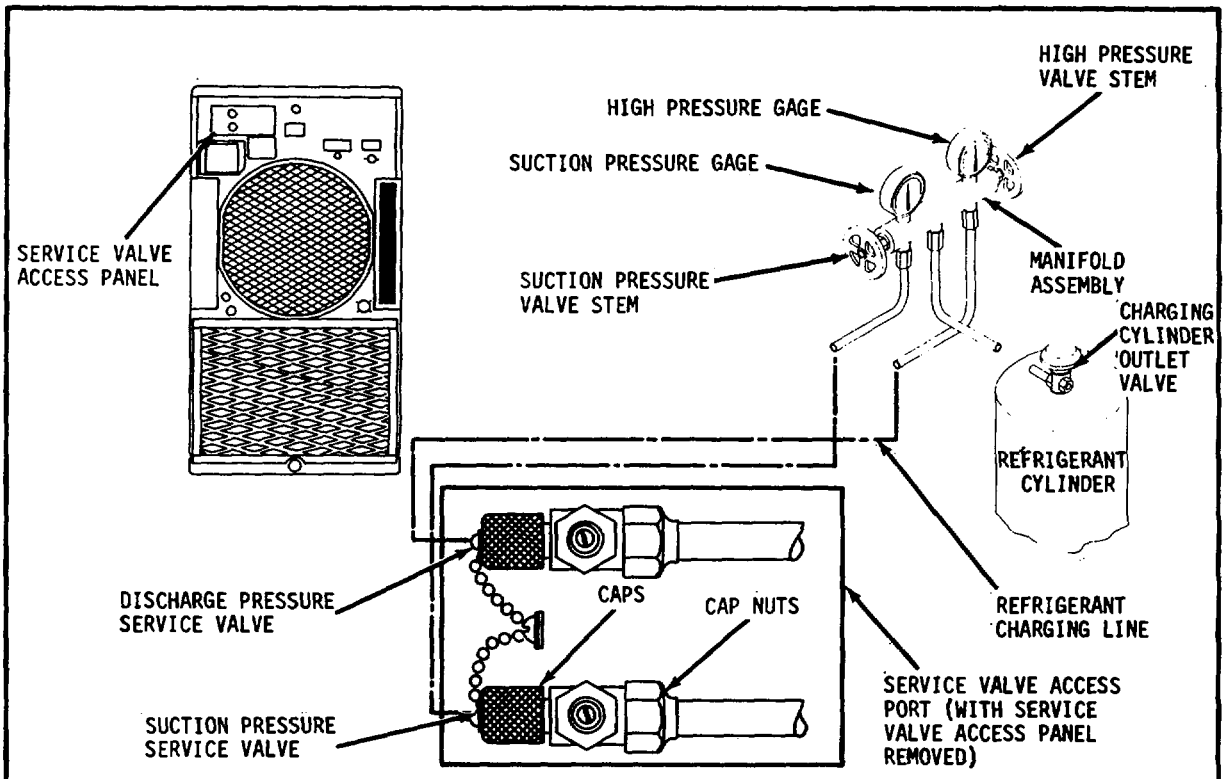
NOTE

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

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

TS5-4120-339-14/4-4

Figure 4-4. Evacuating the refrigerant system



INSTALLATION OF PRESSURE GAGES

1. MAKE SURE THAT THE CAP NUTS ON BOTH SERVICE VALVES ARE TIGHT.
2. CONNECT A CYLINDER OF R-22 REFRIGERANT TO THE CENTER CONNECTOR OF THE MANIFOLD. SET THE CYLINDER UPRIGHT.
3. MAKE SURE THAT ALL VALVES ARE CLOSED.
4. REMOVE CAPS FROM SUCTION PRESSURE SERVICE VALVE AND DISCHARGE PRESSURE SERVICE VALVE.
5. CONNECT CHARGING LINE FROM SUCTION PRESSURE SIDE OF MANIFOLD TO SUCTION PRESSURE SERVICE VALVE. LEAVE CONNECTION LOOSE AT SERVICE VALVE.
6. OPEN SUCTION PRESSURE VALVE STEM AND OPEN CHARGING CYLINDER OUTLET VALVE LONG ENOUGH TO PURGE ALL AIR FROM THE CHARGING LINE THROUGH THE LOOSE CONNECTION. TIGHTEN CHARGING LINE CONNECTION AT SUCTION PRESSURE SERVICE VALVE WHEN GAS CAN BE HEARD ESCAPING FROM THE LOOSE CONNECTION.
7. CONNECT CHARGING LINE FROM HIGH PRESSURE SIDE OF MANIFOLD ASSEMBLY TO DISCHARGE PRESSURE SERVICE VALVE. LEAVE CONNECTION LOOSE AT THE SERVICE VALVE.
8. OPEN DISCHARGE PRESSURE VALVE STEM LONG ENOUGH TO PURGE ALL AIR FROM THE CHARGING LINE THROUGH THE LOOSE CONNECTION. TIGHTEN CHARGING LINE CONNECTION AT DISCHARGE PRESSURE SERVICE VALVE WHEN GAS CAN BE HEARD ESCAPING FROM THE LOOSE CONNECTION.

REMOVAL OF PRESSURE GAGES

TS5-4120-339-14/4-5

1. CLOSE ALL VALVES.
2. DISCONNECT THE REFRIGERANT CHARGING LINES FROM BOTH SERVICE VALVES.
3. INSTALL THE CAPS ON THE DISCHARGE PRESSURE SERVICE VALVE AND THE SUCTION PRESSURE SERVICE VALVE.

Figure 4-5. Installation and removal of pressure gages

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

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

(3) Turn the thermostat control knob counter clockwise to its limit.

(4) Open charging cylinder outlet valve about two turns.

(5) Open the suction pressure service valve slowly while observing the sight glass. When the bubbles disappear and the sight glass becomes clear, close the suction service valve.

(6) Allow the air conditioner to continue to run for 10 minutes. If bubbles reappear, add refrigerant until bubbles disappear again. Continue this cycle until no more bubbles appear. Add refrigerant a little at a time so that the system is not overcharged.

(7) When sight glass remains clear, turn selector switch to "OFF".

(8) Refer to figure 4-5 and remove manifold, gages and charging cylinder.

4-12. PRESSURE SWITCHES.

WARNING

Disconnect the air conditioner from the electrical power source before performing maintenance on the pressure switches.

a. Pressure Control Switch S8.

(1) Removal.

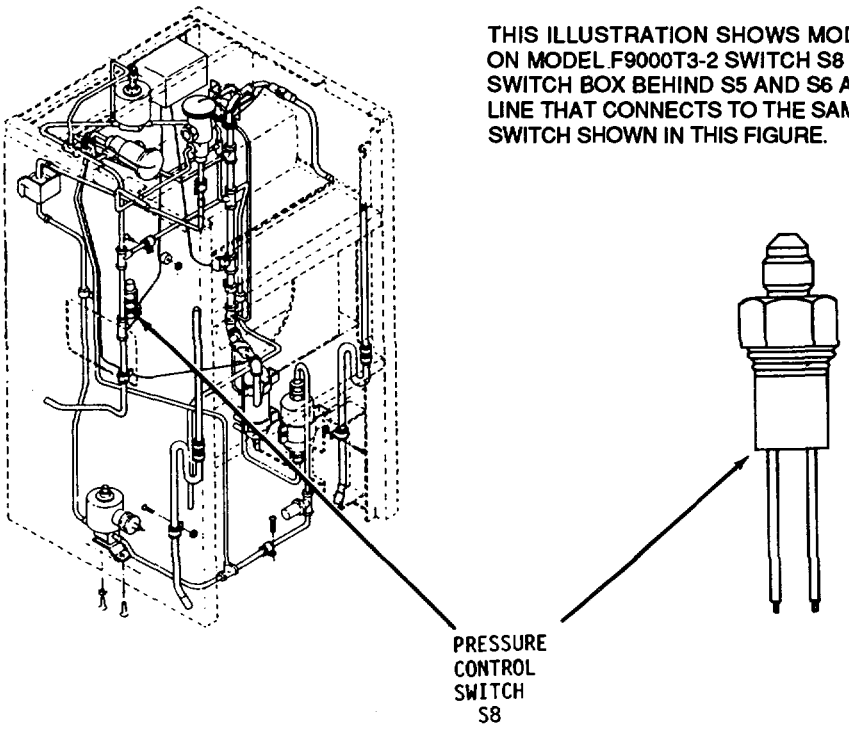
(a) Turn the selector switch to the "OFF" position and disconnect the air conditioner from the electrical power source.
(b) Refer to figure 4-2 and release refrigerant from the system.
(c) Refer to figure 3-13 and disconnect plug P4 from behind the junction box.
(d) Refer to figure 3-4 and remove the condenser fan.
(e) (Model TM-9KV-208-3-60 only) Refer to figure 4-6 and remove the pressure control switch by holding the switch and loosening the flare nut at the base of the switch. It is not necessary to remove the electrical leads from the wire bundle unless the switch is to be replaced.
(f) (Model F9000T3-2 only) Switch S8 is located behind switches S5 and S6; see figure 4-7 and remove S5 and S6 in accordance with removal steps 1 through 4. Remove two screws and washers and pull switch S8 out of switch box. Tag and disconnect wire leads if switch S8 is to be replaced. Loosen flare nut at end of capillary line and remove from tubing connection point.

(2) Test. Refer to figure 4-6 and test the pressure control switch S8.

(3) Replace. Replace pressure control switch S8 if damage would impair serviceability or if failure occurs during testing.

NOTE

THIS ILLUSTRATION SHOWS MODEL TM-9KV-208-3-60. ON MODEL F9000T3-2 SWITCH S8 IS LOCATED IN THE SWITCH BOX BEHIND S5 AND S6 AND HAS A CAPILLARY LINE THAT CONNECTS TO THE SAME LOCATION AS THE SWITCH SHOWN IN THIS FIGURE.



TS5-4120-339-14/4-6

TEST OF PRESSURE CONTROL SWITCH S8

1. REFER TO PARAGRAPH 4-12a FOR PRELIMINARY STEPS IN MAINTENANCE OF PRESSURE CONTROL SWITCH S8.
2. CONNECT ONE LEAD OF A CIRCUIT TESTER TO PIN E OF PLUG P4. CONNECT THE OTHER LEAD OF THE CIRCUIT TESTER TO PIN F OF PLUG P4.
3. SET THE CIRCUIT TESTER UP FOR CONTINUITY TESTING.
4. CONNECT A SOURCE OF VAPORIZED NITROGEN TO THE FITTING END ON MODEL TM-9KV-208-3-60 OR THE CAPILLARY AND FLARE NUT END ON MODEL F9000T3-2 OF THE PRESSURE SWITCH. MAKE SURE THAT THE CONNECTION DOES NOT LEAK UNDER PRESSURE. NITROGEN SOURCE MUST BE EQUIPPED WITH A CALIBRATED GAGE IN PSIG AND MUST BE CAPABLE OF SUPPLYING UP TO 425 PSIG (29.88 ks/cm²) OF NITROGEN PRESSURE.
5. WHILE OBSERVING CIRCUIT TESTER, APPLY 350 PSIG (24.6 ks/cm²) OF NITROGEN TO THE PRESSURE CONTROL SWITCH. THE CIRCUIT TESTER SHOULD INDICATE NO CONTINUITY.
6. WHILE OBSERVING CIRCUIT TESTER, SLOWLY INCREASE NITROGEN PRESSURE TO THE PRESSURE SWITCH. THE CIRCUIT TESTER SHOULD INDICATE CONTINUITY BETWEEN PINS E AND F WHEN THE PRESSURE REACHES 405 ± 17 psig (28.47 ± 1.2 ks/cm²).
7. WHILE OBSERVING CIRCUIT TESTER, SLOWLY DECREASE NITROGEN PRESSURE TO THE PRESSURE SWITCH. THE CIRCUIT TESTER SHOULD INDICATE NO CONTINUITY BETWEEN PINS E AND F WHEN THE PRESSURE HAS BEEN REDUCED TO 285 ± 17 PSIG (20 ± 1.2 ks/cm²).
8. DISCONNECT THE CIRCUIT TESTER LEADS FROM PLUG P4. REDUCE NITROGEN PRESSURE TO ZERO AND DISCONNECT NITROGEN SOURCE FROM THE PRESSURE CONTROL SWITCH.
9. REFER TO PARAGRAPH 4-12a FOR FINAL STEPS IN MAINTENANCE PF PRESSURE CONTROL SWITCH S8.

Figure 4-6. Test of pressure control switch S8

(1) Installation.

CAUTION

Use care in applying high vacuum grease to the flare fitting of the pressure control switch so that none of the material gets inside the refrigerant system.

(a) Apply high vacuum grease (National Stock Number 9150-00-965-2408) or equivalent to the threads of the flare fitting which secures the pressure control switch.

(b) (Model TM-9KV-208-3-60 only) Install the pressure control switch in the position shown in figure 4-6. Tighten the flare nut securely.

(c) (Model F9000T3-2 only) Install switch S8 in switch box with two screws and washers. Reconnect wire leads if they were disconnected. Reinstall switches S5 and S6 (see fig. 4-7). Connect flare nut at end of capillary line from S8 to original connection point.

(d) Refer to figure 3-13 and connect plug P4 to receptacle J4 behind the junction box.

(e) Refer to figure 3-4 and install the condenser fan.

(f) Perform any further maintenance on the refrigeration system and components which may be required.

(g) If no further maintenance is required, refer to paragraph 4-8 and purge the refrigerant system.

(h) Refer to paragraph 4-4c and check the pressure control switch and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

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

b. High Pressure Cut-Out Switch S5 and Low Pressure Cut-Out Switch S6.

(1) Removal. (See figure 4-7.)

(2) Test.

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

(b) Refer to figure 4-9 and test the low pressure cut-out switch.

(3) Replace. Replace the high pressure cut-out switch and/or the low pressure cut-out switch if damage would impair serviceability, or if failure occurs during testing.

(4) Installation.

(a) Refer to figure 4-7 and install cut-out switches.

(b) Perform any further maintenance of refrigerant components which may be required at this time.

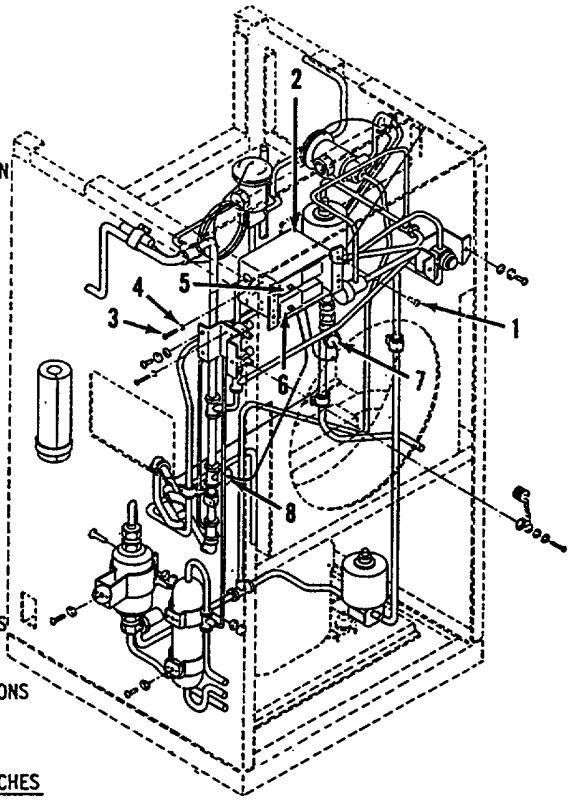
(c) If no further maintenance of refrigerant system components is required, refer to paragraph 4-8 and purge the refrigerant system.

(d) Refer to paragraph 4-4c and check the cut-out switches and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

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

1. SCREW
2. ENCLOSURE
3. SCREW
4. WASHER
5. HIGH PRESSURE CUT-OUT SWITCH
6. LOW PRESSURE CUT-OUT SWITCH
7. HIGH PRESSURE CAPILLARY TUBE CONNECTION
8. LOW PRESSURE CAPILLARY TUBE CONNECTION



REMOVAL OF HIGH AND LOW PRESSURE SWITCHES

1. REFER TO FIGURE 3-24 FOR PRELIMINARY STEPS.
2. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
3. REMOVE FOUR SCREWS (1) AND WASHERS (2) AND PULL THE ENCLOSURE (2) AWAY FROM THE PANEL.
4. REMOVE FOUR SCREWS (3) AND WASHERS (4) AND REMOVE THE CUT-OUT SWITCHES FROM THE ENCLOSURE.
5. TAG AND DISCONNECT THE ELECTRICAL LEADS FROM CUT-OUT SWITCHES (5, 6).
6. DISCONNECT THE CAPILLARY TUBE CONNECTIONS (7, 8).

INSTALLATION OF HIGH AND LOW PRESSURE SWITCHES

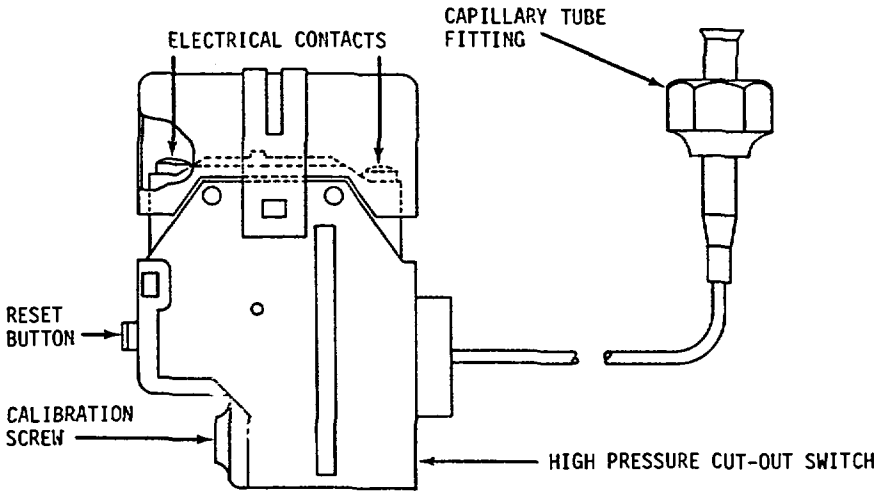
CAUTION

USE CARE IN APPLYING HIGH VACUUM GREASE TO FLARE FITTINGS OF THE CAPILLARY TUBE CONNECTIONS SO THAT NONE OF THE MATERIAL GETS INTO THE REFRIGERANT SYSTEM.

1. APPLY HIGH VACUUM GREASE (NATIONAL STOCK NUMBER 9150-00-965-2408) OR EQUIVALENT TO THE FLARE FITTINGS OF THE CAPILLARY TUBE CONNECTIONS.
2. CONNECT THE CAPILLARY TUBE CONNECTIONS (7, 8).
3. CONNECT THE APPROPRIATE ELECTRICAL LEADS TO THE CUT-OUT SWITCHES AND REMOVE TAGS.
4. POSITION THE CUT-OUT SWITCHES IN THE ENCLOSURE AND SECURE WITH FOUR SCREWS (3) AND WASHERS (4).
5. POSITION THE ENCLOSURE ON THE INSIDE OF THE PANEL AND SECURE WITH FOUR SCREWS (1).
6. REFER TO FIGURE 3-24 FOR FINAL STEPS.

TS5-4120-339-14/4-7

Figure 4-7. Removal and installation of high and low pressure cut-out switches

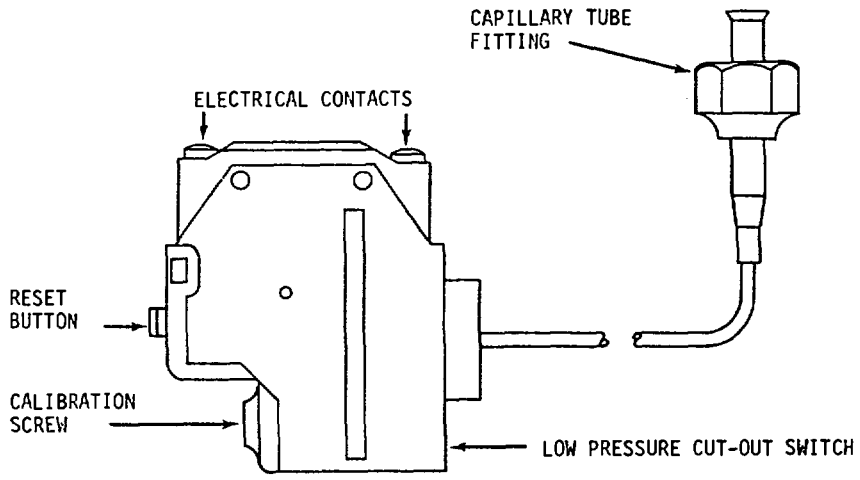


TEST

1. REFER TO FIGURE 4-7 FOR PRELIMINARY STEPS.
2. CONNECT A CIRCUIT TESTER ACROSS THE ELECTRICAL CONTACTS OF THE HIGH PRESSURE CUT-OUT SWITCH.
3. SET THE CIRCUIT TESTER UP FOR CONTINUITY TESTING.
4. CONNECT A SOURCE OF VAPORAIZED NITROGEN TO THE CAPILLARY TUBE FITTING. NITROGEN *SOURCE MUST BE EQUIPPED WITH A GAGE CALIBRATED FROM 0 TO 1000 PSIG (0 TO 100* ks/cm^2).
5. WHILE OBSERVING CIRCUIT TESTER, APPLY 415 PSIG (29 ks/cm^2) NOTROGEN PRESSURE TO THE SWITCH. CIRCUIT TESTER SHOULD SHOW CONTINUITY BETWEEN THE ELECTRICAL CONTACTS OF THE SWITCH.
6. WHILE OBSERVING CIRCUIT TESTER, SLOWLY INCREASE NITROGEN PRESSURE TO THE SWITCH. SWITCH SHOULD TRIP (CIRCUIT TESTER SHOWS A BREAK IN CONTINUITY) WHEN NITROGEN PRESSURE REACHES 450 TO 470 PSIG (31.6 TO 33 ks/cm^2).
7. IF SWITCH DOES NOT TRIP AT ANY PRESSURE UP TO 550 PSIG (38.6 ks/cm^2), REPLACE THE SWITCH.
8. IF SWITCH TRIPS BETWEEN 450 AND 470 PSIG (31.6 TO 33ks/cm^2), DECREASE PRESSURE TO 410 PSIG (48.8 ks/cm^2) AND PUSH THE RESET BUTTON. CIRCUIT TESTER SHOULD AGAIN *SHOW CONTINUITY BETWEEN THE ELECTRICAL CONTACTS OF THE SWITCH.*
9. IF THE SWITCH TRIPS BELOW 450 PSIG (31.6 ks/cm^2) OR ABOVE 470 PSIG (33 ks/cm^2), THE SWITCH MUST BE CALIBRATED. TURNING THE CALIBRATION SCREW CLOCKWISE INCREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. TURNING THE CALIBRATION SCREW COUNTER-CLOCKWISE DECREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. CALIBRATE THE SWITCH TO TRIP AT 460 PSIG (32.3 ks/cm^2).
10. IF SWITCH CANNOT BE CALIBRATED AT 460 ± 10 PSIG (32.3 ks/cm^2), REPLACE SWITCH.
11. DISCONNECT THE CIRCUIT TESTER LEADS FROM THE SWITCH CONTACTS AND DISCONNECT THE NITROGEN SOURCE FROM THE SWITCH CAPILLARY TUBE.
12. REFER TO PARAGRAPH 4-12b FOR FINAL STEPS IN MAINTENANCE OF THE HIGH PRESSURE CUT-OUT SWITCH.

TS5-4120-339-14/4-8

Figure 4-8. Test of high pressure cut-out switch



TEST

1. REFER TO FIGURE 4-7 FOR PRELIMINARY STEPS.
2. CONNECT A CIRCUIT TESTER ACROSS THE ELECTRICAL CONTACTS OF THE LOW PRESSURE CUT-OUT SWITCH.
3. SET THE CIRCUIT TESTER UP FOR CONTINUITY TESTING.
4. CONNECT A SOURCE OF VAPORIZED NITROGEN TO THE CAPILLARY TUBE FITTING OF THE LOW PRESSURE CUT-OUT SWITCH.
5. WHILE OBSERVING CIRCUIT TESTER, APPLY 40 PSIG (2.8 ks/cm^2) NITROGEN PRESSURE TO THE SWITCH. TESTER SHOULD SHOW NO CONTINUITY BETWEEN ELECTRICAL CONTACTS.
6. WHILE OBSERVING CIRCUIT TESTER, SLOWLY DECREASE NITROGEN PRESSURE TO THE SWITCH. SWITCH SHOULD TRIP (CIRCUIT TESTER SHOWS CONTINUITY) WHEN NITROGEN PRESSURE IS DECREASED TO 30 TO 20 PSIG (2.1 TO 1.4 ks/cm^2).
7. IF SWITCH DOES NOT TRIP AT ANY PRESSURE DOWN TO 5 PSIG (.35 ks/cm^2), REPLACE THE SWITCH.
8. IF SWITCH TRIPS BETWEEN 30 AND 20 PSIG (2.1 TO 1.4 ks/cm^2), INCREASE PRESSURE TO 40 PSIG (2.8 ks/cm^2) AND PUSH THE RESET BUTTON. CIRCUIT TESTER SHOULD AGAIN SHOW NO CONTINUITY BETWEEN THE ELECTRICAL CONTACTS.
9. IF SWITCH TRIPS BELOW 20 PSIG (1.4 ks/cm^2) OR ABOVE 30 PSIG (2.1 ks/cm^2), THE SWITCH MUST BE CALIBRATED. TURNING THE CALIBRATION SCREW CLOCKWISE INCREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. TURNING THE CALIBRATION SCREW COUNTER-CLOCKWISE DECREASES THE PRESSURE AT WHICH THE SWITCH WILL TRIP. CALIBRATE THE SWITCH TO TRIP AT 25 ± 5 PSIG (1.75 ± .35 ks/cm^2).
10. IF THE SWITCH CANNOT BE CALIBRATED AS SPECIFIED IN STEP 9, REPLACE THE SWITCH.
11. DISCONNECT THE CIRCUIT TESTER LEADS FROM THE SWITCH CONTACTS AND DISCONNECT THE NITROGEN SOURCE FROM THE SWITCH CAPILLARY TUBE.
12. REFER TO PARAGRAPH 4-12b FOR FINAL STEPS IN MAINTENANCE OF THE LOW PRESSURE CUT-OUT SWITCH.

TS5-4120-339-14/4-9

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

4-13. PRESSURE RELIEF VALVE.

a. Inspection.

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

(2) Refer to figure 3-13 and partially remove the junction box.

(3) Refer to figure 4-10 and inspect the pressure relief valve externally for obvious defects.

(4) Refer to paragraph 4-4c and check the pressure relief valve for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

b. Replace. If damage or defects are found which could impair serviceability, replace the pressure relief valve. Refer to steps c and d for removal of defective valve and the installation of a new valve.

c. Removal.

(1) Refer to figure 4-2 and release refrigerant from the system.

(2) Refer to figure 4-10 and remove the pressure relief valve.

d. Installation.

CAUTION

Use care in applying leak lock to the threads of the pressure relief valve so that none of the material gets into the refrigerant system when the valve is installed.

(1) Apply leak lock (National Stock Number 8030-00-999-6313) or equivalent to the threads of the pressure relief valve.

(2) Refer to figure 4-10 and install the pressure relief valve.

(3) Perform any further maintenance on refrigeration components required.

(4) If no further maintenance of refrigeration components is required, refer to paragraph 4-8 and purge the refrigerant system.

(5) Refer to paragraph 4-4c and check the pressure relief valve and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

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

(8) Refer to figure 3-13 and install the junction box.

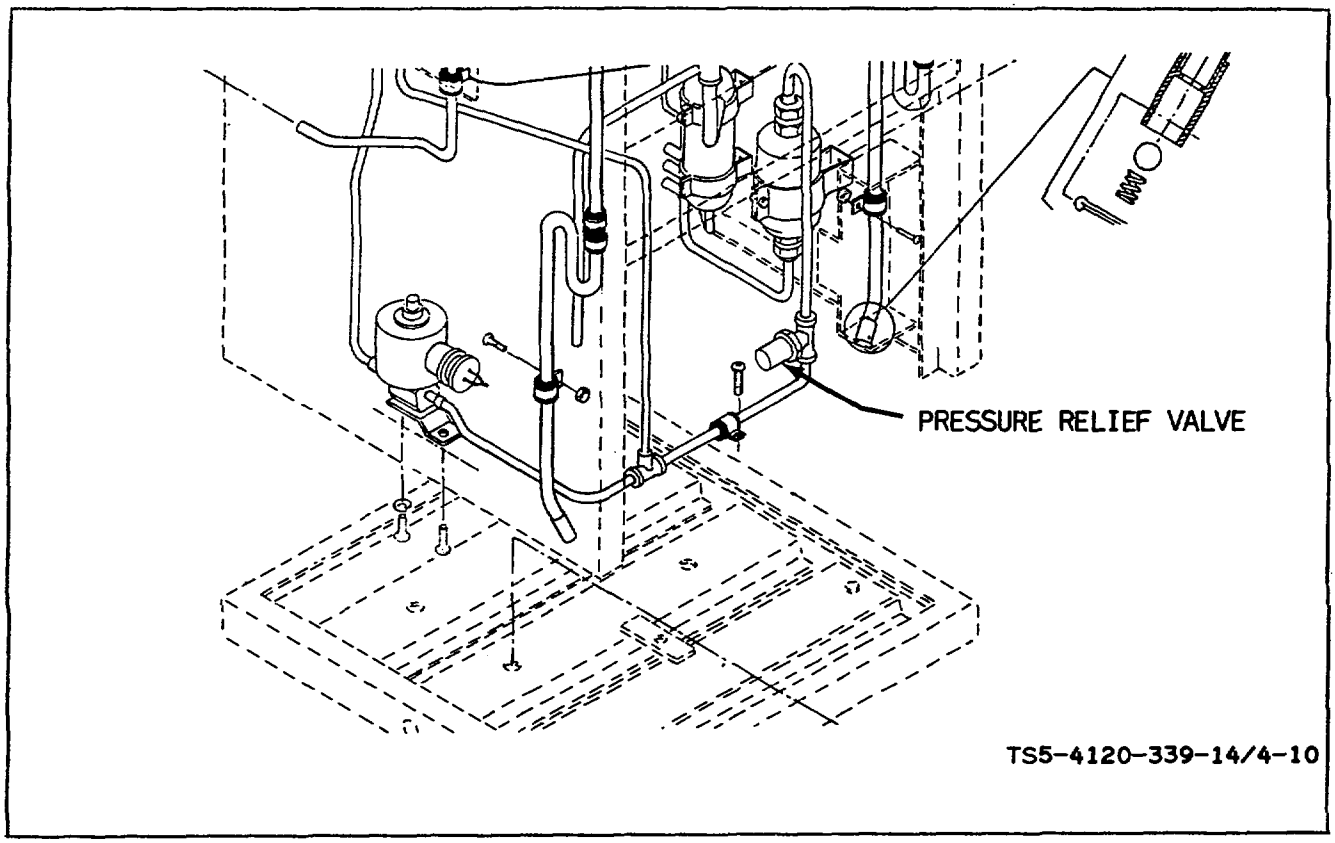


Figure 4-10. Location of pressure relief valve

4-14. SERVICE VALVES.

a. Inspection.

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

(2) Refer to figure 4-11 and inspect the suction pressure service valve and the discharge pressure service valve externally for obvious defects. Make sure that the valve caps are tightly in place, that the valve stems are tightly closed, and that the cap nuts are seated securely on the valves.

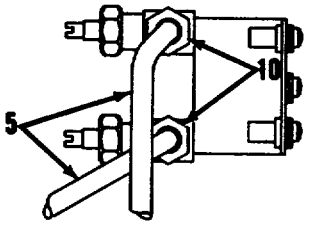
(3) Refer to paragraph 4-4c and check the service valves for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

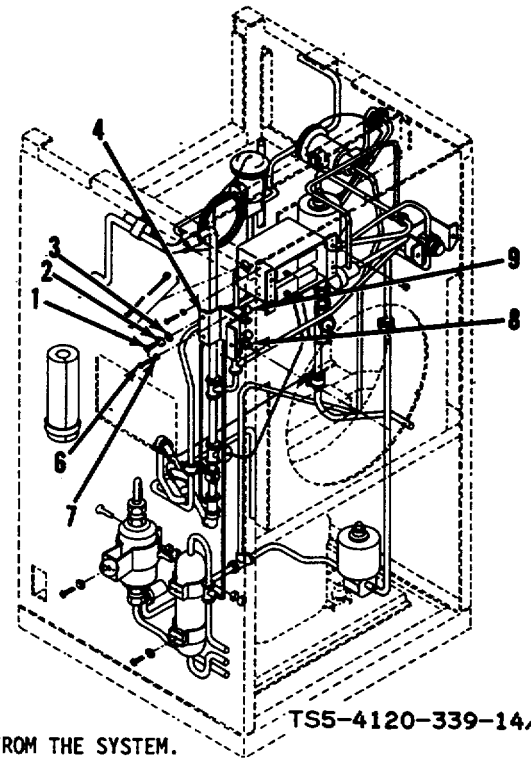
b. Replace. If damage or defects are found which could impair serviceability, replace the suction service valve and/or the discharge pressure service valve. Refer to paragraphs c and d for removal of defective valve or valves and the installation of new valves.

c. Removal. (See figure 4-11.)

NOTE

Do not remove service valves unless one or both valves are to be replaced.





1. SCREW
2. WASHER
3. WASHER
4. BRACKET
5. TUBING
6. SCREW
7. WASHER
8. SUCTION PRESSURE SERVICE VALVE
9. DISCHARGE PRESSURE SERVICE VALVE
10. FLARE NUTS

TS5-4120-339-14/4-11

REMOVAL OF SERVICE VALVES

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
2. LOOSEN FLARE NUTS (10) AND REMOVE TUBING (5) FROM SUCTION PRESSURE SERVICE VALVE (8) AND DISCHARGE PRESSURE SERVICE VALVE (9).
3. REMOVE THREE SCREWS (1) AND WASHERS (2, 3) FROM BRACKET (4).
4. REMOVE TWO SCREWS (6) AND WASHERS (7) FROM SUCTION PRESSURE SERVICE VALVE (8) AND REMOVE VALVE FROM BRACKET (4).
5. REMOVE TWO SCREWS (6) AND WASHERS (7) FROM DISCHARGE PRESSURE SERVICE VALVE (9) AND REMOVE VALVE FROM BRACKET (4).

INSTALLATION OF SERVICE VALVES

1. POSITION DISCHARGE PRESSURE SERVICE VALVE (9) ON BRACKET (4) AND SECURE WITH TWO SCREWS (6) AND WASHERS (7).
2. POSITION SUCTION PRESSURE SERVICE VALVE (8) ON BRACKET (4) AND SECURE WITH TWO SCREWS (6) AND WASHERS (7).
3. POSITION BRACKET (4) ON INSIDE WALL OF AIR CONDITIONER AND SECURE WITH THREE SCREWS (1) AND WASHERS (2, 3).

CAUTION

USE CARE IN APPLYING HIGH VACUUM GREASE TO FLARE NUT FITTINGS SO THAT NONE OF THE MATERIAL GETS INSIDE THE REFRIGERANT SYSTEM.

4. APPLY HIGH VACUUM GREASE (NATIONAL STOCK NUMBER 9150-00-965-2408) OR EQUIVALENT TO THE SEATS OF FLARE NUTS (10) AND CONNECT TUBING (5) TO BOTH SERVICE VALVES.
5. REFER TO PARAGRAPH 4-14d FOR FINAL STEPS IN THE MAINTENANCE OF THE SERVICE VALVES.

Figure 4-11. Removal and installation of service valves

d. Installation.

(1) Refer to figure 4-11 and install the suction pressure service valve and/or the discharge pressure service valve.

(2) Perform any further maintenance of refrigeration components required.

(3) If no further maintenance of refrigeration components is required, refer to paragraph 4-8 and purge the refrigerant system.

(4) Refer to paragraph 4-4c and check the service valves and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

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

(7) Re-perform inspection procedure (paragraph a) for service valve to check for refrigerant leaks.

4-15. EXPANSION VALVE.

a. Inspection.

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

(2) Refer to figure 4-12 and inspect the expansion valve, power bulb and tubing for obvious defects.

(3) Refer to paragraph 4-4c and check the expansion valve for refrigerant leaks. If expansion valve is leaking refrigerant, refer to step c for repair.

b. Adjust.

CAUTION

Never adjust the expansion valve unless absolutely necessary. When adjusting the expansion valve, allow the unit to run on “COOL" at least 20 minutes between each adjustment. Insure that all panels are in place during the running period.

(1) Refer to figure 4-12 and tape the bulb of a thermometer to the suction line near the expansion valve power bulb.

(2) Refer to figure 4-5 and install a suction pressure gage.

(3) Turn the selector switch to the "COOL" position and turn the thermostat control knob counter-clockwise to its limit. Operate the unit on cool for approximately 30 minutes to stabilize the thermometer reading.

(4) Note pressure indicated on the suction pressure gage. To this pressure, add 2 psig (the estimated suction line loss).

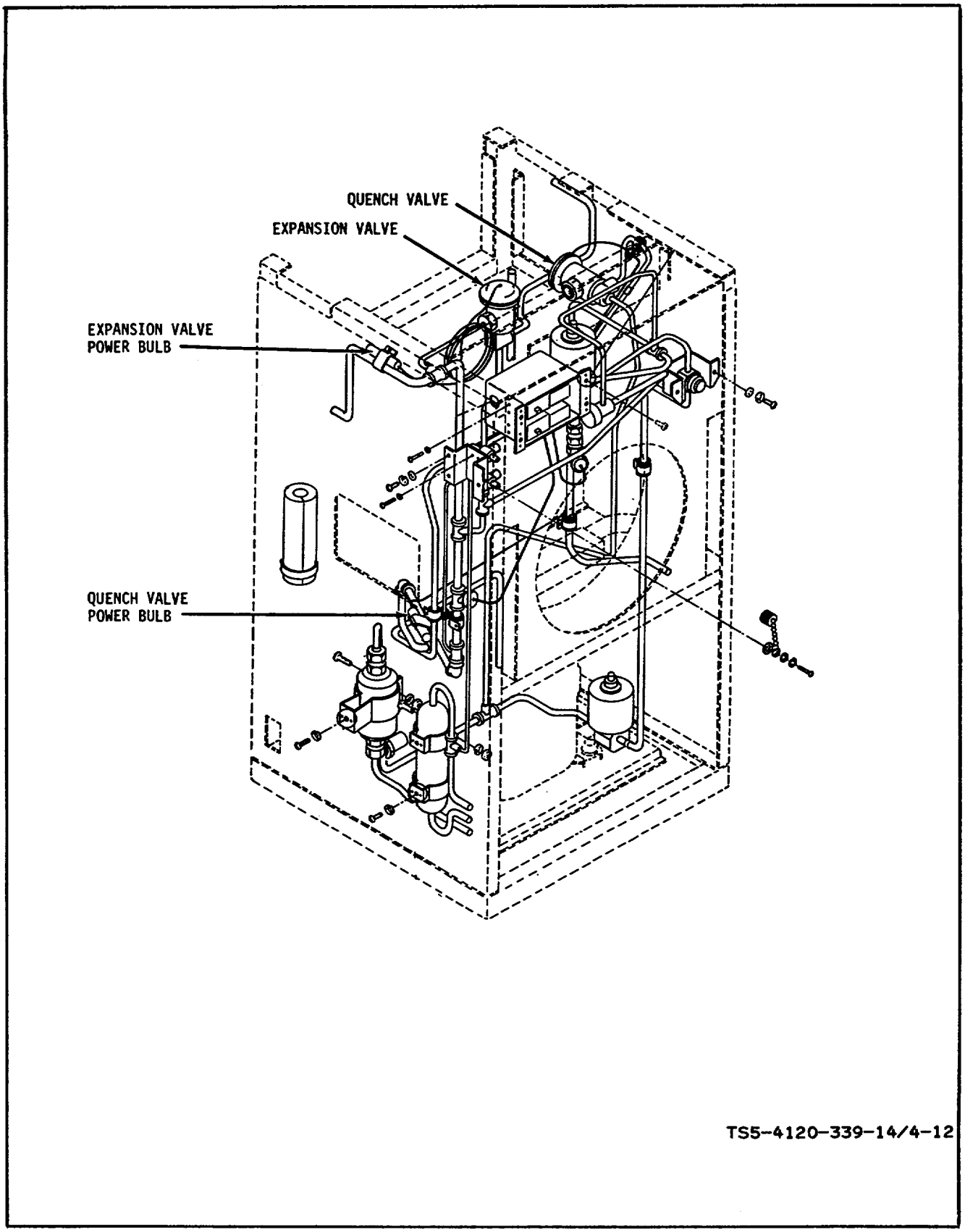


Figure 4-12. Location of expansion valve and quench valve

(5) Refer to table 4-2 and convert pressure (gage pressure plus 2 psig) to temperature.

(6) To calculate superheat of the expansion valve, deduct the temperature calculated in step (5) from the temperature indicated on the thermometer attached to the suction line. Superheat of the expansion valve should be 10° F ± .5° F (-12.22° C ± .5° C).

(7) If superheat is 10° F ± .5° F (-12.22° C ± .5° C), no adjustment of the expansion valve is necessary.

(8) If superheat is not as specified in step (7), adjust the expansion valve as follows:

(a) Remove seal cap on the side of the expansion valve.

(b) The expansion valve superheat is adjusted by turning the adjusting screw. Turning the adjusting screw counter-clockwise increases flow and lowers the superheat. Turning the adjusting screw clockwise decreases flow and raises superheat. Four complete turns will raise or lower the superheat by approximately 2° F (1.1° C). Turn the adjusting screw to obtain a superheat of 10° F ± .5° F (-12.22° C ± .5° C).

(c) Allow the unit to run on “COOL" for at least 20 minutes before adjusting to a new setting.

(d) Calculate the superheat of the expansion valve. If the superheat is now 10° F ± .5° F (-12.22° C ± .5° C), no further adjustment is necessary. If the superheat is not correct, continue the adjustment cycle, allowing at least 20 minutes between adjustments until the specified superheat is obtained.

Table 4-2. Conversion of temperature to pressure (R22)

TEMPER-ATURE °F	TEMPER-ATURE °C	PRES-SURE PSIG	PRES-SURE ks/mc^2	TEMPER-ATURE °F	TEMPER-ATURE °C	PRES-SURE PSIG	PRES-SURE ks/mc^2	TEMPER-ATURE °F	TEMPER-ATURE °C	PRES-SURE PSIG	PRES-SURE ks/mc^2
0	-17.77	24.0	1.68	17	-8.33	39.8	2.8	34	1.11	60.1	4.22
1	-17.22	24.8	1.74	18	-7.77	40.8	2.67	35	1.66	61.5	4.31
2	-16.66	25.6	1.80	19	-7.22	41.9	2.95	36	2.22	62.8	4.42
3	-16.1	26.4	1.86	20	-6.66	43.0	3.02	37	2.77	64.2	4.51
4	-15.55	27.3	1.92	21	-6.11	44.1	3.10	38	3.33	65.6	4.61
5	-15.0	28.2	1.98	22	-5.55	45.3	3.19	39	3.88	67.1	4.72
6	-14.44	29.1	2.05	23	-5.0	46.4	3.26	40	4.44	68.5	4.82
7	-13.88	30.0	2.11	24	-4.44	47.6	3.35	41	5.0	70.0	4.92
8	-13.33	30.9	2.17	25	-3.88	48.8	3.43	42	5.55	71.4	5.02
9	-12.77	31.8	2.23	26	-3.33	49.9	3.50	43	6.11	73.0	5.13
10	-12.22	32.8	2.31	27	-2.77	51.2	3.60	44	6.66	74.5	5.24
11	-11.66	33.7	2.37	28	-2.22	52.4	3.68	45	7.22	76.0	5.34
12	-11.11	34.7	2.44	29	-1.66	53.6	3.77	46	7.77	77.6	5.46
13	-10.55	35.7	2.51	30	-1.11	54.9	3.86	47	8.33	79.2	5.57
14	-10.0	36.7	2.58	31	-0 55	56.2	3.95	48	8.88	80.8	5.68
15	-9.44	37.7	2.65	32	0	57.5	4.04				
16	-8.88	38.7	2.72	33	0.55	58.8	4.13				

c. Repair. If the expansion valve is leaking refrigerant, refer to figure 4-13 and repair the expansion valve.

d. Replace. If damage or defects are found which would impair serviceability and are beyond repair, replace the expansion valve. Refer to paragraphs e and f for removal of defective valve and installation of a new valve.

e. Removal. (See figure 4-13.)

f. Installation.

(1) Refer to figures 4-12 and 4-13 and install the expansion valve.

(2) Perform any further maintenance of refrigeration components required at this time.

(3) If no further maintenance of refrigeration components is required, refer to paragraph 4-8 and purge the refrigerant system.

(4) Refer to paragraph 4-4c and check the expansion valve and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

(6) Re-perform inspection procedure (paragraph a) for the expansion valve to check of refrigerant leaks.

4-16. QUENCH VALVE.

a. Inspection.

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

(2) Refer to figure 3-13 and partially remove the junction box.

(3) Refer to figure 3-4 and remove the evaporator fan.

(4) Refer to figure 4-12 and inspect the quench valve, power bulb and tubing for obvious defects. If any obvious defects are found replace the quench valve.

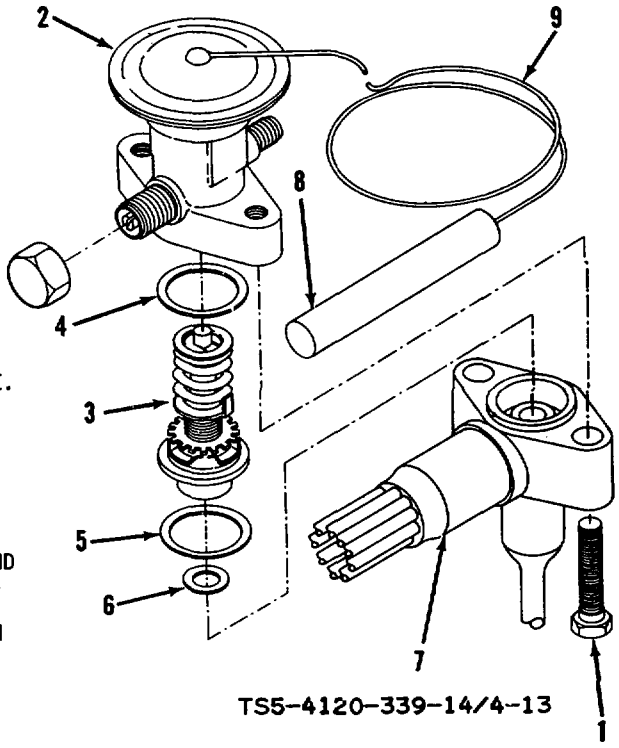
(5) Refer to paragraph 4-4c and check the quench valve for refrigerant leaks. If quench valve is leaking refrigerant, refer to paragraph c for repair.

b. Adjust.

CAUTION

Never adjust the quench valve unless absolutely necessary. When adjusting the quench valve, allow the unit to run on “COOL" for at least 20 minutes between each adjustment. Make sure that all panels are in place during running period.

1. BOLT
2. POWER ASSEMBLY
3. CAGE ASSEMBLY
4. BODY FLANGE GASKET
5. *BODY FLANGE GASKET*
6. SEAT GASKET
7. BODY FLANGE
8. POWER BULB
9. CAPILLARY TUBE



REMOVAL

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
2. DISCONNECT EQUALIZER LINE FROM POWER ASSEMBLY.
3. REMOVE TWO BOLTS (1) FROM BODY FLANGE.
4. CAREFULLY LIFT OFF THE POWER ASSEMBLY (2).
5. REMOVE CAGE ASSEMBLY (3) AND THREE GASKETS (4, 5, 6).
6. IF EXPANSION VALVE IS TO BE REPLACED, DISCONNECT TUBING FROM BODY FLANGE AND REMOVE BODY FLANGE FROM MOUNTING PROVISION. FREE EXPANSION VALVE POWER BULB (8) BY REMOVING BLACK INSULATION TAPE AND LOOSENING SCREWS IN CLAMP STRAPS. *REMOVE TIES FROM CAPILLARY* TUBE (9).

REPAIR

1. REFER TO REMOVAL PROCEDURE AND REMOVE EXPANSION VALVE. IT IS NOT NECESSARY TO REMOVE THE POWER BULB OR THE BODY FLANGE UNLESS DEFECTS ARE FOUND IN ONE OR BOTH OF THESE ITEMS.
2. INSPECT POWER ASSEMBLY, CAGE ASSEMBLY AND BODY FLANGE FOR DAMAGE OR DEFECTS WHICH WOULD IMPAIR SERVICEABILITY. IF SUCH DAMAGE OR DEFECTS ARE FOUND, REPLACE DEFECTIVE PART(S).

INSTALLATION

1. IF BODY FLANGE HAS BEEN REMOVED, POSITION BODY FLANGE ON MOUNTING PROVISION AND BRAZE TUBING INTO PLACE.
2. APPLY HIGH VACUUM GREASE (NATIONAL STOCK NUMBER 9150-00-965-2408) TO BOTH SIDES OF THREE GASKETS (4, 5, 6) AND INSTALL GASKETS ON CAGE ASSEMBLY.
3. INSTALL CAGE ASSEMBLY IN BODY FLANGE.
4. INSTALL THE POWER ASSEMBLY ON THE CAGE ASSEMBLY. MAKE SURE THE CAGE ASSEMBLY LUGS LINE UP WITH THE SLOTS INSIDE THE POWER ASSEMBLY.

CAUTION

DO NOT OVERTORQUE BOLTS (1). OVERTORQUING OF BOLTS MAY RESULT IN VALVE DAMAGE.

5. INSTALL TWO BOLTS (1). TIGHTEN EVENLY AND TORQUE TO 300 INCH POUNDS.
6. *IF POWER BULB HAS BEEN REMOVED, PLACE IT IN THE SAME POSITION ON THE SUCTION TUBE AS REMOVED* FROM, ASSURING CLEANLINESS AND GOOD PHYSICAL CONTACT.
7. SECURE POWER BULB BY TIGHTENING SCREWS IN CLAMP STRAPS. WRAP POWER BULB WITH BLACK INSULATION TAPE.

CAUTION

USE CARE IN APPLYING LEAD LOCK TO THE THREADS OF THE EQUALIZER LINE FITTING, SO THAT NONE OF THE MATERIAL GETS INSIDE THE REFRIGERANT SYSTEM WHEN THE LINE IS INSTALLED.

8. APPLY LEAK LOCK (NATIONAL STOCK NUMBER 8030-00-999-6313), OR EQUIVALENT, TO THREADS OF THE EQUALIZER LINE FITTING, AND CONNECT THE EQUALIZER LINE TO THE POWER ASSEMBLY.
9. REFER TO PARAGRAPH 4-15 FOR FINAL STEPS IN INSTALLATION OF EXPANSION VALVE.

Figure 4-13. Expansion valve removal, repair and installation

(1) Refer to figure 4-12 and tape the bulb of a thermometer to the suction line near the power bulb of the quench valve.

(2) Refer to figure 3-4 and install the evaporator fan.

(3) Refer to figure 3-13 and install the junction box.

(4) Refer to figure 4-5 and install a suction pressure gage.

(5) Connect the air conditioner to the electrical power source.

(6) Turn the selector switch to the “COOL" position and turn the thermostat control knob counter-clockwise to its limit. Operate the unit on cool for approximately 30 minutes to stabilize thermometer reading.

(7) At the end of 30 minutes operation, note the pressure indicated on the suction pressure gage. To this add 2 psig (estimated suction line loss).

(8) Refer to table 4-2 and convert pressure (gage pressure plus 2 psig) to temperature.

(9) To calculate the superheat of the quench valve, deduct the temperature calculated in step (8) from the temperature indicated on the thermometer attached to the suction line. The superheat of the quench valve should be 30.4°F ± .5°F (-0.88°C ± 0.5°C).

(10) If the superheat is as specified in step (9),.no adjustment is necessary.

(11) If the superheat is not as specified in step (9), adjust the quench valve as follows:

(a) Remove the seal cap on the side of the quench valve.

(b) The quench valve superheat is adjusted by turning the adjusting screw. Turning the adjusting screw counter-clockwise increases flow and lowers superheat. Turning the adjusting screw clockwise decreases flow and raises superheat. Four completes turns will raise or lower the superheat by approximately 2° F (1.1°C). Turn the adjusting screw to obtain the superheat specified in step (9).

(c) Allow the unit to run on "COOL" for at least 20 minutes before making a second adjustment.

(d) Calculate superheat of the quench valve. If superheat is now as specified in step (9), no further adjustment is necessary. If superheat is not as specified, continue the adjustment cycle until the superheat reaches the specified temperature allowing at least 20 minutes running time between adjustments.

(e) When adjustment is completed, turn the selector switch to the “OFF" position and disconnect the air conditioner from the electrical power source.

(f) Refer to figure 3-13 and partially remove the junction box.

(g) Refer to figure 3-4 and remove the evaporator fan.

(h) Refer to figure 4-12 and remove the thermometer bulb from the “OFF” position and disconnect the air conditioner from the electrical power source.

(i) Install the seal cap on the quench valve.

(j) Refer to figure 3-4 and install the evaporator fan.

(k) Refer to figure 3-13 and install the junction box.

(l) Refer to figure 4-5 and remove the suction pressure gage.

c. Repair. If the quench valve is leaking refrigerant, refer to figure 4-14 and repair the quench valve.

d. Replace. If damage or defects are found which would impair serviceability and is not repairable, replace the quench valve. Refer to paragraphs e and f for removal of defective quench valve and the installation of a new valve.

e. Removal.

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

(2) Refer to figure 3-13 and partially remove the junction box.

(3) Refer to figure 3-4 and remove the evaporator fan.

(4) Refer to figure 4-2 and release refrigerant from the system.

(5) Refer to figure 4-12 and 4-14 and remove the quench valve.

f. Installation.

(1) Refer to figure 4-12 and 4-14 and install the quench valve.

(2) Perform any further maintenance of refrigeration components required.

(3) If no further maintenance of refrigeration components is required, refer to paragraph 4-8 and purge the refrigerant system.

(4) Refer to paragraph 4-4c and check the quench valve and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

(5) Refer to paragraph 4-4 and evacuate the refrigerant system.

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

(7) Refer to figure 3-4 and install the evaporator fan.

(8) Refer to figure 3-13 and install the junction box.

(9) Re-perform inspection procedure (paragraph a) for quench valve to check for refrigerant leaks.

4-17. LIQUID LINE SOLENOID VALVE AND PRESSURE EQUALIZER SOLENOID VALVE.

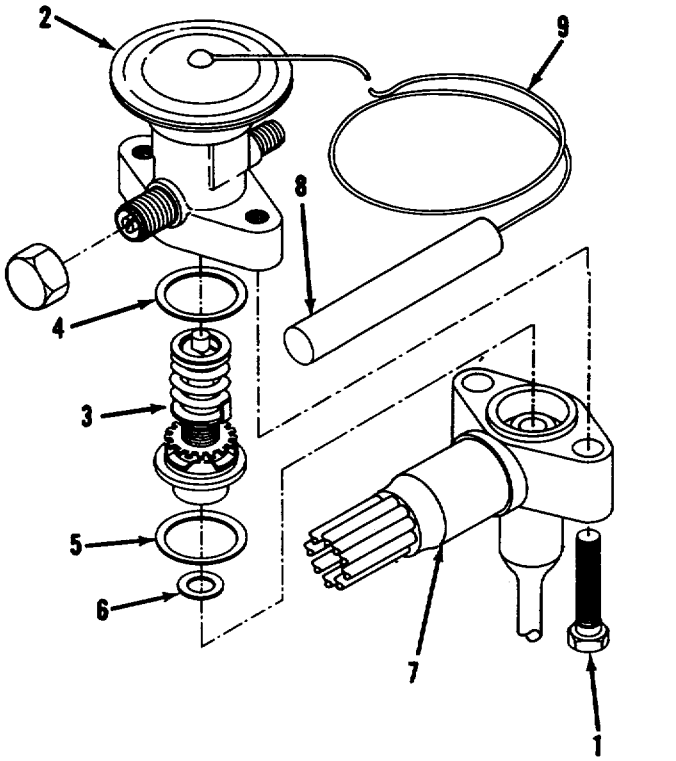
a. General. Inspection and testing of the solenoid valves is accomplished at organizational level (refer to paragraphs 3-13c and 3-13d).

b. Removal. (See figure 4-15.)

NOTE

Remove the liquid line solenoid valve and/or the pressure equalizer solenoid valve only for repair or replacement.

1. BOLT
2. POWER ASSEMBLY
3. CAGE ASSEMBLY
4. BODY FLANGE GASKET
5. BODY FLANGE GASKET
6. SEAT GASKET
7. BODY FLANGE
8. POWER BULB
9. CAPILLARY TUBE



TS5-4120-339-14/4-14

REMOVAL

1. REFER TO PARAGRAPH 4-16e FOR PRELIMINARY STEPS.
2. DISCONNECT EQUALIZER LINE FROM POWER ASSEMBLY.
3. REMOVE TWO BOLTS (1) FROM BODY FLANGE.
4. CAREFULLY LIFT OFF THE POWER ASSEMBLY (2).
5. REMOVE CAGE ASSEMBLY (3) AND THREE GASKETS (4, 5, 6).
6. IF QUENCH VALVE IS TO BE REPLACED, DISCONNECT TUBING FROM BODY FLANGE AND REMOVE BODY FLANGE FROM MOUNTING. FREE QUENCH VALVE POWER BULB (8) BY REMOVING BLACK INSULATION TAPE AND LOOSENING SCREWS IN CLAMP STRAPS. REMOVE TIES FROM CAPILLARY TUBE (9).

REPAIR

1. REFER TO REMOVAL PROCEDURE AND REMOVE QUENCH VALVE. IT IS NOT NECESSARY TO REMOVE THE POWER BULB OR THE BODY FLANGE UNLESS DEFECTS ARE FOUND IN ONE OR BOTH OF THESE ITEMS.
2. INSPECT POWER ASSEMBLY, CAGE ASSEMBLY AND BODY FLANGE FOR DAMAGE OR DEFECTS WHICH WOULD IMPAIR SERVICEABILITY. IF SUCH DAMAGE OR DEFECTS ARE FOUND, REPLACE DEFECTIVE PARTS.

INSTALLATION

1. IF BODY FLANGE HAS BEEN REMOVED, POSITION BODY FLANGE ON MOUNTING AND BRAZE TUBING INTO PLACE.
2. APPLY HIGH VACUUM GREASE (NSN 9150-00-965-2408) TO BOTH SIDES OF GASKETS (4, 5, 6) AND INSTALL GASKETS ON CAGE ASSEMBLY.
3. INSTALL CAGE ASSEMBLY IN BODY FLANGE.
4. INSTALL THE POWER ASSEMBLY ON THE CAGE ASSEMBLY. MAKE SURE THAT THE CAGE ASSEMBLY LUGS LINE UP WITH THE SLOTS INSIDE THE POWER ASSEMBLY.

CAUTION

DO NOT OVERTORQUE BOLTS (1). OVERTORQUING OF BOLTS MAY RESULT IN VALVE DAMAGE.

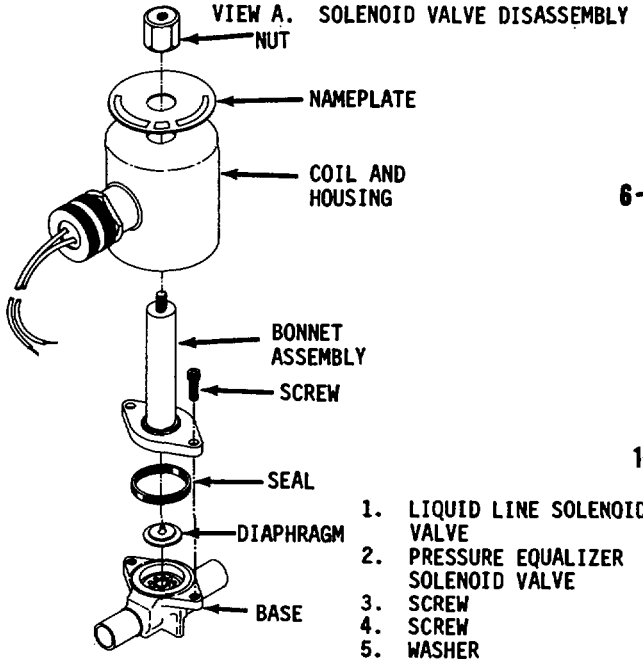
5. INSTALL TWO BOLTS (1). TIGHTEN BOLTS EVENLY AND TORQUE TO 300 INCH POUNDS.
6. IF POWER BULB HAS BEEN REMOVED, PLACE IT IN THE SAME POSITION ON THE SUCTION TUBE AS IT WAS REMOVED FROM, ASSURING CLEANLINESS AND GOOD PHYSICAL CONTACT.
7. SECURE POWER BULB BY TIGHTENING SCREWS IN CLAMP STRAPS. WRAP POWER BULB WITH INSULATION TAPE.

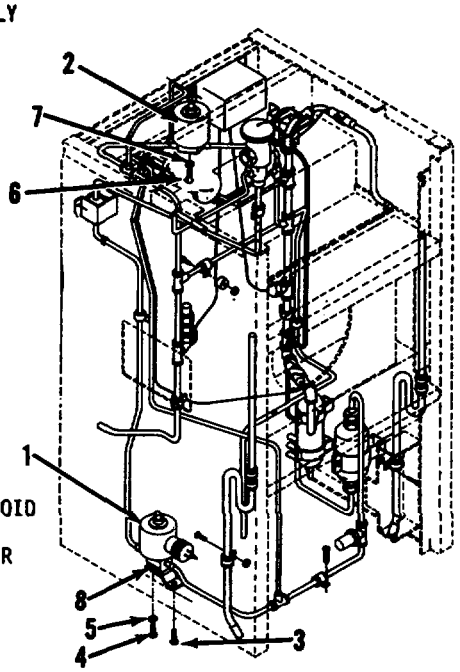
CAUTION

USE CARE IN APPLYING LEAK LOCK TO THE THREADS OF THE EQUALIZER LINE FITTING, SO THAT NONE OF OF THE MATERIAL ENTERS THE REFRIGERANT SYSTEM.

8. APPLY LEAK LOCK (NSN 8030-00-999-6313), TO THREADS OF EQUALIZER LINE FITTING AND CONNECT LINE.
9. REFER TO PARAGRAPH 4-16f FOR FINAL STEPS IN INSTALLATION OF QUENCH VALVE.

Figure 4-14. Removal, installation and repair of quench valve





VIEW B. SOLENOID VALVE LOCATION

1. LIQUID LINE SOLENOID VALVE
2. PRESSURE EQUALIZER SOLENOID VALVE
3. SCREW
4. SCREW
5. WASHER
6. SCREW
7. WASHER
8. BRACKET

LIQUID LINE SOLENOID VALVE

REMOVAL

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM. REFER TO PARAGRAPH 4-4 AND REMOVE APPROPRIATE PANELS TO GAIN ACCESS TO VALVE.
2. REFER TO FIGURE 3-13 AND PARTIALLY REMOVE THE JUNCTION BOX.

CAUTION

THE LIQUID LINE SOLENOID VALVE MUST BE DISASSEMBLED BEFORE DISCONNECTING THE TUBING FROM THE VALVE HOUSING TO AVOID HEAT DISTORTION.

3. REFER TO VIEW A AND DISASSEMBLE THE LIQUID LINE SOLENOID VALVE.
4. REFER TO VIEW B AND DISCONNECT TUBING FROM VALVE HOUSING.
5. REMOVE TWO SCREWS (3) FROM BRACKET (8) AND REMOVE BRACKET ALONG WITH ATTACHED VALVE HOUSING FROM BOTTOM PANEL OF AIR CONDITIONER.
6. REMOVE TWO SCREWS (4) AND WASHERS (5) AND SEPARATE BRACKET (8) FROM VALVE HOUSING.

INSTALLATION

1. POSITION BRACKET (8) ON VALVE HOUSING AND SECURE WITH TWO SCREWS (4) AND WASHERS (5).
2. POSITION BRACKET (8) ON BOTTOM PANEL OF AIR CONDITIONER AND SECURE WITH TWO SCREWS (3).

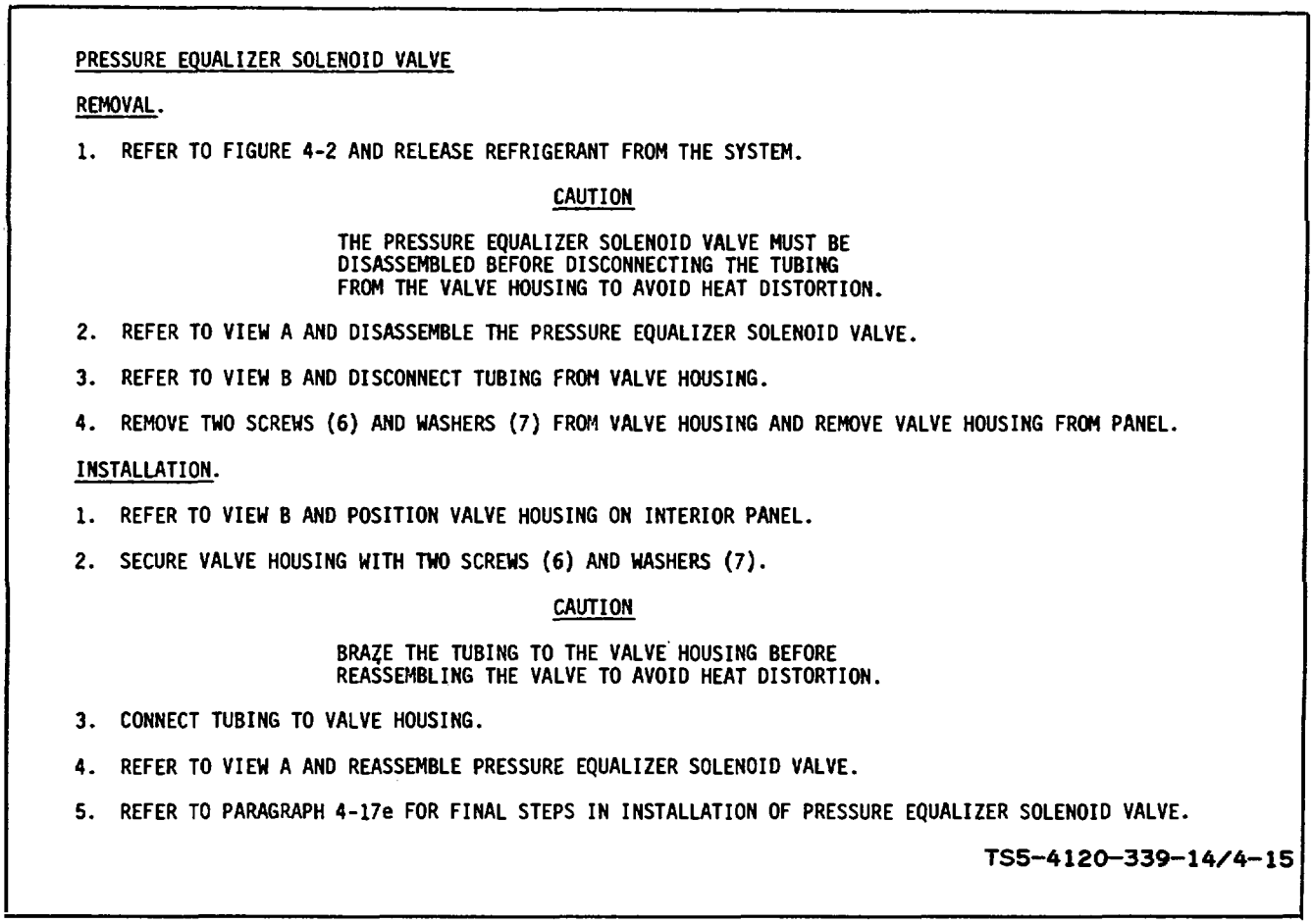
CAUTION

BRAZE THE TUBING TO THE VALVE HOUSING BEFORE REASSEMBLING THE VALVE TO AVOID HEAT DISTORTION.

3. CONNECT TUBING TO VALVE HOUSING.
4. REFER TO VIEW A AND REASSEMBLE LIQUID LINE SOLENOID VALVE.
5. REFER TO FIGURE 3-13 AND INSTALL THE JUNCTION BOX.
6. REFER TO PARAGRAPH 4-17e FOR FINAL STEPS IN INSTALLATION OF LIQUID LINE SOLENOID VALVE.

TS5-4120-339-14/4-15

Figure 4-15. Removal and installation of solenoid valves (sheet 1 of 2)



PRESSURE EQUALIZER SOLENOID VALVE

REMOVAL.

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.

CAUTION

THE PRESSURE EQUALIZER SOLENOID VALVE MUST BE DISASSEMBLED BEFORE DISCONNECTING THE TUBING FROM THE VALVE HOUSING TO AVOID HEAT DISTORTION.

2. REFER TO VIEW A AND DISASSEMBLE THE PRESSURE EQUALIZER SOLENOID VALVE.

3. REFER TO VIEW B AND DISCONNECT TUBING FROM VALVE HOUSING.

4. REMOVE TWO SCREWS (6) AND WASHERS (7) FROM VALVE HOUSING AND REMOVE VALVE HOUSING FROM PANEL.

INSTALLATION.

1. REFER TO VIEW B AND POSITION VALVE HOUSING ON INTERIOR PANEL.

2. SECURE VALVE HOUSING WITH TWO SCREWS (6) AND WASHERS (7).

CAUTION

BRAZE THE TUBING TO THE VALVE HOUSING BEFORE REASSEMBLING THE VALVE TO AVOID HEAT DISTORTION.

3. CONNECT TUBING TO VALVE HOUSING.

4. REFER TO VIEW A AND REASSEMBLE PRESSURE EQUALIZER SOLENOID VALVE.

5. REFER TO PARAGRAPH 4-17e FOR FINAL STEPS IN INSTALLATION OF PRESSURE EQUALIZER SOLENOID VALVE.

TS5-4120-339-14/4-15

Figure 4-15. Removal and installation of solenoid valves (sheet 2 of 2)

c. Repair.

(1) If either solenoid valve fails the test or organizational level, check continuity through solenoid valve electrical leads. Replace any lead which does not check out for continuity.

(2) Check continuity through the solenoid coil. If no continuity, replace the coil. (Refer to figure 4-15 for disassembly of solenoid valve.)

(3) Repair any Solenoid valve related refrigerant leaks.

d. Replace. Replace the liquid line solenoid valve and/or the pressure equalizer solenoid valve if evidence is found of damage which would impair serviceability and is unrepairable.

e. Installation.

(1) Refer to figure 4-15 and install the liquid line solenoid valve and/or the pressure equalizer solenoid valve.

(2) Perform any further maintenance of refrigeration components required.

(3) If no further maintenance of refrigeration components is required,

refer to paragraph 4-8 and purge the system.

(4) Refer to paragraph 4-4c and check the liquid line solenoid valve and/or the pressure equalizer solenoid valve and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

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

(7) Operate the unit on "COOL" and check for refrigerant leaks around the newly installed solenoid valve and dehydrator. Repair any leaks found.

4-18. DEHYDRATOR.

a. Replace. The dehydrator must be replaced each time the refrigerant system is exposed to the atmosphere. Refer to paragraphs b and c for the removal of the old dehydrator and the installation of a new dehydrator.

b. Removal. (See figure 4-16.)

c. Installation.

(1) Refer to paragraph 4-8 and purge the refrigerant system.

(2) Refer to figure 4-16 and install a new dehydrator.

(3) Refer to paragraph 4-4c and check the dehydrator far refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

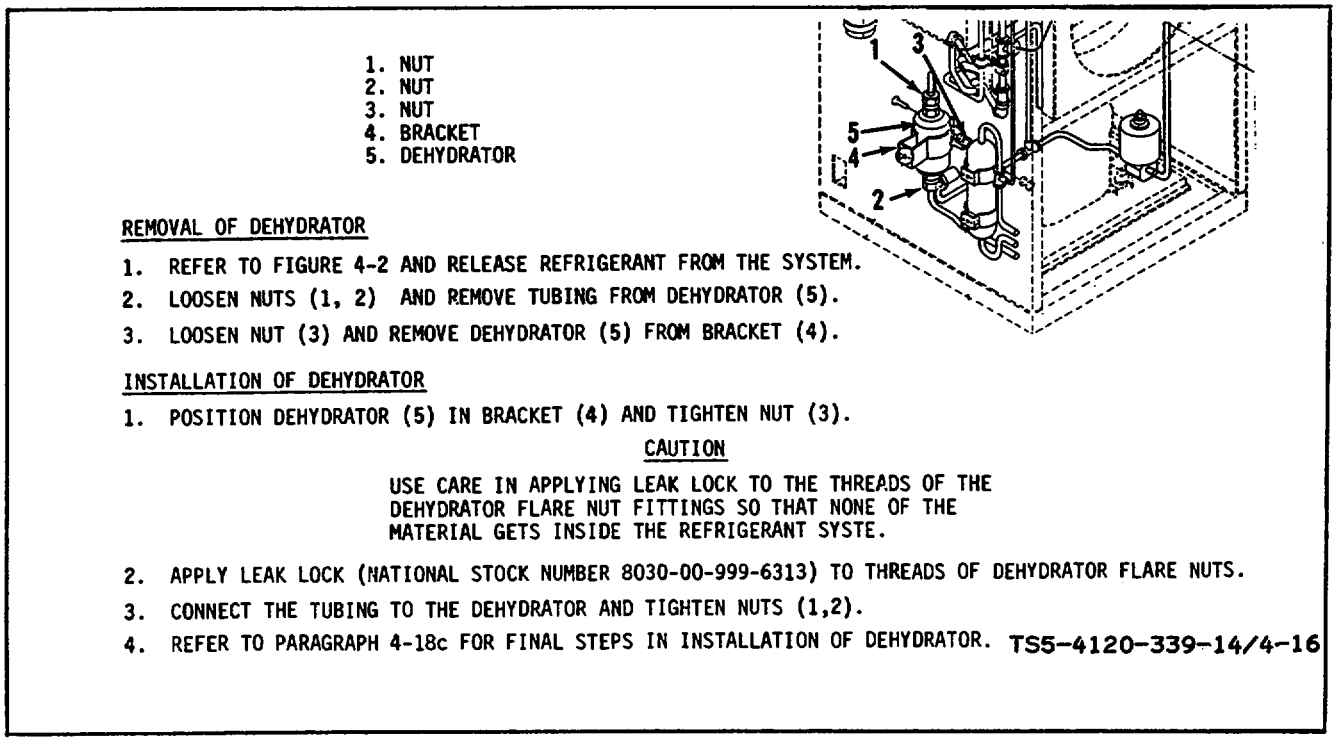


Figure 4-16. Removal and installation of dehydrator

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

4-19. SIGHT GLASS.

a. Inspection.

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

(2) Refer to figure 4-17 and inspect the sight glass for damage or defects which would impair serviceability.

(3) Refer to paragraph 4-4c and check the sight glass for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

b. Replace. Replace the sight glass if evidence is found of defects or damage which would impair serviceability. Refer to paragraphs c and d for removal of defective sight glass and the installation of a new sight glass.

c. Removal. (See figure 4-17.)

d. Installation.

(1) Refer to figure 4-2 and release refrigerant from the system.

(2) Refer to figure 4-17 and install a new sight glass.

(3) Perform any further maintenance of refrigeration components required.

(4) If no further maintenance of refrigeration components is required, refer to paragraph 4-8 and purge the refrigerant system.

(5) Refer to paragraph 4-4c and check the sight glass and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

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

4-20. EVAPORATOR COIL.

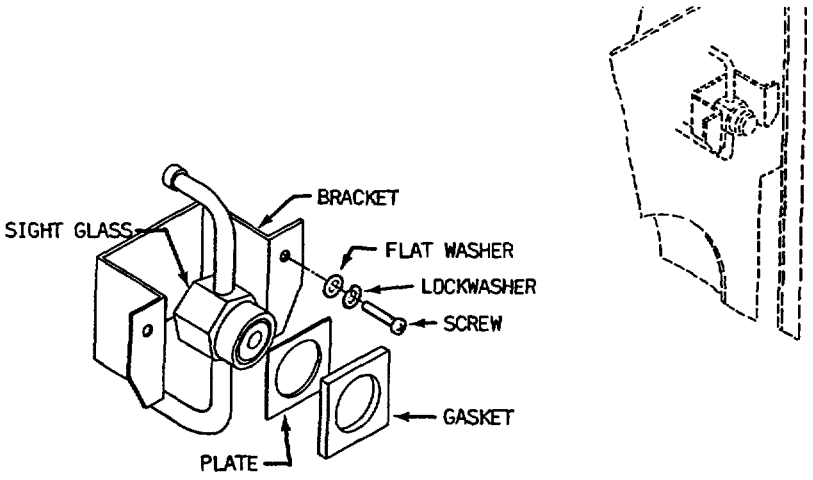
a. Test.

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

(2) Refer to paragraph 4-4 and check the evaporator coil for refrigerant leaks.

b. Repair. Refer to paragraph 4-4d and repair any leaks found.

c. Replace. Replace the evaporator coil if unrepairable or if defects or damage would impair serviceability. Refer to paragraph d and e for removal of defective evaporator coil and the installation of a new evaporator coil.



REMOVAL OF SIGHT GLASS

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
2. REMOVE TWO SCREW AND TWO WASHERS FROM BRACKET THEM REMOVE BRACKET FROM AIR CONDITIONER.
3. REMOVE RUBBER GASKET AND METAL PLATE FROM SIGHT GLASS
4. DISCONNECT SIGHT GLASS TUBING AND REMOVE SIGHT GLASS FROM AIR CONDITIONER.

INSTALLATION OF SIGHT GLASS

1. POSITION SIGHT GLASS IN AIR CONDITIONER AND BRAZE TUBING IN PLACE.
2. PLACE METAL PLATE AND RUBBER GASKET OVER SIGHT GLASS.
3. POSITION BRACKET IN AIR CONDITIONER AND SECURE WITH TWO SCREWS AND WASHERS.
4. REFER TO PARAGRAPH 4-19d FOR FINAL STEPS.

TS5-4120-339-14/4-17

Figure 4-17. Removal and installation of sight glass

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

e. Installation.

(1) Refer to figure 4-18 and install the evaporator coil in the unit.

(2) Perform any further maintenance of refrigeration components required.

(3) If no further maintenance of refrigeration components is required, refer to paragraph 4-8 and purge the refrigerant system.

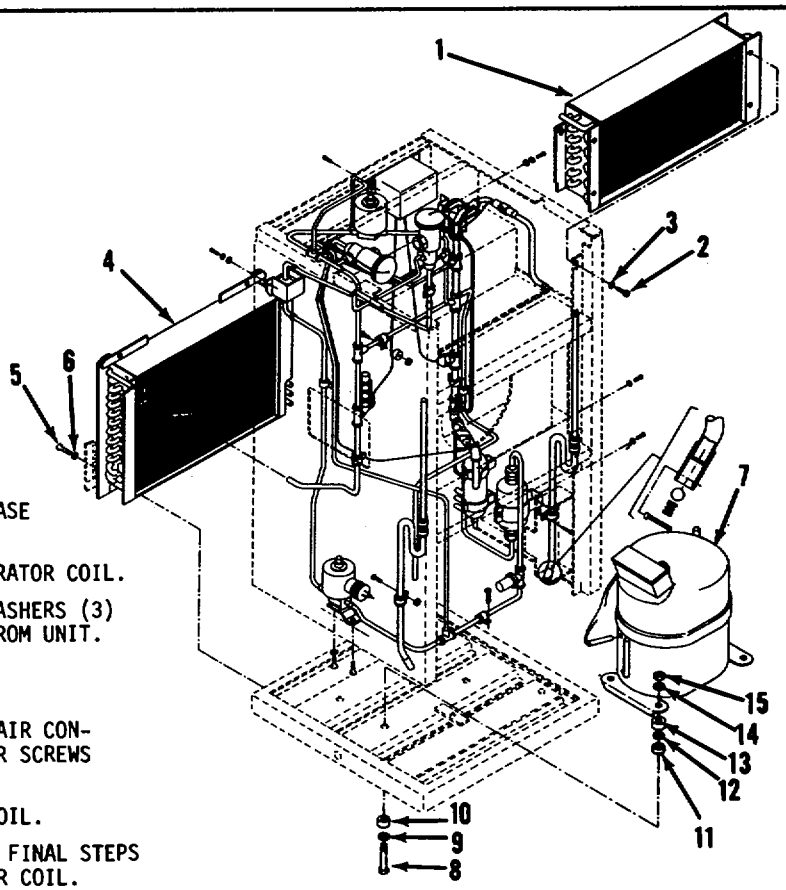
(4) Refer to paragraph 4-4c and check the evaporator coil and the dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

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

(7) Re-perform the test procedure of paragraph a to check for refrigerant leakage.

1. EVAPORATOR COIL
2. SCREW
3. WASHER
4. CONDENSER COIL
5. SCREW
6. WASHER
7. COMPRESSOR
8. BOLT
9. WASHER
10. SPACER
11. SPACER
12. WASHER
13. SPACER
14. WASHER
15. NUT



TS5-4120-339-14/4-18

REMOVAL OF EVAPORATOR COIL

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
2. DISCONNECT TUBING FROM EVAPORATOR COIL.
3. REMOVE FOUR SCREWS (2) AND WASHERS (3) AND REMOVE EVAPORATOR COIL FROM UNIT.

INSTALLATION OF EVAPORATOR COIL

1. POSITION EVAPORATOR COIL IN AIR CONDITIONER AND SECURE WITH FOUR SCREWS (2) AND WASHERS (3).
2. BRAZE TUBING TO EVAPORATOR COIL.
3. REFER TO PARAGRAPH 4-20e FOR FINAL STEPS IN INSTALLATION OF EVAPORATOR COIL.

REMOVAL OF CONDENSER COIL

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
2. DISCONNECT TUBING FROM THE CONDENSER COIL.
3. REMOVE FOUR SCREWS (5) AND WASHERS (6) AND REMOVE CONDENSER COIL FROM THE AIR CONDITIONER.

INSTALLATION OF CONDENSER COIL

1. POSITION CONDENSER COIL IN AIR CONDITIONER AND SECURE WITH FOUR SCREWS (5) AND WASHERS (6).
2. BRAZE TUBING TO CONDENSER COIL.
3. REFER TO PARAGRAPH 4-21e FOR FINAL STEPS IN INSTALLATION OF CONDENSER COIL.

REMOVAL OF COMPRESSOR

1. REFER TO FIGURE 4-2 AND RELEASE REFRIGERANT FROM THE SYSTEM.
2. DISCONNECT ELECTRICAL CONNECTOR AND DISCONNECT TUBING FROM THE COMPRESSOR.
3. REMOVE FOUR BOLTS (8), WASHERS (9, 12,14), SPACERS (11, 13) AND NUTS (15) AND REMOVE COMPRESSOR FROM THE AIR CONDITIONER.

INSTALLATION OF COMPRESSOR

1. POSITION COMPRESSOR IN AIR CONDITIONER AND SECURE WITH FOUR BOLTS (8), WASHERS (9, 12, 14), SPACERS (11, 13) AND NUTS (15).
2. BRAZE TUBING TO COMPRESSOR AND CONNECT THE ELECTRICAL CONNECTOR.
3. REFER TO PARAGRAPH 4-21e FOR FINAL STEPS IN THE INSTALLATION OF THE COMPRESSOR.

Figure 4-18. Removal and installation of evaporator coil, condenser coil and compressor

4-21. CONDENSER COIL.

a. Test.

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

(2) Refer to paragraph 4-4 and check the condenser coil for refrigerant leaks.

b. Repair. Refer to paragraph 4-4d and repair any leaks found.

c. Replace. Replace condenser coil if unrepairable or if defects or damage would impair serviceability. Refer to paragraphs d and e for removal of defective coil and the installation of a new condenser coil.

d. Removal. (See figure 4-18)

e. Installation.

(1) Refer to figure 4-18 and install the condenser coil in the air conditioner.

(2) Perform any further maintenance of refrigeration components required.

(3) If no further maintenance of refrigeration components is required, refer to paragraph 4-8 and purge the refrigerant system.

(4) Refer to paragraph 4-4c and check the condenser coil and dehydrator for refrigerant leaks. Refer to paragraph 4-4d and repair any leaks found.

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

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

(7) Re-perform test procedure (paragraph a) to check for refrigerant leakage.

4-22. COMPRESSOR.

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

b. Test.

WARNING

Disconnect air conditioner from electrical power source before performing maintenance on the compressor.

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

(2) Refer to figure 3-13 and partially remove the junction box.

(3) If the compressor is obviously burned out, proceed to step c.

(4) If the compressor is inoperative, but does not appear to be burned out, refer to figure 3-7 (wiring diagram) and test the compressor wire bundle for continuity.

(5) Repair or replace any broken wires found and check for compressor operation. If compressor now operates properly, no further maintenance action is required on the compressor.

(6) If no broken wires are found, or if the compressor fails to operate after broken wires are repaired or replaced, refer to table 4-1 and troubleshoot the compressor.

(7) If troubleshooting fails to isolate and correct the problem, proceed to step c.

c. Replace. Replace the compressor if burned out or if the compressor has damage which would impair serviceability. Refer to step d for removal of defective compressor, step e for system clean up (flushing), and step f for installation of a new compressor.

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

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

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

(2) Refer to figure 4-16 and remove the dehydrator. Do not replace with a new dehydrator at this time.

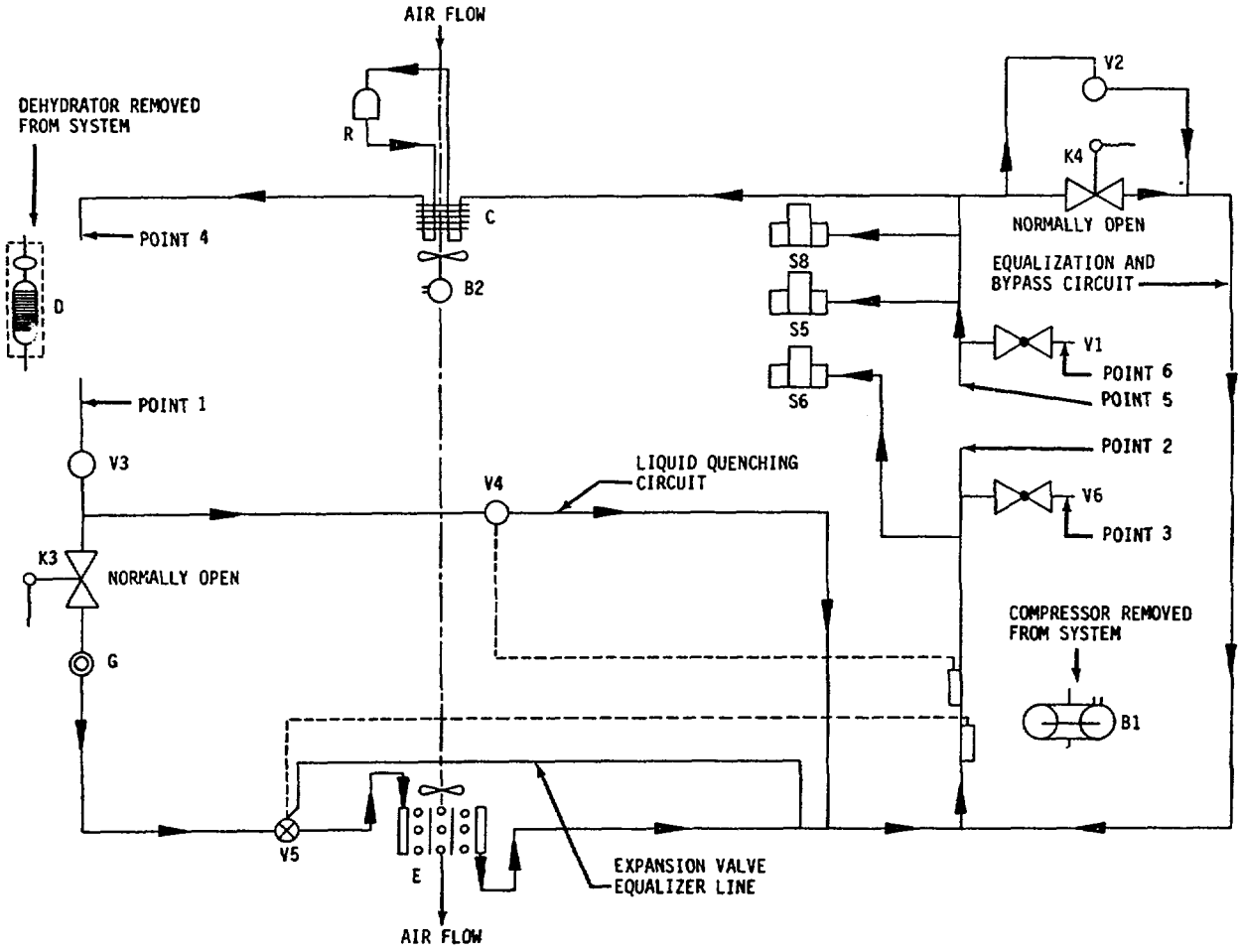
(3) Flush the refrigerant system with trichlorotrifluroethane refrigerant solvent R-114 (National Stock Number 6830-00-782-6512). Flushing should be done under a pressure of 8 to 12 psig (.56 to .84 ks/cm^2), using a pump of approximately 1/3 horse power. The R-114 my be recirculated if run through a 10 micron filter. Procedures for flushing the system are as follows:

(a) Refer to figure 4-19 and connect the discharge line of the pump to the tubing at point 1. Connect the recovery line to the tubing at point 2. Leave the suction pressure service valve (point 3) closed. Cap the tubing at points 4 and 5.

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

(c) Remove the recovery line from point 2 and cap the tubing at point 2.

(d) Connect the recovery line to the valve at point 3 and open the suction pressure service valve.



DESIGNATION	NAME	DESIGNATION	NAME
B1	COMPRESSOR	S8	PRESSURE CONTROL SWITCH
B2	FAN MOTOR	R	RECEIVER
C	CONDENSER COIL	V1	DISCHARGE PRESSURE SERVICE VALVE
D	DEHYDRATOR		
E	EVAPORATOR COIL	V2	FLUID PRESSURE REGULATOR
G	SIGHT GLASS	V3	PRESSURE RELIEF VALVE
K3	LIQUID LINE SOLENOID VALVE	V4	QUENCH VALVE
		V5	EXPANSION VALVE
K4	PRESSURE EQUALIZER SOLENOID VALVE	V6	SUCTION PRESSURE SERVICE VALVE
S5	HIGH PRESSURE CUT-OUT SWITCH	S6	LOW PRESSURE CUT-OUT VALVE

TS5-4120-339-14/4-19

Figure 4-19. Refrigeration flow system with dehydrator and compressor removed

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

(f) Refer to figure 3-13 and disconnect plug P10 (3) from receptacle J10 (4) on the junction box.

(g) Energize the liquid line solenoid valve by applying 24 volts dc across pins N and M of plug P10.

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

(i) Switch the pump lines so that the discharge line is connected to the valve at point 3 and the recovery line is connected to the tubing at point 1.

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

(k) Close the suction pressure service valve and move the discharge line from the valve at point 3 to the tubing at point 2.

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

(m) De-energize the liquid line solenoid valve by disconnecting the dc voltage source from pins N and M of plug P10.

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

(o) Uncap the tubing at point 4 and 5.

(p) Disconnect the pump discharge line from the tubing at point 2 and connect it to the tubing at point 5.

(q) Disconnect the recovery line from the tubing at point 1 and connect it to the tubing at point 4.

(r) Cap the tubing at points 1 and 2.

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

(t) Move the pump discharge line from the tubing at point 5 to the valve at point 6. Cap the tubing at point 5.

(u) Open the discharge pressure service valve.

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

(w) Switch the pump lines so that the discharge line is connected to the tubing at point 4 and the recovery line is connected to the valve at point 6.

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

(y) Remove the cap from the tubing at point 2. Disconnect the pump discharge line from the tubing at point 4 and connect it to the tubing at point 2. Cap the tubing at point 4.

(z) Energize the pressure equalizer solenoid valve by applying 24 volts dc across pins C and F of plug P10.

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

(ab) Remove the cap from the tubing at point 5.

(ac) Remove the pup discharge line from the tubing at point 2 and connect it to the tubing at point 5.

(ad) Remove the recovery line from the valve at point 6 and connect it to the tubing at point 2. Close the valve at point 6.

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

(af) De-energize the pressure equalizer solenoid valve by removing the voltage source from pins C and F of plug P10.

(ag) Disconnect the discharge and recovery lines from the tubing and remove all caps from the tubing.

(4) Refer to figure 4-19 and purge the system with nitrogen at approximately 30 psig (2.11 ks/cm^2) as follows:

(a) Make sure caps are off the tubing at all point and that valves V1 and V6 are open.

(b) Connect the nitrogen line to the tubing at point 1 and release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(c) Energize the liquid line solenoid valve by applying 24 volts dc across pins N and M of plug P10.

(d) Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(e) Remove the nitrogen line from the tubing at point 1 and connect it to the tubing at point 2. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(f) De-energize the liquid line solenoid valve and release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(g) Energize the pressure equalizer solenoid valve by applying 24 volts dc across pins C and F of plug P10.

(h) Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(i) Remove the nitrogen line from the tubing at point 2 and connect it to the tubing at point 5. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(j) De-energize the pressure equalizer solenoid valve and release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(k) Remove the nitrogen line from the tubing at point 5 and connect it to the tubing at point 4. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(l) Remove the nitrogen line from the tubing at point 4 and connect it to the valve at point 6. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(m) Remove the nitrogen line from the valve at point 6 and connect it to the valve at point 3. Release nitrogen into the system for approximately 5 minutes or until moisture ceases to be discharged from the system.

(n) Remove the nitrogen line from the valve at point 3.

(o) Close valves V1 and V6.

(p) Cap all open tubing until installation of new components.

f. Installation.

(1) Refer to figure 3-13 and connect plug P10 (3) to receptacle J10 (4) on the junction box.

(2) Refer to figure 4-16 and install a new dehydrator.

(3) Refer to figure 4-18 and install a new compressor.

(4) Refer to figure 3-13 and install the junction box.

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

(6) Refer to paragraph 4-10 and charge the system with refrigerant. Leave the pressure gages connected.

(7) Connect the unit to an appropriate electrical power source, turn the selector switch to the "COOL"' position and the thermostat control knob counter-clockwise to its limit.

(8) Refer to paragraph 4-4c and check the system for refrigerant leaks.

(9) Refer to paragraph 4-4d and repair any leaks found.

(10) With the air conditioner operating in the cooling mode, check the pressures. Pressures should be as given in table 4-3.

(11) Close all valves and remove gages.

Table 4-3. Air conditioner operating pressures

AMBIENT TEMPERATURE	RETURN AIR TEMPERATURE	SUCTION PRESSURE	DISCHARGE PRESSURE
120°F 49°C	90°F DB/75°F WB 32°C DB/24°C WB	85-95 PSIG 5.98-6.68 ks/cm^2	387-395 PSIG 27.21-27.71 ks/cm^2
95°F 35°C	80°F DB/67°F WB 26.66°C DB/19.44°C WB	70-80 PSIG 4.92- 5.62 ks/cm^2	253-263 PSIG 17.8-18.5 ks/cm^2
DB = dry bulb WB = wet bulb			

4-23. COMPRESSOR CRANKCASE HEATER.

a. Inspection. Refer to figure 4-20 and inspect the compressor crankcase heater for damage which would impair serviceability.

b. Test. Refer to figure 4-20 and check for continuity between pins F and G of compressor electrical receptacle.

c. Replace. Replace compressor crankcase heater if damage would impair serviceability or if failure occurs during testing.

4-24. TUBING AND PIPING.

a. Inspection. Inspect tubes and pipes for breaks and for damage which would impair serviceability.

b. Test. Refer to paragraph 4-4c and check tubes and pipes for refrigerant leakage.

c. Repair. Refer to paragraph 4-4d and repair all leaks found.

d. Replace. Replace unrepairable tubing and piping as follows:

(1) Refer to figure 4-2 and release refrigerant from the system.

(2) Refer to figure 4-18 and replace defective tubing and/or piping.

(3) Refer to paragraph 4-8 and purge the refrigerant system.

(4) Refer to paragraph 4-4c and check replaced tubing or piping and the dehydrator for leaks. Refer to paragraph 4-4d and repair any leaks found.

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

(6) Refer to paragraph 4-10 and recharge the system with refrigerant.

4-25. CASING ASSEMBLY.

a. Inspection. Inspect the entire casing assembly for damaged or defective rivnuts and nut plates.

b. Repair. Replace any damaged or defective rivnuts or nut plates found during inspection.

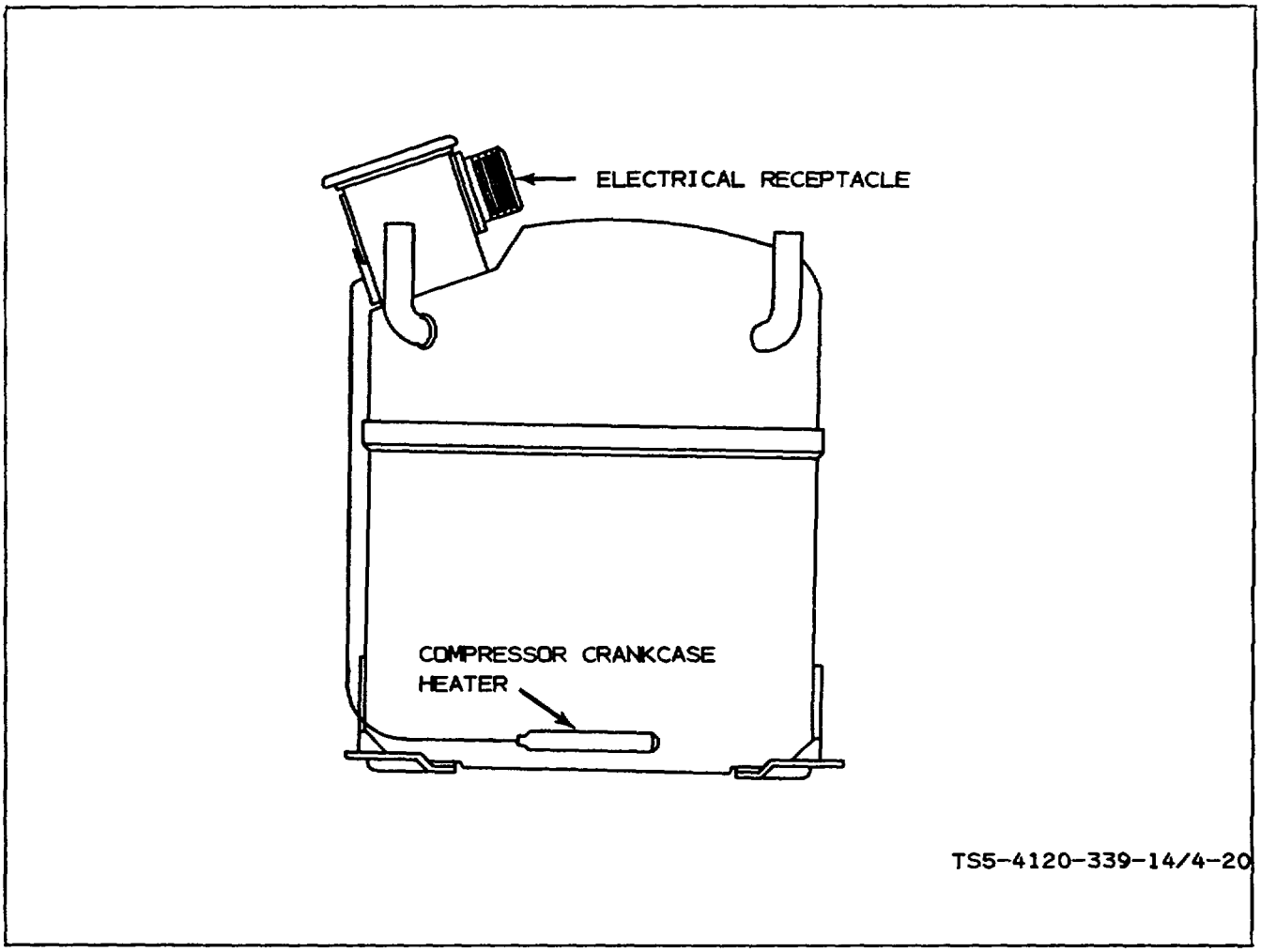


Figure 4-20. Compressor crankcase heater

CHAPTER 5

GENERAL SUPPORT MAINTENANCE

5-1. GENERAL MAINTENANCE PROCEDURES.

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

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

5-2. REPLACEMENT OF CASING ASSEMBLY.

Replace casing assembly if damage is unrepairable and would impair serviceability.

WARNING

Disconnect the air conditioner from the electrical power source before performing general maintenance procedures on the unit.

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

b. Refer to figure 4-2 and release refrigerant from the system.

c. Remove all panels, grilles, filters and screens from the unit.

d. Remove all components and tubing from the casing assembly.

e. Install all components and tubing in new casing assembly.

f. Install panels, grilles, filters and screens in new casing assembly.

g. Refer to paragraph 4-8 and purge the refrigerant system.

h. Refer to figure 4-4 and evacuate the refrigerant system.

i. Refer to paragraph 4-10 and charge the system with refrigerant.

j. Connect the air conditioner to the electrical power, turn the selector switch to the “COOL" position and turn the thermostat control knob counter-clockwise to its limit.

k. Using available leak detector, check the entire unit for refrigerant leaks. Repair any leaks found in accordance with paragraph 4-4d.

l. If unit does not function properly, troubleshoot according to table 4-1.

APPENDIX A

REFERENCES

A-1. Administration

TM 740-90-1	Administrative Storage of Equipment

A-2. Fire Protection

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

A-3. Painting

TM 43-0139	Painting Instruction for Field Use

A-4. Maintenance

FM 20-31	Electric Motor and Generator Repair
TM 5-4120-339-24P	Repair Parts and Special Tools List
TM 38-250	Crate Fabrication
DA PAM 738-750	The Army Maintenance Management System

A-5. Lubrication

C9100-IL	Fuels, Lubricants, Oils and Waxes

A-6. Cleaning

Fed. Spec. P-D-680	Dry Cleaning Solvent

APPENDIX B

MAINTENANCE ALLOCATION CHART

SECTION I

INTRODUCTION

B-1. GENERAL

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

b. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

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

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep and item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of replacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code in the SMR code.

i. Repair. The application of maintenance services[2], including fault location/troubleshooting[3] removal/ installation, and disassembly/assembly[4] procedures, and maintenance actions[5] to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable, operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/ components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION III

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00".

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

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)

---

[2]Services - inspect, test, service, adjust, aline, calibrate, and/or replace.

[3]Fault locate/troubleshoot - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

[4]Disassemble/assemble - encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componency identified as maintenance significant (i.e., assigned SMR code) for the category of maintenance under consideration.

[5]Actions - welding, grinding, riveting, straightening, facing, remachinery, and/or resurfacing.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C..... Operator or crew
O..... Organizational Maintenance
F ..... Direct Support Maintenance
H..... General Support Maintenance
L ..... Specialized Repair Activity (SRA)[6]
D..... Depot Maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, Which shall be keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

[6]This maintenance category is not included in Section II, column (4) of the Maintenance Allocation Chart. To identify functions to this category of maintenance, enter a work time figure in the “H” column of Section II, column (4), and use an associated reference code in the Remarks column (6). Key the code to Section IV, Remarks, and explain the SRA complete repair application there. The explanatory remark(s) shall reference the specific Repair Parts and Special Tools List (RPSTL) TM which contains additional SRA criteria and the authorized spare/repair parts.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National Stock Number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

a. Column 1, Reference Code. The code recorded in column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

SECTION II. MAINTENANCE ALLOCATION CHART
FOR
TM9KV-208-3-60

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
GROUP NUMBER	COMPONENT/ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
01	PANELS, COVERS AND GRILLES								
0101	PANELS	Inspect Repair Replace	0.5	 1.0 0.5					
0102	COVERS	Inspect Repair Replace	0.5	 1.0 0.5					
0103	GRILLES	Inspect Adjust Repair Replace	0.5 0.1	 1.0 0.5					
0104	AIR FILTER	Inspect Service Replace	0.2	 0.5 0.2					
0105	MIST ELIMINATOR	Inspect Service Replace	0.75	 0.75 1.0					
02	FAN MOTOR & FANS								
0201	IMPELLER FANS	Inspect Repair Replace		1.5 0.5 1.75					
0202	FAN MOTOR	Inspect Test Repair Replace		1.5 0.5 2.5 1.75					
03	HEATING SYSTEM								
0301	HEATING ELEMENTS	Inspect Test Replace		0.75 0.5 2.5					
04	ELECTRICAL SYSTEM								
0401	CONTROL BOX	Inspect Repair Replace		1.5 2.5 3.2					
0402	SWITCHES	Inspect Test Replace		1.1 0.5 1.5					
0403	THERMOSTAT	Inspect Test Replace		1.5 0.5 1.75					

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
0404	JUNCTION BOX	Inspect		0.5					
		Repair		1.5					
		Replace		1.0					
0405	RELAYS	Inspect		1.0					
		Test		1.0					
		Replace		1.5					
0406	FUSES	Inspect		0.5					
		Test		0.5					
		Replace		0.5					
0407	RECTIFIER	Inspect		0.5					
		Test		0.5					
		Replace		0.5					
0408	TRANSFORMER	Inspect		0.5					
		Test		0.5					
		Replace		0.5					
0409	CIRCUIT BREAKERS	Inspect		0.5					
		Test		0.5					
		Replace		0.75					
0410	TERMINAL BOARDS	Inspect		0.5					
		Replace		1.0					
05	REFRIGERANT SYSTEM								
0501	SWITCH, CUT-OUT	Inspect		0.5					
		Test			2.0				
		Replace			2.5				
0502	SWITCH, PRESSURE CONTROL	Inspect		0.5					
		Test			2.0				
		Replace			2.5				
0503	VALVE, PRESSURE RELIEF	Inspect		0.5					
		Replace			2.5				
0504	VALVES, SERVICE	Inspect			0.5				
		Replace			3.0				
0505	VALVE, EXPANSION	Inspect			0.5				
		Adjust			3.0				
		Repair			4.0				
		Replace			5.5				
0506	VALVE, QUENCH	Inspect			0.5				
		Adjust			3.0				
		Repair			4.0				
		Replace			5.5				
0507	VALVE, SOLENOID	Inspect		0.5					
		Test		2.0					
		Repair			1.5				
		Replace			2.5				

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
0508	DEHYDRATOR	Replace			4.0				
0509	SIGHT GLASS	Inspect		0.5					
		Replace			3.0				
0510	COIL, EVAPORATOR	Inspect		0.5					*
		Service		0.75					
		Test			1.0				
		Repair			2.5				
		Replace			12.0				
0511	COIL, CONDENSER	Inspect		0.5					*
		Service		0.75					
		Test			1.0				
		Repair			2.5				
		Replace			12.0				
0512	COMPRESSOR	Inspect		1.0					*
		Test			2.0				
		Replace			12.5				
0513	HEATER, COMPRESSOR CRANKCASE	Inspect		0.4	0.4				
		Test			0.75				
		Replace			1.5				
0514	TUBING AND PIPING	Inspect			3.0				
		Test			3.5				
		Repair			4.5				
		Replace			16.0				
06	CASING ASSEMBLY								
0601	CASING	Inspect		1.0					
		Repair			3.5				
		Replace			60.0				
	* External only for obvious	defects.							

SECTION III. TOOLS AND TEST EQUIPMENT REQUIRED

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
		No special tools and test equipment required. Standard tools and test equipment in the following kits are adequate to accomplish the maintenance functions listed in Section II.		
1	O-F-H	Tool kit, service, refrigeration (SC 5180-90-CL-N 18)	5180-00-596-1474	
2	F-H	Pump, Vacuum	4310-00-098-5272	
3	O-F-H	Soldering Gun Kit	3439-00-930-1638	
4	F-H	Recovery and Recycling Unit, Refrigerant	4130-01-338-2707	17500B (07295)

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. Introduction

C-1. SCOPE

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

C-2. GENERAL

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

C-3. EXPLANATION OF LISTINGS

National Stock Number, descriptions and quantities are provided to help you identify and request the additional items you require to support this equipment. "USABLE ON"' codes are identified as follows: (not applicable)

Section II

ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER AND FSCM	USABLE ON CODE	(3) U/M	(4) QTY AUTH
7520-00-559-9618	CASE, COTTON DUCT		EA	1
	TM 5-4120-339-14	OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL	EA	1
	TM 5-4120-339-24P	ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST	EA	1

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

SECTION I. INTRODUCTION

D-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the air conditioner. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. EXPLANATION OF COLUMNS

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., “Use cleaning compound, item 5, App. “D").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. Column 3 - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column 4 - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicated the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column 5 - Unit of Measure U/M. Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II

EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) (U/M)/ (U/I)
1	F	9150-00-823-7905	Lub. Oil Ref. VV-L-825	
2	C	6850-00-264-9037	Dry Cleaning Solvent P-D-680 (81348)	GL
3	F	6850-00-837-9927	Monochlordifluoromethane, Technical: w/cylinder 22 lb. (Refrigerant 22) BB-F-1421, type 22 (81348)	CY
4	F	6830-00-782-6512	Trichlortrifluoroethane, Refrigerant Solvent (R-114). 50 lb. drum (73925)	LB
5	F	9150-00-965-2408	High Vacuum Grease 5.3 oz tube (71984)	OZ
6	F	8030-00-999-6313	Leak Lock. Item Number 68176-10001 (08589)	OZ

INDEX

INDEX

Subject C Page No.

INDEX

Subject C Page No.

INDEX

Subject E Page No.

F

INDEX

Subject F Page No.

G

H

INDEX

INDEX

Subject M Page No.

INDEX

Subject P Page No.

Q

R

INDEX

Subject R Page No.

S

INDEX

INDEX

Subject V Page No.

By Order of the Secretary of the Army:

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

Official:

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

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25C, Operator Maintenance requirements for Environmental Equipment, Air Conditioners: 9,000 BTU.

U.S. GOVERNMENT PRINTING OFFICE: 2001-472-151/31252

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARDWOOD, MO 63108

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-4120-339-14	23 Oct 81	Air Conditioner, Vertical Compact, 9000 BTU, 208V, 3 Phase, 50/60 Hz

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.
6	2-1 a		
81		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 Cylenders. The engine on my set only has 4 Cylenders. Change the manual to show 4 Cylenders.

Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
JOHN DOE, PFC (268) 317-7111

SIGN HERE: John Doe
JOHN DOE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.
DRSTS-M Overprint 1, 1 Nov 80

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 1, 1 Nov 80

TEAR ALONG PERFORATED LINE

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U S ARMY SUPPORT AND AVIATION MATERIEL READINESS COMMAND
ATTN: DRSTS-MTT
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-4120-339-14	23 Oct 81	Air Conditioner, Vertical Compact, 9000 BTU, 208V, 3 Phase, 50/60 Hz

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE:

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

DRSTS-M Overprint 2, 1 Nov 80.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 1, 1 Nov 80

TEAR ALONG PERFORATED LINE

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U S ARMY SUPPORT AND AVIATION MATERIEL READINESS COMMAND
ATTN: DRSTS-MTT
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter= 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 Meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = 0.35 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 27.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter= 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. decimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.365	metric tons	short tons	1.102
pounds-inches	newton-meters	.11375			

Temperature (Exact)

°F	Fahrenheit Temperature	5/9 (after subtracting 32)	Celsius Temperature	°C

PIN: 049536-003

This fine document...

Was brought to you by me:

Liberated Manuals -- free army and government manuals

Why do I do it? I am tired of sleazy CD-ROM sellers, who take publicly available information, slap “watermarks” and other junk on it, and sell it. Those masters of search engine manipulation make sure that their sites that sell free information, come up first in search engines. They did not create it... They did not even scan it... Why should they get your money? Why are not letting you give those free manuals to your friends?

I am setting this document FREE. This document was made by the US Government and is NOT protected by Copyright. Feel free to share, republish, sell and so on.

I am not asking you for donations, fees or handouts. If you can, please provide a link to liberatedmanuals.com, so that free manuals come up first in search engines:

<A HREF=http://www.liberatedmanuals.com/>Free Military and Government Manuals</A>

- Sincerely
  Igor Chudov
  http://igor.chudov.com/
- Chicago Machinery Movers