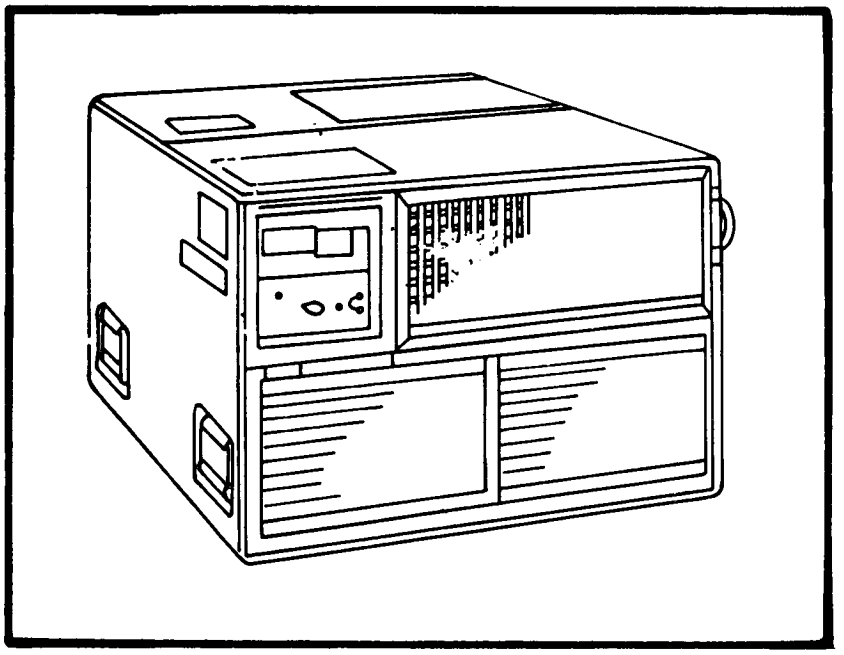
TM 5-4120-386-14

TECHNICAL MANUAL

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

AIR CONDITIONER
HORIZONTAL, COMPACT,
9,000 BTU/HR,
208 VOLT
THREE PHASE
50/60 HERTZ



MODEL ECU-9HC326
NSN4120-01-193-4998

HEADQUARTERS, DEPARTMENT OF THE ARMY

27 MARCH 1987

CHANGE

No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 8 October 1995

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

AIR CONDITIONER, HORIZONTAL, COMPACT 9,000 BTU/HR, 208V, 50/60 HERTZ, THREE-PHASE, MODEL ECU-9HC326

(NSN 4120-01-193-4998)

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

AIR CONDITIONER, HORIZONTAL, COMPACT, 9,000 BTU/HR, 208 VOLT THREE PHASE, 50/60 HERTZ MODEL ECU-9HC326 NSN 4120-01-1934998

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

AIR CONDITIONER, HORIZONTAL, COMPACT,
9,000 BTU/HR 208 VOLT
THREE PHASE 50/60 HERTZ
MODEL ECU–9HC326
NSN 4120–01–193–4998

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DISTRIBUTION:

To be distributed in accordance with DA Form 12–25E, Operator, Unit, Direct Support and General Support Maintenance Requirements for Air Conditioner, 9,000 BTU, Model 13225E8455.

WARNING

Notices in this manual must be obeyed by all personnel. Failure to do so can result in serious injury, or death.

WARNING

Do not use steam, open flame, heat gun, or any other high temperature source to thaw an iced coil. Thaw an iced coil by operating unit in high heat mode, or by leaving unit shut down until ice melts.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (2.1 kg/cm^2). Do not direct compressed air against skim Use goggles or full face shield.

WARNING

Avoid inhaling fumes from acid formed by burn out of oil and refrigerant. Wear gas mask if area is not thoroughly ventilated. Wear protective goggles or glasses to protect eyes. Wear rubber gloves to protect hands. Use care to avoid spilling compressor burn out sludge. If sludge is spilled, clean area thoroughly.

WARNING

Clean parts in well ventilated area. Avoid inhalation of' solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly. Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is l00°F to 138°F (38°C to 59°C).

WARNING

DEATH ON CONTACT or severe injury may result if personnel fail to observe safety precautions. Always disconnect the air conditioner from power source before performing maintenance on this equipment. If power must remain on for troubleshooting, exercise extreme care to avoid contact with any electrical component, fan, fan motor, etc.

WARNING

Whenever possible, input power supply to the equipment must be shut off before beginning work. Take particular care to ground every capacitor likely to hold a dangerous potential charge. When working inside after power has been turned off always ground every part before touching it.

WARNING

Do not operate equipment without all grilles, guards, louvers, and covers in place and tightly secured.

WARNING

Compressed air used for cleaning refrigerant system should not exceed 30 psi (3.5 kg/cm^2). Do not direct compressed air against skin. Use goggles or full face shield.

WARNING

The burning of polyurethane foam is dangerous. Due to the chemical composition of a polyurethane foam, toxic fumes are released when it is burned or heated. If it is burned or heated indoors, such as during a welding operation in its proximity, precautions should be taken to adequately ventilate the area. An exhaust system equivalent to that of a paint spray booth should be used. Air supply respirators, approved by the National Institute for Occupational Safety and Health or U.S. Bureau of Mines should be used for all welding in confined spaces and when ventilation is inadequate.

WARNING

DEATH or severe injury may result if personnel fail to observe safety precautions. Never use a heating torch on any part that contains Refrigerant-22. Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas.

TECHNICAL MANUAL

NO. 5-4120-386-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 27 March 1987

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

FOR

AIR CONDITIONER, HORIZONTAL, COMPACT
9,000 BTU/HR,
208V, 50/60 HERTZ, THREE-PHASE,
MODEL ECU-9HC326

(NSN 4120-01-193-4998)

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of away to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. You may also submit your recommended changes by E-mail directly to <daf2028@st-louis-emh7.army.mil>. A reply will be furnished directly to you.

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CHAPTER 1

INTRODUCTION

Section I GENERAL INFORMATION

1-1. SCOPE.

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

Model Number and Equipment Name: ECU-9HC326 Air Conditioner, Compact, Horizontal, 9,000 BTU/HR, 208 Volt, Three Phase, 50/60 Hertz.

Purpose of Equipment: Provide filtered, cooled or heated air to a desired range and circulate the air to provide cooling or heating of equipment or personnel within the area.

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 MATERIAL TO PREVENT ENEMY USE.

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

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

If your air conditioner needs improvement let us know. Send us an 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. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it directly to Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, MO, 63120-1798. A reply will be furnished directly to you.

1-5. LIST OF ABBREVIATIONS.

a	ampere	l	liter
BTU/HR	British Thermal units per hour	lb	pound
C	celsius	OD	outside diameter
COMPR	compressor	psi	pounds force per square inch
DB	dry bulb		
F	fahrenheit	psig	pounds force per square gage
hp	horsepower		
in	inch	pt	pint
kg	kilogram	rpm	revolutions per minute
kg/m^2	kilogram per square meter	SHR	sensible heat ratio
kg/cm^2	kilogram per square centimeter	v	volts
		vac	volts alternating current
		vdc	volts direct current

Section II EQUIPMENT DESCRIPTION

1-6. PURPOSE OF AIR CONDITIONER.

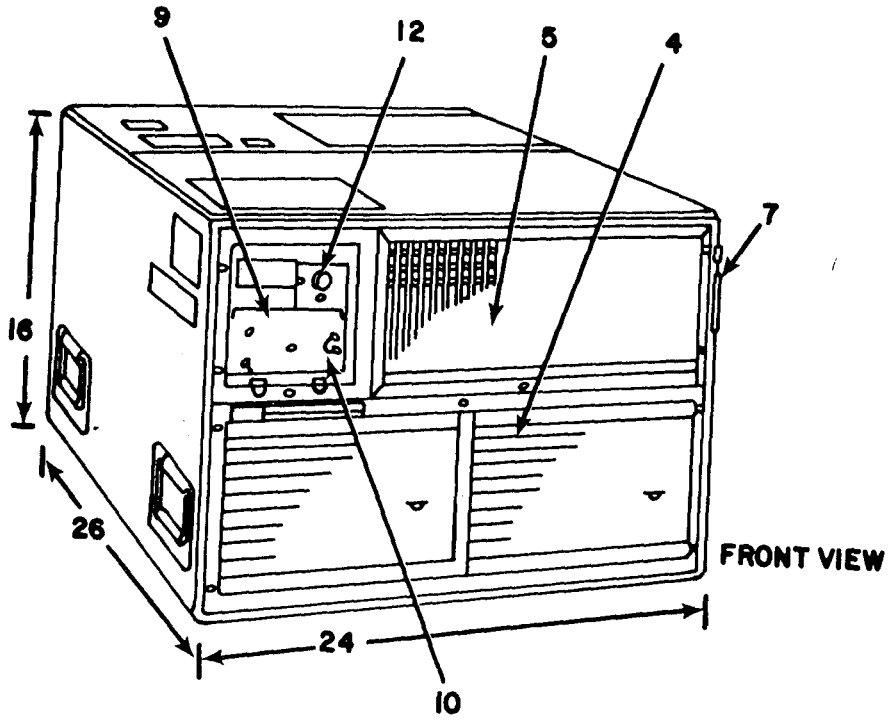
The air conditioner is used primarily in van type enclosures to provide filtered, cooled or heated air, as required to maintain the service conditions necessary for the efficient operation of electronic equipment in the vans. The air conditioner also provides for the comfort of operating personnel housed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

Capabilities and Features:

Light-weight, compact, horizontal.
Floor-mounted and air-cooled.
Electric motor driven and designed for continuous operation under varying loads.
Furnishes 10,000 BTU/HR for cooling; 7,000 BTU/HR for heating.
Handles for lifting.
Auxiliary power input source (J11).
Roll-up condenser cover.

1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

1.	Fabric Cover	● Protects condenser coil from extreme cold temperatures during winter months.
2.	Fresh Air Screen	● Filters fresh (make-up) air for evaporator compartment.
3.	Condenser Guard	● Protects condenser from external damage.
4.	Evaporator, Inlet Louver	● Horizontal adjustable louver. ● Directs room air into air conditioner for filtering and recycling.
5.	Evaporator, Outlet Louver	● Vertical and horizontal louvers. ● Individually hand adjustable. ● Directs conditioned air into room.
6.	Condenser Louver	● Directs air exhaust from condenser for minimizing over-heating.
7.	Ventilation Actuator	● Opens and closes fresh air inlet passage.
8.	Drain Tubes	● Allow discharge of condensate during operation.
9.	Control Module Panel	● Contains operator control switches. ● Includes compressor circuit breaker.
10.	Compressor Circuit Breaker	● Protects compressor from electrical current overload.
11.	Liquid Sight Indicator	● Indicates condition and level of refrigerant.
12.	Main Power Comector	● For connections to 208 volt, 50/60 Hz, three-phase power source.
13.	Auxiliary Power Input Connector	● Provides auxiliary power input.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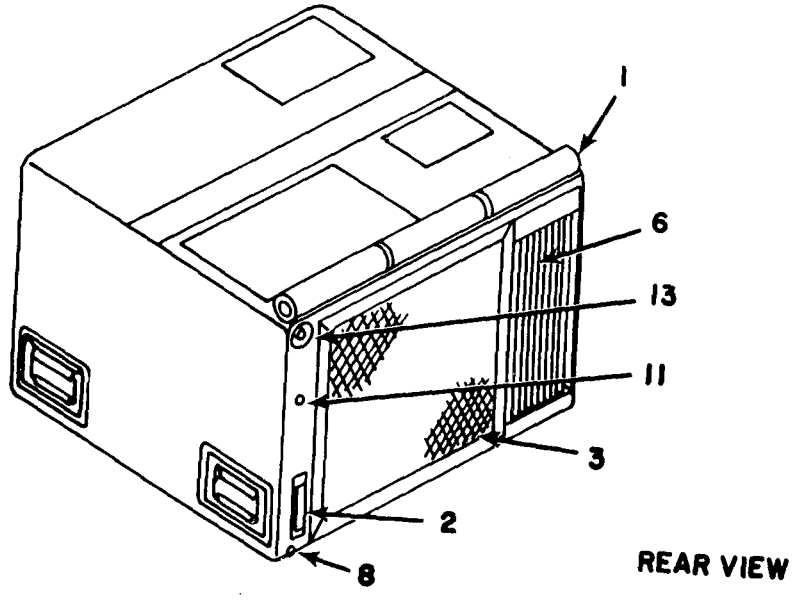
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REAR VIEW

1-8. PERFORMANCE DATA.

The following listing contains the performance and dimensional data applicable to the air conditioner:

a. Air Conditioner Model ECU-9HC326:

Nomenclature	Air Conditioner, Horizontal, Compact, 9,000 BTU/HR, 208 Volt, Three Phase, 50/60 Hertz.
Manufacturer	ATACS Corporation,
Capacity:	
Cooling	10,000 BTU/HR
Heating	7,000 BTU/HR
Phase	3
Hertz	50/60
A/C Volts	208
Current input, full load, amperes:	
Cooling	33 (maximum)
High Heat	20 (maximum)
Low Heat	12 (maximum)
Ventilating	5 (maximum)
Refrigerant	R22
Amount of Charge	2.3 lbs. (1.04 kg)

b. Dimensions and Weight

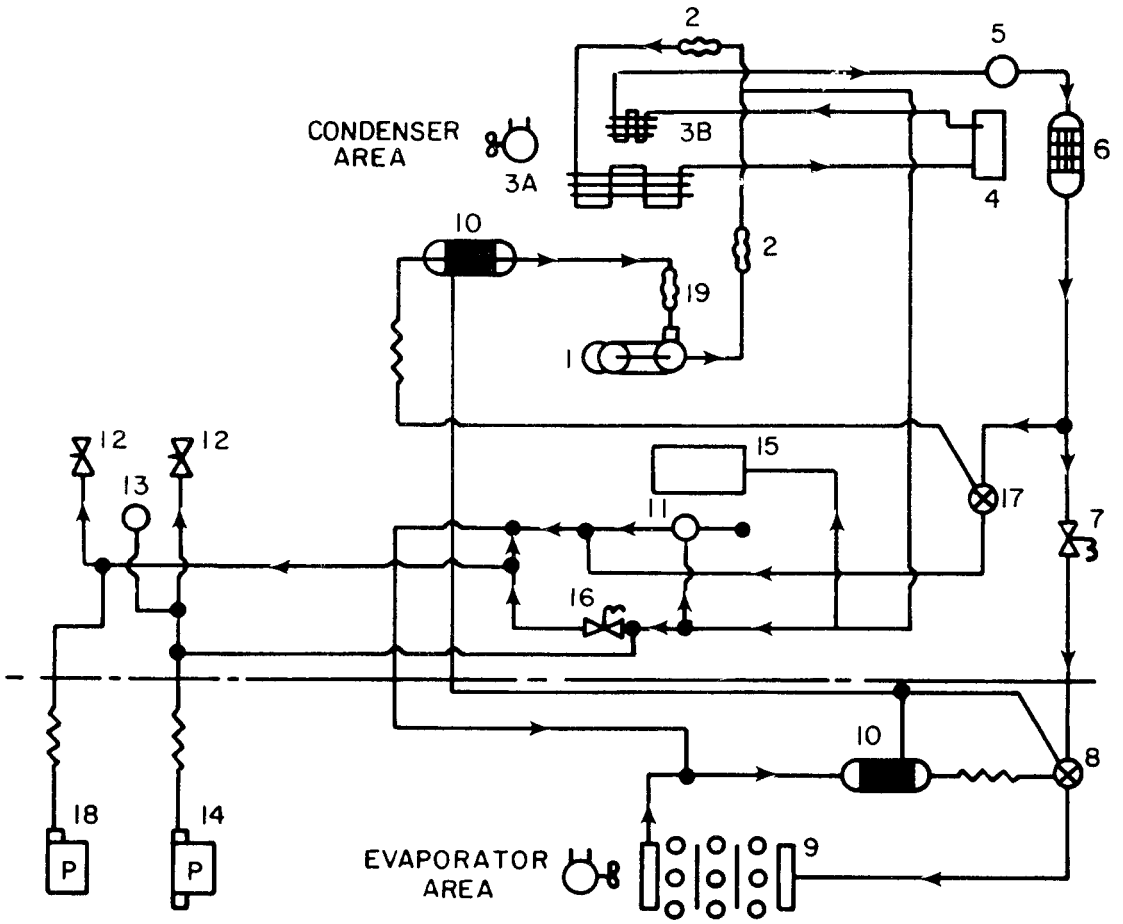
Length	26 inches (66.04 cm)
Height	16 inches (40.64 cm)
Width	23 3/4 inches (60.33 cm)
Weight	200 pounds (90.80 kg) (maximum)

c. Normal Operating Temperature Range -50°F to +125°F.

Section III TECHNICAL PRINCIPLES OF OPERATION

1-9. REFRIGERATION CYCLE.

a. The Refrigeration Cycle. The refrigeration system removes heat from a given area.



(1) The compressor (1) takes cold, low pressure refrigerant gas and compresses it to a high temperature, high pressure gas. This gas flows through the copper tubing and metal hose assy (2) to the condenser coil (3A) and receiver (4).

(2) The condenser fan draws outside ambient air over and through the condenser coil (3A). The high temperature, high pressure gas from the compressor (1) is cooled by the flow of air and is changed into a high pressure liquid.

(3) The sight indicator (5) indicates the presence of moisture and quantity of refrigerant in the system.

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1-9. Refrigeration CYCLE - Continued.

(4) The dehydrator (6) removes any moisture (water vapor) or dirt that may be carried by the liquid refrigerant,

(5) The solenoid valve (7) is controlled by the temperature selector on the control panel. This valve. will shut off the flow of refrigerant to the evaporator section when the temperature in the conditioned area reaches the set point.

(6) The expansion valve (8) senses the temperature and pressure of the refrigerant as it leaves the evaporator coil. By use of the feeler bulb in the bulb well (10) and "external equalizer line" the valve constantly adjusts the flow of liquid refrigerant to the evaporator coil (9).

(7) As the high pressure liquid refrigerant leaves the expansion valve (8), it enters the evaporator coil (9). As the liquid enters the coil, due to the size difference between the coil and the tubing, the pressure is suddenly decreased. As the pressure decreases, the liquid refrigerant "flashes" to a gas. The evaporator blower circulates the warm air from the conditioned space over and through the evaporator coil (9). Liquid refrigerant absorbs heat when it changes from a liquid to a gas. As the air from the conditioned spaces comes in contact with the evaporator coil (9), the air is cooled.

(8) To prevent compressor damage during start-up, solenoid valve (16) is normally open to equalize pressure on both sides of the compressor.

b. Bypass System. This unit has a bypass system which allows cooling operation at low cooling loads without cycling the compressor on and off. In bypass, the refrigerant flow is from the discharge to the suction of the compressor, bypassing the evaporator coil (9).

(1) When the temperature selector on the control panel senses that cooling conditions have reached the set point, it. closes the solenoid valve (7) to shut off refrigerant flow to the evaporator coil (9).

(2) As the compressor suction pressure starts to drop, the pressure regulator (11) opens to allow flow of hot gas from the compressor.

(3) The quench valve (17) senses the temperate of the gas at the suction side of the compressor. To prevent excessively hot gas from reaching the compressor, the quench valve (17) opens to allow liquid refrigerant to mix with the hot gas.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I DESCRIPTION AND USE. OF CONTROLS AND INDICATORS

2-1. GENERAL.

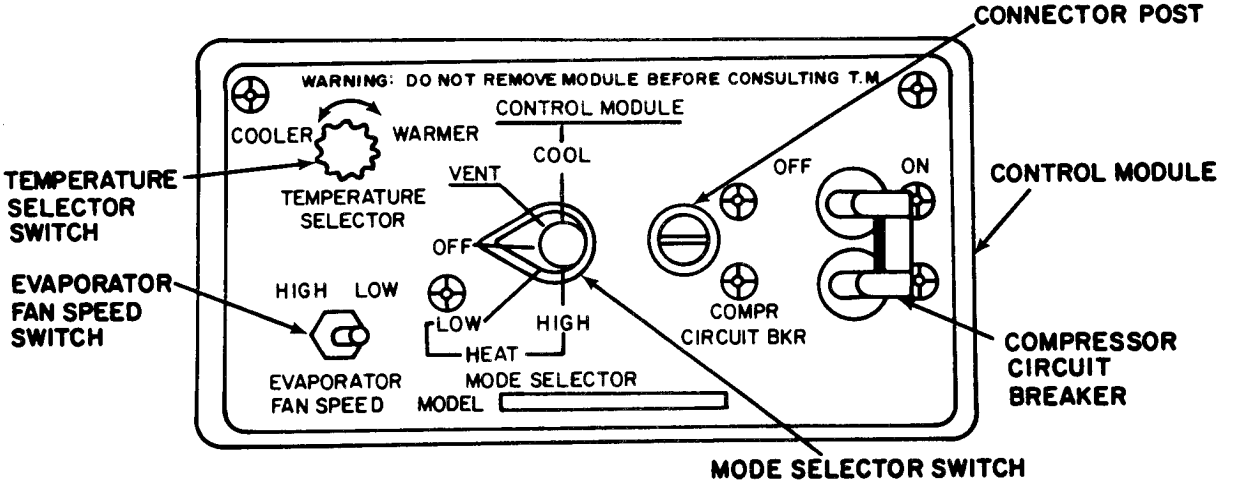
The air conditioner is a self-contained and electric powered unit that provides 10,000 BTU/HR for cooling or 7,000 BTU/HR for heating. Once started, it operates automatically due to the relationship of the components, controls and instruments.

2-2. OPERATOR'S CONTROLS.

a. Cooling. With the MODE SELECTOR switch in COOL position, the fan motors and the compressor are energized. The fan motors and compressor run continuously. The flow within the refrigerant circuit determines the cooling mode of the unit. With the fan motor and compressor operating, the flow within the refrigerant circuit is controlled by the temperature selector switch. The evaporator fan speed is controlled by a HIGH or LOW speed switch. The compressor is protected from current overload by a circuit breaker in the control module.

b. Heating. With the MODE SELECTOR switch in the HEAT position, air is blown by the evaporator fan as in cooling, but the heating elements are energized instead of the refrigeration system.

c. Ventilation. Placing the MODE SELECTOR switch in the VENT position energizes the evaporator fan motor which forces air out of the evaporator outlet louver into the room. The amount of outdoor air used for ventilation is determined by the position of the ventilation damper actuator.



Section II PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-3. GENERAL.

a. Before You Operate (B). Always keep in mind the CAUTIONS and WARNINGS. Perform (B) PMCS before you operate.

b. While You Operate (D). Always keep in mind the CAUTIONS and WARNINGS. Perform (D) PMCS while you operate.

c. After You Operate (A). Be sure to perform (A) PMCS after operation.

d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA PAM 738-750.

2-4. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

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.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS).

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

B-Before Operation D-During Operation A-After Operation

Item No.	Interval B	D	A	Item to be Inspected	Procedures:	Equipment is not ready/ available if
1	●	-		Canvas Cover	With cover rolled up for operation, check securing ties for damage. Report damage to organizational maintenance personnel.	Cover can not be secured.
2	●	-	●	Panels	Inspect for security of attachment and cleanliness. Report damaged condition to organizational maintenance personnel.	Panels missing or severely damaged.
3	●	-	●	Fresh Air Screen	Inspect for obstructions and insecure mountings. Remove obstructions.	Screen missing, loose, obstructed, or damaged.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) Continued.

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

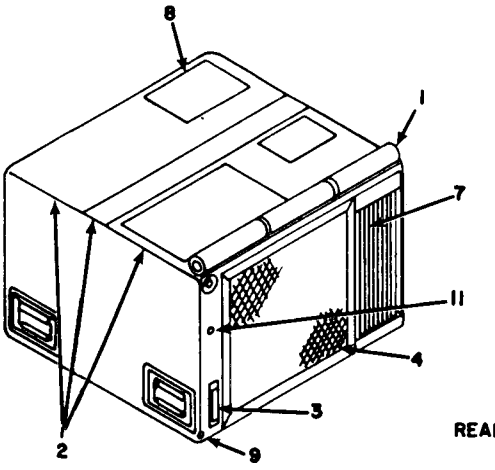
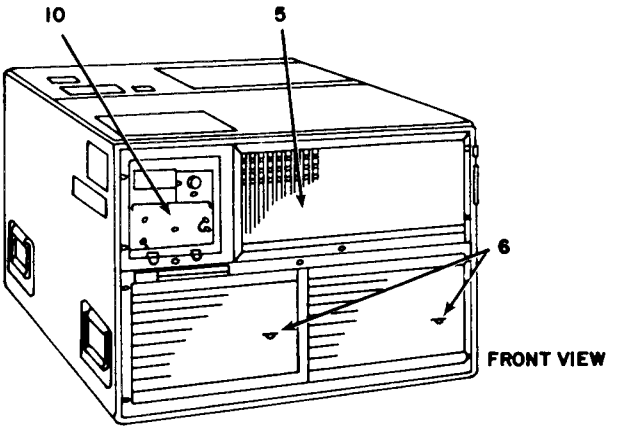
B-Before Operation D-During Operation A-After Operation						
Item No.	Interval B	D	A	Item to be Inspected	Procedures:	Equipment is not ready/ available if
 REAR VIEW  FRONT VIEW						
4	●	-	●	Condenser Guard	Inspect for cleanliness, obstructions, damage, and security of attachment. Report damaged condition to organizational maintenance personnel.	Guard requires cleaning, is obstructed, damaged, loose or missing.
5	●	-	●	Evaporator Outlet Louver	Inspect for cleanliness, obstructions, damage, and security of attachment. Report damaged condition to organizational maintenance personnel.	Louver requires cleaning, is obstructed, damaged, loose, or missing.
6	●	-	●	Evaporator Inlet Louver	Inspect for cleanliness, obstructions, damage, and security of attachment. Report damaged condition to organizational maintenance personnel.	Louver requires cleaning, is obstructed, damaged, loose, or missing.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) Continued.

Note: Within designated intervals, these checks aretobe performed inthe order listed.

B-Before Operation D-During Operation A-After Operation

Item No.	Interval B	D	A	Item to be Inspected	Procedures:	Equipment is not ready/ available if
7	●	-	●	Condenser Louver	Check for insecure mountings and damaged louver blades. Report damaged condition to organizational maintenance personnel.	Louver requires cleaning, is obstructed, damaged, or loose.
8	●	-	●	Information Plates	Check for security and legibility.	Plates are loose or illegible.
9	●	-	●	Condensate Drain Tubes	Inspect drains for obstructions. Remove obstructions as required.	Obstructions cannot be removed.
l0	●	–	–	Control Module	Insure knobs are in place and check to see that switches function properly. Report damaged condition to organizational maintenance personnel.	Knobs are missing or switches do not function properly.
11	–	●	–	Liquid Sight Indicator	After approximately five minutes of operation, check for moisture and low refrigerant charge. Yellow indicates moisture; bubbles or milky appearance indicates low charge. Report abnormal condition to direct support maintenance personnel.	Moisture or low charge is indicated, or if indicator is cracked.

Section III OPERATION UNDER USUAL CONDITIONS

2-5. STARTING AND OPERATING INSTRUCTIONS FOR COOLING.

CAUTION

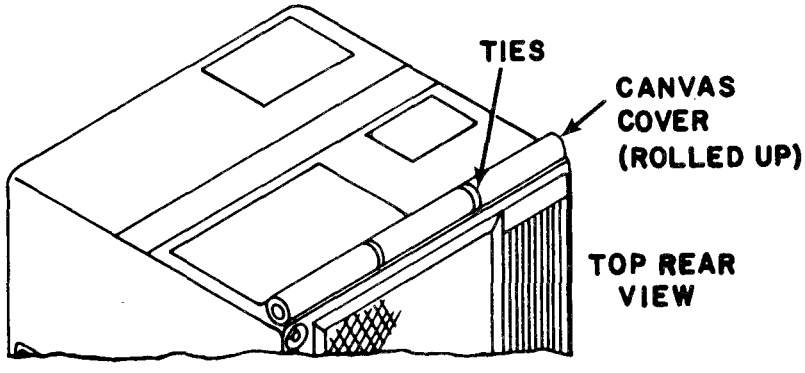
Unit should have power applied for four hours prior to operating in the cooling mode in order to heat compressor oil.

a. Starting

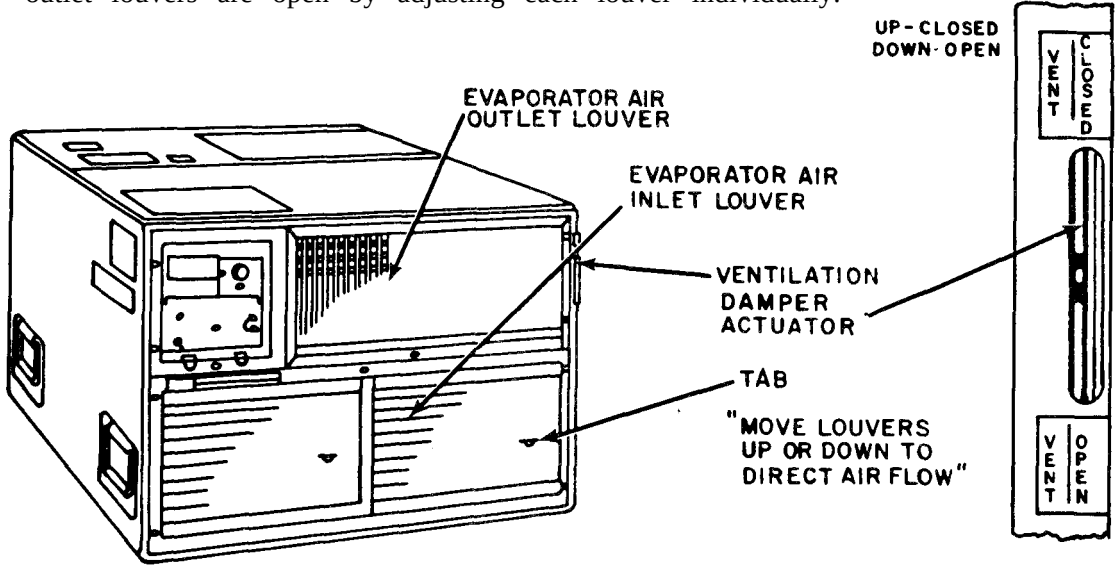
(1) Refer to the preventive maintenance checks and services table before operation.

(2) Check for correct voltage at power source (208 volts, 50/60 hz). Connect the main power to the unit.

(3) Roll up and tie the fabric cover.



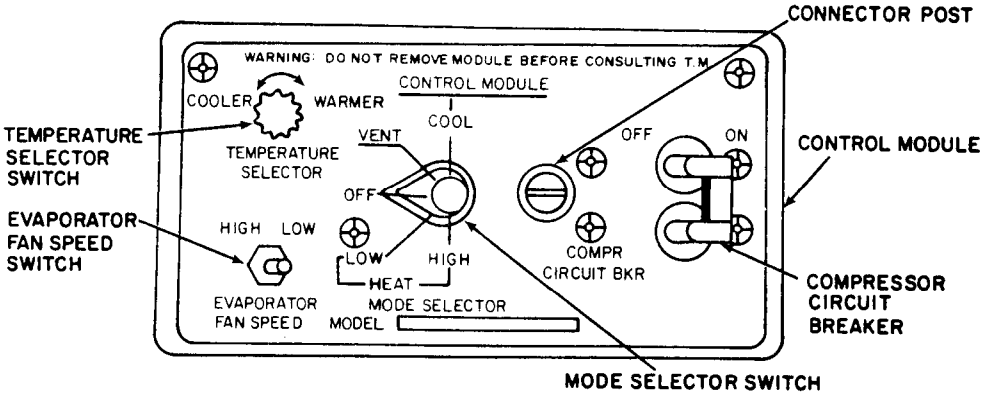
(4) Open the evaporator inlet louvers by moving the tabs up. Ensure evaporator outlet louvers are open by adjusting each louver individually.



2-5. STARTING AND OPERATING INSTRUCTIONS FOR COOLING - Continued.

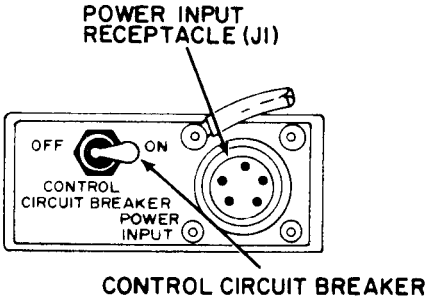
(5) Turn theventilation damper actuator to close the damper door.

(6) Turn the temperature selector switch to WARMER (lowest cooling position clockwise).



(7) Position compressor circuit breaker to ''ON".

(8) Position thecontrol circuit breaker to''ON".



(9) Position the mode selector switch to VENT, then position the mode selector switch to COOL. (Allow 30 to 45 sec delay for compressor to begin operating.)

b. Cooling Operation. After starting theairconditioner forcooling operation, adjust for amount of air and degree of cooling.

(1) Leave the mode selector switch on COOL.

(2) Adjust the temperature selector switch from WARMER to the degree of cooling desired. See Table 2-2 for operator control setting.

(3) Set the evaporator fan speed switch to the desired position.

(4) Adjust the evaporator outlet louvers individually to direct the airflow as desired.

2-5. STARTING AND OPERATING INSTRUCTIONS FOR COOLING - Continued.

NOTE

Cool air is denser than warm air so it has a tendency to flow downward. To offset this tendency, it is often advisable to adjust the evaporator outlet louvers to direct the cool air slightly upward.

c. Cooling With Fresh Air.

(1) When the vent damper door is open to admit fresh air, partially close the evaporator inlet louver to balance the incoming air.

(2) Keep the vent damper door closed during heavy rain.

2-6. STOPPING THE AIR CONDITIONER.

a. Position the mode selector switch to OFF.
b. Close the evaporator inlet louver blades by pushing tabs down.
c. Close the ventilation damper by turning the ventilation damper actuator.
d. If a shutdown is to be for an extended period, cover condenser side of unit with fabric cover and discomect the power cable.

2-7. STARTING AND OPERATING INSTRUCTIONS FOR HEATING.

a. Starting

(1) Perform the preventive maintenance checks and services (Table 2-1).

(2) Check for the correct voltage (208 volts, 50/60 Hz)

(3) Roll up and tie fabric cover.

(4) Open the evaporator inlet louver by moving the tabs up.

(5) Open the evaporator outlet louvers.

(6) Turn the ventilation damper actuator to close the damper door.

(7) Turn the temperature selector switch to COOLER (lowest heating position - counter clockwise).

(8) Position the control circuit breaker to ON.

(9) Position the mode selector switch to LOW HEAT. Position it to HIGH HEAT if more heat is wanted. (Wait 3 to 5 minutes for heat.)

b. Heating Operation. After starting the air conditioner in the heating mode, adjust it as follows:

(1) Position the mode selector switch to HIGH HEAT or LOW HEAT as desired.

2-7. STARTING AND OPERATING INSTRUCTIONS FOR HEATING - Continued.

(2) Adjust the temperature selector switch from COOLER to the desired temperature. See Table 2-2 for operator control settings.

(3) Adjust the evaporator outlet louver blades to direct the airflow as desired.

NOTE

Warm air is less dense than cool air, so it has a tendency to rise. To obtain comfortable temperatures near the floor and lower parts of the room, it is often advisable to adjust the evaporator louver blades to direct the air slightly downward.

c. Heating Operation with Fresh Air.

(1) Open the damper door by turning the ventilation damper actuator if fresh air is desired.

(2) Partially close the evaporator inlet louver blades.

2-8. STOPPING THE AIR CONDITIONER.

a. Position the mode selector switch to OFF.
b. Close the evaporator inlet louver blades by pushing tabs down.
c. Close the ventilation damper by turning the ventilation damper actuator.
d. If a shutdown is to be for an extended period, cover condenser side of unit with fabric cover and disconnect the power cable.

2-9. VENTILATING OPERATION.

To operate the air conditioner as a ventilating blower, without affecting temperature, proceed as follows:

a. Perform the preventive maintenance checks and services (Table 2-l).
b. Check for the correct voltage (208 volts, 50/60 Hz).
c. Roll up and tie the fabric cover.
d. Turn the ventilation damper actuator to open the damper door.
e. Partially close the evaporator inlet louver blades.
f. Position the mode selector switch to VENT.
g. Open evaporator outlet louvers.

2-10. STOPPING THE AIR CONDITIONER.

a. Position the mode selector switch to OFF.
b. Close the evaporator inlet louver blades by pushing tabs down.
c. Close the ventilation damper by turning the ventilation damper actuator.
d. If a shutdown is to be for an extended period, cover condenser side of unit with fabric cover and discomect the power cable.

Table 2-2. OPERATOR CONTROL SETTINGS.

Mode	Mode Selector Switch	Temperature Control Thermostat	Fresh Air Damper	Evaporator Inlet Louver	Evaporator Outlet Louver	Fabric Cover
Ventilate with 100% recirculated air	VENT	Dots not operate	Closed	Open	Adjust to suit	Rolled up or snapped closed
Ventilate with make-up (Fresh air)	VENT	Does not operate	Open	Partially closed	Adjust to suit	Rolled up or secured
Ventilate with 100% fresh air	VENT	Does not operate	Open	Closed	Adjust to suit	Rolled up and secured
Heating with 100% recirculated air	LO HEAT or HI HEAT	Desired temperature	Closed	Open	Slightly down for best results	Rolled up or snapped closed
Heating with make-up (fresh air)	LO HEAT or HI HEAT	Desired temperature	Open	Partially closed	Slightly down for best results	Rolled up and secured
Cooling with 100% recirculate ed air	COOL	Desired temperature	Closed	Open	Slightly up for best results	Rolled up and secured
Cooling with make-up (fresh air)	COOL	Desired temperature	Open	Partially closed	Slightly up for best results	Rolled up and secured
Any mode with make-up air thru CBR filter	Desired mode	Desired temperature	Closed and sealed	Partially closed	Adjust to suit	Rolled up and secured

Section IV OPERATION UNDER UNUSUAL CONDITIONS

NOTE

The air conditioner can be equipped for operation in chemical biological radiological (CBR) environment by connecting filtering equipment to the rectangular covered opening at the lower left side of the rear surface of the unit.

2-11. OPERATION IN EXTREME COLD.

a. General. The air conditioner is designed to operate on the heating cycle in ambient temperatures as low as -50°F (-45°C) and on cooling cycle with 0°F (-18°C) air entering the condenser and 70°F (21°C) air entering the evaporator.

CAUTION

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

To start unit in cool mode at 0°F (-18°C) ambient, have organizational maintenance personnel jumper Low Pressure Cut-Out (LPCO) switch (S-5).

b. Before Operation. Before starting on cooling cycle be sure fabric cover is rolled up and secured. Clear all ice and snow from openings. Be sure all dampers are in operating condition.

c. After Operation. Roll down and snap on fabric cover over condenser intake and outlet.

2-12. OPERATION IN EXTREME HEAT.

a. General. The air conditioner is designed to operate satisfactorily at temperatures up to 125°F (520 C). If unit is operated at condenser inlet temperatures higher than 125°F (52°C), the cooling capacity will be lowered and long periods of operation at extended temperatures may cause compressor or condenser fan motor to overheat and trip their internal overload switches or the high pressure cutout switch to shut the unit off.

b. Filters. To maintain the highest capacity of the unit, the evaporator inlet filter and fresh air screen should be cleaned weekly or more often if necessary. Dirty filters reduce the flow of air across the evaporator coil, thereby reducing the capacity of the air conditioner.

c. Guards and Louvers. Keep all guards and louvers clean and free of any obstructions to maintain full air flow through the air conditioner.

d. Coils. Clean evaporator and condenser coils as frequently as necessary to prevent dirt or other matter from obstructing the air flow.

2-13. OPERATION IN DUSTY OR SANDY AREAS,

a. Protection. Shield the air conditioner from dust as much as possible. Take advantage of any natural barriers which offer protection.

b. Cleaning. Keep the air conditioner as clean as possible. Pay particular attention to the louvers. Use compressed air, if available, to aid in cleaning.

NOTE

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

2-14. OPERATION UNDER RAINY OR HUMID CONDITIONS.

WARNING

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

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

2-15. OPERATION IN SALT WATER AREAS.

WARNING

Disconnect power source prior to washing the air conditioner.

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

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

CHAPTER 3

OPERATOR'S MAINTENANCE INSTRUCTIONS

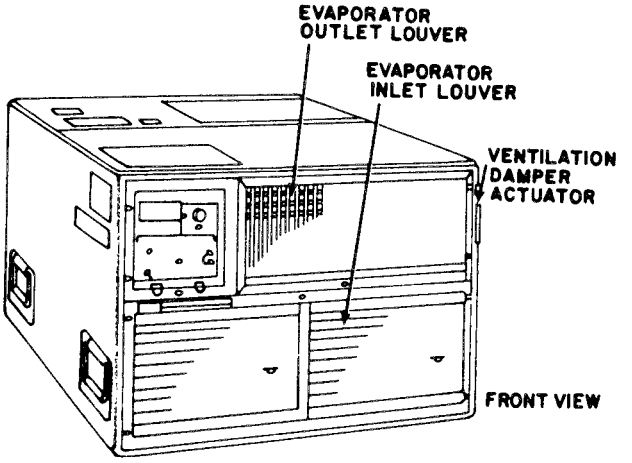
Section I LUBRICATION INSTRUCTIONS

3-1. FAN AND COMPRESSOR MOTOR LUBRICATION.

Motors driving the evaporator fan, condenser fan and compressor are permanently lubricated. The compressor is a sealed unit complete with lubricant, The rotating parts do not need any lubrication.

3-2. AIR LOUVERS.

The evaporator louvers should operate freely. If they bind, lubricate with a small amount of lightweight general purpose machine oil.



Section 11 OPERATOR TROUBLESHOOTING

3-3. GENERAL.

a. This section lists the common malfunctions which you may find during the operation or maintenance of the air conditioner or its components. You should perform the tests/inspections and corrective actions in the order listed.

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

3-4. TROUBLESHOOTING TABLES.

Table 3-1. Operator Troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. AIR CONDITIONER FAILS TO OPERATE.
Step 1. Verify that power cable is connected to proper voltage, Connect power cable to receptacle.
Step 2. Check to be sure that control or compressor circuit breaker is ON. Reset circuit breaker.
Step 3. Make sure that mode selector switch is not in OFF position. Turn selector knob to desired operation.
Step 4. Check that high and low pressure switches have been reset. Reset pressure switches and wait for compressor to start.
2. INSUFFICIENT COOLING.
Step 1. Check to be sure that mode selector switch is properly positioned. Set switch to COOL.
Step 2. Make sure that temperature switch is set correctly. Adjust setting to COOLER.
Step 3. Determine that sufficient air is passing across evaporator coil by placing a piece of paper in front of the evaporator inlet louver. The paper should be held against the louver blades by the air. Open evaporator inlet louver blades. Remove any obstructions from evaporator inlet and outlet louvers.
Step 4. Make sure that there is not too much outside air entering unit. Close or adjust damper door.

3-4. TROUBLESHOOTING TABLES-Continued.

Table 3-1. Operator Troubleshooting - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
2. INSUFFICIENT COOLING (Continued).
Step 5. Check liquid sight indicator to see whether there is sufficient refrigerant in the system. If sight glass is not full and clean report to Direct Support Maintenance Personnel.
Step 6. Check to see whether evaporator fan switch is set at low speed. Reset switch to high speed,
Step 7. Check to see that sufficient air is passing through condenser coil by placing a piece of paper on the condenser guard. The paper should be held against the guard by the air. Remove any obstructions from condenser inlet and outlet. Make sure that condenser louver outlet is open.
3. NO HEAT OR LOW HEAT.
Step 1. See that mode selector switch is properly set. Set switch on LOW HEAT or HIGH HEAT.
Step 2. Make sure that temperature selector switch is set correctly. Reset switch.
Step 3. Check for sufficient air movement over heaters by placing a piece of paper in front of the evaporator inlet louver. The paper should be held against the louver by the air. Remove any obstructions from evaporator inlet and discharge louvers. Make sure that evaporator inlet louver blades are open.

Section III OPERATOR MAINTENANCE INSTRUCTIONS

3-5. GENERAL.

Operator maintenance consists primarily of the following procedures:

a. Servicing screens and guards.

b. Adjusting louvers, dampers and actuators, and control module.

3-6. SCREENS AND GUARDS - SERVICE.

This task covers: Cleaning

NITIAL SETUP

Materials/Parts
Dry Cleaning Solvent (Item 16, App. D)
Brush
Cleaning Cloth

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect the power source before performing any maintenance function. Do not use compressed air for cleaning purposes except where reduced to less than 30 psi (2.1 kg/cm^2) and then only with effective chip guarding and Personnel protective equipment.	
SERVICE Rear of Housing CLEAN	a. Brush off any loose dirt or foreign matter, and remove obstructions.	

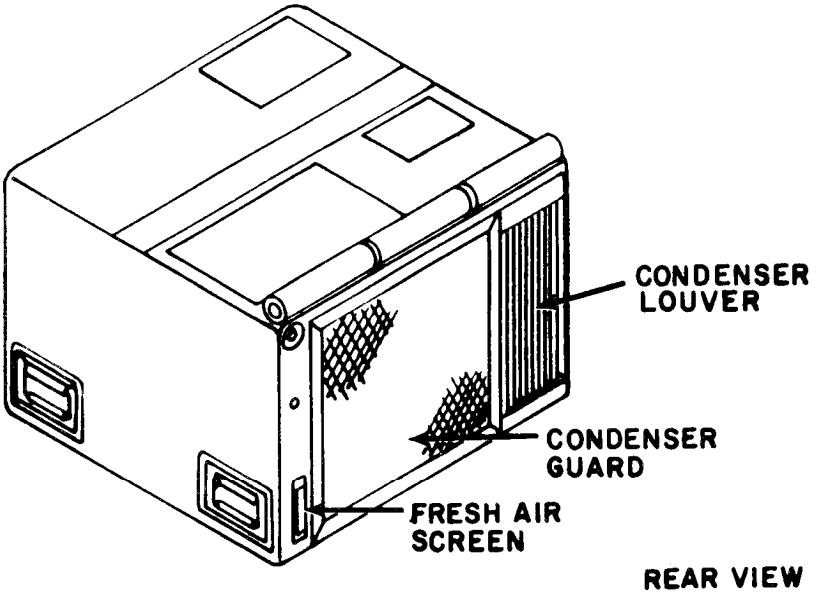
3-6. SCREENS AND GUARDS-Continued.

LOCATION/ITEM	ACTION	REMARKS

WARNING

Dry cleaning solvent (Item 16 App. D) used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

b. Wipe off with a cloth moistened with dry cleaning solvent (Item 16, App. D).
c. Inspect for security of attachment and damage.
d. Report damaged condition to organizational maintenance personnel.



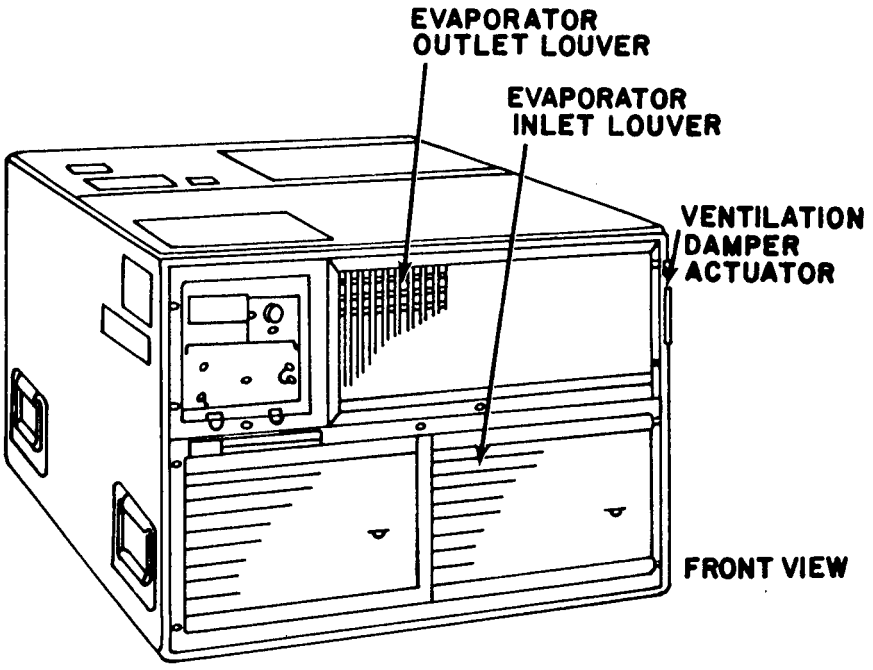
3-7 LOUVERS - ADJUST.

This task covers: Adjust

LOCATION/ITEM	ACTION	REMARKS
ADJUST		

a. Using the tabs provided, position the evaporator inlet louver so that the louvers are fully open when the ventilation damper actuator is in the closed position. Partially close the evaporator inlet louver when the ventilation damper actuator is in the open position.

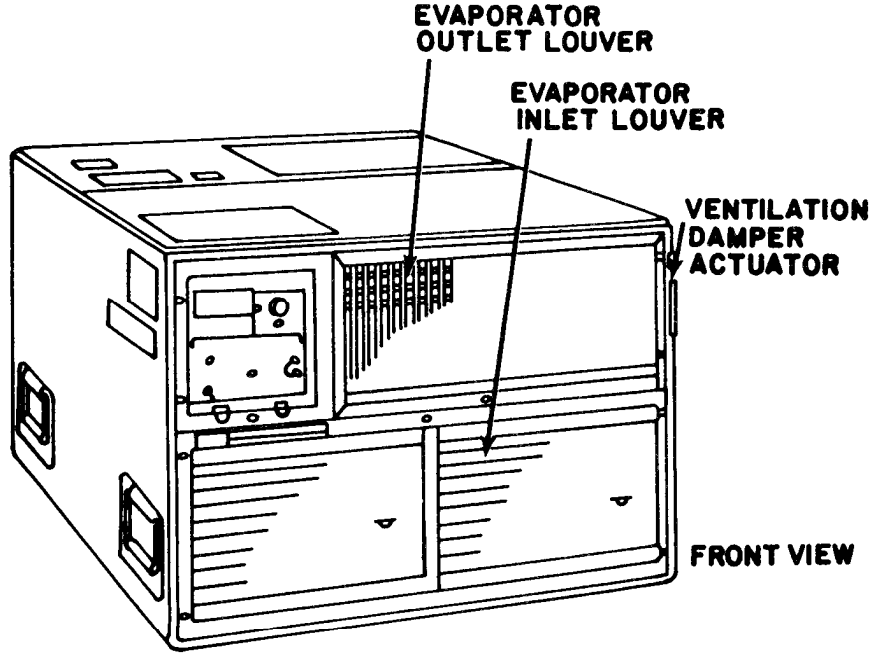
b. It is recommended that the evaporator outlet louver be adjusted to direct the airflow slightly upward when the air conditioner is operated in the cool mode, and slightly downward when the air conditioner is operated in the heat mode.



3-8. FRESH AIR DAMPER AND ACTUATOR - ADJUST.

This task covers: Adjust

LOCATION/ITEM	ACTION	REMARKS
ADJUST		
Ventilation damper	a. Check for bindings; remove obstructions. b. Brush off any loose dirt or foreign matter. c. Inspect for security of attachment and damage. d. Report damaged condition to organizational maintenance personnel. e. Adjust ventilation damper actuator to desired degree of fresh air.	



3-9. CONTROL MODULE-ADJUST.

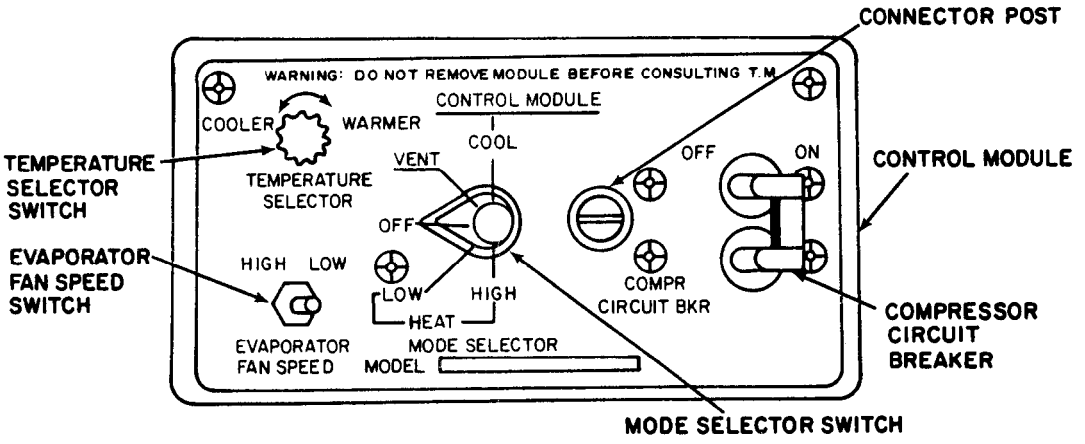
This task covers: Adjust

LOCATION/ITEM	ACTION	REMARKS
ADJUST		

a. Rotate the temperature selector switch to cooler (counter-clockwise) or warmer (clockwise) while the air conditioner is being operated in either thecool or heat mode in order to achieve the desired temperature in the conditioned area.

b. Position the evaporator fan speed switch to high or low depending on the amount of airflow desired.

c. Rotate the mode selector switch to the vent or cool position (clockwise), or to the low heat or high heat position (counter-clockwise).



CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

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

4-1. MAINTENANCE REPAIR PARTS.

Repair parts for the air conditioner are listed and illustrated in TM 5-4120-386-24P.

4-2. COMMON TOOLS AND EQUIPMENT.

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

4-3. SPECIAL TOOLS AND TEST EQUIPMENT.

Refer to Appendix B, Section III for special tools list.

4-4. CONSUMABLE MATERIALS.

Refer to Appendix D, Section II for a list of expendable supplies and materials.

Section II SERVICE UPON RECEIPT

4-5. SERVICE UPON RECEIPT.

a. Unloading. The air conditioner is shipped in a crate which has a skid pallet base. It should be handled with fork lift equipment with at least 300 pound (136.2 kg) capacity. Reasonable precaution should be taken to prevent damage by dropping or bumping. Keep the unit upright during unloading.

b. Unpacking. Move the equipment as close to the site of installation as possible before unpacking. Remove crating hardware and metal straps being careful not to damage the unit with the tools used in uncrating.

c. Checking Unpacked Equipment.

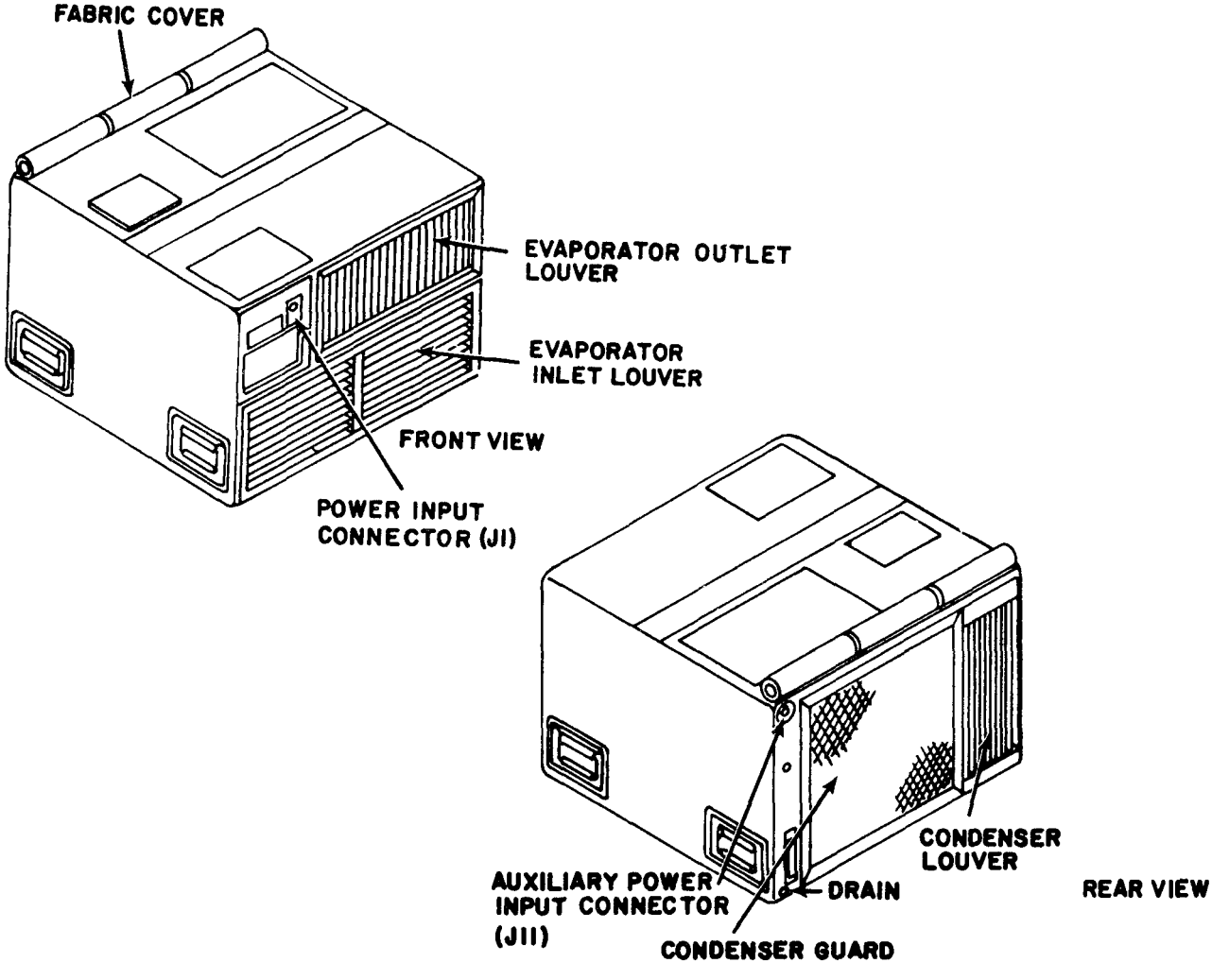
(1) Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DA Form 368 Quality Deficiency Report (QDR).

(2) Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738-750.

(3) Check to see whether the equipment has been modified.

4-6. SERVICE UPON RECEIPT CHECKLIST.

LOCATION	ITEM	ACTION	REFERENCE
1. Exterior	Louvers, Covers, Drains Guards, Controls, Switches	Perform operator PMCS before you operate.	Table 2-1
2. Front	Main Power Connectors	a. Inspect connector for damage.	Table 2-1
		b. Replace damaged connector.	Para 4-27



4-7. INSTALLATION.

a. General.

(1) Air conditioner is assembled, ready for operation.

(2) It contains full charge of refrigerant and compressor oil.

b. Mounting.

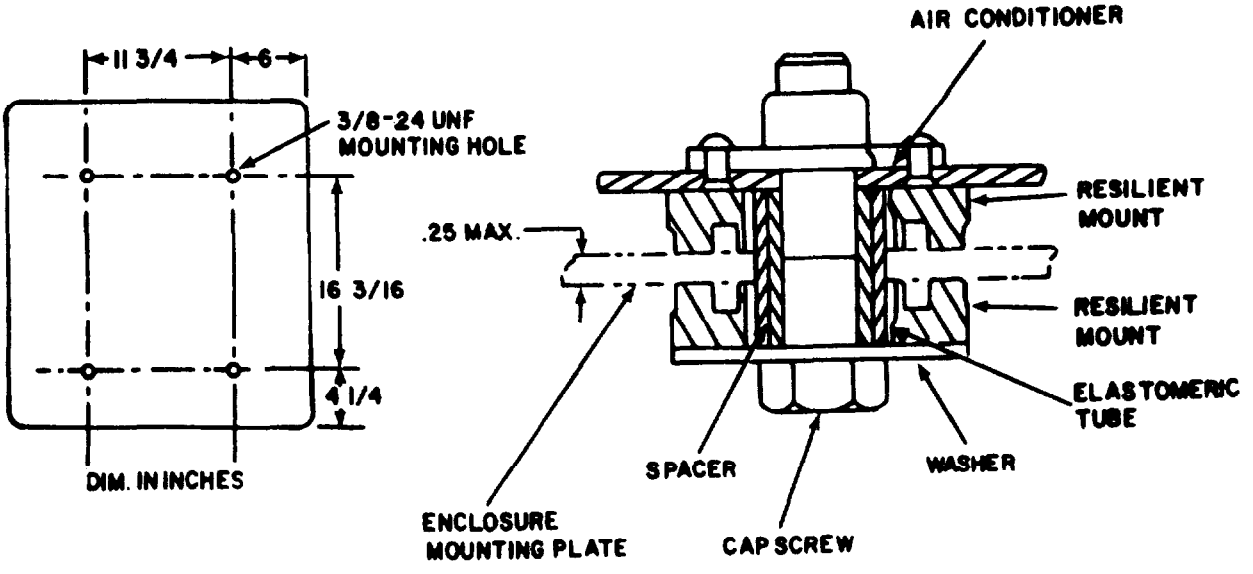
(1) Place the unit on a firm, level surface to permit proper drainage of water that condenses out of the air.

(2) Position the unit so that the control panel and the condenser and evaporator louvers are accessible to the operator and to maintenance personnel.

(3) Check that there are no obstructions in front of any air inlet or outlet louvers or other openings.

(4) The dimensions for base-mounting holes are shown below. The resilient mounting parts shown in the lower parts of the figure are shipped with the air conditioner.

(5) Connect a drain line if necessary.



4-7. INSTALLATION - Continued.

c. Grounding.

(1) Clean front of ground connection to obtain a bright metal surface.

(2) Remove insulation from ends of grounding wire (10 AWG) or use bare ends. Make loop at wire ends.

(3) Using 1/4-20 screw and washer, attach one end of wire to air conditioner front panel ground connection.

(4) Wrap a suitable length of perforated strap around clean surface on water pipe or grounding rod.

(5) Using a 1/4-20 screw, two washers and nut, attach other end of grounding wire to strap in a reamer such as to securely tighten strap to pipe or grounding rod, and wire to strap. If vehicle chassis is used, secure other end of grounding wire to vehicle chassis using screw, nut, and lockwasher. The screw shall fit in a tapped hole in the chassis or frame or it shall be held in hole by nut.

4-8. CONNECT THE POWER SOURCE.

CAUTION

Make sure the mode selector switch is in the OFF position.

For safe operation, connect a ground wire (at least No. 10 AWG) to the ground connection.

a. Connect the air conditioner power cable to a 208 volt, 50/60 Hz, three phase power source.

b. If auxiliary power input receptacle (J11) is used, refer to Figures F–1 and F–2, Wiring Diagrams for connections.

4-9. OPERATION CHECK AND ADJUSTMENTS.

a. Check operation of unit.

b. Check for proper fan rotation. With the fan rotating, check to see that air is sucked through evaporator inlet louver and blown out through evaporator outlet louver.

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Section III ORGANIZATIONAL PREVENTM MAINTENANCE CHECKS AND SERVICES (PMCS)

4-10. GENERAL.

To insure that the air conditioner is ready for operation at all times it must be inspected systematically so that the defects may be discovered and corrected before the result is serious damage or failure. Defects discovered during operation of the unit shall be noted for future corrections to be made as an operation has ceased. Stop operation which would damage the equipment if operation were to continue. All deficiencies and shortcomings shall be recorded together with the corrective action taken on DA Form 2404 Equipment Inspection and Maintenance Inspection Worksheet, at the earliest opportunity. If your equipment fails to operate, troubleshoot with proper equipment. Report any deficiencies using proper forms. See DA PAM 738-750.

4-11. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) TABLE.

WARNING

Dry cleaning solvent (Item 16, App. D) used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is lOOoF (38°C).

Do not use compressed air for cleaning purposes except where reduced to less than 30 psi (2.1 kg/cm^2) and then only with effective chip guarding and personal protective equipment.

Interval Columns. The columns headed “W” and “Q contain a dot (o) opposite the appropriate check. If a given check is performed weekly, a dot is shown opposite the check in the “W” column; if the check is accomplished quarterly, the dot is shown in the column headed “Q”.

Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS).

W-Weekly Q-Quarterly

Item No.	Interval W	Interval Q	Item to be Inspected	Procedures:	Equipment is not ready/ availableif
1	●		Evaporator Louvers	a. Check louvers for dirt ordamage.	Items are damaged, missing, or clogged

WARNING

Dry cleaning solvent (Item 16, App. D) used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near flame or excessive heat. Flash point of solvent is 100°F (380 C).

b. Clean or replace damaged parts.
c. Inspect louver for bent blades. Straighten or replace.

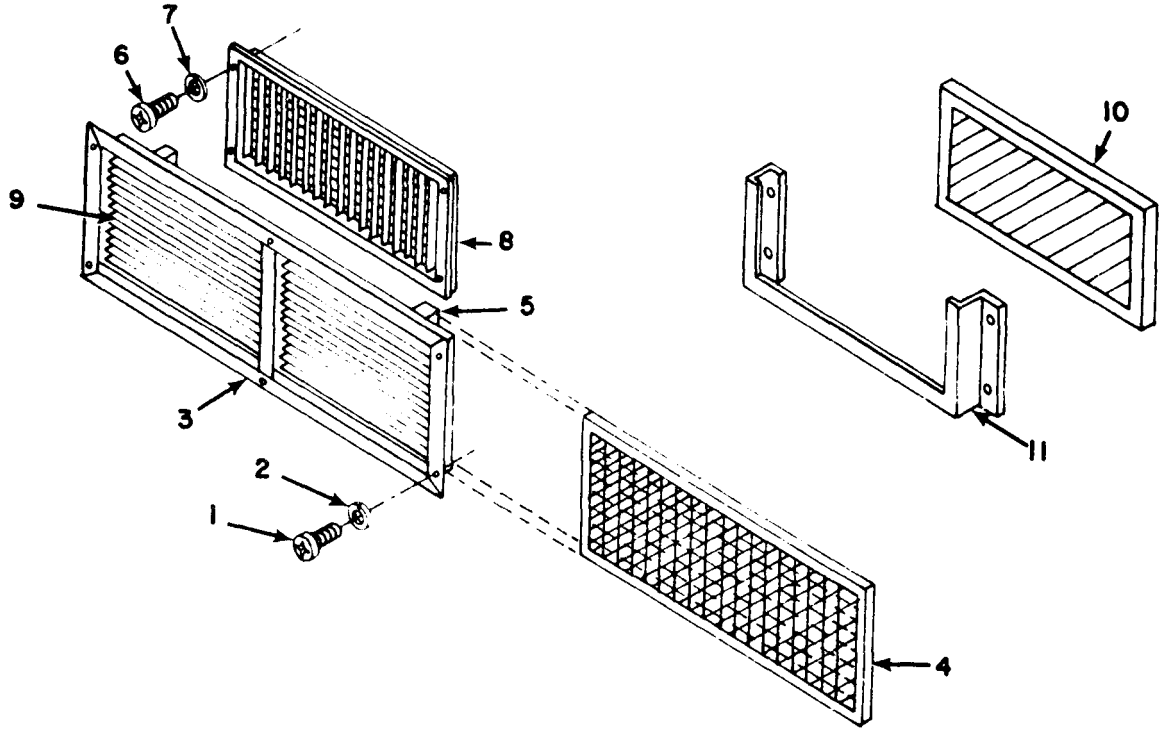
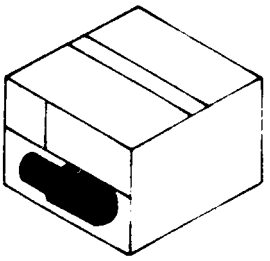


Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS)-Continued.

Item No.	Interval W	Interval Q	Item to be Inspected	Procedures:	Equipment is not ready/ available if
	W-Weekly	Q-Quarterly			
2	●		Evaporator Inlet Filter and Evaporator Inlet Louver	a. Slide air filter out of the retaining clips. b. Inspect air filter for damage. Replace if damaged. c. Clean air filter with running water. d. Inspect louver for bent blades. Straighten or replace. e. Slide air filter into evaporator inlet louver. f. Install evaporator inlet louver.	Filter is damaged, missing, or clogged.
3		●	Mist Eliminator and Evaporator Outlet Louver	a. Remove top cover. b. Slide mist eliminator out of the mist eliminator holder. . Inspect mist eliminator for damage. Replace if damaged. **WARNING** Dry cleaning solvent (Item 16, App. D) used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). d. Clean mist eliminator with dry cleaning solvent. e. Lubricate mist eliminator with filter-kote (Item 17, App. D). Drain off excessive oil. f. Install mist eliminator in holder.	Items are damaged, missing, or clogged.

Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS)-Continued.

	W-Weekly			Q-Quarterly	
[tern No.	Interval W	Q	Item to be Inspected	Procedures:	Equipment is not ready/ available if
4	o		Evaporator Impeller and Motor and Housing	a. Inspect evaporator motor and impeller for security of attachment. b. Check motor and wiring for damage. c. Replace damaged fan or motor (Para. 4-30 and 4-3 1.)	Items loose, binding or damaged.



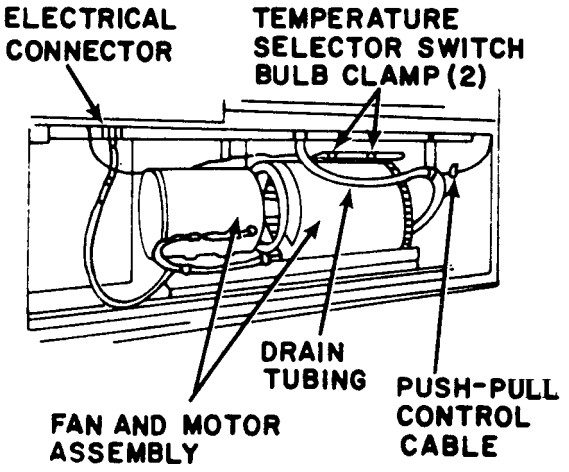


Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS)-Continued.

W-Weekly Q-Quarterly

Item No.	Interval W	Interval Q	Item to be Inspected	Procedures:	Equipment is not ready/ available if
5	●		Heaters		Items loose, or wires or elements are damaged.

WARNING

Disconnect air conditioner power supply before doing maintenance work on the electrical system.

a. Check for breaks in wiring and insulation. Tighten loose connect ions.
b. Check heating elements for damage.
c. Clean heating elements with clean, dry cloth.
d. Replace heating elements if damaged.

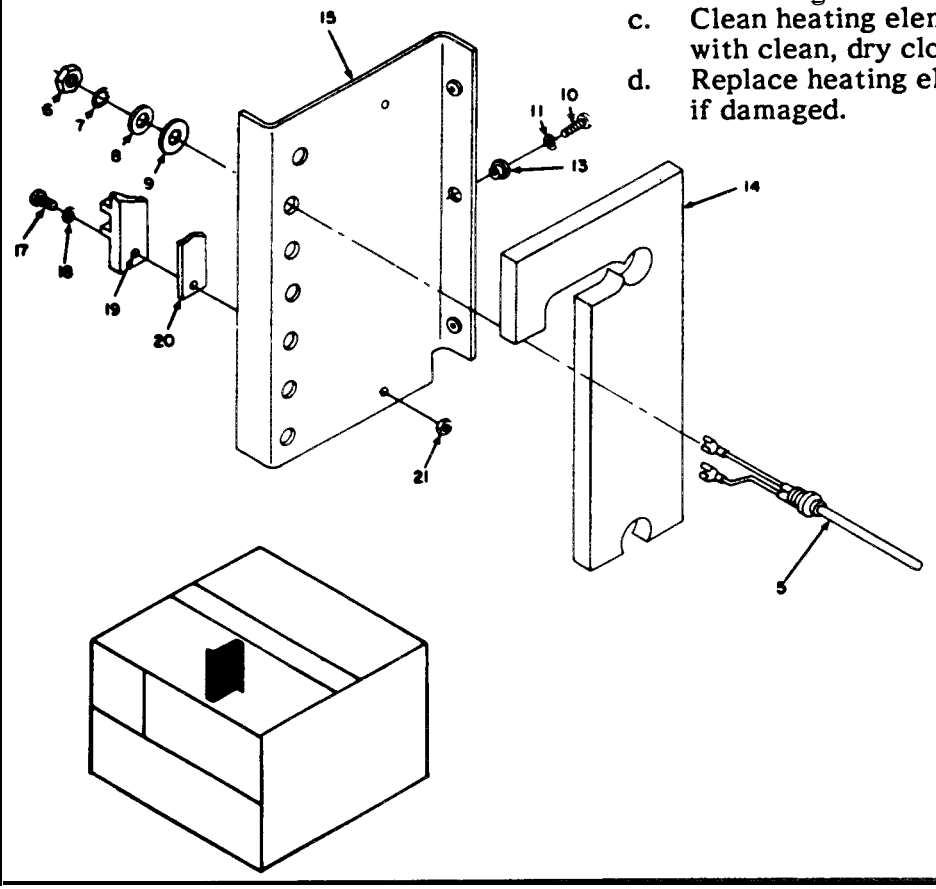


Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS)-Continued.

Item No.	Interval W	Interval Q	Item to be Inspected	Procedures:	Equipment is not ready/ available if
	W-Weekly			Q-Quarterly	
6	●		Evaporator Coil	a. Inspect evaporator coil for dirtor damage, Vacuum or report damage to direct support maintenance personnel. b. Inspect evaporator coil for leaks. Report damageto direct support maintenance personnel.	Item dirty or damaged. Leaking refrigerant.

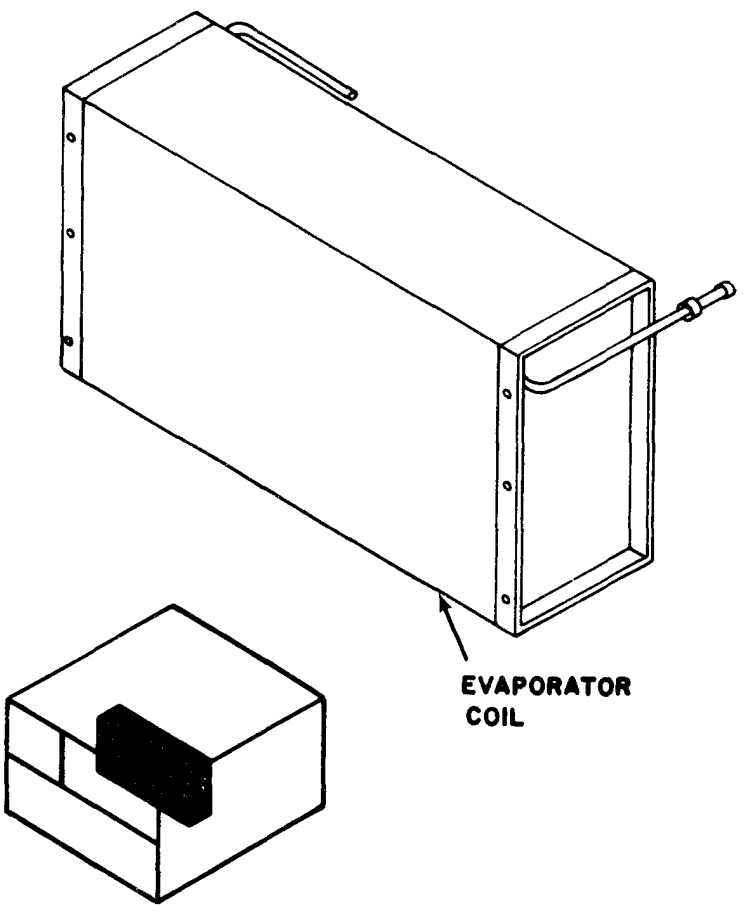
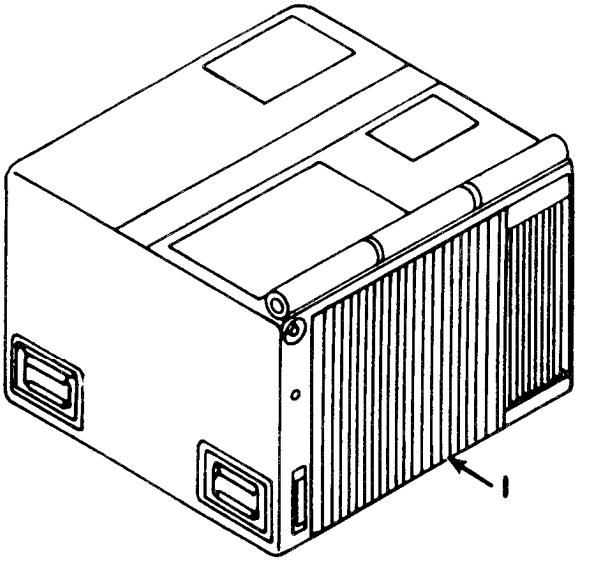


Table 4-1. Organizational Preventive Maintenance Checks and Services (PMCS)-Continued.

[tern No.	Interval W	Interval Q	Item to be Inspected	Procedures:	Equipment is not ready/ available if
	W-Weekly			Q-Quarterly	
7	●		Condenser Coil	a. Remove guard. b. Inspect condenser coil for dirt or damage. Vacuum or report damage to direct support maintenance personnel. **c.** Inspect condenser coil for leaks. Report damage to direct support maintenance personnel.	Item dirty or damaged. Leaking refrigerant.



REAR VIEW

Section IV ORGANIZATIONAL TROUBLESHOOTING

4-12. GENERAL.

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

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

c. Control Circuit. The cause of a system's failure to operate can be greatly narrowed if control that caused the failure can be isolated. It is the function of safety devices to open the circuit under certain conditions; therefore, additional checking may be required to determine whether the safety device is open because it is bad or because it is doing what it is suppose to do. The following steps contain instructions for checking the control circuit.

(1) Disconnect power from the air conditioner.

(2) Test continuity across each control in the affected circuit, using an ohmmeter. Refer to the appropriate schematic diagram and wiring diagram (Figures E-1 and E-2) as a guide to the connections in the circuit.

(3) Replace defective parts.

d. Safety Devices. When testing the control circuit and other equipment, you must take into consideration the fact that open safety devices may not be bad. It may be normal for the device to be open under the existing conditions, or it may indicate trouble elsewhere in the air conditioner.

4-13. ORGANIZATIONAL TROUBLESHOOTING TABLES.

Table 4-2. Organizational Troubleshooting.

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
NOTE: Before using this table, be sure you have performed all applicable operating checks.	
AIR CONDITIONER	
1. AIR CONDITIONER FAILS TO OPERATE	
Step 1. Check to see that main power cable is comected.	Connect cable.
Step 2. Make sure that you are using the correct voltage. **WARNING** HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions. Never work on electrical equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.	Check line voltage with voltmeter for 208 VAC, three phase, 50/60 Hz power.
Step 3. Inspect main power receptacle connections for breaks.	Replace connector. (Refer to paragraph 4-27.)
Step 4. Check for loose electrical comections.	Tighten comections.
Step 5. Inspect rotary selector switch for incorrect setting. (See Table 2-2, Operator Control Setting.)	Turn selector switch to COOL or VENTILATE.

Table 4-2. Organizational Troubleshooting-Continued.

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
1. AIR CONDITIONER FAILS TO OPERATE - Continued	
Step 6. Check to see whether control or compressor circuit breaker is in OFF position or is defective.	Make continuity check with ohmmeter. Reset circuit breaker. (Refer to paragraph 4-25.7.)
Step 7. Disconnect control circuit transformer and make continuity check of primary and secondary windings, and from windings to case, using ohmmeter. Reset circuit breaker.	If windings do not show continuity, or if windings-to-case continuity exists, replace transformer. (Refer to paragraph 4-29.)
Step 8. Apply 30-volt AC to input side terminals of control circuit rectifier, and check to see that 24-28 volts DC exists at end terminals.	Replace bad rectifier. (Refer to paragraph 4-28.)
2. INSUFFICIENT COOLING	
Step 1. Check to see that mode selector switch is properly positioned.	
Step 2. Check liquid sight indicator level to see that refrigerant is colorless and clear. Yellow indicates moisture in system. Milky or bubbly refrigerant indicates low level refrigerant charge.	Report condition to direct support maintenance personnel.
Step 3. Inspect condenser coil for dirt.	**WARNING** Compressed air used for cleaning purposes will not exceed 30 psi (2.1 kg/cm^2). Do not direct compressed air against skin. Use goggles or full face shield. Clean coil with 25-30 psi (1.76 -2.11 kg/cm^2) compressed air.

Table 4-2. Organizational Troubleshooting - Continued.

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
2. INSUFFICIENT COOLING-Continued	
Step 4. Inspect evaporator inlet air filter for dirt.	
Step 5. See whether temperature selector switch is set incorrectly or is defective.	Adjust setting or replace switch. (Refer to paragraph 4-24.)
Step 6. Check evaporator outlet louver to see whether it is bent, or stuck in the closed position.	Repair or replace louver. (Refer to paragraph 4-18.)
Step 7. Observe evaprator fan motor to see whether it is worn or defective.	Report fault to direct support maintenance personnel, or replace motor. (Refer to paragraph 4-31.)
Step 8. Check to see whether evaporator impeller fan is loose or defective.	Tighten setscrew or replace impeller fan. (Refer to paragraph 4-30.)
3. EVAPORATOR OR CONDENSER FAN MOTOR FAILS TO OPERATE	
Step 1. Make sure that power cable is properly connected.	Connect cable.
Step 2. Check for bad fan motor. (Refer to paragraph 4-31 and 4-35.)	Replace motor. (Refer to paragraph 4-30 and 4-34.)
Step 3. Check evaporator or condenser fan motor for binding.	Relieve binding or replace fan motor. (Refer to paragraph 4-31 and 4-35.)
Step 4. Check continuity of receptacle or plus terminals.	Replace terminals or receptacles. (Refer to paragraph 4-26.)

Table 4-2. Organizational Troubleshooting - Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. EVAPORATOR OR CONDENSER FAN MOTOR FAILS TO OPERATE - Continued

Step 5. Disconnect condenser fan motor relay. Actuate primary contacts with 24 volt DC source, then check continuity of contacts that should be closed.

Replace bad relay. (Refer to paragraph 4-25.)

Step 6. Inspect for bad evaporator fan speed control switch by checking continuity with ohmmeter.

Replace bad switch. (Refer to paragraph 4-24.)

Step 7. Inspect mode selector Rotary switch for improper adjustment of damper.

Replace bad switch. (Refer to paragraph 4-24.)

4. COMPRESSOR WILL NOT START

WARNING

Disconnect the power source before performing any troubleshooting function.

Step 1. Make sure that compressor or control circuit breakers or selector switch is properly set.

Step 2. Make continuity check of control circuit to determine whether open circuit exists.

Repair open circuit or replace wire.
(Refer to Wiring Diagram E-1.)

Step 3. Check continuity across primary winding and across secondary winding of control transformer to see whether windings are good.

Replace bad transformer. (Refer to paragraph 4-29.)

Step 4. Apply 30 volts AC across side input terminals; check for 24-28 volts DC across output terminals (marked + and -) of rectifier.

Replace bad rectifier. (Refer to paragraph 4-28.)

Table 4-2. Organizational Troubleshooting- Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
4. COMPRESSOR WILL NOT START-Continued
Step 5. Observe operation of time delay relay. Replace badrelay. (Refer toparagraph 4-25.)
5 INSUFFICIENT HEATING
Step 1. Check that mode selector switch is in HIGH HEAT position. Switch to HIGH HEAT position. Replace bad mode selector Switch. (Refer to paragraph 4-24.)
Step 2. Check that evaporator fan toggle switch is in HIGH SPEED position. Switch to HIGH SPEED position. Replace bad evaporator fan speed switch, (Refer to paragraph 4-24.)
Step 3. Check that temperature selector switch is in WARMER position. Switch to WARMER position. Replace bad temperature selector switch. (Refer to paragraph 4-24.)
Step 4. Check that the compressor circuit breaker is in the ON position. Switch to ON position. Replace bad compressor circuit breaker. (Refer to paragraph 4-24.)
Step 5. Check that control circuit breaker is in the ON position. Switch to ON position. Replace bad compressor circuit breaker. (Refer to paragraph 4-24.)
Step 6. Observe that six heating elements are energized and operating in HIGH HEAT by using an ammeter to measure amperage draw of air conditioner. Amperage draw in HIGH HEAT mode should be 18-20 amps, all heaters are not working.

Table 4-2. Organizational Troubleshooting-Continued.

MALFUNCTION TEST OR INSPECTION	CORRECTWE ACTION
5. INSUFFICIENT HEATING-Continued	
Step 7. Check that each heater element has approximately 115 Volts AC across it. Disconnect power from unit. If heater element does not have 115 volts AC across it, check continuity of heater elements. (Refer to paragraph 4-33.)	If no continuity exists, replace heater elements. (Refer to paragraph 4-33.)
Step 8. Check that heater relay is energized and correct contacts are closed when in HIGH HEAT mode using continuity tester and applying 30 volts DC across Xl and 2X terminals. See schematic diagram.	Replace bad relay. (Refer to paragraph 4-25.)
Step 9. Check that output of rectifier is 24-28 volts DC when 30 volts AC is applied across input terminals of rectifier.	Replace bad rectifier. (Refer to paragraph 4-28.)
Step 10. Check that output of transformer's 33-36 volts AC is applied across input terminals of transformer.	Replace bad transformer. (Refer to paragraph 4-29.)
Step 11. Check that continuity exists on heater cutout switch between terminals 1 and 2, and elements 3 and 4.	Replace bad heater cutout switch. (Refer to paragraph 4-32.)

Section V ORGANIZATIONAL MAINTENANCE' PROCEDURES

4-14. MAINTENANCE OF MECHANICAL PARTS.

a. Louvers, guards, and controls covered in this section include:

Evaporator Louvers
Panels
Guards
Condenser Air Discharge Louver and Linkage
Fabric Cover
Evaporator Inlet Air Filter
Mist Eliminator
Condensate Drain Tube
Fresh Air Damper and Actuator
Condenser Louver Control

b. Mechanical assemblies and groups of associated components are covered in separate paragraphs.

4-15. MAINTENANCE OF ELECTRICAL SYSTEM.

a. The electrical system is made up of:

Heater Thermostatic Switch
Heater Elements
Control Module and Components
Junction Box and Components
Transformer
High/Low Pressure Cutout Switches
Wiring Harness
Compressor Wiring

b. Electric assemblies and groups of associated components are covered in separate paragraphs.

WARNING

Disconnect air conditioner power supply before doing maintenance work on the electrical system.

c. Testing and inspecting the electrical system

(1) Troubleshooting procedures for testing the electrical system to isolate causes of trouble are discussed in Table 4-1. More detailed test information is contained in specific paragraphs about the electrical components.

(2) Use a continuity tester or a multimeter set on low-resistance range to test for continuity.

(3) Use an insulation tester or a multimeter set on a high-resistance range to test for short circuits between the circuit in a component and the outside casing of the component.

(4) When testing an electrical component, check for visible damage, and inspect all wiring in the area for damage or loose connections.

4-16. FABRIC COVER-SERVICE.

This task covers:

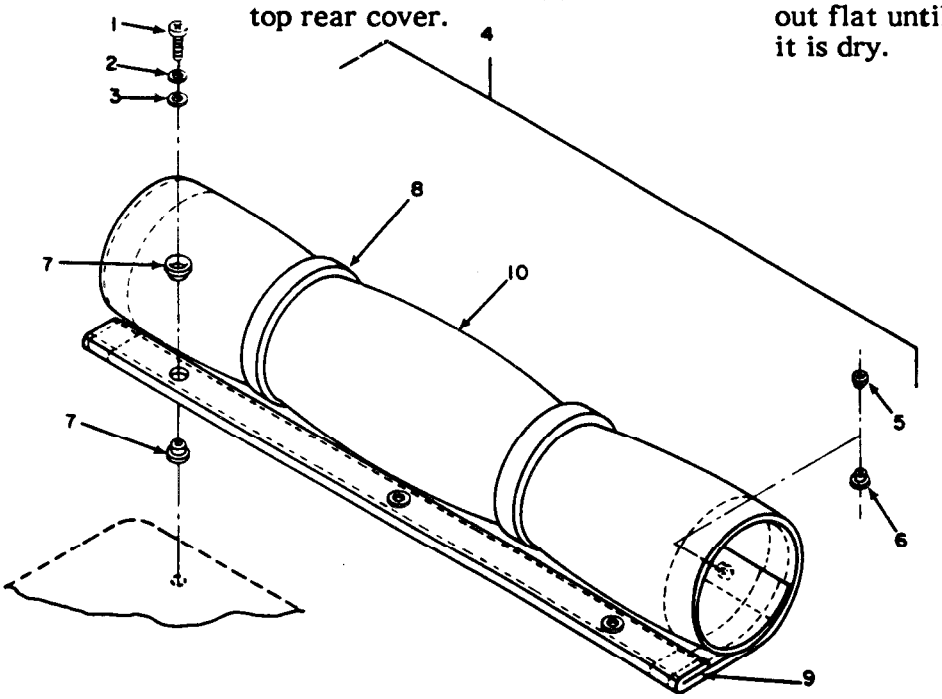
a. Removal
b. Inspection and Cleaning
c. Installation

INITIAL SETUP

Materials/Parts
Cloth, lint free (Item 9, App. D)
Dry cleaning solvent (Item 16, App. D)

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
TOP REAR OF HOUSING		
Removal	a. Remove three screws, (1) three lockwashers (2) and three flat washers (3) securing fabric cover (4) to rear top cover.	
	b. Roll up fabric cover (4) at rear top coyer and ties (8).	Do not leave rolled up when wet. Spread fabric cover **out flat until it is dry.**
	c. Remove fabric cover (4) from **top rear cover.**	



4-16. FABRIC COVER-Continued.

LOCATION/ITEM	ACTION	REMARKS
TOP REAR OF HOUSING (Continued)		
[nspection and Cleaning	a. Inspect for cuts, rips, tears, and fraying.	
	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, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).	
	b. Inspect for stains, clean with dry cleaning solvent (Item 16, App. D) and lint free cloth.	Do not roll up immediately af. ter cleaning with solvent. Spread fabric condenser cover out flat until it is dry.
Installation	a. Secure with three screws (l), three lockwashers, (2) and three flat washers (3) to rear of top rear cover, roll up and tie.	

4-17. PANELS-SERVICE.

This task covers:

a. Removal
b. Inspection and Cleaning
c. Installation

INITIAL SETUP

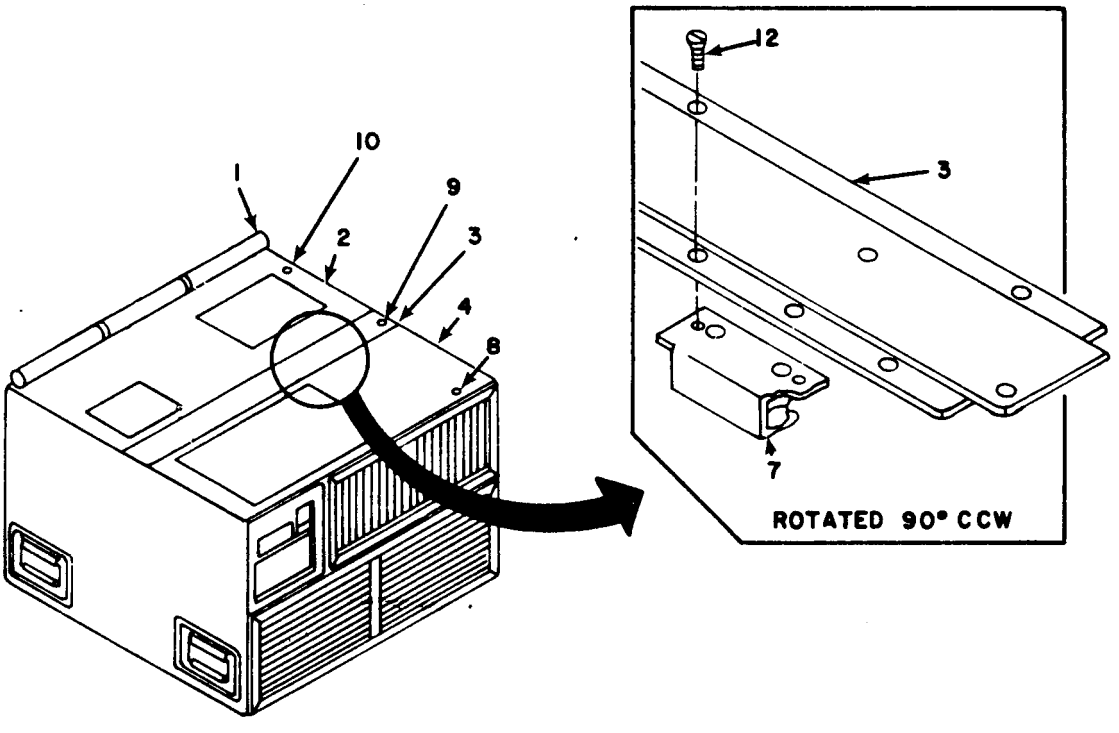
Materials/Parts
Warm, soapy water

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power input connector before doing maintenance work on electrical system.	
TOP OF HOUSING		
Removal		
1. Fabric Cover	a. Loosen ties on fabric cover (l). b. Roll down. c. Remove three screws, three flat washers, and three lockwashers securing fabric cover. d. Roll up fabric cover. e. Refasten ties around rolled fabric cover. f. Set aside.	
2. Front Top Cover	a. Remove eight screws (8) securing front top cover (4), b. Remove front top cover (4).	
3. Rear Top Cover	a. Remove ten screws (10) securing rear top cover (2). b. Remove rear top cover (2).	

4-17. PANELS - Continued.

LOCATION/ITEM	ACTION	REMARKS
TOP OF HOUSING (continued) Removal- (Continued) 4. Center Top Cover	a. Remove six screws (9) securing center top cover (3), b Remove two screws (12) holding the thermostatic heater switch bracket (7) to the cover. Leave the switch in place. c. Remove center top cover (3).	



4-17. PANELS-Continued.

LOCATION/ITEM	ACTION	REMARKS
TOP OF HOUSING (continued)		
CLEANING	Clean dirty panels with warm, soapy water.	
[INSTALLATION		
6. Center Top Cover	a. Secure thermostatic heater switch bracket (7) to underside of cover (3) with two screws (12). b. Aline cover (3) and secure with six screws (9).	
7. Rear Top Cover	Aline cover (2) and secure with ten screws (10).	
8. Front Top Cover	Aline cover (4) and secure with eight screws (8).	
9. Fabric Cover	Aline fabric cover (1) and secure with three screws three, flatwashers, and three lockwashers.	

4-18. EVAPORATOR LOUVERS-SERVICE.

This task covers:

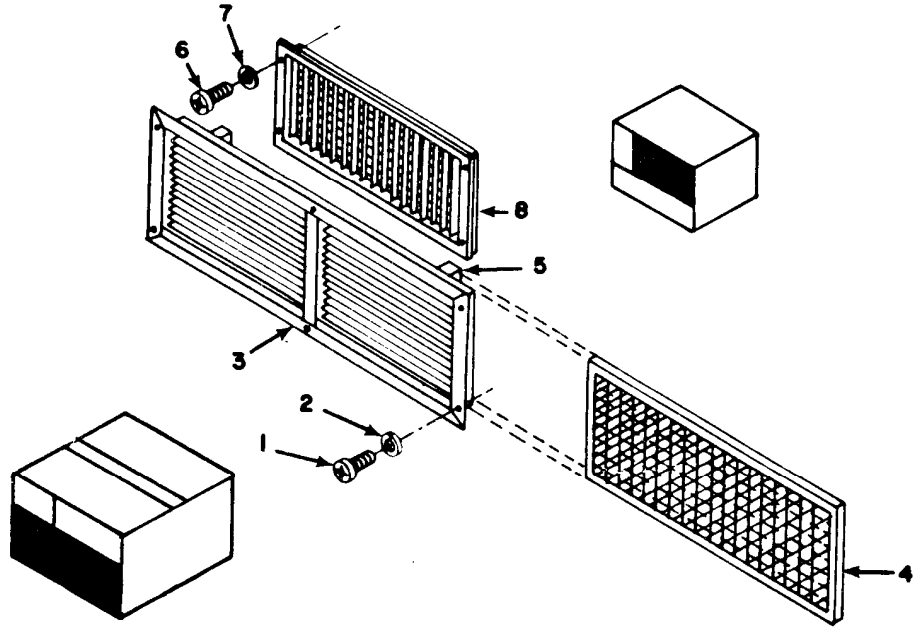
a. Removal
b. Inspection and Cleaning
c. Installation

INITIAL SETUP

Materials/Parts
Dry cleaning solvent (Item 16, App. D)

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
REMOVAL Evaporator	a. Remove eight screws (1) and eight lockwashers (2) securing louver (3) to housing. Remove louver (3). Remove evaporator air inlet filter (4) from filter clips (5). Remove six screws (6) and six lockwashers (7) securing louver (8) to housing. Remove louver (8).	



4-18. EVAPORATOR LOUVERS-Continued,

LOCATION/ITEM	ACTION	REMARKS
CLEAN		
3. Evaporator Inlet and Outlet Louvers	a. Inspect louver blades for bends or damage and straighten. b. Inspect for missing or damaged tabs, (9) and filter clips (5).	Evaporator Inlet Louvers
	WARNING Clean parts in well ventilated area. Avoid inhalation of solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly. Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C). c. Clear obstructions from louver blades using dry cleaning solvent. d. Clean louver blades of obstructions.	
INSTALLATION		
4. Evaporator Inlet Louver	a. Install evaporator inlet air filter (4) into filter clips (5). b. Aline and secure louver (3) to housing using eight screws (1) and eight lockwashers (2) respectively.	Evaporator Inlet Louver Only.
5. Evaporator Outlet Louver	Aline and secure louver (8) to housing using six screws (6) and six lockwashers (7) respectively.	Evaporator Outlet Louver Only.

4-19. EVAPORATOR INLET AIR FILTER-SERVICE/REPLACE.

This task covers:

a. Removal
b. Cleaning
c. Installation

INITIAL SETUP

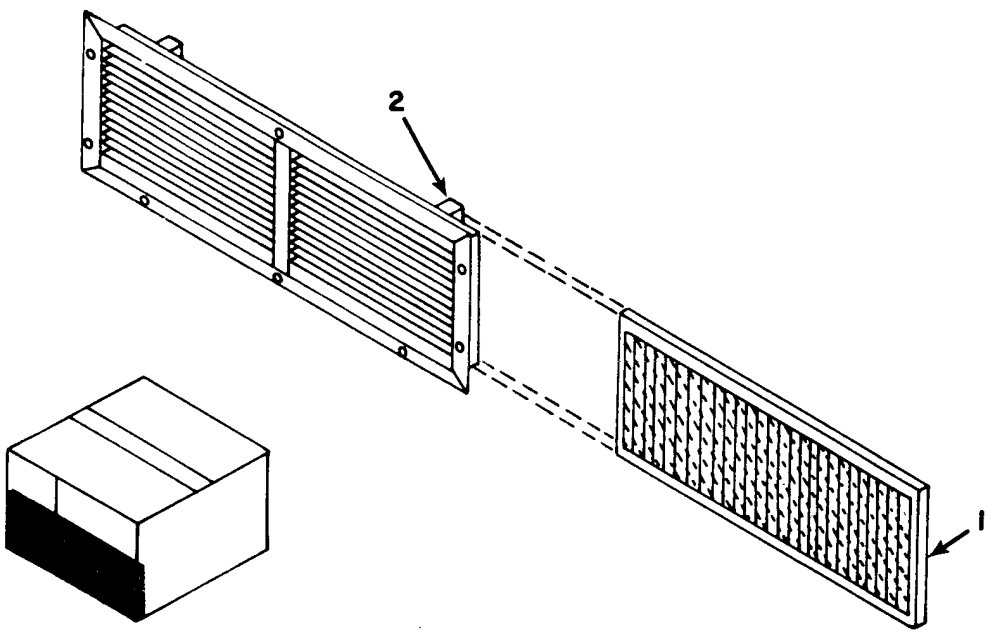
Equipment Condition

Para	Condition Description
4-18	Evaporator inlet louver removed

Materials/Parts
Hose, with running water

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	Slide air filter (1) out of retaining clips (2).	



4-19. EVAPORATOR INLET AIR FILTER-Continued.

LOCATION/ITEM	ACTION	REMARKS
Cleaning	a. Inspect filter (l). Replace damaged filter. Clean with running water. b. Replace filters having breaks, tears, excess accumulations of dirt or grease, or other major damage.	
Installation	Slide air filter into retaining clips (2) on rear of evaporator inlet louver.	Heed air flow directional arrow on air filter frame.

4-20. MIST ELIMINATOR-SERVICE/REPLACE/REPAIR.

This task covers:

a. Removal
b. Inspect
c. Cleaning
d. Repair
e. Installation

INITIAL SETUP

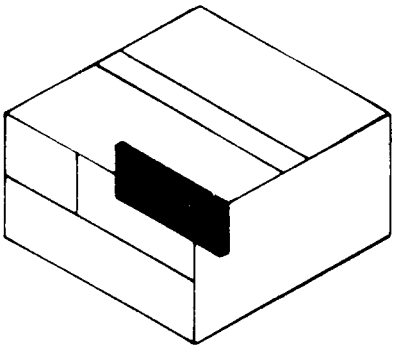
Equipment Condit ion

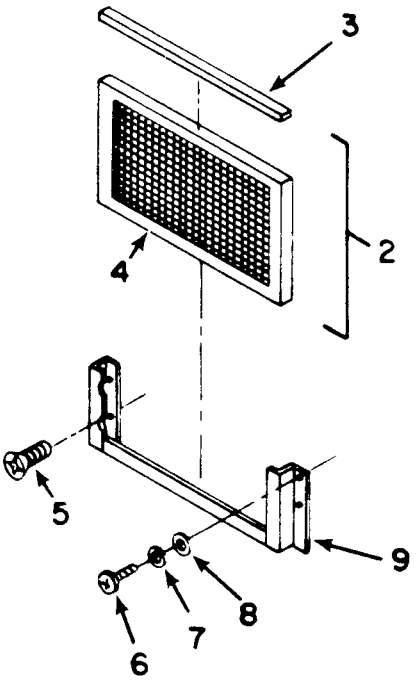
Para	Condition Description
4-17	Front Top Cover removed.

Materials/Parts
Hose, with running water

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Removal	Slide mist eliminator (1) up and out of mist eliminator holder (2).	





4-20. MIST ELIMINATOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspect	a. Inspect mist eliminator for dirt, bends, or warped frame. b. Inspect for damage or missing insulation on top of mist eliminator.	
Clean	Clean mist eliminator by hosing water through in opposite direction of air flow.	
Repair	a. Replace bent or damaged mist eliminator. b. Replace insulation (3) if it has been damaged or is missing.	
Installation	Insert mist eliminator (1) into mist eliminator holder (2).	Heed air flow direction arrow on mist eliminator frame.

4-21. CONDENSER AIR DISCHARGE LOUVER AND LINKAGE-SERVICE/REPLACE/ADJUST.

This task covers:

a. Removal
b. Disassembly
c. Repair & Clean
d. Assembly
e. Installation
f. Adjustment

INITIAL SETUP

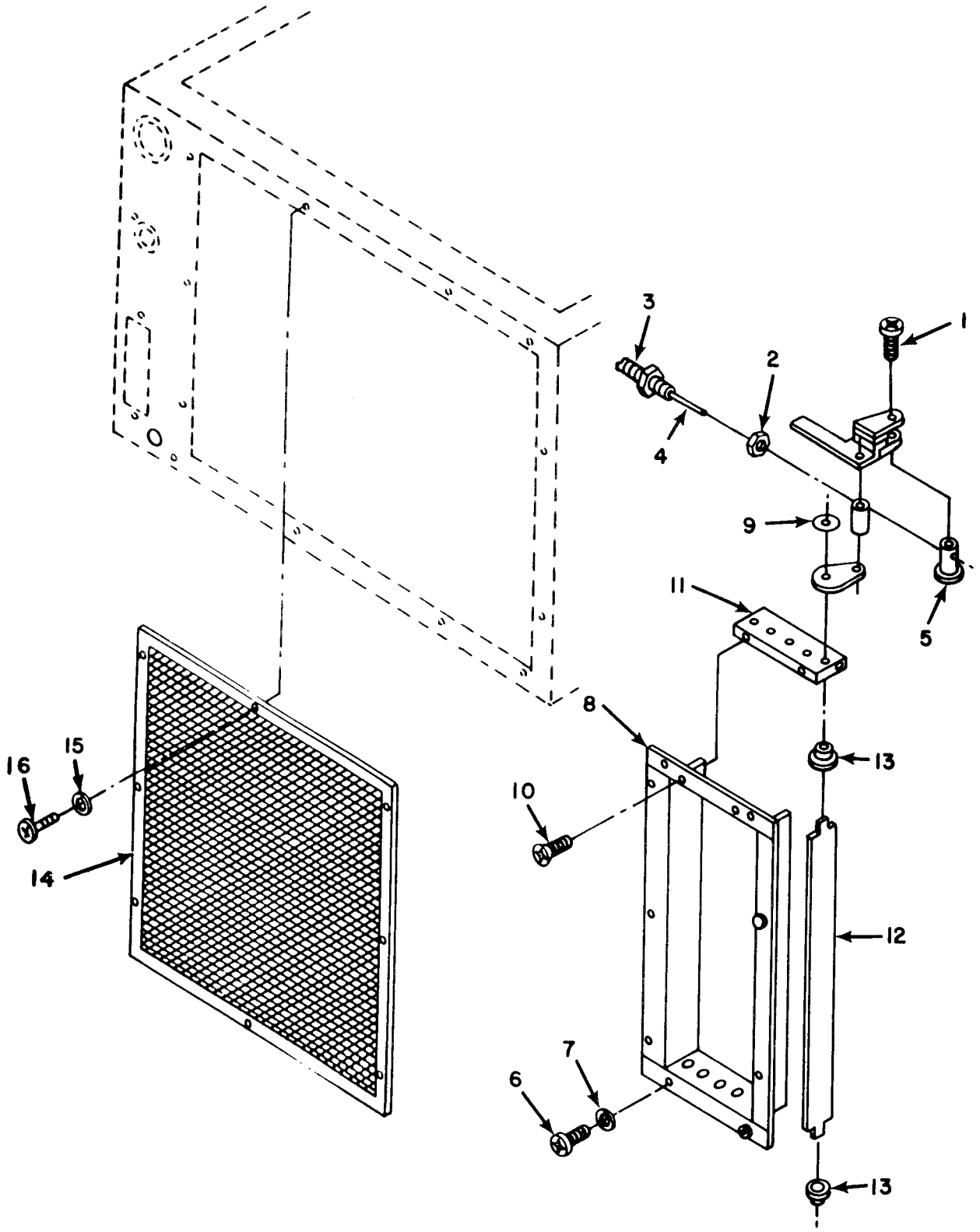
Equipment Condition

Para	Condition Description
4-16	Fabric Cover detached.
4-17	Rear Top cover removed.

Materials/Parts
Dry cleaning solvent (Item 16, App. D)

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Removal		
1. Condenser Guard	Remove condenser guard (14) by removing eight screws (16) and eight lockwashers (15).	
2. Condenser Louver	a. Loosen post screw (l). b. Remove outer sheath retaining nut (2) from control cable sheath (3). c. Straighten and pull end of wire (4) from mechanical post (5). d. Remove six screws (6) and six lockwashers (7) securing condenser louver assembly (8) to housing. e. Remove condenser louver assembly (8) from housing.	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4-21. CONDENSER AIR DISCHARGE LOUVER AND LINKAGE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Disassembly		
3. Condenser Louver	a. Remove five push nuts (9). b. Remove four screws (10). c. Remove bearing plate (11). d. Remove five louver blades (12) and ten bearings (13) from louver assembly frame (8).	
Repair & Clean		
4. Condenser Louver	a. Replace damaged louver blades, bearing, lever, or insulation. b. Straighten, or replace, bent frame. **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, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is l00°F to 138°F (38°C to 58°C) c. Clean with dry cleaning solvent.	
Assembly		
5. Condenser Louver	a. Install ten bearings (13) and five louver blades (12) into louver assembly frame (8). b. Install bearing plate (11) to louver assembly frame (8) by securing four screws (10). c. Install five push nuts (9).	

4-21. CONDENSER AIR DISCHARGE LOUVER AND LINKAGE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation		
6. Condenser Louver	a. Place condenser louver assembly (8) in housing. b. Install top and bottom screws (6) and washers (7) finger tight. c. Reconnect control (push-pull) cable (4). d. Install remaining screws (6) and washers (7).	
Adjustment	a. Turn off air conditioner and wait four hours, or until air conditioner is at ambient temperature. b. Loosen post screw (1) on mechanical post (5). c. Close condenser louvers (12) and draw wire (4) tight. d. Tighten post screw (l). e. Check to see that louvers (13) are tightly closed when air conditioner is off. f. Assure that all external screws (6) are tight.	

4-22. FRESH AIR DAMPER AND ACTUATOR -INSPECT/SERVICE/REPLACE/ADJUST.

This task covers:

a. Removal
b. Inspect
c. Cleaning
d. Installation
e. Adjustment

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Top Covers removed.
4-18	Evaporator inlet and outlet louvers removed.

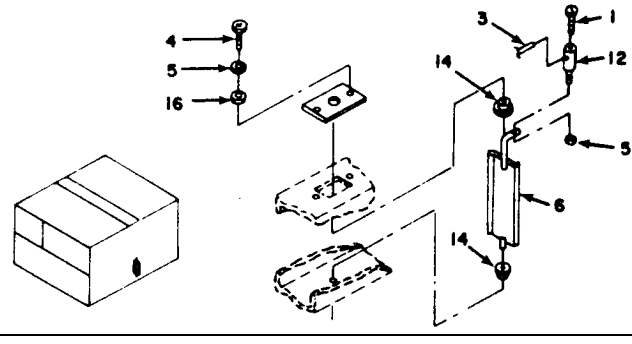
Special Tools

Off-set Phillips Screwdriver.
Tool Kit SC 5180-90-CL-N18

Materials/Parts

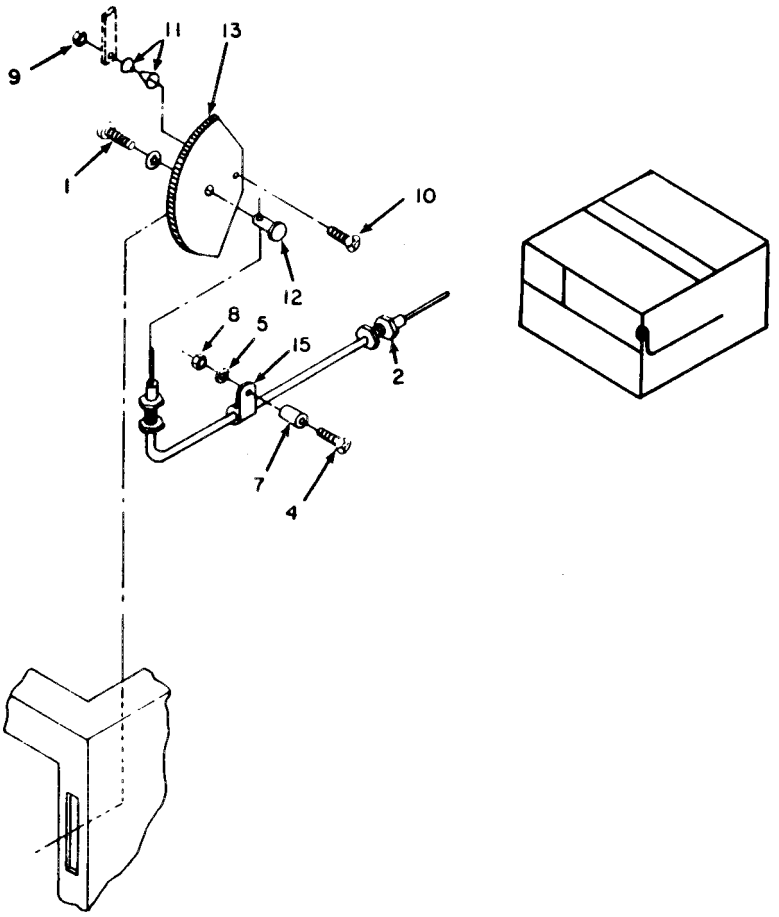
Dry cleaning solvent (Item 16, App. D)
Cloth, Lint free (Item 9, App. D)

LOCATION/ITEM	ACTION	REMARKS
Removal		
Fresh Air Ventilation Damper	a. Loosen post screw (1) on mechanical post (12).	
	b. Remove screws (4), lockwashers (5) and flat washers (5).	
	c. Disconnect push-pull control cable wire (3) from mechanical post (12).	
	d. Lift fresh air ventilation damper assembly (6) from fresh air duct.	
	e. Remove two bushings (14).	



4-22. FRESH AIR DAMPER AND ACTUATOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal- (Continued)		
2. Ventilation Control Actuator	a. Loosen post screw (1) on mechanical post (12). b. Disconnect push-pull control cable wire (2) from mechanical post (12). c. Remove nut (9), screw (10), and spring washers (11) from center hole of actuator and housing.	



d. Remove ventilation control actuator (13).

4-22. FRESH AIR DAMPER AND ACTUATOR - Continued.

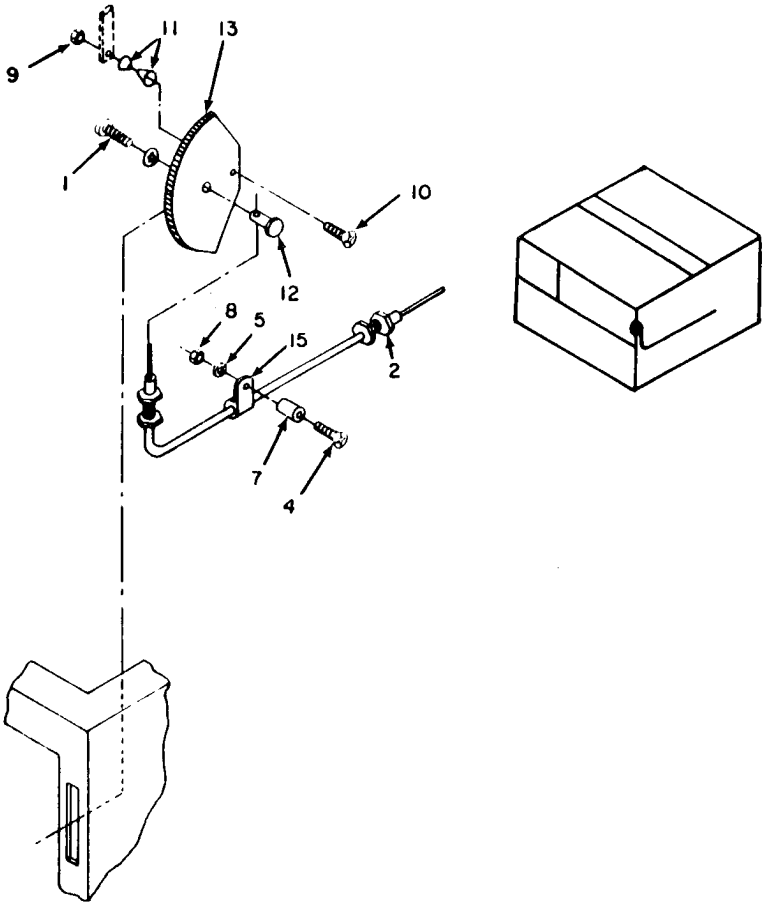
LOCATION/ITEM	ACTION	REMARKS
Removal- Continued)		
3. Push-Pull Control Cable	a. Remove two outer sheath retaining nuts on push-pull control cable (3). b. Remove screw (4), lockwasher (5), spacer (7), nut (8), and clamp (15). c. Remove push-pull control cable (3) from unit.	
Inspection		
4. Fresh Air Ventilation Damper	a. Inspect ventilation damper for bends and breaks. b. Inspect rubber seal for damage. c. Inspect damper plate for bending or warping. d. Inspect bearing for cracks and excessive wear.	
5. Ventilation Control Actuator	Inspect for cracks, chips or warps.	
6. Push-Pull Control Cable	a. Pull control wire from sheath. b. Inspect wire and sheath for fraying, kinking, or breaks.	
Service		
7. Fresh Air Ventilation Damper	a. Wipe off dirt with clean dirt free cloth, (Item 9, App. D). For stubborn dirt, wash with warm soapy water and lint free cloth.	

4-22. FRESH AIR DAMPER AND ACTUATOR-Continued,

LOCATION/ITEM	ACTION	REMARKS
Service - Continued)		
1. Fresh Air Ventilation Damper	**WARNING** Dry cleaning solvent (P-D-680), used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near flame or excessive heat. b. Carefully scrape away all adhesive from damper cover and opening, and clean with dry cleaning solvent Item 16, App. D).	
B. Push-Pull Control Cable	a. Clean control cable wire and sheath using dry cleaning solvent (Item 16, App. D) and lint free cloth (Item 9, App. D). b. Slide control wire into sheath.	
9. Ventilation Control Actuator	a. Wipe off loose dirt using lint free cloth (Item 9, App. D). For stubborn dirt, wash with warm soapy water using lint free cloth (Item 9, App. D) and rinse.	
Repair		
10. Fresh Air Ventilation Damper	a. Straighten damper and cover if possible. Replace if necessary. b. Remove and replace cellular rubber seals on damper if necessary using cellular rubber strips (Item 29, App. D) acid swab brush, and adhesive (Item 18, App. D). c. Replace vent damper bearings as necessary.	
11. Push-Pull Control Cable	Straighten out minor kinks and bends in control wire and sheath or replace as necessary.	
12. Ventilation Control Actuator	Straighten if possible. Replace as necessary.	

4-22. FRESH AIR DAMPER AND ACTUATOR-Continued.

LOCATION/ITEM	ACTION	REMARKS



Installation

13. Fresh Air Ventilation Damper	a. Place top and bottom damper bearings (14) into position. b. Slide damper cover over damper arm. c. Install mechanical post (12) and screw (1) to damper arm using locknut (13). d. Apply thin bead of adhesive (Item 18, App. D) around damper cover opening. e. Install damper (6). f. Slide damper cover into position and firmly press down to ensure good seal.

4-22. FRESH AIR DAMPER AND ACTUATOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation-Continued)		
13. Fresh Air Ventilation Damper-(Continued)	g. Slide push-pull control cable wire (3) into mechanical post (12). h. Install screw (4), lockwasher (5), and flat washer into (16) damper cover and tighten. i. Tighten screw of mechanical post atop damper arm.	
14. Push-Pull Control Cable	a. Slide control cable (3) through housing bulkhead. b. Slide retaining nuts over control cable wire ends. c. Install clamp (15) with screw (4), spacer (7), lockwasher (5), and nut (8) to bulkhead. d. Slide control cable wire ends into mechanical posts (12). e. Tighten control cable retaining nuts (2). f. Tighten screws (1) to mechanical posts (1 2).	
15. Ventilation Control Actuator	a. Slide control actuator (13) into position on unit. b. Install screw (10), springs (11), and nut (9) that hold control actuator (13) in position. c. Slide push-pull control cable wire into mechanical post (12). d. Tighten screw (1) to mechanical post (12).	

4-22. FRESH AIR DAMPER AND ACTUATOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
Adjustment	a. Position control actuator (13) to fully closed position. b. Loosen screw (1) from mechanical post (12) of fresh air damper. c. Position fresh air damper to fully closed position by hand while looking down vent housing from evaporator fan motor compartment with flashlight. d. Tighten screw (1) on mechanical post (12). e. Shine flashlight into fresh air damper screen side of unit (read side) while looking into vent housing from evaporator fan motor compartment. Ensure no light can be seen around edges of damper seal. If fails, repeat adjustment procedure. If fails again, Service or Replace fresh air damper as necessary. f. Install evaporator inlet and outlet louvers. g. Install top covers.	See paragraph 4-18. See paragraph 4-17.

4-23. CONDENSER DRAIN TUBE-INSPECT/SERVICE/REPLACE.

This task covers:

a. Removal
b. Disassembly
c. Cleaning
d. Assembly
e. Installation

INITIAL SETUP

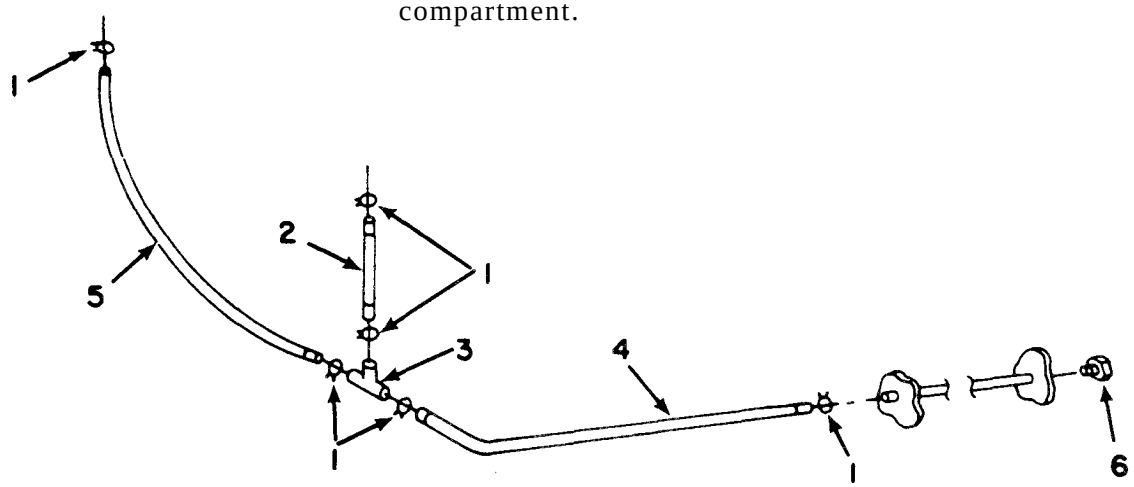
Equipment Condition

Para	Condition Description
4-17	Front top cover removed.
4-18	Evaporator inlet louver removed.
4-20	Mist Eliminator removed.

Materials/Parts
Water, warm soapy
wire, soft 10-12 gage

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Removal	a. Loosen tube clamps (1) attaching the tubing to the housing. b. Remove drain tube assembly from inside evaporator inlet compartment.	



Disassembly	Remove three clamps (1) at tee fitting (3).	

4-23. CONDENSER DRAIN TUBE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Cleaning	a. Clean tubing using warm soapy water or replace.	
	b. Clear obstructions from drains at bottom of evaporator compartment using soft wire.	Under mist eliminator.
	c. Clear obstructions from drain outlet using soft wire.	Insert from evaporator drain opening.
	d. Replace damaged tubing, tee, pipe plug, mist eliminator, or hose clamps as necessary.	
Installation	a. Reassemble tubing and tee (3).	
	b. Install drain tube assembly on evaporator drains using hose clamps (l).	
	c. Install mist eliminator.	See para. 4-20.
	d. Aline and install front top cover.	See para. 4-15.
	e. Install evaporator inlet louver.	See para. 4-18.

4-24. CONTROL MODULE -REPAIR/SERVICE.

This task covers:

a. Removal
b. Disassembly
c. Repair
d. Inspection
e. Test
f. Replacement
g. Reassembly
h. Installation

INITIAL SETUP

Equipment Condition

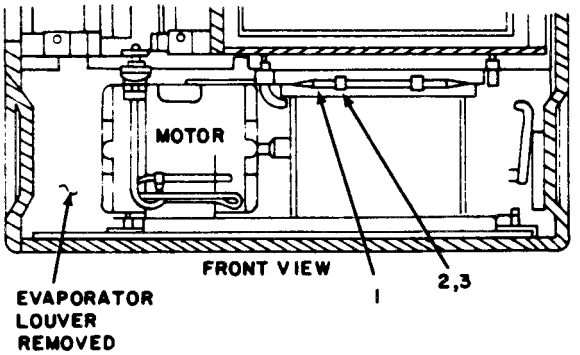
Para	Condition Description
4-18	Evaporator inlet louver removed.

Test Equipment
Multimeter

Special Tools
Tool Kit SC 5180-90-CL-N18

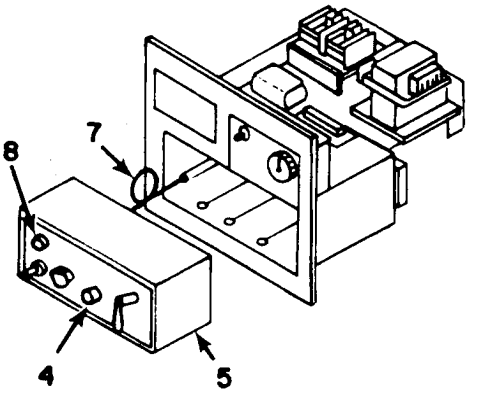
Materials/Parts
Solder (Item 2, App. D)
Flux (Item 15, App. D)

LOCATION/ITEM	ACTION	REMARKS
Removal	**WARNING** Disconnect power from air conditioner before removing control module.	
1. Control Module	a. Remove temperature selector switch sensing bulb (1) from top of evaporator fan housing by removing clamps (2) attached with screws (3) and lockwashers (3).	Take care not to break or kink sensing line (7) while removing from mounting place

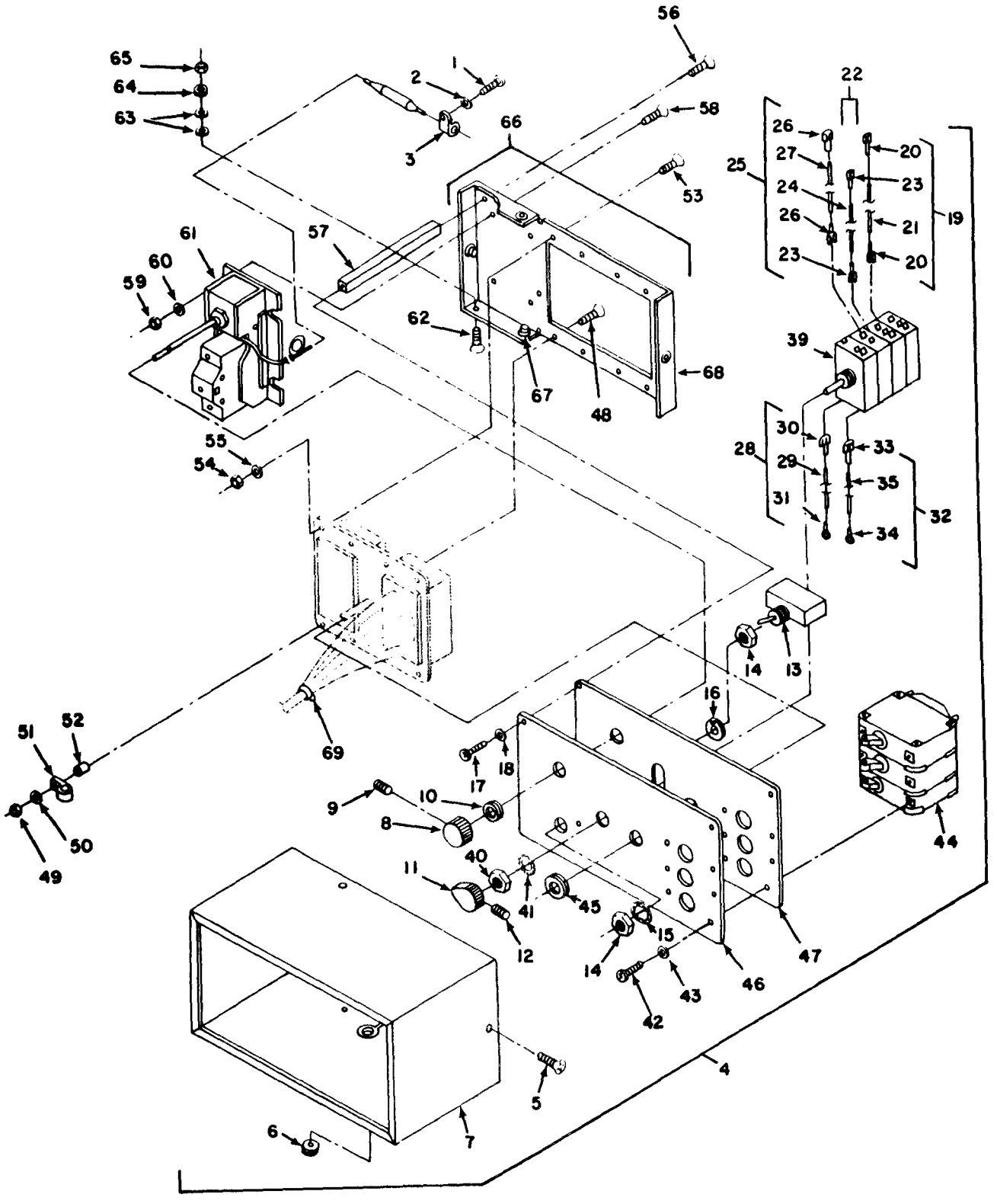


4-24. CONTROL MODULE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal-Continued) Control Module	b. Turn comector post (4) counter-clockwise until post is disengaged.	



	c. Pull control module (5) straight out of junction box. d. Carefully pull temperature sensing line (7) and bulb (1) through slot in bottom of junction box.	
Disassembly 2. Control Module	a. Remove four screws (5) attaching cover (7) to frame and slide cover (7) from module. b. Remove temperature control switch knob (8) by loosening hex set screw (9). c. Remove three screws (56) attaching frame posts (57) that hold front (47) and back (66) plates together. d. Pull front (47) and back (66) plates apart until comector posts clear front (47) plate. e. Remove wire ties (69) from wires as required.	



NOTE: ITEMS 36,37 AND 38 NOT USED

4-24. CONTROL MODULE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Repair		
3. Control Module Cover	a. Remove nicks, dents or deformation if minor. b. Prime and paint as necessary.	
4. Designation Plate	a. Remove dents or deformation if minor. Replace if major. b. Replace if illegible.	
5. Front and Back Plate	a. Remove dents or deformation if minor. Replace if major. b. Replace if cracked.	
6. Frame Posts	a. Straighten posts if bend is minor. b. Replace if bend is major.	
Inspection		
7. Temperature Selector Switch	a. Turn temperature control knob from stop to stop to ensure smooth operation. Replace if binding occurs. b. Inspect temperature control knob for chips, cracks, or indicator line cannot be readily seen. Replace if found. c. Inspect sensor bulb and line for kinks, excessive bends, nicks, breaks, or cuts. Replace if found. d. Inspect sensor line grommet (6) for tears, cracks, and general deterioration. Replace if found or missing.	
8. Evaporator Fan Speed Switch	a. Inspect contacts. Replace switch if damaged. b. Inspect contact leads for damage or corrosion. Clean if minor or replace if major. c. Inspect wiring for breaks or damage. Replace if found. d. Inspect switch for distinct click when changing positions. Replace switch if not found.	

4-24. CONTROL MODULE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspection-Continued		
Mode Selector Switch	a. Inspect selector knob for chips, stripping out, cracks, or damage. Replace if found. b. Inspect contacts. Replace switch if damaged. c. Inspect wiring for breaks or damage. Replace if found. d. Inspect for distinct click when changing positions. Replace switch if not found.	
10. Compressor Circuit Breaker	a. Inspect toggle for chips, cracks, or damage. Replace switch if found. b. Inspect contacts. Replace switch if damaged. c. Inspect wiring for breaks or damage. Replace if found. d. Inspect for distinct click and engagement of switch when placed in ON position. Replace if found. e. Inspect for smooth motion to OFF position. Replace if not found.	
11. Connector With Leads (Wiring)	a. Inspect contacts. Replace connector if damaged. b. Inspect wiring for breaks, fraying, discoloration, or damage. Replace if found. c. Inspect soldered connections for breaks or damage. Repair or replace if found. d. Inspect pins for bending or corrosion. Straighten bent pins if possible. Clean minor corrosion. Replace if necessary. e. Inspect electrical contacts for corrosion. Replace or clean as necessary.	

4-24. CONTROL MODULE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Test		
12. Temperature Selector Switch	a. Tag and disconnect leads. b. Check for continuity. Switch should close on temperature drop below setting. c. Turn switch to full COOLER position. Switch should be open. d. Turn switch knob toward WARMER. Switch should close as setting becomes higher than bulb temperature. e. Replace if fails above indications.	See Figure E-2. Switch operates in temperature range of 94°F to 56°F (34°C to 13°C) If out of range, immerse bulb in water.
13. Evaporator Fan Speed Switch	a. Tag and disconnect leads. b. Check for continuity in low and high speed position. c. Replace if fails test.	See Figure E-2.
14. Mode Selector Switch	a. Tag and disconnect leads. b. Check for continuity. c. Check for no continuity. d. Replace if fails test.	See Figure E-2. See Figure E-2.
15. Compressor Circuit Breaker	a. Tag and disconnect leads. b. Check for continuity in ON position. c. Check for no continuity in OFF position. d. Replace if fails test.	See Figure E-2. See Figure E-2.
16. Control Module Wiring Harness	a. Tag and disconnect leads. b. Check for continuity. Replace pins and wire if not found.	See Figures E-1 and E-2 “Wiring Diagrams”.

4-24. CONTROL MODULE-Continued.

LOCATION/ITEM	ACTION	REMARKS
replacement 17. Temperature Selector Switch	a. Remove screw (48), nut (49), flat washer (50), and spacer (52) from capillary clamp (51). b. Remove clamp (51). c. Remove four screws (58), four flat washers (60), and four nuts (59) attaching switch to back plate (66). d. Remove switch (61) from control module. e. Clean contacts. Replace switch if contacts are damaged. f. Replace if failed test. g. Replace grommet (6) if damaged. h. Reassemble into control module if passed test.	NOTE: Switches are not repairable and may only be replaced.
18. Evaporator Fan Speed Switch	a. Remove two mounting nuts (14), lockwasher (15), and Iockring (16). b. Slide switch (13) out backside of front panel (47). c. Clean contacts. Replace switch if contacts are damaged. d. Replace if failed test. e. Reassemble into control module if passed test.	
19. Mode Selector Switch	a. Remove selector knob (11) by loosening set screw (12). b. Remove mounting nut (40) and lockwasher (41). c. Slide switch (39) through back of front plate (47). d. Clean contacts. Replace switch if contacts are damaged. e. Replace if failed test. f. Reassemble into control module if passed test.	

4-24. CONTROL MODULE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Replacement-Continued		
20. Compressor Circuit Breaker	a. Remove pin and middle sections of throw switch. b. Remove six screws (42), and six flat washers (43) securing switch to front plate (47). c. Slide switch (44) through back of front plate (47). d. Clean contacts. Replace switch if contacts are damaged. e. Replace if failed test. f. Reassemble in control module if passed test.	
21. Control Module Wiring Harness	a. Remove screw (48), flat washer (50) post spacer (52), locknut (49), and clamp (51) securing temperature selector switch sensing line to back plate (47). b. Remove seven screws (53), seven flat washers (55), and seven locknuts (54) securing connector plug to back plate (47). c. Remove comector with leads from back plate (47). d. Replace wires if damaged or failed test. e. Desolder wire from connector pin. f. Measure old wire and cut new wire to that length. g. Strip insulation from wire ends. h. Crimp required contacts on appropriate wire ends. i. Print wire identification number on shrink sleeving and shrink on appropriate wire end.	

4-24. CONTROL MODULE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Replacement-Continued		
21. Control Module Harness-Continued	j. Solder wire to appropriate connector pin. k. Straighten and clean any bent or dirty pins on comector plug. 1. Replace connector plug with leads if pins are damaged beyond repair.	
Reassembly		
22. Temperature Selector Switch	a. Attach switch to back plate using four screws (53), four flat washers (55), and four nuts (54). b. Install capillary tube clamp on capillary tube. c. Attach capillary tube clamp (51) to back plate using screw (48), flat washer (50), lock nut (49), and spacer (52).	
23. Evaporator Fan Speed Switch	a. Slide switch (13) into front plate through backside. b. Attach switch (13) using lockring (16), lockwasher (15), and two mounting nuts (14). c. Connect leads and remove tags.	
24. Mode Selector Switch	a. Slide switch (39) into front plate through backside. b. Attach switch (39) using lockwasher (41) and mounting nut (40). c. Install selector knob (11) and tighten set screw (12). d. Connect leads and remove tags.	
25. Compressor Circuit Breaker	a. Slide switch (44) into front plate through backside. b. Attach switch using six screws (42) and six flat washers (43). c. Aline middle sections of throw switch and insert pin. d. Connect leads and remove tags.	

4-24. CONTROL MODULE-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation		
26. Connector With Leads (Wiring)	a. Install connector with leads into back plate. b. Connect leads and disconnect tags. c. Install seven screws (53), seven flat washers (55) and seven locknuts (54) and secure connector to back plate. d. Install screw (48), flat washer (50), post spacer (52), locknut (49), and clamp (51) and secure temperature selector switch sensing line to back plate.	
Assembly		
27. Control Module	a. Add wire ties (69). b. Push connector post through front plate pressing on front and back plates. c. Attach three frame posts (57) with three screws (56). d. Attach temperature control switch knob (8) by tightening hex setscrew (9). e. Slide cover (7) over module and attach frame to cover with four screws (5).	
Installation		
28. Control Module	a. Carefully push sensing bulb and line through slot in bottom of junction box. b. Push control module straight into junction box. c. Turn connector post screw clockwise until post is fully engaged. d. Attach temperature selector switch bulb atop evaporator fan housing with clamps, lockwashers, and screws. e. Install evaporator inlet louver f. Connect power.	See para 4-18.

4-25. JUNCTION BOX- INSPECT/REPAIR/REPLACE..

This task covers:

a. Removal
b. Inspection
c. Test
d. Repair/Replacement
e. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Top Front Cover removed.
4-18	Evaporator Inlet Louver removed.
4-24	Control Module removed.

Test Equipment

Multimeter or Continuity Tester
Variable Voltage Power Source (AC/DC)

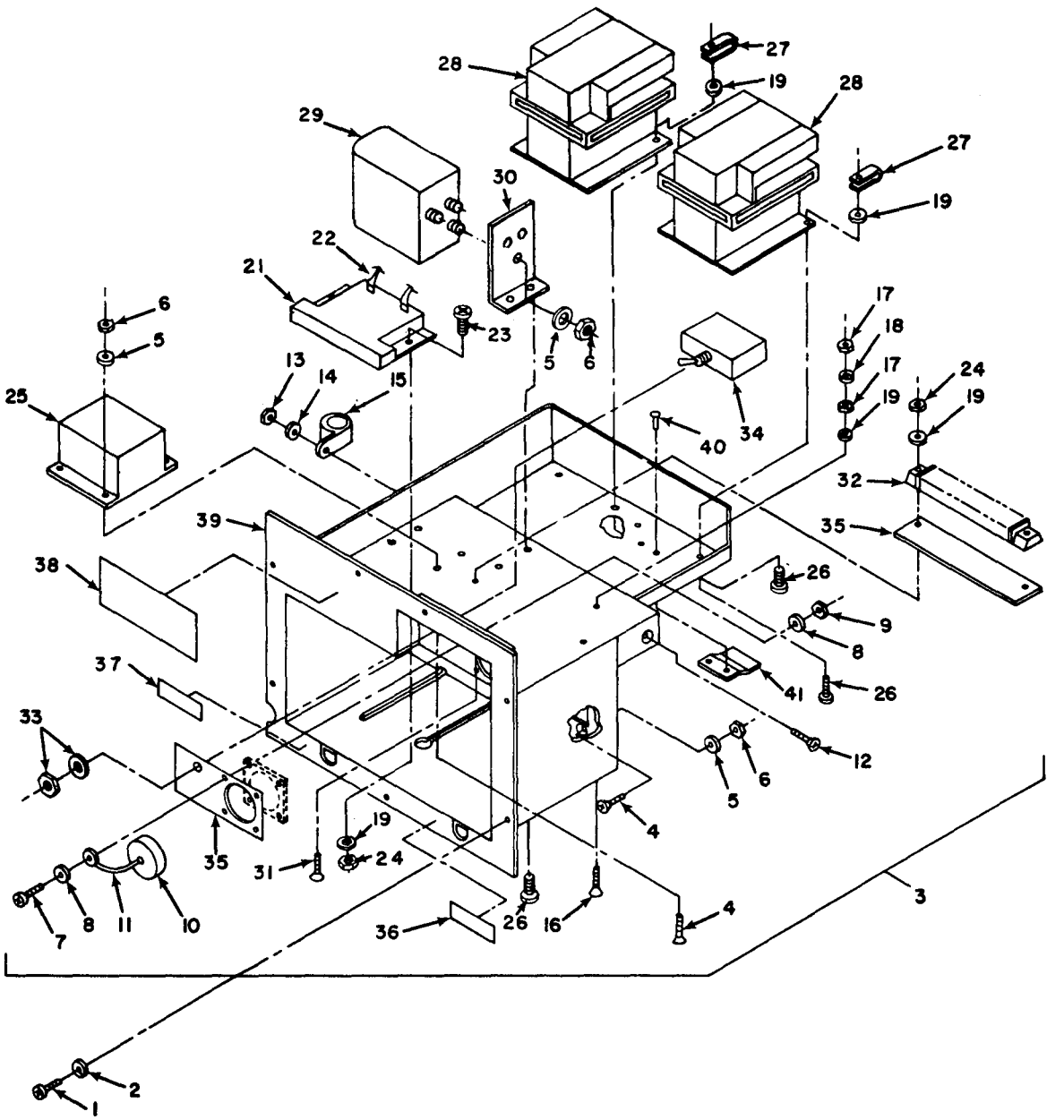
Materials/Parts

Solder (Item 2, App. D)
Flux (Item 15, App. D)

Special Tools

Tool Kit SC5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Removal 1. Junction Box	**WARNING** Disconnect air conditioner power supply before doing maintenance work on the electrical system. a. Remove seven screws (1) and seven lockwashers (2) that secure the junction box to the housing. b. Partially remove the junction box by pulling it forward and out of the air conditioner.	Support the junction box to relieve the strain on wiring.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4-25. JUNCTION BOX-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal-(Continued)		
1. Junction Box-(Continued)	c. It is not necessary to remove junction box completely from unit.	Most repairs and replacements can be made without removing junction box completely.
Inspection		
2. Junction Box	a. Inspect junction box for damage. b. Inspect all designation part markings for illegibility. c. Inspect all designation plates and instruction plates for damage and illegibility. d. Replace damaged designation markings, instruction plates and designation plates. e. Replace junction box if damaged enough to prevent normal operation of air conditioner.	
3. Time Delay Relay (K1) Heater Relay (K2) Compressor Motor Relay (K3) Condenser Fan Motor Relay (K4), Phase Sequence Relay (KS)	a. Inspect relays for any external damage to housing or contacts. b. If damaged enough to prevent normal operation of relay, replace relay.	
4. Control Circuit Breaker (CB2)	a. Inspect control circuit breaker (33) for external damage. b. Inspect toggle for distinct click and engagement of switch when placed in ON or OFF positions. c. Inspect contacts for damage. d. Replace circuit breaker (33) if damaged to prevent normal operation.	

4-25. JUNCTION BOX-Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspection - (Continued)		
5. Terminal Board (TB1) and Marker Strip	a. Inspect terminal board (TB1) for dents, breaks, nicks or damaged terminals. b. If unrepairable, replace terminal board. c. Inspect marker strip for illegibility or damage. d. Replace marker strip if damaged.	
Test		
6. Time Delay Relay (K1) Heater Relay (K2) Compressor Motor Relay (K3) Condenser Fan Motor Relay (K4), Phase Sequence Relay (KS)	a. Check coils of relays (Kl, K2, K3, K4 and K5) for continuity. b. Actuate the coils of the relays with a 24-volt DC power source. c. Check for continuity across closed contacts and discontinuity across open contacts. d. Replace if fails test.	Refer to schematic and wiring diagram (Figures E-1 and E-2)
7. Control Circuit Breaker	a. Check continuity of control circuit breaker in ON and OFF position. b. Replace if fails test.	Refer to schematic and wiring diagram (Figures E-1 and E-2)

4-25. JUNCTION BOX - Continued.

LOCATION/ITEM	ACTION	REMARKS
Repair/ replacement		
8. Junction Box	a. Repair or straighten sheet metal parts. b. Tag and disconnect the leads from components to be replaced	Disassembly is limited to replacement if individual components.
9. Time Delay Relay (Kl)	a. Remove the time delay relay (Kl) (21) from the junction box by removing two screws (23) and two nuts (24). b. Install replacement time delay relay (Kl)(21) on the junction box. c. Secure relay to junction box with two screws (23) and two nuts (24).	
10. Heater Relay (K2) and Compressor Motor Relay (K3)	a. Remove four screws (26), four flat washers (19) and four nuts (27). b. Remove the heater relay (K2) (28) or compressor motor relay (K3) (28) from the junction box. c. Install replacement relay (K2 or K3) and secure relay with four screws (26), four flat washers (19) and four nuts (27).	
11. Condenser Fan Relay (K4)	a. Remove two screws (26) from beneath bracket (30). b. Remove three relay mounting nuts (6) and three washers (5). c. Disconnect solder joints and remove fan motor relay (K4) from bracket (30). d. Insert replacement relay (K4) into bracket (30) and make solder connections. e. Replace three washers (5) and three nuts (6) to secure relay to bracket (30). f. Install relay bracket (30) to junction box with two screws (26) from beneath.	

4-25. JUNCTION BOX-Continued.

LOCATION/ITEM	ACTION	REMARKS
Repair/ Replacement- Continued		
12. Phase Sequence Relay (KS)	a. Remove four screws (4), four flat washers (5), and four nuts (6). b. Remove phase sequence relay (KS) (25) from the junction box. c. Install replacement relay (K5) and secure with four screws (4), four flat washers (5), and four nuts (6).	
.3. Control Circuit Breaker (CB2)	a. Remove the circuit breaker mounting nut and lockwasher (33) from front of the junction box and pull the circuit breaker (CB2)(34) to the rear of the junction box. b. Install replacement control circuit breaker (CB2)(34) through opening in junction box. c. Install the circuit breaker mounting nut and lockwasher (33) to secure circuit breaker.	
14. Terminal Board (TB1) and Marker Strip	a. Remove two screws (31), two flat washers (19) and two nuts (24). b. Remove terminal board (TB1) (32) and marker strip (35) from junction box. c. Install replacement terminal board (TB1) (32) and marker strip (35) on junction box. d. Secure to junction box using two screws (31), two flat washers (19) and two nuts (24).	
Installation 15. Junction Box	a. Carefully install junction box in housing and secure with seven screws (1) and seven lockwashers (2). b. Install the control module. c. Install evaporator inlet louver d. Install top front cover.	 See para. 4-24. See para. 4-18. See para. 4-17.

4-26. JUNCTION BOX WIRING HARNESS - INSPECT/TEST/REPAIR/REPLACE.

This task covers:

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

INITIAL SETUP

Equipment
Condit ion

Para	Condition Description
4-17	Top Covers removed.
4-18	Evaporator Inlet Louver removed.
4-24	Control Module removed.
4-25	Junction Box partially removed.

Test Equipment
Multimeter
Continuity Tester

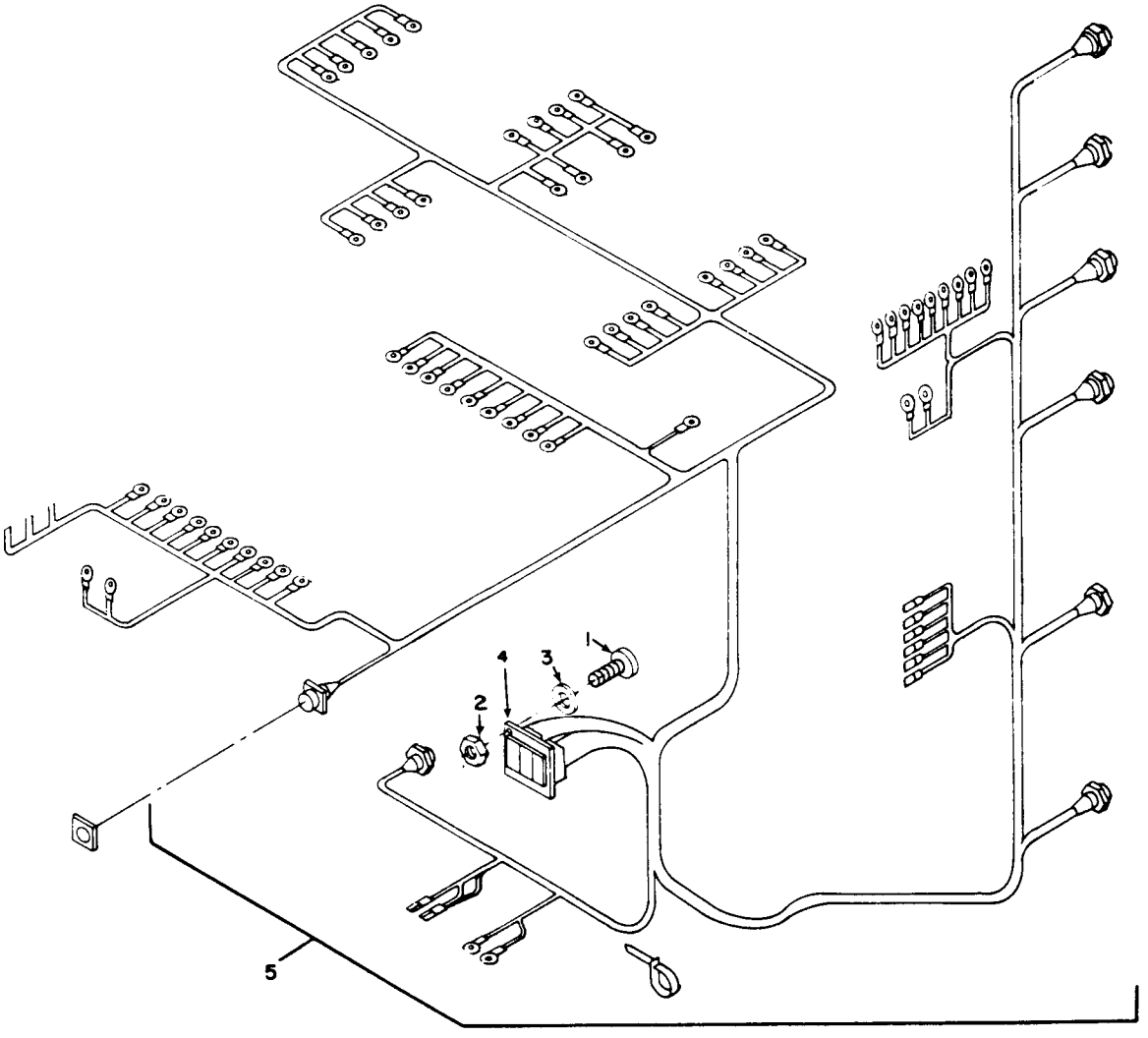
Special Tools
Tool Kit SC5180-90-CL-N18

Materials/Parts
Solder (Item 2, App, D)
Flux (Item 15, App. D)

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power supply before doing maintenance work on the electrical system.	
Inspection	a. Inspect all installed wiring for cracked or frayed insulation. Pay particular attention to wires passing through holes in the frame or routed around sharp edges. b. Inspect electrical connectors and fittings for damage.	

4-26. JUNCTION BOX WIRING HARNESS-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal	a. Tag all wire leads prior to removal. b. Remove eight screws (l), eight nuts (2) and eight flat washers (3) to release connector (4) from housing. c. Disconnect all connector plugs and terminals. d. Carefully remove harness from unit.	Use Wiring Diagrams. (Figures E-1 and E-2)



4-26. JUNCTION BOX WIRING HARNESS-Continued.

LOCATION/ITEM	ACTION	REMARKS
Test	a. Test for continuity on wiring harness. b. Touch the test probes of a continuity tester or multimeter, set on low-resistance range, to ends of wire and/or corresponding pin of connector. c. If continuity is not indicated, repair or replace wire or damaged connector.	See Figures E-1 and E-2
Repair	a. Remove the insulation to expose 1/2 inch/1.27 centimeters of bare wire on each side of break or damaged insulation. b. Insert the ends into a splice-connector; splice and crimp the comector to make firm electrical contact. c. Alternatively, heat-shrink tubing may be slipped over one end of the wire before splicing, then heated after the splice is made and soldered, so as to cover the spliced area. d. Be sure that no bare wire is exposed after the splice is complete. e. Replace broken terminal lugs with exact duplicates. f. To replace electrical plugs or connectors, tag and unsolder wires from the solder-wells of the inserts. g. Insert bare ends if the wires in corresponding holes of new insert, and solder in place. h. Check continuity terminal-to-terminal.	

4-26. JUNCTION BOX WIRING HARNESS-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation		
	a. Transfer tags to new harness.	
	b. Install connector into junction box with nuts and washers.	
	c. Connect all connector plugs and terminals and remove tags.	Use Wiring Diagrams. (Figures E-1 and E-2)
	d. Install junction box.	See paragraph 4-25.
	e. Install control module.	See paragraph 4-24.
	f. Install Evaporator Inlet Louver.	See paragraph 4-18.
	g. Install top covers.	See paragraph 4-17.

4-27. UNIT WIRING HARNESS -INSPECT/TEST/REPAIR/REPLACE.

This task covers:

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

INITIAL SETUP

Equipment Condition

Para	Conditicm Description
4-17	Rear Top Cover removed.
4-18	Evaporator inlet louver removed.

Test Equipment
Multimeter
Continuity Tester

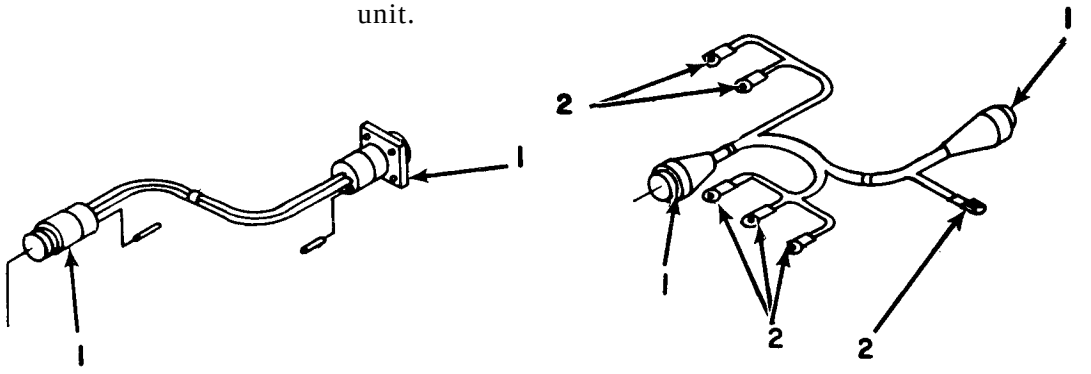
Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Solder (Item 2, App. D)
Flux (Item 15, App. D)

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power supply before doing maintenance work on the electrical system.	
Inspection	a. Inspect all installed wiring for cracked or frayed insulation. Pay particular attention to wires passing through holes in the frame or routed around sharp edges. b. Inspect electrical connectors (1) and lugs (2) for damage.	

4-27. UNIT WIRING HARNESS-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal	a. Tag all wire leads prior to removal. b. Disconnect all connector plugs (1) and terminals (2). c. Carefully remove harness from unit.	Use Wiring Diagrams. (Figures E-1 and E-2)
Test	a. Test for continuity on wiring harnesses. b. Touch the test probes of a continuity tester or multimeter, set on low-resistance range, to ends of wire and/or corresponding pin of connector. c. If continuity is not indicated, repair or replace wire or damaged connector.	Use Wiring Diagrams (Figures E-1 and E-2).
Repair	a. Remove the insulation to expose 1/2 inch/1.27 centimeters of bare wire on each side of break or damaged insulation. b. Insert the ends into a splice-connector; splice and crimp the connector to make firm electrical contact. c. Alternatively, heat-shrink tubing may be slipped over one end of the wire before splicing, then heated after the splice is made and soldered, so as to cover the spliced area.	



4-27. UNIT WIRING HARNESS-Continued.

LOCATION/ITEM	ACTION	REMARKS
Repair - (Continued)	d. Be sure that no bare wire is exposed after the splice is complete.	
	e. Replace broken terminal lugs with exact duplicates.	
	f. To replace electrical plugs or connectors, tag and unsolder wires from the solder-wells of the inserts.	
	g. Insert bare ends of the wires in corresponding holes of new insert, and solder in place.	
	h. Check continuity terminal-to-terminal.	
Installation	a. Transfer tags from old harnesses to new harnesses.	
	b. Connect all connectors and terminals and remove tags.	Use Wiring Diagrams. (Figures E-1 and E-2)
	c. Install junction box.	See Paragraph 4-25.
	d Install control module.	See Paragraph 4-24.
	e. Install evaporator inlet louver.	See Paragraph 4-18.
	f. Install top covers.	See Paragraph 4-17.

4-28. RECTIFIER - INSPECT/TEST/REPLACE.

This task covers:

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

INITIAL SETUP

Equipment Condition

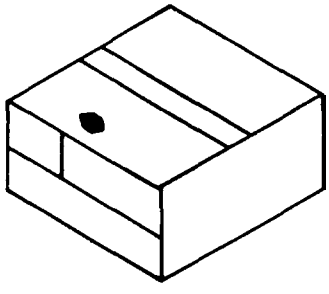
Para	Condition Description
4-17	Front Top Cover removed.
4-18	Evaporator Inlet Louver removed.
4-24	Control Module removed.
4-25	Junction Box partially removed.

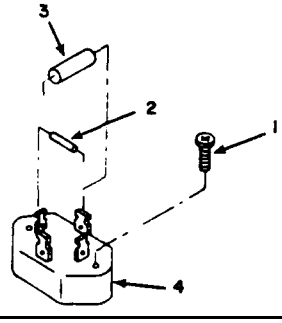
Test Equipment
Multimeter
Variable Voltage Power Source (AC/DC)

Materials/Parts
Solder (Item 2, App. D)
Flux (Item 15, App. D)

Special Tools
Tool Kit SC 5180-90-CL-N18
Heat Gun

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power source and discharge capacitors before doing work on elecrtical system.	
Removal	a. Tag and discomect leads. b. Remove screws (l). c. Remove rectifier (4) from unit. d. Remove shrink sleeving from capacitor C6 (3). e. Desolder capacitors (2 and 3).	See Figure E-1.





4-28. RECTIFIER -Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspection	a. Inspect rectifier (4) for external damage. b. Inspect capacitors (2 and 3) for external damage.	
Test		
1. Rectifier	a. Apply 24-28 VAC to input terminals (unmarked). b. Check for 24-28 VDC across output terminals (marked pos and neg). c. Replace if fails test.	See Figure E-2.
2. Capacitor	a. Check for internal condition by placing the test leads of an ohmmeter on the terminals of the capacitor. b. Ohmmeter needle should move rapidly toward top of the scale; then slowly return toward zero if the capacitor is good. c. If needle moves to top of scale and remains there, the capacitor is internally short-circuited: if the needle does not move, the capacitor contains an open circuit. d. Replace capacitors with short/open circuits.	
Installation	a. Install shrink sleeving on capacitor C6 (3). b. Solder capacitors (2 and 3) to rectifier (4). c. Install rectifier (4) using screws (1). d. Connect leads and remove tags on wires. e. Install junction box. f. Install control module. g. Install evaporator inlet louver. h. Install front top cover. i. Reconnect power.	See Figures E-1 and E-2. See para. 4-25. See para. 4-24. See para. 4-18. See para. 4-17.

4-29. TRANSFORMER-INSPECT/TEST/REPLACE.

This task covers:

a. Inspect
b. Removal
c. Test
d. Replacement
e. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-18	Evaporator Inlet Louver removed.
4-17	Front top cover removed.
4-24	Control Module removed.
4-25	Junction Box partially removed.

Test Equipment
Multimeter
Variable Voltage Power Source (AC/DC)

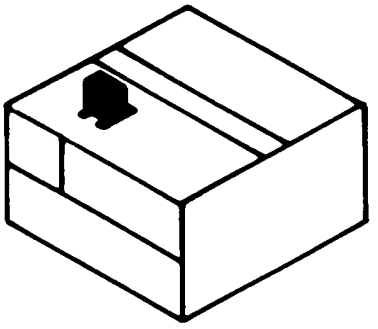
Materials/Parts
Solder (Item 2, App. D)
Flux (Item 15, App. D)

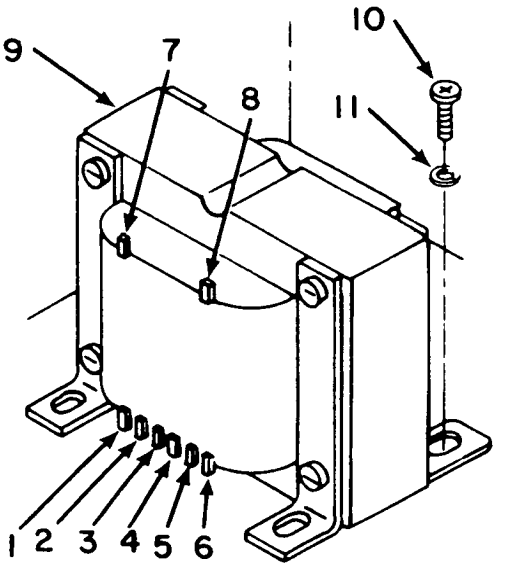
Special Tools
Tool Kit SC 5180-90-CL-N18
Heat Gun

LOCATION/ITEM	ACTION	REMARKS
Inspect	Inspect transformer for external damage.	
Removal	**WARNING** Disconnect air conditioner power source before doing work on electrical system. a. Remove screws (10) and lockwashers (11). b. Remove shrink sleeving from two input and six output terminals. c. Tag and desolder wires connected to input and output terminals. d. Lift transformer (9) out of unit.	

4-29. TRANSFORMER-Continued.

LOCATION/ITEM	ACTION	REMARKS





Test	a. Check for continuity across primary terminals (1, 2, and 3) and (4, 5, and 6). b. Check for continuity across secondary terminals (7 and 8). c. Check for no continuity between primary and secondary coils. d. If transformer fails continuity/ no continuity test, replace. e. Connect jumper wire between terminals 3 and 4 and 208 vac power source to terminals 2 and 5. f. Connect multimeter to secondary terminals (7 and 8). g. Check for reading of 27 to 33 VAC. h. If transformer fails test, replace.	See Figure E-2 for all test steps.
Repair	a. Straighten any bent terminals. b. If badly bent or damaged, replace transformer.	

4-29. TRANSFORMER-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation	a. Slide new shrink sleeving onto and up wire.	
	b. Solder leads on terminals and remove tags.	
	c. Slide shrink sleeving down wire and over solder connection.	
	d. Heat shrink sleeving onto solder connection.	
	e. Secure transformer (9) to housing using screws (10) and lockwasher (11).	
	f. Install junction box.	See para. 4-25.
	g. Install control module.	See para. 4-24.
	h. Install evaporator inlet louver.	See para. 4-18.
	i. Install front top cover.	See para. 4-17.

4-30. EVAPORATOR FAN AND HOUSING -REPLACE.

This task covers:

a. Removal
b. Disassembly
c. Assembly
d. Installation

INITIAL SETUP

Equipment Condition

Para	condition Description
4-18	Evaporator Inlet Louver removed.
4-23	Evaporator drain tubing removed.
4-24	Control Module removed.

Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Methyl-Ethyl Ketone (MEK)(Item 23, App. D)
Industrial Sealant (Item 28, App. D)

LOCATION/ITEM	ACTION	REMARKS

WARNING

Disconnect air conditioner power source before doing maintenance work on the electrical system.

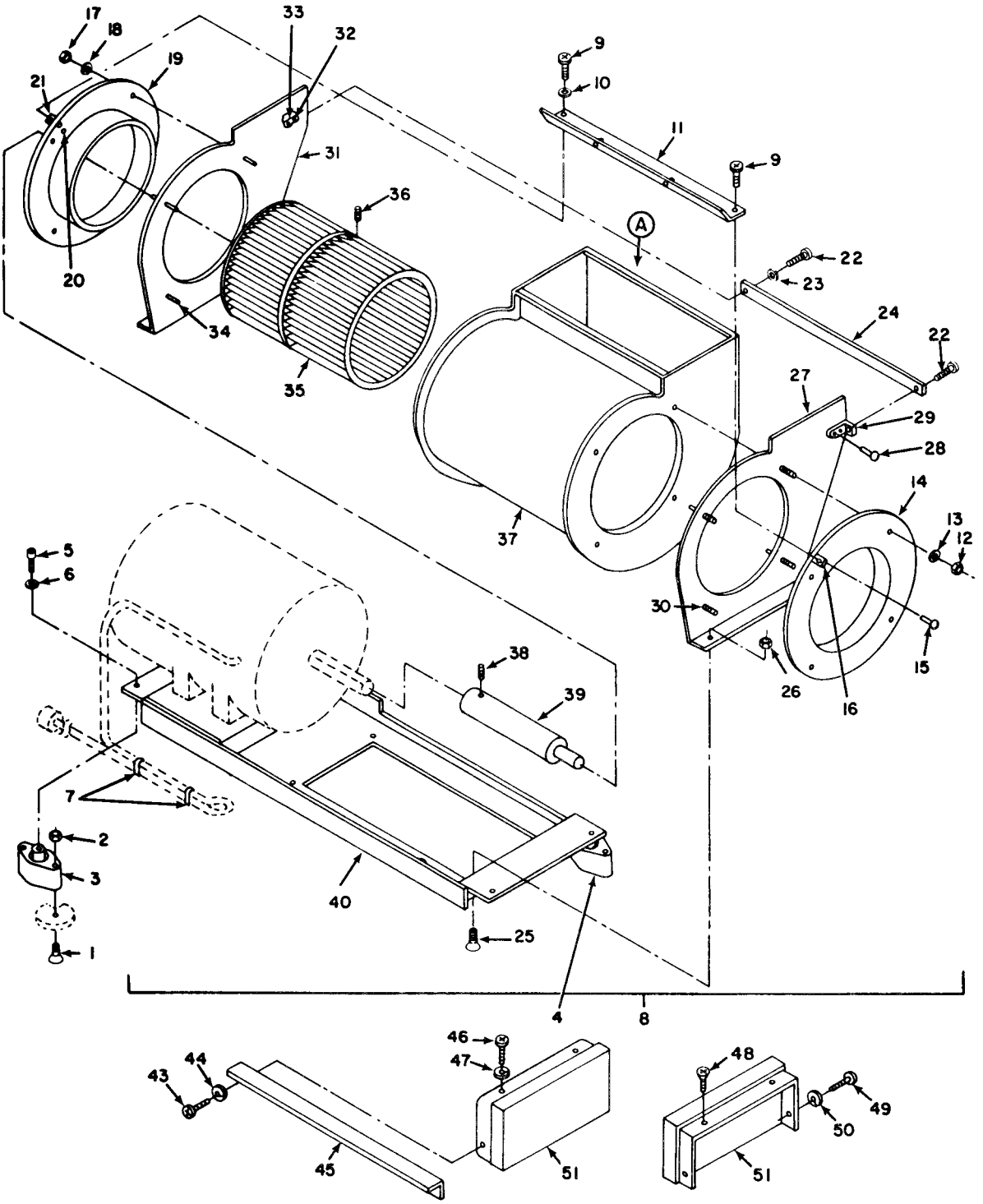
FRONT OF HOUSING

Removal

1. Evaporator Fan Assembly
   a. Unplug the electrical comector from the motor.
   b. Remove the bracket (45) by removing two screws (43) and two lockwashers (44).
   c. Loosen clamps holding temperature selector switch sensing bulb, move bulb to clear housing.
   d. Remove four screws (5) and four lockwashers (6) securing the fan and motor base to the resilient mounts (3 and 4).
   e. Lift out fan and motor assembly.

4-30. EVAPORATOR FAN AND HOUSING-Continued.

LOCATION/ITEM	ACTION	REMARKS
Disassembly 2. Fan & Housing	a. Remove two screws (9) and flat washer (10) on strap (11). Remove strap (11). b. Loosen the setscrew (38) on motor shaft extension (39). c. Remove four nuts (12) and four flat washers (13) securing inlet ring (14) to flange (27). d. Remove inlet ring (14). e. Withdraw impeller (35) and shaft extension (39) through opening of flange (27). f. Loosen setscrew (36) of impeller (35) that secures impeller to shaft extension (39). g. Remove shaft extension (39) from impeller (35) h. Remove four screws (25) and four nuts (26) securing flanges (27 and 31) to base (40). i. Remove two screws (22) and flat washer (23) on strap (24). Remove strap (24). j. Remove flange (27). k. Remove housing (37). l. Remove flange (31) with inlet ring (19). m. Remove four nuts (17) and four flat washers (18) securing inlet ring (19) to flange (31), and remove inlet ring (19).	



NOTE: ITEMS 41 AND 42 NOT USED

DETAIL A

4-30. EVAPORATOR FAN AND HOUSING-Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspection	a. Inspect shaft extension (39), fan inlet rings (14 and 19), impeller (35), flanges (27 and 31), straps (11 and 24) and housing (37) for visible out-of-round conditions, dents, burrs and nicks. b. Replace defective items. c. Check impeller (35) for damaged or bent vanes. Straighten or replace impeller (35).	
Cleaning 3. Evaporator Fan Assembly	**WARNING** Acetone and Methyl-Ethyl Ketone are flammable and either vapors are explosive. Prolonged or repeated inhalation of fumes or contact with the skin can be toxic. Use in a well ventilated area, wear gloves and keep away from sparks or flame. Clean off old sealant from inlet rings (14 and 19), flanges (27 and 31) and sides of housing (37) using methyl-ethyl ketone (Item 23, App. D) and clean rag.	
Assembly	a. Install inlet rings (14 and 19) to flanges (27 and 31) respectively using eight nuts (12 and 17) and eight flat washers (13 and 18).	

4-30. EVAPORATOR FAN AND HOUSING - Continued.

LOCATION/ITEM	ACTION	REMARKS
Assembly-Continued	**WARNING** Industrial sealant (Item 28, App. D) is extremely flammable. The vapors given off from this product can easily be ignited. Contains methyl-ethyl ketone (MEK), methyl isobutyl ketone (MIBK) and asbestos (bound). Keep product and its vapors away from heat, sparks and open flames. Use only in a well ventilated area with enough air movement to remove vapor and prevent vapor build up. Avoid prolonged breathing of vapor. Avoid eye contact. Avoid prolonged or repeated skin contact. b. Seal the outer edge of the inlet rings (14 and 19) to flanges (27 and 31) using industrial sealant (Item 28, App. D) and acid swab brush (Item 29, App. D). c. Install inlet ring (19) and flange (31) to base using two screws and two nuts. d. Insert motor shaft extension (39) into impeller (35). e. Tighten impeller setscrew (36) on motor shaft extension (39). f. Install motor shaft extension (39) and impeller (35) onto motor shaft. g. Install housing (37) to connect with flange (31) and inlet ring (19). h. Install inlet ring (14) and flange (27) onto housing (37) and base (40) using two screws (25) and two nuts (26).	

4-30. EVAPORATOR FAN AND HOUSING-Continued.

LOCATION/ITEM	ACTION	REMARKS
Assembly-Continued	i. Install strap (11) to inlet rings (14 and 19) with two screws (9) and flat washer (10). Position strap (11) parallel to base (40) before final tightening of two screws (9) and flat washer (10). j. Install strap (24) to flanges (27 and 31) using two screws (22) and flat washer (23). k. Adjust impeller (35) inside housing with equal space from each inlet ring (14 and 19). l. Tighten setscrew (38) in motor shaft extension (39). **WARNING** Industrial sealant (Item 28, App, D) is extremely flammable. Keep away from sparks, heat, and open flames. Use on well ventilated area. Avoid prolonged breathing of vapor, prolonged skin contact and eye contact. m. Seal outer edge of flanges (27 and 31) to sides of housing (37) using industrial sealant (Item 28, App. D) and acid swab brush (Item 29, App. D).	

4-30. EVAPORATOR FAN AND HOUSING -Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation	a. Place the fan and motor assembly on resilient mounts (3 and 4) and install four screws (5) and four lockwashers (6).	
	b. Install bracket (45) using two screws (43) and two lockwashers (44).	
	c. Place the temperature selector switch sensing bulb in clamps and tighten screws.	
	d. Install evaporator drain tubing.	See paragraph 4-23.
	e. Plug in the motor electrical connector.	
	f. Install the evaporator inlet louver.	See paragraph 4-18.

4-31. EVAPORATOR MOTOR-INSPECT/TEST/REPLACE.

This task covers:

a. Inspect
b. Test
c. Removal
d. Installation

INITIAL SETUP

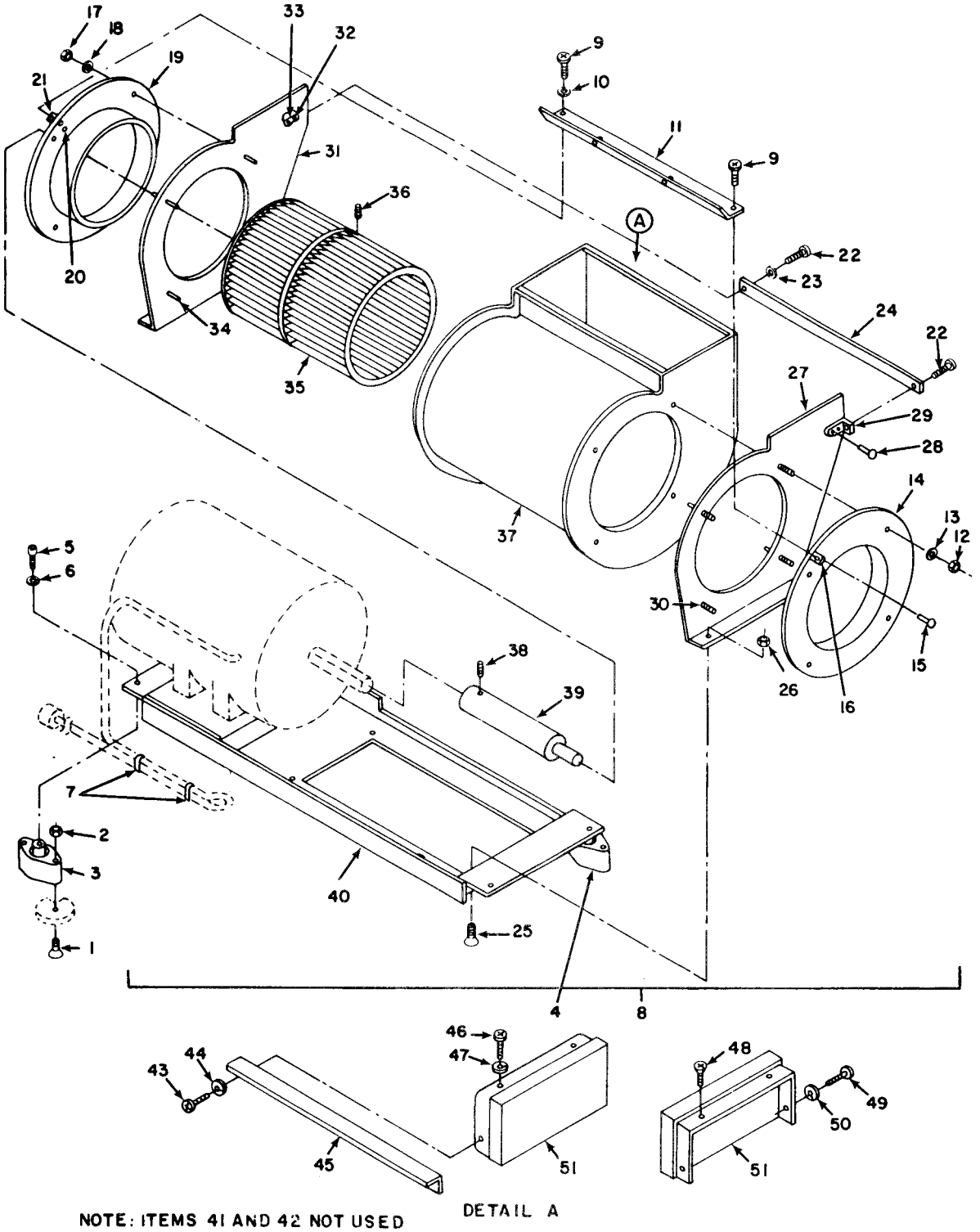
Equipment Condition

Para	Condition Description
4-18	Inlet Louver removed.
4-23	Evaporator Drain Tubing removed.
4-30	Evaporator Fan and Housing removed.

Test Equipment
Ohmmeter

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power source before doing maintenance work on the electrical system.	
Inspect	Inspect plug for bent pin, loose wires, etc.	
Testing	a. Turn the motor shaft by hand and listen for clicking sounds that indicate bad bearings. b. If the shaft cannot be rotated, the bearings may have seized. c. Test the thrust bearings by attempting to push and pull the motor shaft axially. d. If end play is excessive (i.e. can be felt manually in push-pull), the thrust bearings or shims are worn beyond limits and should be replaced. e. If fails test, notify direct support maintenance personnel.	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NOTE: ITEMS 41 AND 42 NOT USED
DETAIL A

4-31. EVAPORATOR MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
	f. Use an ohmmeter to check resistance between pins of the electrical connector (P3).	See Figures E-1 and E-2, Wiring Diagrams.
	g. The motor is capable of operating at two speeds; therefore, there are two sets of field coils.	
	h. Check the resistance between connector pins A and B and E and D (33 to 40 ohms). Resistance reading indicates that no open circuits exist.	
	i. Then check from pin G to pins A,B,E and D. No continuity should exist, which indicates that there is no internal short circuit. Replace the motor if either short or open circuits exist.	
Removal	a. Remove four cap screws and four lockwashers from underside of base (40).	
	b. Loosen the setscrew (38) on shaft extension (39) and remove motor.	
Installation	a. Set the motor on base (40) with the motor shaft in the shaft extension (39).	
	b. Install four cap screws (41) and four lockwashers (42) through the underside of the base to secure the motor.	
	c. Tighten setscrew (38) of shaft extension.	
	d. Place the fan and motor assembly on resilient mounts (3 and 4) and install four screws (5) and four lock washers (6).	

4-31. EVAPORATOR MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation-Continued		
	e. Install bracket (45) above fan. Place the temperature selector switch bulb in clamps and secure clamps with screws and lockwashers.	
	f. Install evaporator drain tubing.	See paragraph 4-23.
	g. Connect the motor electrical comector.	
	h. Install the evaporator inlet louver,	See paragraph 4-18.

4-32. HEATER THERMOSTAT - INSPECT/TEST/REPAIR.

This task covers:

a. Inspect
b. Removal
c. Test
d. Install

INITIAL SETUP

Equipment Condition

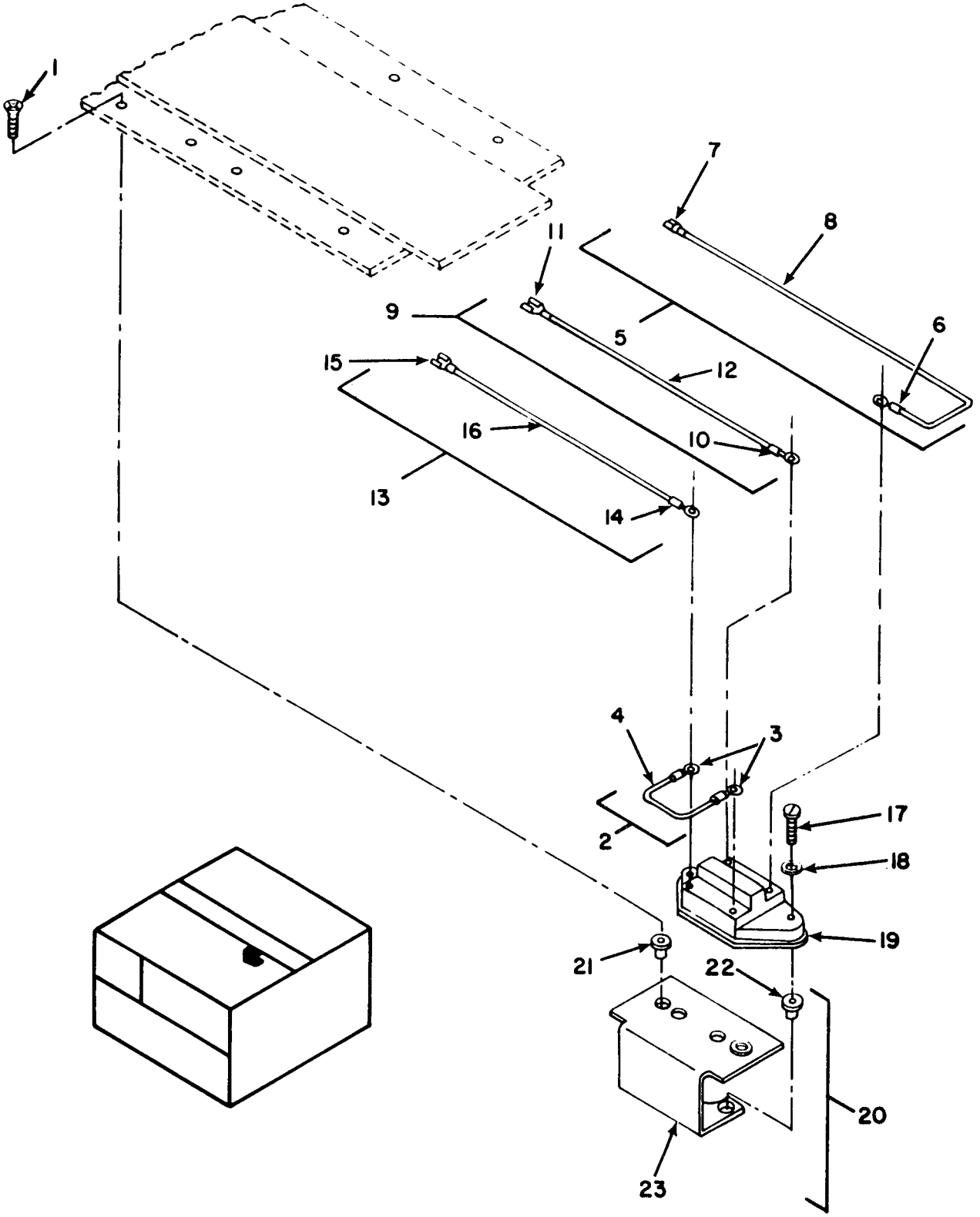
Para	Condition Description
4-17	Top covers removed.

Test Equipment
Multimeter
Thermometer (32°F to 212°F)-(0°C to 100°C)

Materials/Parts
heat gun

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power supply before doing maintenance work on the electrical system.	
Inspect	Inspect for wiring damage.	
Removal	a. Take out two screws (17) and two lockwashers (18) and remove thermostat from bracket (23). b. Tag leads and remove screws to disconnect.	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4-32. HEATER THERMOSTAT-Continued.

LOCATION/ITEM	ACTION	REMARKS
Test	a. Test for continuity between contacts 1 and 2 and between contacts 3 and 4. Contacts should open on temperature rise at 145-155 degrees F (63-68 degrees C) and should close on temperature drop at 100-120 degrees F (38-49 degrees C). Use heat gun as heat source for testing.	See Wiring Diagrams, Figures E-1 and E-2. Use thermometer to determine temperature of sensor surface.
	b. Replace if defective.	
Installation	a. Connect leads to thermostat (19) with four screws and remove tags.	See Wiring Diagrams, Figures E-1 and E-2
	b. Attach the thermostat (19) to bracket (23) with two screws (17) and two lockwashers (18).	
	c. Secure the bracket (23) to the center cover with two screws (l).	
	d. Install top covers.	See paragraph 4-17.

4-33. HEATER ELEMENTS-INSPECT/TEST/REPLACE.

This task covers:

a. Inspect
b. Test
c. Removal
d. Installation

INITIAL SETUP

Equipment Condit ion

Para	Condition Description
4-17	Top covers removed.
4-25	Junction box pulled half way out of unit.

Test Equipment
Multimeter

Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Toluolene (Item 27, App. D)
Adhesive (Item 18, App. D)
Insulation (Item 25, App. D)
Swab Brush (Item 29, App. D)
Lint-Free Cloth (Item 9 App. D)

LOCATION/ITEM	ACTION	REMARKS

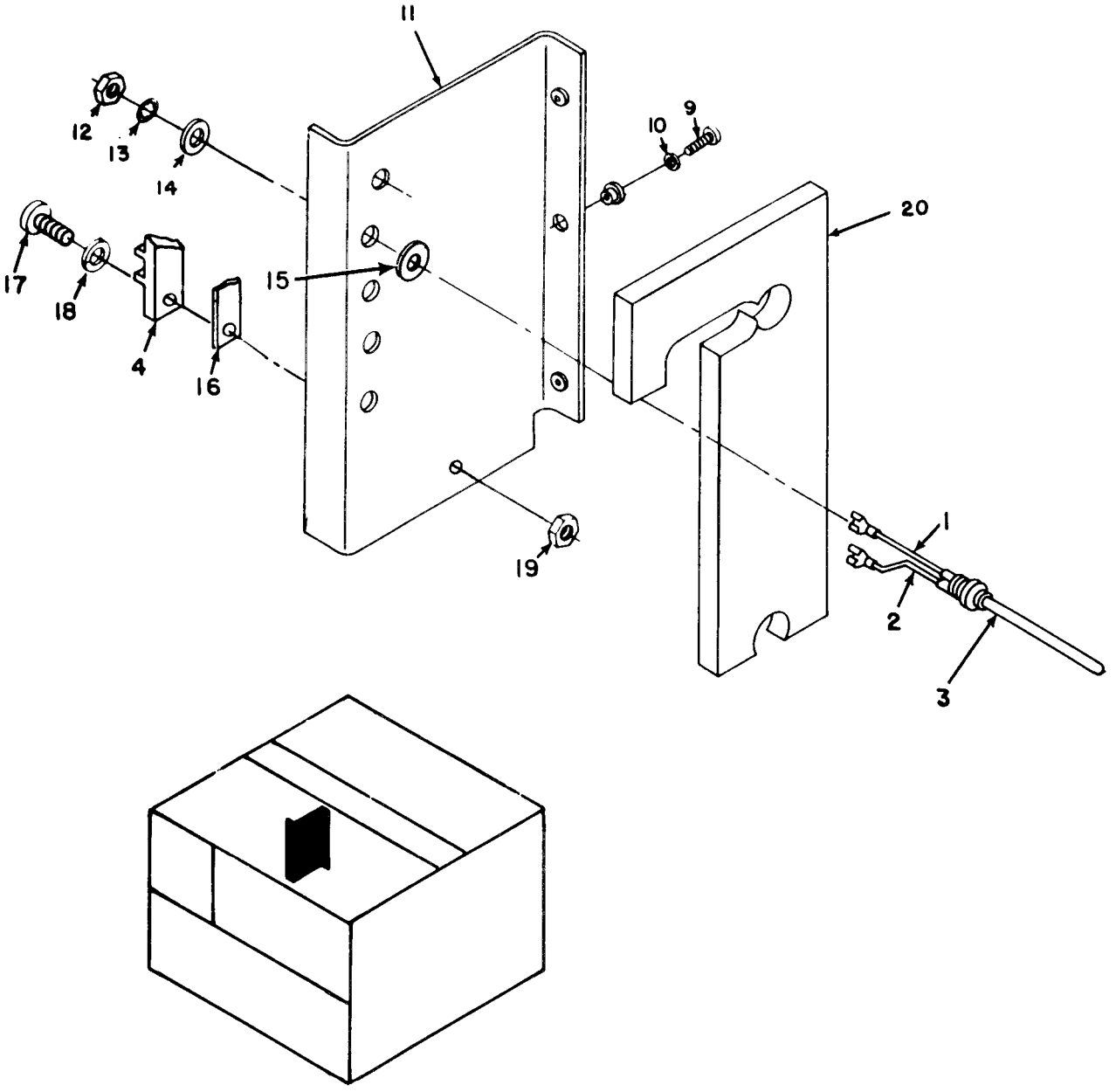
WARNING

Allow heating elements to cool for 15 minutes before touching.

Disconnect air conditioner power supply before doing maintenance work on the electrical system.

4-33. HEATER ELEMENTS-Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspection		
1. Heater Elements and Electrical Wiring	a. Inspect for damage to elements or leads. b. Replace damaged leads and bad elements.	
2. Heater Mounting Bracket	a. Inspect for warping or cracking. b. Replace as necessary.	
3. Heater Mounting Bracket Insulation	a. Inspect for damaged or missing insulation (20). b. Replace as necessary.	
4. Terminal Board (TB2)	a. Inspect TB2 (4) for corrosion or damage. b. Replace as necessary.	
Test	Test elements (3) for resistance (40 to 50 ohms).	
Removal	a. Tag and disconnect leads from terminal board TB2 (4). b. Remove three screws (9) and three lockwashers (10) securing heater mounting bracket (11) to housing. c. For each heater element, Remove nut (12), lockwasher (13), and flatwasher (14) securing heater element (3) to heater mounting bracket (11).	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4-33. HEATER ELEMENTS-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal - (continued)	d. Slide each heating element (3) from heater mounting bracket (11) and remove insulator (15). e. Remove heater mounting bracket (11) with terminal board (TB2) (4) and marker strip (16) from unit. f. Remove two screws (17), two lockwashers (18) and two nuts (19) securing TB2 to bracket (11). g. Remove TB2 from bracket (11). **h. Remove insulation (20) from bracket (11) using a scraper.** **WARNING** Toluolene is flammable and its vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapor can be toxic. Use in well ventilated area and keep away from sparks or flame. Use goggles, gloves, and apron when appropriate.	Do not remove tags from heater element wire.
Installation	a. Clean area with toluolene (Item 27, App. D) and lint free cloth (Item 9, App. D). b. Measure and cut piece of unicellular plastic foam insulation (Item 25, App. D) c. Apply adhesive (Item 18, App D) to foam insulation and heater mounting bracket using acid swab brush (item 29, App. D) and allow to become tacky. d. Press foam insulation firmly into place. e. Replace TB2 (4) if terminals are missing or unserviceable. f. Replace marker strip (16) if cannot be easily read, if cracked, or missing.	

4-33. HEATER ELEMENTS-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation-Continued	g. Insert heater elements (3) and insulator (15) into heater mounting bracket (11).	
	h. Secure each heater element (3) to heater mounting bracket (11) using flat washer (14), lockwasher (13) and nut (12).	
	i. Install heater mounting bracket (11) in unit using three screws (9) and three lockwashers (10).	
	j. Connect leads to terminal board TB2 (4) and remove tags.	
	k. Install junction box.	See paragraph 4-25.
	1. Install top covers.	See paragraph 4-17.

4-34. CONDENSER FAN AND HOUSING AND MOTOR-INSPECT/TEST/REPLACE.

This task covers:

a. Removal
b. Inspection
c. Disassembly
d. Assembly
e. Test
f. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Top Covers removed.
4-21	Condenser Louver removed.

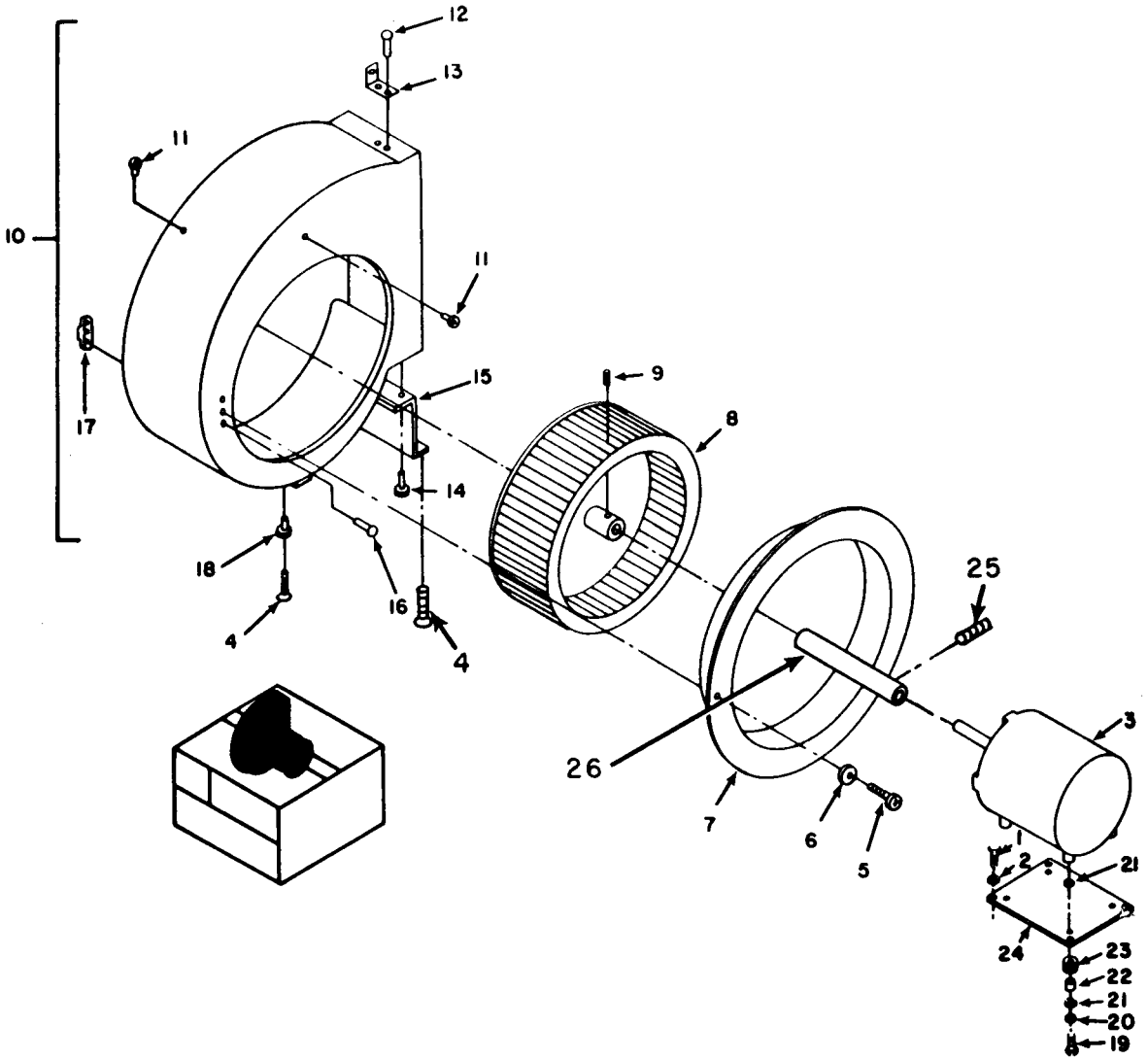
Special Tools

Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power supply before doing maintenance work on the electrical system.	
TOP OF HOUSING		
Removal	a. Tag, disconnect and put aside the plugs as necessary. b. Remove four screws (1) and four flat washers (2) securing motor mounting plate (24) to housing. c. Remove wire ties as required. d. Loosen two setscrews (25) and slide shaft extension (26) from motor shaft. e. Loosen five screws (4) to loosen fan scroll housing (10). f. Remove screws, flatwashers, and lockwashers from clamps securing service valves to scroll housing (10).	

4-34. CONDENSER FAN AND HOUSING AND MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
	g. Remove screw, flatwasher and lockwasher from clamp securing high pressure relief valve to scroll housing.	



4-34. CONDENSER FAN AND HOUSING AND MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
	CAUTION Take care to avoid damaging condenser coil while removing motor and mounting plate from unit.	
	h. Lift out motor (3) and mounting plate (24), and set aside.	
	CAUTION Handle tubing at service valves and pressure relief valve with special care to avoid kinking or creating leaks at brazed joints.	
	i. Bend tubing back at service valves and at pressure relief valve with extreme care to permit scroll to be rotated. j. Rotate scroll so that lower opening is at top. k. Ease base flange of scroll up until it extends slightly above cabinet housing. l. Rotate scroll gently toward condenser louver opening and lift carefully from housing.	
Inspection	a. Visually inspect impeller (8), inlet ring (7), shaft extension (26) and out of round conditions. b. Straighten bent vanes on impeller (8). c. Replace unserviceable impeller (8). d. Straighten bent inlet ring (7) and scroll (10). Replace if unserviceable. e. Replace damaged shaft extension (26).	

4-34. CONDENSER FAN AND HOUSING AND MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
disassembly	a. Remove three screws (5) and three flat washers (6) from inlet ring (7) and remove inlet ring from scroll. b. Remove impeller gently from scroll. (Do not force.)	
Assembly	a. Install impeller (8) in scroll (10). b. Secure inlet ring (7) with three screws (5) and three flat washers (6).	
Test	a. Inspect exterior case of motor for cracks, dents, oil, evidence of overheating any other abnormalities.	Replace defective motor.
	b. Turn motor shaft by hand and listen for clicking sounds that indicate bad bearings. Report condition to direct support maintenance personnel.	
	c. If the shaft cannot be rotated, the bearings may have seized.	
	d. Test the thrust bearings by attempting to push and pull the motor shaft axially. Report condition to direct support maintenance personnel.	
	e. If end play is excessive (i.e. can be felt on manual push-pull), the thrust bearings and shims are worn beyond limits and should be replaced.	See paragraph 5-8.
	f. Use an ohmmeter or continuity tester to check continuity between pins of the electrical connector (P5).	See Wiring Diagrams. (Figures E-1 and E-2)
	g. Check resistance (8 to 12 ohms) between connector pins A and B and (0.6 to 1.0 ohms) between E and D. This means that open circuits do not exist.	Replace motor if either open or short circuits exist.

4-34. CONDENSER FAN AND HOUSING AND MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
Test - Continued	h. Then check from pin G to pins A,B,E, and D. No continuity should exist, which indicates that there is not an internal short circuit.	
Installation	a. Put scroll (10) back in position in unit. b. Hand tighten five screws (4) securing scroll (10) to housing. **CAUTION** Handle tubing at service valves and pressure relief valve with special care to avoid kinking or creating leaks at brazed joints. c. Bend service valve and pressure relief valve tubing into position. d. Secure clamps to scroll (10) using screws, flatwashers, and lockwashers. e. Secure screws (4) attaching scroll (10) to housing. f. Slide shaft extension (19) over motor shaft as far as possible and partially tighten two setscrews (8). **CAUTION** Take care to avoid damaging condenser coil while installing motor and mounting plate in unit. g. Secure motor assembly to to housing using four screws (1) and four flat washers (2). h. Loosen setscrew (9) and slide shaft extension (19) into impeller (8). i. Tighten setscrew (9).	

4-34. CONDENSER FAN AND HOUSING AND MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation-Continued	j. Center impeller (8) in scroll (10) while looking through louver opening.	
	k. Tighten two setscrews (25) on shaft extension (26).	
	l. Connect plugs, remove tags, and retie wires.	
	m. Install condenser louver.	See paragraph 4-21.
	n. Install top covers.	See paragraph 4-17.

4-35. CONDENSER MOTOR ASSEMBLY-REPAIR.

This task covers:

a. Removal
b. Reassembly
c. Installation

INITIAL SETUP

Equipment Condition

Para	Condition) Description
4-17	Top Covers removed.

Test Equipment
Ohmmeter
Continuity Tester

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS

WARNING

Disconnect air conditioner power supply before doing maintenance work on the electrical system.

TOP OF HOUSING

Removal

a. Tag, unhook and put aside plugs, as necessary.
b. Remove four screws (1) and flat washers (2) securing motor mounting plate (24) to housing.
c. Loosen two setscrews (25) and slide shaft extension (26) from motor shaft and impeller.

CAUTION

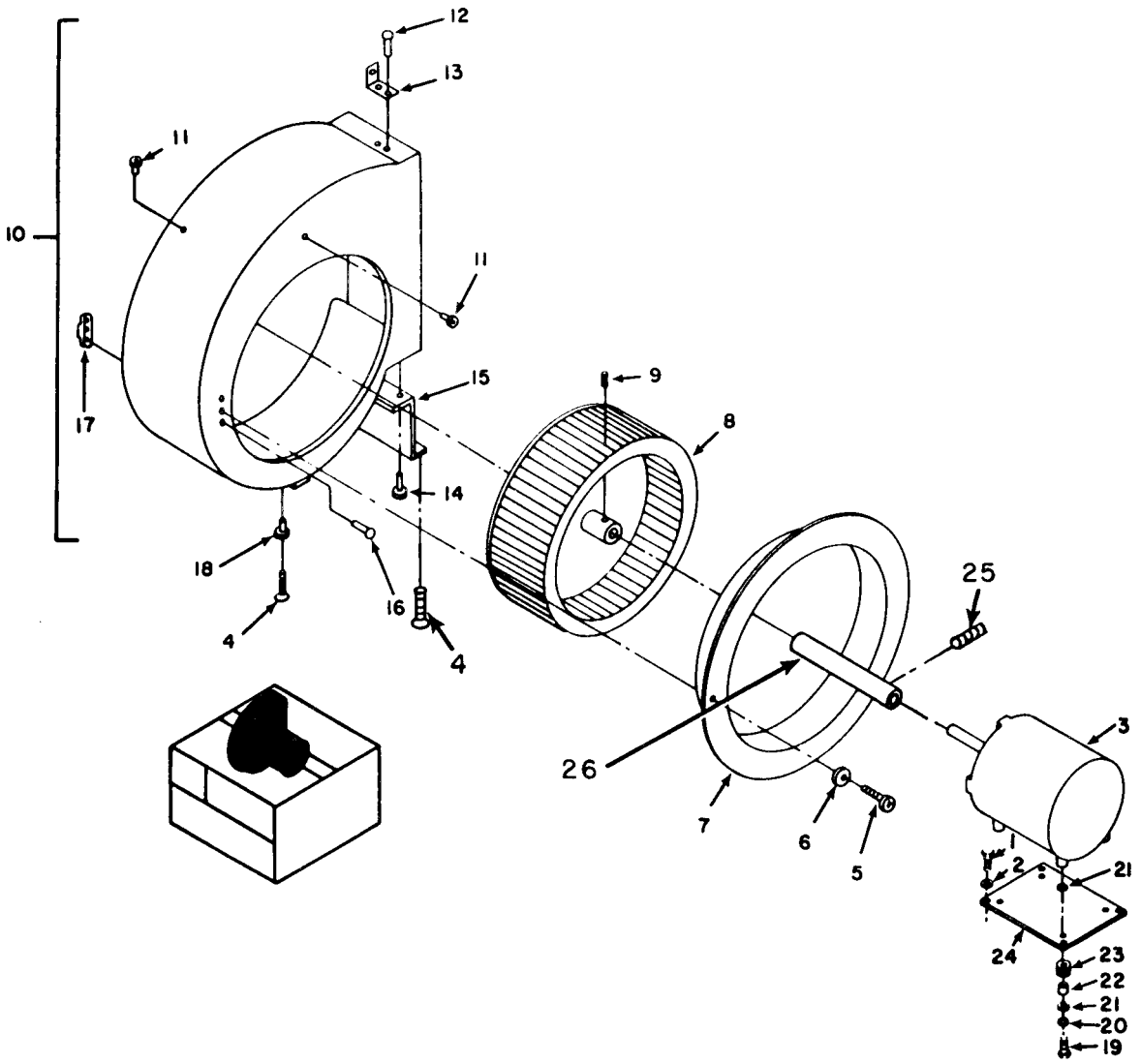
Take care to avoid damaging condenser coil and refrigerant tubing while removing motor and mounting plate from unit.

4-35. CONDENSER MOTOR ASSEMBLY-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal-Continued	d. Lift out motor (3) and mounting plate (24). e. Separate motor from mounting plate by removing four screws (19), four lockwashers (20), eight flat washers (21), and four bushings (22) securing motor to plate.	

4-35. CONDENSER MOTOR ASSEMBLY - Continued.

LOCATION/ITEM	ACTION	REMARKS
Reassembly	a. Install bushing (29) into mounting plate (24). b. Secure motor to mounting plate (24) with screws, (19) flarwashers (20) and lockwashers (21).	
Installation	a. Install shaft extension (26) on motor shaft and tighten two setscrews (25). b. Install motor mounting plate assembly in air conditioner. c. Insert shaft extension (26) into impeller (8). Tighten setscrew (9). d. Secure motor mounting plate (24) with four screws (1) and four flat washers (2). e. Loosen two setscrews, adjust position of shaft extension on motor shaft, and tighten set-screws. f. Using tags as a guide; hook up electrical connectors and remove tags. g. Install top covers	See paragraph 4-17.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4-36. EVAPORATOR COIL ASSEMBLY-SERVICE.

This task covers:

a. Inspection b. Cleaning

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Front Top Cover removed.
4-20	Mist Eliminator removed.

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Inspection	a. Check to be sure power is disconnected. b. Check for accumulated dirt. Clean if an accumulation of dirt is evident. c. Check fins for dents, bent edges, or any condition that would block or distort air flow. Straighten all damaged fins with a plastic fin comb.	
	WARNING Compressed air used for cleaning purposes will not exceed 30 psi (2.1 kg/cm^2).	
	CAUTION Do not use steam to clean coil.	
Cleaning	Clean coil with a soft bristle brush, vacuum cleaner and brush attachment, or use compressed air at 30 psi or less from the inside of the unit to blow the dirt out. Take care to avoid fin damage. When using compressed air, wear safety glasses or goggles. Dirt can be blown into your eyes.	

4-37. SOLENOID VALVES-TEST/REPAIR.

This task covers:

a. Test b. Repair

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Rear and Center Top Covers removed.

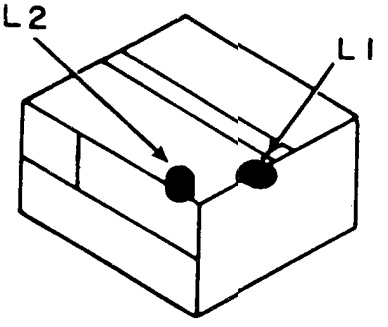
Test Equipment
Multimeter
24V Power Supply

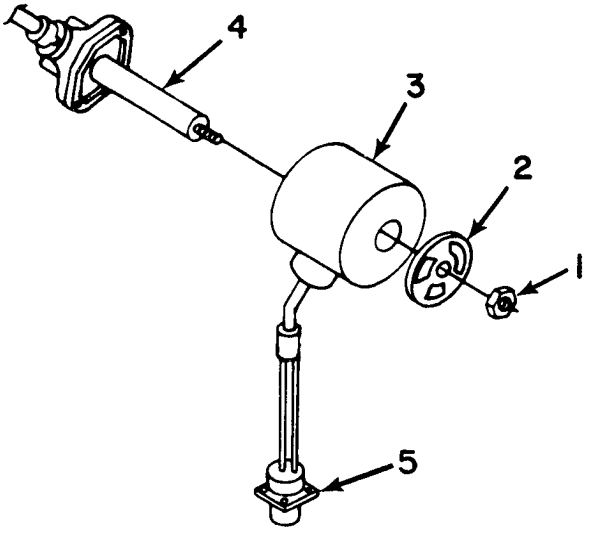
Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Test	a. Check to be sure power has been disconnected. NOTE The following instructions apply to both the equalizing solenoid L2 and the liquid line solenoid L1. b. Disconnect wiring harness connector from comector on solenoid valve. c. Use a multimeter set on lowest OHMS scale to check for continuity between contacts A and B in solenoid valve connector. If continuity is not found, coil is open and must be replaced. d. Use multimeter to check for continuity between each contact in solenoid valve connector and coil casing. If continuity is found between either contact and case, the coil is grounded and should be replaced.	

4-37. SOLENOID VALVES-TEST/REPAIR.

LOCATION/ITEM	ACTION	REMARKS





Test-Continued

e. If continuity checks are satisfactory, apply 24 volts dc from an external power supply across contacts A and B in solenoid valve connector, and listen for a sharp click when the valve changes position. If a click is not heard, internal valve problems are indicated and entire valve should be replaced. Notify your supervisor.

Repair

WARNING

Do not attempt any disassembly of solenoid valve other than coil removal with a refrigerant charge in the system. Refrigerant will be sprayed out dangerously if screws that attach tube and plunger assembly to valve body are loosened.

a. Remove nut (1) that attaches coil (3) to valve body (4), and remove coil and connector assembly.
b. Unsolder coil leads from pins in the connector, and remove connector (5).

4-38. CONDENSER COIL ASSEMBLY - INSPECT/SERVICE.

This task covers:

a. Inspection b. Cleaning

INITIAL SETUP

Equipment Condition

Para	Condition Description
5-4	Condenser Guard removed.

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Inspection	a. Check to be sure power is disconnected. b. Check for accumulated dirt. Clean if an accumulation of dirt is evident. c. Check fins for dents, bent edges, or any condition that would block or distort air flow. Straighten all damaged fins with a plastic fin comb.	
	WARNING Compressed air used for cleaning purposes will not exceed 30 psi (2.1 kg/cm^2).	
	CAUTION Do not use steam to clean coil.	
Cleaning	Clean coil with a soft bristle brush, vacuum cleaner and brush attachment, or use compressed air at 30 psi or less from the inside of the unit to blow the dirt out. Take care to avoid fin damage. When using compressed air, wear safety glasses or goggles. Dirt can be blown into your eyes.	

4-39. HOUSING-INSPECT/SERVICE.

This task covers:

a. Inspection b. Service

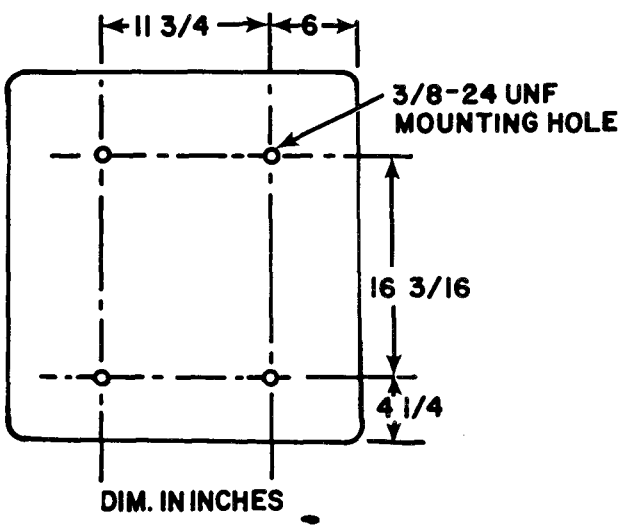
Should touch-up or refinishing be necessary, see TM 43-0139, Painting Instructions for Field Use.

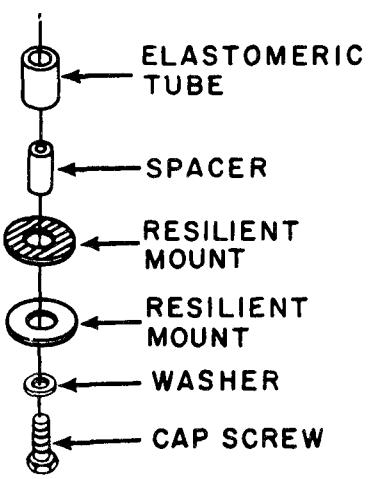
4-40. INSTALLATION HARDWARE-INSPECT/REPLACE.

This task covers:

a. Removal
b. Inspection
c. Installation

LOCATION/ITEM	ACTION	REMARKS
Removal	a. Remove four screws and flat washers from bottom of air conditioner and enclosure mounting plate. b. Remove four resilient mounts, four elastomeric tubes and four spacers from bottom of enclosure mounting plate. c. Remove air conditioner from atop of four remaining resilient mounts and the enclosure mounting plate. d. Remove the remaining four resilient mounts from atop of enclosure mounting plate.	





4-40. INSTALLATION HARDWARE - Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspection	a. Inspect four screws and flat washers for damage. b. Inspect eight resilient mounts, four elastomeric tubes and four spacers for damaged or worn out conditions. c. Replace damaged hardware.	
Installation	a. Assemble onto each of four screws, a flat washer, a spacer, an elastomeric tube and a resilient mount. b. Install the above screws, flat washers, spacers, elastomeric tubes and resilient mounts through the bottom of enclosure plate and then install one additional resilient mount on each of the four screws, on top of the enclosure mounting plate. c. Aline the air conditioner on top of the resilient mounts and screws, which attach the air conditioner to the enclosure mounting plate. d. Tighten the screws into the bottom of air conditioner.	

Section VI PREPARATION FOR STORAGE OR SHIPMENT

4-41. STORAGE AND SHIPMENT.

This task covers:

a. Storage
b. Shipment

INITIAL SETUP

Materials/Parts
Safety glasses
Gloves
Sack, PPP-S-30, Type II (cushioned)
Cushioning material, PPP-C-843
Wood Box, PPP-B-601, Domestic Type
Strapping, QQ-S-781, Class I, Type I or IV, Finish A
Tape, PPP-T-97, Type III 1/2 inch wide, pressure sensitive
Fiberboard corner pads, MIL-STD-1186
Polyethylene film, minimum 3 mil thickness
4 bolts, 3/8-24 and washers

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Storage		
1. Short Term		
	a. Disconnect power supply and remove from shelter.	
	b. Make sure unit is clean and dry.	
	c. Close all louvers and grilles.	
	d. Unroll canvas cover and snap into place.	
	e. Store in the operating (upright) position.	
2. Long Term	a. Disconnect power supply and remove from shelter.	
	b. Make sure unit is clean and dry.	
	c. Close all louvers and grilles.	
	d. Unroll canvas cover and snap into place.	
	e. Package all hardware, cable connectors, technical manuals, etc. in a cushioned protective sack. Staple shut and secure to unit.	

4-41 STORAGE AND SHIPMENT - Continued.

LOCATION/ITEM	ACTION	REMARKS

NOTE

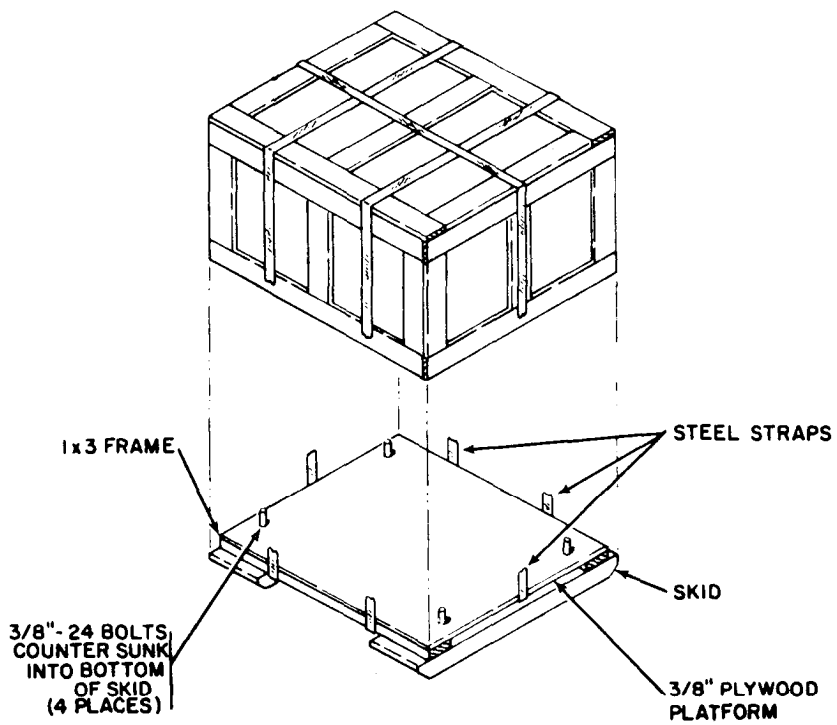
Wrap cable connectors in cushioning material before packaging.

f. Seal all openings with polyethylene film and 1/2 inch pressure sensitive tape.

g. Cover the entire unit with a polyethylene film shroud and secure with 1/2 inch pressure sensitive tape.

h. Store air conditioner in a dry, dust-free space and in the operating (upright) position.

i. Storage of the air conditioner will be in accordance with TM 740-90-1, Administrative Storage of Equipment.



4-41. STORAGE AND SHIPMENT-Continued.

LOCATION/ITEM	ACTION	REMARKS
Shipment - Continued Preparation	Prepare unit as prescribed for long term storage.	
2. Shipping Container	a. Fabricate a wood shipping container conforming to PPP-B-601, Domestic Type. A minimum of 1 inch clearance will exist between the air conditioner and walls of the box. The box will be modified with skids located so that the bolts securing the air conditioner pass through the skids. Bolt heads will be countersunk into the bottom of the skids. The bolts with washers, should protrude at least 3/8 inch above the skid and not more than 1/2 inch. b. The air conditioner will be packed in the shipping container and secured to the skids with four bolts (3/8-24) and washers. c. Wood spacers will be padded with water resistant cushioning material to prevent abrasion. Corner pads constructed of fiberboard will be used on all top and bottom edges of the air conditioner. d. The shipping container will be closed and secured with nails and steel strapping material. e. The air conditioner will be stored and shipped in the operating (upright) position. The words “THIS END UP” with arrows will be placed on each side of the shipping container. The letters will be black, at least 3 inches high, and located within the upper third of each side.	

CHAPTER 5

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I DIRECT SUPPORT TROUBLESHOOTING

5-1. GENERAL.

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

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

5-2. DIRECT SUPPORT TROUBLE SHOOTING.

Table 5-l. Direct support troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. COMPRESSOR WILL NOT START.
Step 1. Make continuity check of control circuit, See Figures E-1 and E-2 for control circuit schematic and wiring diagrams. Repair loose or broken connections, replace bad components. (Refer to paragraph 4-24, 4-25 and 4-26.)
Step 2. Make continuity check of circuit breaker. Replace bad circuit breaker. (Refer to paragraph 4-24.)
Step 3. Check continuity or compressor motor leads, and leads to casing using ohmmeter. Replace bad compressor. (Refer to paragraph 5-28.)
Step 4. Check continuity of high and low pressure switches at a room temperature. Continuity should exist. If continuity does not exist, press reset button and recheck. Replace faulty high or low pressure switch. (Refer to Paragraph 5-23.)
Step 5. Check polarity of power input plug (P1) using voltmeter. With positive (+) lead in pin A and negative (-) lead in pin B, voltage should be 208 VAC. With positive (+) lead pin A and negative (-) lead in pin D, voltage should be 208 VAC. With positive (+) lead in pin B and negative (-) lead in pin D, voltage should be zero volts. Replace power input plug (P1) which does not pass above test,

Table 5-l. Direct support troubleshooting-Continued.

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
2. COMPRESSOR STARTS, BUT STOPS AT ONCE - "SHORT CYCLES"	
Step 1. Inspect evaporator coil for dirt or icing, and check for obstructions at outlet louver.	Clean dirty evaporator coil; defrost in heat mode, or remove obstructions from outlet louver.
Step 2. Check for proper operation of condenser fan and motor.	a. Repair faulty condenser fan/motor. b. Replace bad motor. (Refer to paragraphs 4-34 and 4-35.)
	CAUTION Do not exceed 12 second operating time for compressor, or vacuum may be formed in suction side of refrigeration system and damage it.
Step 3. Turn off power; short-circuit ("jumper") the high pressure switch. Turn on power. For maximum of 12 seconds cycle compressor to see whether compressor operates normally.	Replace faulty high pressure switch. (Refer to paragraph 5-23.)
Step 4. Check dehydrator to see that it is not sweating, frosting or cold to the touch.	If so, replace obstructed dehydrator. (Refer to paragraph 5-17.)
Step 5. Check refrigerant system for leaks, using a halogen or electronic leak detector. Refrigerant charge may be low, as indicated by bubbles in liquid sight indicator, or non-condensable gas may have entered system.	If refrigerant charge is low, but no leaks are found, discharge and purge system, repair or replace leaking component, and recharge. (Refer to paragraphs 5-9 through 5-16.)

Table 5-1. Direct support troubleshooting-Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
2. COMPRESSOR STARTS, BUT STOPS AT ONCE - "SHORT CYCLES" - Continued
Step 6. Install pressure gages in system (paragraph 5-16) and check system pressures to see whether an overcharge of refrigerant is indicated. If overcharge is indicated, partially discharge the system and retest.
3. INSUFFICIENT COOLING
Step 1. Feel dehydrator to see whether it is cold to the touch, or is frosted or sweating. If so, replace dehydrator. (Refer to paragraph 5-17.)
Step 2. Check input and discharge sides of solenoid valves for temperature difference, Abnormally cold discharge indicates leakage or obstruction. Replace faulty solenoid valves. (Refer to paragraph 5-20.)
Step 3. Check evaporator coil for over-all temperature. If part of coil is relatively warm, and evaporator inlet is sweaty or frosty, expansion valve may be obstructed or damaged. (Refer to paragraph 5-18.)
Step 4. Check liquid sight indicator for bubbles or cloudiness, which indicates insufficient refrigerant. Recharge system after checking for and repairing leaks. (Refer to paragraphs 5-15 through 5-16.)
Step 5. Check for low discharge pressure to see whether compressor is pumping. (Refer to table 5-2 for normal pressures.) Replace faulty compressor. (Refer to paragraph 5-28.)

Table 5-l. Direct support troubleshooting-Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
4. COMPRESSOR RUNS BUT DOES NOT COOL
Step 1. Check for excessively high temperature in conditioned area.
a. Close doors, windows or other openings.
b. Insulate areas of high heat gain.
Step 2. Check compressor for noisy operation, high suction pressure or excessively low discharge pressure indicating leaky internal valves. (Refer to paragraph 5-16 and table 5-2.)
Replace compressor (Refer to paragraph 5-28.)
Step 3. Check liquid sight indicator for bubbles indicating low charge of refrigerant.
a. Repair leaks or replace leaking component.
b. Purge and recharge system (Refer to paragraphs 5-11 and 5-15.)
Step 4. Check for high discharge pressure (Refer to table 5-2.)
Purge or bleed off excess refrigerant; check high-pressure switch or pressure regulator valve.
5. COMPRESSOR EXCESSIVELY NOISY
Step 1. Listen for knocking.
Check for high pressure indicating that liquid refrigerant is returning to compressor (Refer to paragraph 5-16 and table 5-2.)
Step 2. Check for high discharge pressure, indicating overcharge of refrigerant (Refer to paragraph 5-16 and table 5-2.)
Purge or bleed off excess refrigerant; check high-pressure switch or pressure regulator valve.

Table 5-l. Direct support troubleshooting-Continued.

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
6. SUCTION PRESSURE TOO LOW OR TOO HIGH	
Step 1. Stop compressor and check expansion valve as follows:	
a. Remove remote bulb from well in suction line.	
b. Place bulb in ice water for 1-2 minutes.	
c. Start compressor.	
CAUTION Do not let liquid flood back into compressor or compressor will be seriously damaged.	
d. Remove bulb from ice water and hold it in one hand to warm it. At the same time, check the suction line for rapid change of temperature, which indicates flood-through of liquid refrigerant. If liquid floods through valve, it is operating satisfactorily. If not, valve or remote bulb is faulty.	
e. Replace faulty expansion valve. (Refer to paragraph 5-19.)	
Step 2. Feel dehydrator for temperature difference. Discharge end will feel cooler than input end if clogged, or discharged end may be frosty or sweaty.	
	Replace dehydrator. (Refer to paragraph 5-17.)
7. LOW HEAT OR NO HEAT	
Step 1. Check heater wiring and control circuit for loose connections or broken wires.	
a. Tighten loose connections.	
b. Replace or repair broken wires (Refer to paragraphs 4-33, 4-24 and 4-26.)	
Step 2. Check continuity of mode selector switch and temperature selector switch. (Refer to paragraph 4-24.)	

Table 5-l. Direct support troubleshooting-Continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
7. LOW HEAT OR NO HEAT - Continued
Step 3. Disconnect and remove heater elements, and apply 115-volt ac power to check for open circuit in element. Element should heat. Replace faulty heating elements (Refer to paragraph 4-33.)
Step 4. Check continuity of high-pressure cutout switch at room temperature. Continuity should exist. a. If continuity does not exist, press reset button and recheck. (Refer to paragraph 5-23.) b. Replace faulty switch.
Step 5. Disconnect heater relay. Apply 24-28 volts dc to actuate relay and check continuity at secondary terminals. Continuity should exist. Replace faulty relay. (Refer to paragraph 4-25.)
Step 6. Check operation of evaporator fan and motor. Repair or replace faulty fan or motor. (Refer to paragraphs 4-30, 4-31 and 5-7.)

SECTION II DIRECT SUPPORT MAINTENANCE PROCEDURES

5-3. COVERS AND PANELS-REPAIR/REPLACE.

This task covers:

a. Repair
b. Installation

INITIAL SETUP

Equipment Condition

Para	condition Description
4-17	Top Covers removed as required

Materials/Parts
- Flexible polyurethane Foam, (Item 20, App. D)
- Warm, soapy water
- Filter-kote or oil (Item 17, App. D)
- Cellular Rubber strips (Item 19, App. D)
- Adhesive (Item 18, App. D) - Toluolene (Item 27, App. D)

Special Tools
- Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS

WARNING

Disconnect air conditioner power input connector before doing maintenance work on electrical system.

Repair

1. Canvas Cover
   a. Repair any rips in canvas or seams.
   b. Replace any damaged grommets or snaps.
   c. Replace cover if heavily damaged.

2. Top Covers
   a. Inspect for bent covers, loose, missing gaskets or foam insulation.
   b. Clean dirty covers with warm, soapy water.
   c. Straighten or replace damaged covers.

5-3. COVERS AND PANELS - Continued.

LOCATION/ITEM	ACTION	REMARKS
	WARNING MMM-A-121 Adhesive is flammable and its vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use in a well ventilated area and keep away from sparks or flame. Use goggles, gloves, and apron when appropriate. d. Secure loose rubber gaskets or insulating foam with adhesive (Item 18, App. D). e. Remove damaged gaskets. **WARNING** Toluolene is flammable and its vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use in a well-ventilated area and keep away from sparks or flame. Use goggles, gloves, and apron when appropriate. . Clean area using toluolene (Item 27, App. D). **WARNING** MMM-A-121 Adhesive is flammable and its vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use in a well-ventilated area and keep away from sparks or flame. Use goggles, gloves, and apron when appropriate. g. Replace damaged gaskets using cellular rubber strips (Item 19, App.D). h. Replace damaged foam insulation with flexible polyurethane foam (Item 20, App. D) and Adhesive (Item 18, App. D).	

5-4. CONDENSER GUARD - REPLACE/REPAIR.

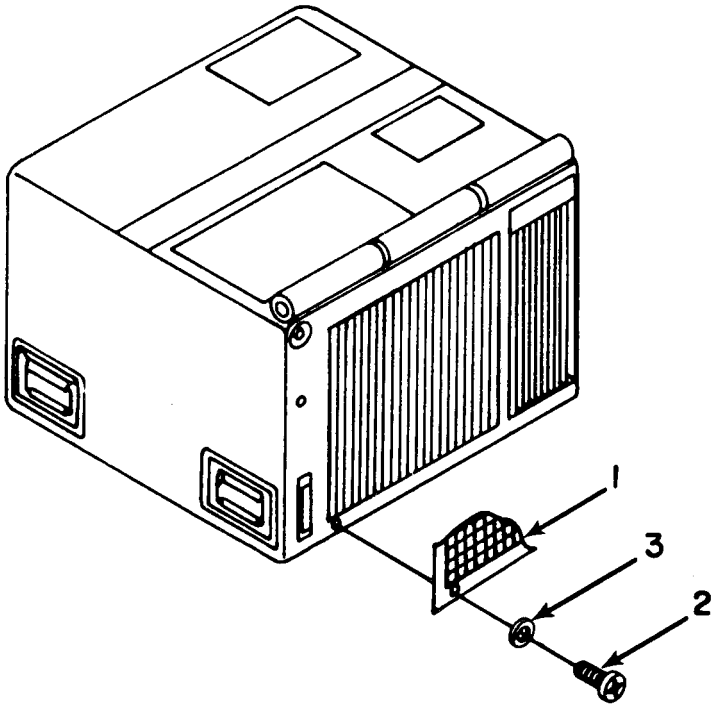
This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
REAR OF HOUSING		
Removal	Remove eight screws (2) and eight lockwashers (3) securing guard (l). Remove guard.	



5-4. CONDENSER GUARD-Continued.

LOCATION/ITEM	ACTION	REMARKS
Repair	a. Inspect for bent guard. b. Straighten bent guard, or replace if damaged beyond repair.	
Installation	a. Install guard (1) with screws (2) and washers (3). b. Tighten all screws (2) securing guard (l).	

5-5. LOUVERS-REPLACE.

This task covers: Repair

INITIAL SETUP
Equipment
Condit ion

Para	Condition Description
4-18	Louvers Removed

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Repair		
1. Evaporator Inlet Louver	a. Straighten bent frame or blades. b. Replace louver if damaged beyond repair.	
2. Evaporator Outlet Louver	a. Straighten bent frame or blades. b. Replace louver if damaged beyond repair.	

5-6. INFORMATION PLATES-REPLACE.

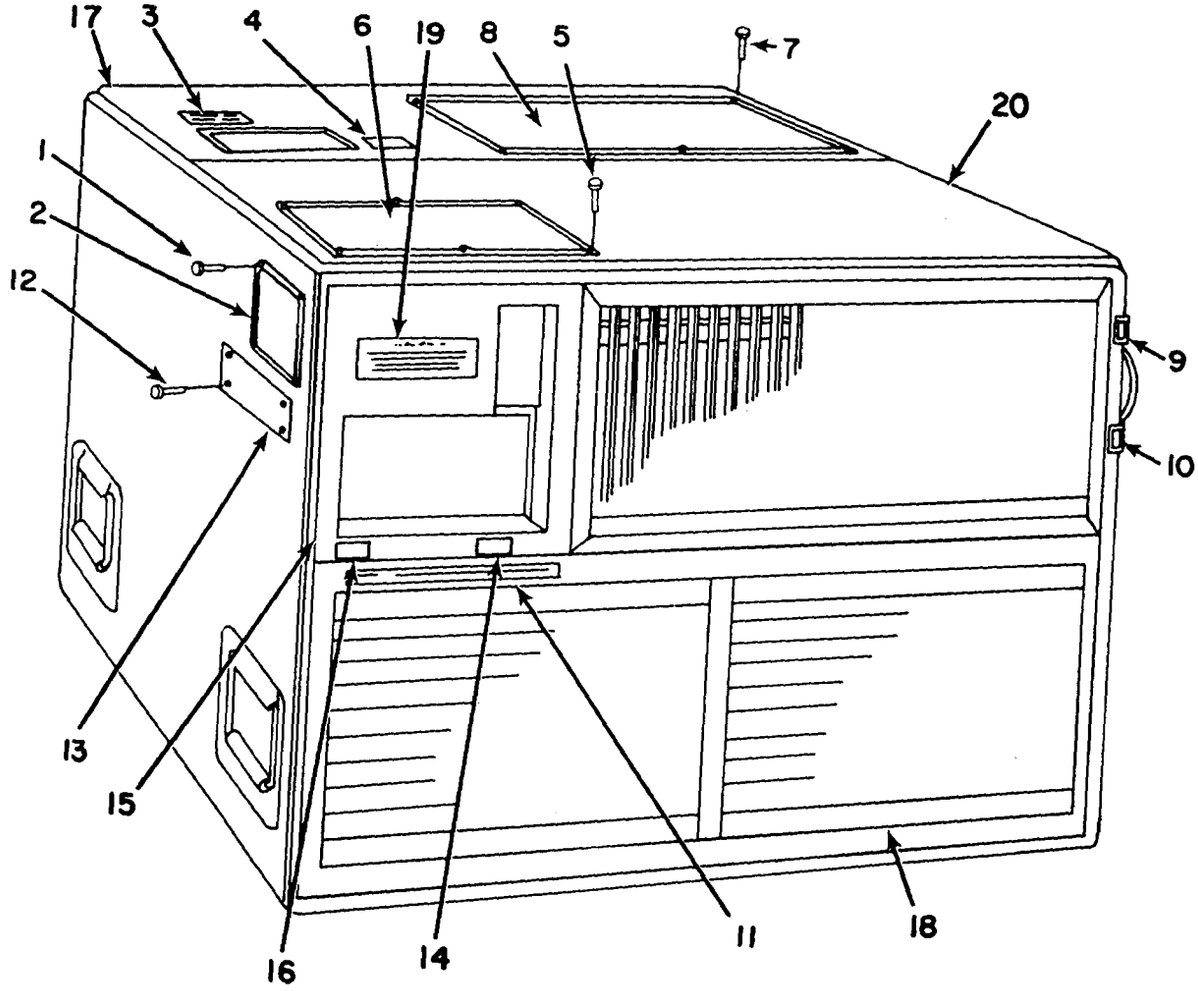
This task covers:

a. Removal
b. Repair
c. Installation

INITIAL SETUP

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Removal		
1. Reset High Pressure Decal	Using a flathead screwdriver, remove high pressure reset decal (14) from junction box (15).	
2. Reset Low Pressure Decal	Using a flathead screwdriver, remove low pressure reset decal (16) from junction box (15).	
3. High Pressure Charging Valve Decal	Using a flathead screwdriver, remove high pressure charging valve decal (4) from rear to cover (17).	
4. Low Pressure Charging Valve Decal	Using a flathead screwdriver, remove low pressure charging valve decal (3) from rear top cover (17).	
5. Caution: LPCO Jumper Decal	Using a flathead screwdriver, remove caution decal (11) from evaporator inlet louver (18).	
6. Caution: Grounding Decal	Using a flathead screwdriver, remove caution decal (19) from front of junction box (15).	
7. Vent Closed Decal	Using a flathead screwdriver, remove the vent closed decal (9) from right front of air conditioner (above vent damper actuator wheel).	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5-6. INFORMATION PLATES-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal-Continued		
8. Vent Open Decal	Using a flathead screwdriver, remove the vent open decal (10) from the right front of the air conditioner (beneath vent damper actuator wheel).	
9. Identification Plate	**WARNING** Disconnect air conditioner power supply before doing maintenance work on or near electrical components or junction box compart ment. a. Remove front top cover (20). (See paragraph 4-17.) b. Remove junction box (15). (See paragraph 4-25.) **CAUTION** When removing or installing Identification Plate be careful not to damage any components in the junction box compartment. c. using a 1/8" diameter drill, remove four rivets (1) from identification plate (2) and housing. **d. Remove identification plate (2) from housing.**	
10. Danger Plate	**WARNING** Disconnect air conditioner power supply before doing maintenance work on or near electrical components or in junction box compartment. a. Remove front top cover (20). (See paragraph 4-17.) b. Remove junction box (15). (See paragraph 4-25.)	

5-6. INFORMATION PLATES-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal-Continued 10. Danger Plate-Continued	**CAUTION** When removing or installing Danger Plate, be careful not to damage any components in the junction box compartment. c. Using a 1/8" diameter drill remove four rivets (12) from danger plate (13) and housing. d. Remove danger plate (13) from housing.	
11. Schematic Diagram	a. Remove front top cover (20). (See paragraph 4-17.) b. Using a 1/8" diameter drill, remove six rivets (5) from schematic diagram (6) and front top cover (20). c. Remove schematic diagram (6) from front top cover (20).	
12. Refrigeration Diagram	a. Remove rear top cover (17). (See paragraph 4-17.) b. Using a 1/8" diameter drill remove six rivets (7) from refrigeration diagram (8) and rear top cover (17). c. Remove refrigeration diagram (8) from rear top cover (17).	
Repair	a. Repair of all information plates is limited to replacement. b. Replace damaged information plates.	
Installation 13. Reset High Pressure Decal	a. Remove protective paper from back of new reset high pressure decal (14) to expose sticky surface. b. Aline reset high pressure decal (14) to proper position on junction box (15) and press in place.	

5-6. INFORMATION PLATES-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation-Continued		
14. Reset Low Pressure Decal	a. Remove protective paper from back of reset low pressure decal (16) and expose sticky surface. b. Aline reset low pressure decal (16) to proper position on junction box (15) and press in place.	
15. High Pressure Charging Valve Decal	a. Remove paper from back of new high pressure charging valve decal (4) to expose sticky surface. b. Aline decal (4) to proper position on rear top cover (17) and press in place.	
16. Low Pressure Charging Valve Decal	a. Remove paper from back of new low pressure charging valve decal (3) to expose sticky surface. b. Aline decal (3) to its proper position on rear top cover (17) and press in place.	
17. Caution: LPCO Jumper Decal	a. Remove paper from back of Caution: LPCO Jumper Decal (11) and expose sticky surface. b. Aline decal (11) to its proper position on evaporator inlet louver (18) and press in place.	
18. Caution: Grounding Decal	a. Remove paper from back of Caution: Grounding Decal (19) and expose sticky surface. b. Aline decal (19) to proper position on junction box (17) and press in place.	
19. Vent Open Decal	a. Remove paper from back of new Vent Open Decal (10) and expose sticky surface. b. Aline decal (10) to proper position on housing (above vent damper actuator wheel) and press in place.	
20. Vent Closed Decal	a. Remove paper from back of new Vent Closed Decal (9) and expose sticky surface.	

5-6. INFORMATION PLATES-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation - Continued 20. Vent Closed Decal-Continued	b. Aline decal (9) to proper position on housing (beneath vent damper actuator wheel) and press in place.	
21. Identification Plate	**WARNING** Disconnect air conditioner power supply before doing maintenance work on or near electrical components or junction box compartment. a. Aline identification plate (2) onto housing in proper position. **CAUTION** Be careful not to damage internal components of junction box compartment when installing identification plate. b. Secure identification plate (2) to housing using four rivets (l). c. Install junction box (15). (See paragraph 4-25.) d. Install Front Top cover (20). (See paragraph 4-17.)	
22. Danger Plate	**WARNING** Disconnect air conditioner power supply before doing maintenance work on or near electrical components or junction box compartment. a. Aline danger plate (13) onto housing in proper position. **CAUTION** Be careful not to damage internal components of junction box compartment when installing danger plate.	

5-6. INFORMATION PLATES-Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation-Continued		
22. Danger Plate-Continued	b. Secure danger plate (13) to housing using four rivets (12). c. Install junction box (15). (See paragraph 4-25.) d. Install front top cover (20). (See paragraph 4-17.)	
23. Schematic Diagram	a. Aline schematic diagram (6) onto proper position. b. Secure schematic diagram (6) to front top cover (20) with six rivets (5). c. Install front top cover (20). (See paragraph 4-17.)	
24. Refrigeration Diagram	a. Aline refrigeration diagram (8) onto rear to cover (17) in proper position. b. Secure refrigeration diagram (8) to rear to cover (17) with six rivets (7). c. Install rear top cover (17) onto air conditioner. (See paragraph 4-17.)	

5-7. EVAPORATOR MOTOR-REPAIR.

This task covers:

a. Disassembly
b. Repair
c. Reassembly

INITIAL SETUP

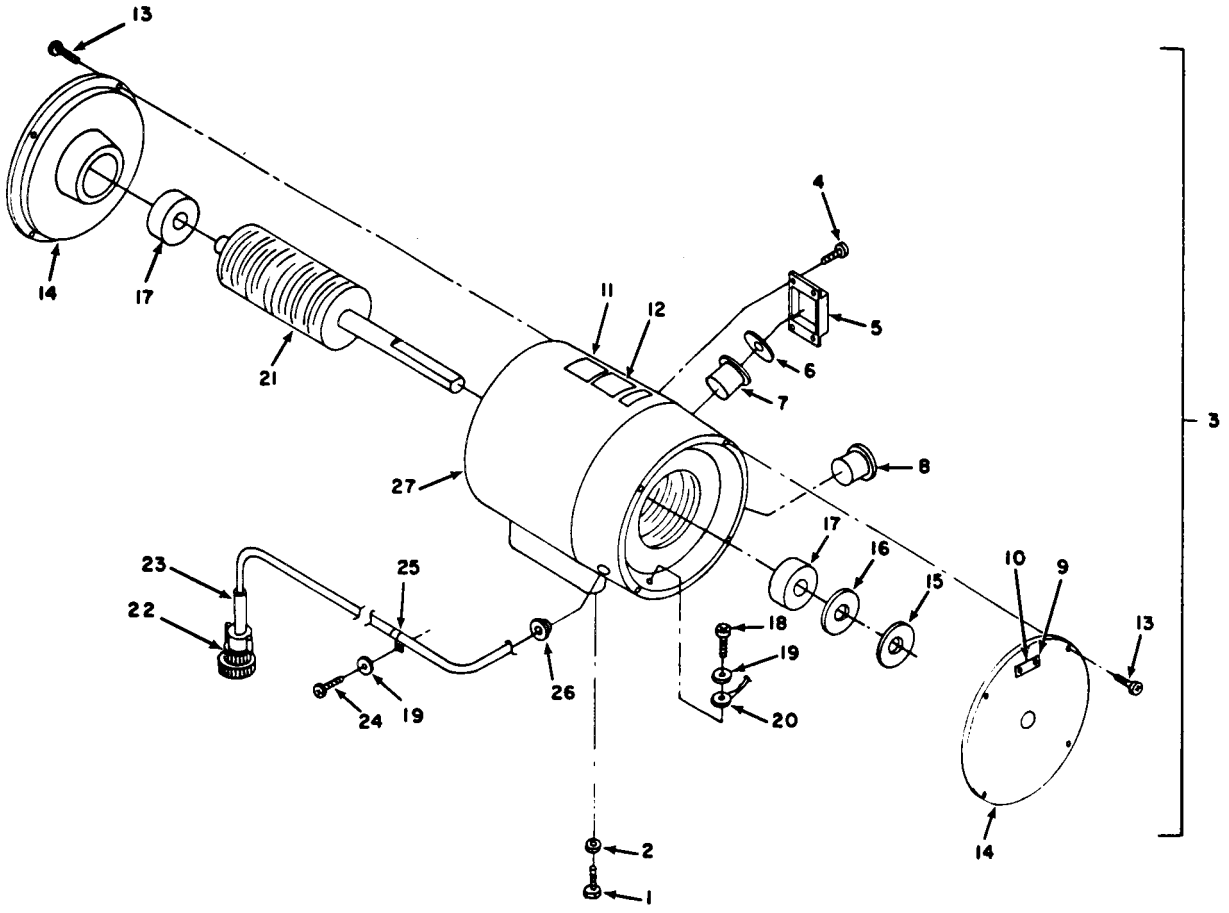
Equipment Condition

Para	Condition Description
4-18	Evaporator Inlet Louver removed.
4-30	Evaporator fan assembly removed.

Special Tools
Plastic bar or rawhide mallet
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Dry cleaning solvent (App. D, Item 16)
Cloth, lint-free (App. D, Item 9)
Oil (App. D, Item 14)

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power supply before doing any maintenance work on the electrical system.	
Disassembly	a. Match-mark the stator (27) and both end-bells (14) the motor to ease reassembly. b. Unscrew four screws (13) from each end bell (14). c. Using a rawhide mallet or plastic bar and hammer, tap the rear end-bell (13) away from the stator (27). Tap opposite sides, top and bottom in an alternating sequence to break the end-bell loose, if necessary.	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5-7. EVAPORATOR MOTOR – Continued.

LOCATION/ITEM	ACTION	REMARKS
disassembly-Continued)	d. Pull out the rotor (21) and inspect the bearing surfaces for damage. If damaged, replace the bearings (17). Press out or drive out damaged bearings from the end-bell. If their condition is acceptable, proceed with disassembly. e. Remove four screws (4) securing protector cover (5). f. Remove protectors (7 and 8) and spacers (6). **CAUTION** Remove the front end-bell carefully to avoid damaging wires. Wires may be left in place if care is taken to avoid damaging them. f. Remove the front end-bell (14) from the stator (17), in the same manner as described in step c above. g. Press out or drive out bearings (17) from the end-bell. Retain the shims and thrust washer for use at reassembly if they are in good condition. **WARNING** Dry cleaning solvent (App. D, Item 16) used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-130°F (38°C-59°C). Compressed air used for cleaning purposes will not exceed 30 psi (2.1 kg/cm^2). Do not direct compressed air against skin. Use goggles or full face shield.	

5-7. EVAPORATOR MOTOR -Continued.

LOCATION/ITEM	ACTION	REMARKS
Repair	a. Clean inside surfaces of end-bells with solvent and blow dry with compressed air or wipe dry with lint-free cloth. b. Blow dust out of coils in stator with compressed air (30-50 PSI). 2.1 kg/cm³ to 3.5 kg/cm 2) c. Inspect shaft surfaces of rotor for nicks, gouges and deformation. Dress out high metal with a fine file of stone. If damage is excessive, replace motor. d. Inspect protectors for burn-out. Replace if burned out. e. Inspect the thrust washer, shims and bearings for wear, tearing or other damage. Replace if worn or damaged. f. Inspect the wire connections to stator coils for cuts, abrasions or loose connections. Repair or replace as required. g. Replace bolts if worn or damaged. h. Inspect connector and replace if necessary.	
Reassembly	a. Coat the shaft surfaces of the rotor with oil; then slide bearings over end of shaft so they seat against shoulder at inner end of bearing diameter of shaft. Press or drive bearings onto shoulders. b. Dip a thrust washer and shims in oil and slide over each end of shaft with thrust washer next to bearings.	

5-7. EVAPORATOR MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS
Reassembly-Continued	NOTE: Bearings are lubricated at time of manufacture and require no further lubrication before they are installed. c. Coat the bearing cavity of the end-bells with oil. d. Slide bearing cavity fully into position over shaft so that the outer diameter of bearing enters inner diameter of bearing cavity in end-bells. e. Insert rotor into stator and housing. f. Install end-bells. g. Install nuts, lockwashers and tiebolts to secure end-bells to housing. h. Install protectors and spacers and attach cover with four screws (4). i. Install motor into housing.	See paragraph 4-31.

5-8. CONDENSER FAN MOTOR- REPAIR.

This task covers:

a. Disassembly
b. Cleaning and Inspection
c. Reassembly

INITIAL SETUP

Equipment Condition

Para	Conditon Description
4-17	Rear Top Cover removed.
4-35	Condenser Fan Motor removed.

Special Tools

Plastic bar or rawhide mallet
Tool Kit SC 5180-90-CL-N18

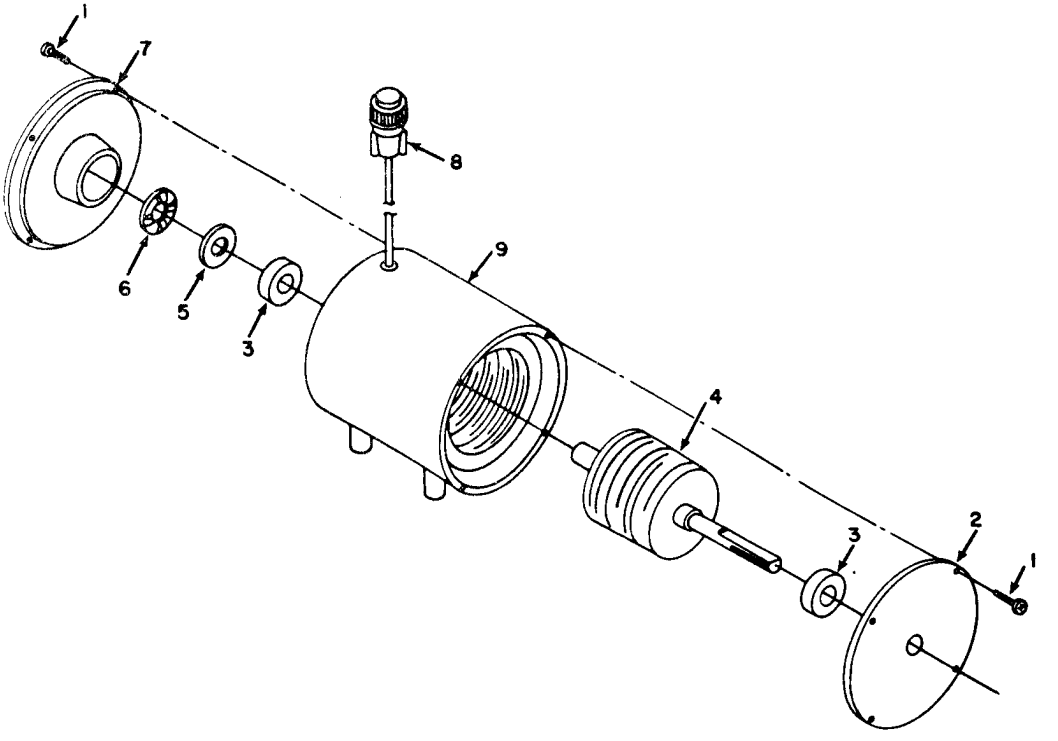
Materials/Parts

Dry cleaning solvent (App. D, Item 16)
Cloth, Line free (App. D, Item 9)
Oil (App. D, Item 14)

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power supply before doing any maintenance work on the electrical system.	
Disassembly	a. Match-mark the end plates and motor housing to ease reassembly. b. Remove four screws (1) from the end plate (2) on motor.	
	CAUTION Remove the rear end plate carefully to avoid damaging wires. Wires may be left in place if care is taken to avoid damaging them.	

5-8. CONDENSER FAN MOTOR-Continued.

LOCATION/ITEM	ACTION	REMARKS



c. Using a rawhide mallet or plastic bar and hammer, tap the rear end plate (2) away from housing (9). Use caution not to damage wiring.

d. Pull out the rotor (4), with bearings from end plate (7).

e. Remove bearings (3) from rotor (4). Retain the shims (5) and thrust washers (6) for use at re-assembly if they are in good condition.

f'. Remove end plate (7).

5-8. CONDENSER FAN MOTOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Disassembly-Continued	**WARNING** Dry cleaning solvent (App. D., Item 16) used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. (38°C-59°C) Compressed air used for cleaning purposes will not exceed 30 psi (2.1 kg/cm^2). Do not direct compressed air against skin. Use goggles or full face shield.	
Repair	a. Clean inside surfaces of end plates and housing with solvent, blow dry with compressed air or wipe dry with lint-free cloth. b. Blow dust out of coils in stator with compressed air (30-50 PSI). (2.1 kg/cm^3 to 3.5 kg/cm^2) c. Inspect shaft surfaces of rotor for nicks, gouges and deformation. Dress out high metal with a fine file or stone. If damage is excessive, replace motor. d. Inspect the thrust washer and shims for wear, tearing or other damage. Replace if worn or damaged. e. Inspect the wire connections to stator coils for cuts, abrasion or loose connections. Repair or replace as required.	
Reassembly	a. Coat the shaft surfaces of the rotor with oil; then slide bearings over end of shaft so they seat against shoulder at imer end of bearing diameter of shaft. Press or drive bearings onto shoulders.	

5-8. CONDENSER FAN MOTOR- Continued.

LOCATION/ITEM	ACTION	REMARKS
Reassembly - Continued)	b. Dip a thrust washer (6) and shims (5) in oil and slide over each end of shaft with thrust washer next to bearings (3). NOTE: Bearings are lubricated at time of manufacture and require no further lubrication before they are installed. c. Coat the bearing cavity of the housing and end plates with oil. d. Insert rotor (4) into stator and housing (9). e. Install end plates (2 and 7). f. Install four screws (1) to secure each end plate to stator and housing (9).	

5-9. REFRIGERATION SYSTEM.

a. Description

WARNING

Whenever it is necessary to open the refrigeration system for any reason, discharge the refrigerant carefully. Avoid contact with liquid refrigerant. Severe freezing of body tissues can take place with extreme rapidity. Avoid excessive inhalation of refrigerant gas, and ventilate the area in which it is released. Refrigerant gas in contact with flame or hot surfaces is converted to phosgene, a highly toxic gas having an odor similar to newly mown grass or hay.

(1) The refrigeration system, illustrated by the refrigerant flow diagram is a mechanical, vapor-cycle circuit consisting of the evaporator, thermal expansion valve, compressor, condenser, and the necessary valves and cutout devices for automatic control during operation.

(2) The thermal expansion valve releases high-pressure liquid refrigerant into the evaporator at reduced pressure.

(3) The liquid refrigerant begins to vaporize by absorbing heat from the air passing over the outside surface of the evaporator coil.

(4) The heated vapor is sucked out of the evaporator section by the compressor, and is forced into the condenser section under high pressure where it is cooled and condensed back into a liquid.

(5) The heat released during condensation is carried off by the condensing airstream.

(6) The liquid refrigerant flows from the condenser to a receiver, to a subcooler, and then to the thermal expansion valve to repeat the cycle.

(7) If the temperature control switch (evaporator return-air thermostat) becomes satisfied or the evaporator return-air temperature is lower than the point at which you have set the control, the refrigeration system will switch to a by-pass condition.

5-9. REFRIGERATION SYSTEM-Continued.

(8) The temperature control switch will activate the normally open liquid by-pass solenoid valve, and shut off the evaporator section of the unit. You will notice that compressor will continue to pump as usual, and the suction pressure will begin to drop.

(9) When the suction pressure reaches about 65 PSIG (4.6 kg/cm^2), the valve starts to open in an effort to maintain the suction pressure above about 55 PSIG. (3.86 kg/cm^2)

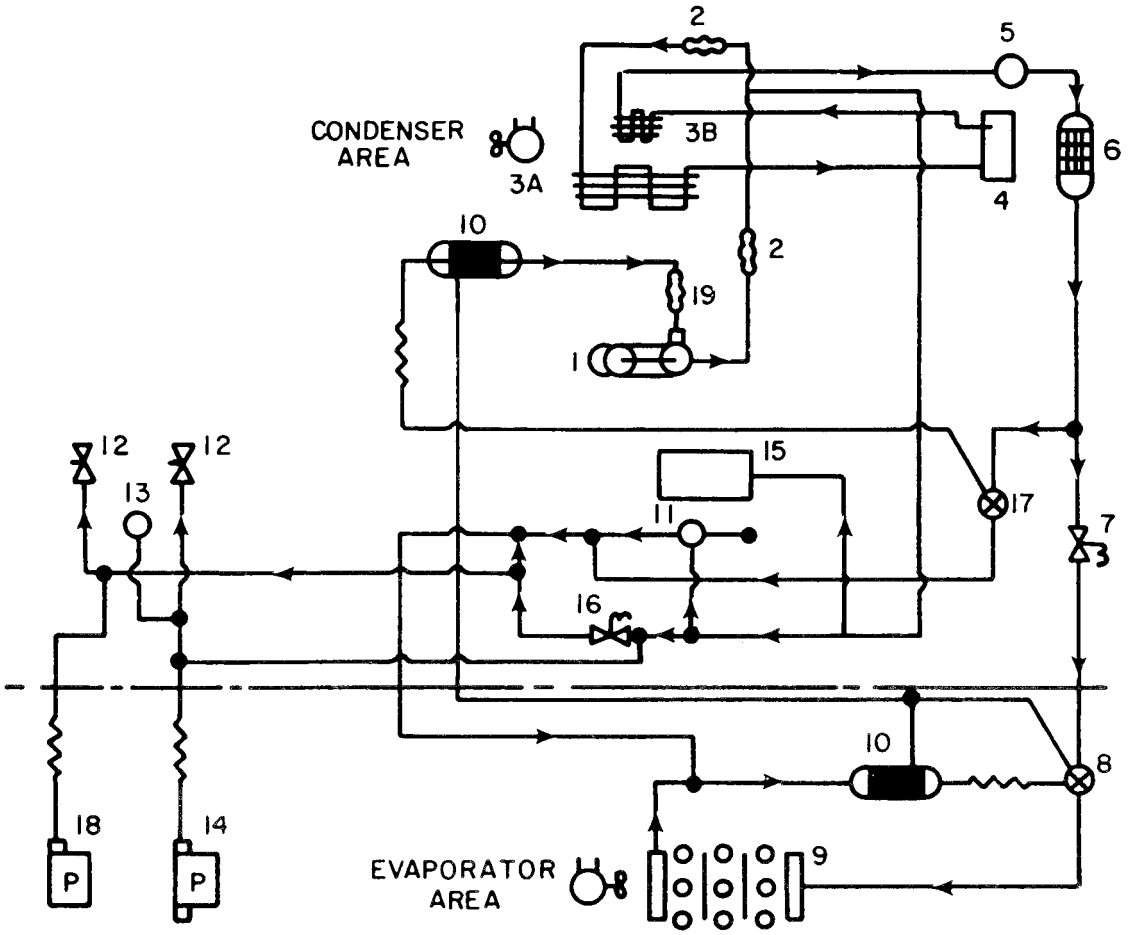
(10) As the suction temperature goes up, due to the opening of the pressure regulating valve, the quench expansion valve will start to meter liquid refrigerant into the suction line to maintain the suction temperature below 75°F (24°C).

(11) The action of the pressure regulating valve and quench valve is automatic. This action may also occur at extreme conditions in an attempt to maintain the suction pressure (even during the cooling mode) at a point above 55 PSIG (3.86 kg/cm^2) and the suction temperature (measured at the quench bulb well) below 75°F (24°C).

(12) The condenser louvers are operated by a refrigerant-powered actuator located in the high-pressure part of the system. This actuator should be fully extended (louvers open) at approximately 80°F (27°C) at 260-220 PSIG (18.3-15.5 kg/cm^2) dischar e pressure, and fully closed at 180-150 PSIG (12.67-10.56 kg/cm). Failure to perform this function could result in cutout on the high pressure cutout switch.

b. Refrigeration System Repair

The following paragraphs contain repairs covering commonly used hardware, the tubing and valves of the refrigeration system. Re-use or repair of seals and gaskets should not be attempted; new parts should be used at assembly. When heating refrigeration piping to debraze or unsolder connections (See paragraph 5-12) as well as to solder or braze them, the piping should be protected with a continuous flow of dry nitrogen to prevent scaling or oxidation of the inside surface.



DESCRIPTION		DESCRIPTION	
1	COMPRESSOR, RECIPROCATING	10	BULBWELL
2	HOSE ASSY, METAL	11	REGULATOR, FLUID PRESSURE
3A	COIL, CONDENSER W/ANGLE	12	VALVE, SERVICE
3B	SUB COOLER	13	VALVE., PRESSURE RELIEF
4	RECEIVER, LIQUID REFRIGERANT	14	SWITCH, PRESSURE (HIGH)
5	INDICATOR, SIGHT, LIQUID	15	CYLINDER ASSY, ACTUATING LINEAR
6	DEHYDRATOR, DESICCANT, REFRIGERANT	16	SOLENOID VALVE W/LEADS
7	SOLENOID, VALVE W/LEADS	17	VALVE, EXPANSION (QUENCH)
8	VALVE, EXPANSION (PRIMARY)	18	SWITCH, PRESSURE (LOW)
9	COIL, EVAPORATOR	19	HOSE ASSY, METAL

5-10. REFRIGERATION SYSTEM SERVICING - (DISCHARGING).

This task covers: Service

IN ITIALSETUP

Equipment Condition
Para — Condition Description
Mode selector switch in off position.
Main power source is disconnected.

Test Equipment
Recovery/Recycling Unit

LOCATION/lTEM	ACTION	REMARKS
REAR TOP OF UNIT Service	a. Remove screws from service valve access cover. b. Remove service valve access cover. c. Unscrew hose connection protective caps from service valves.	

WARNING

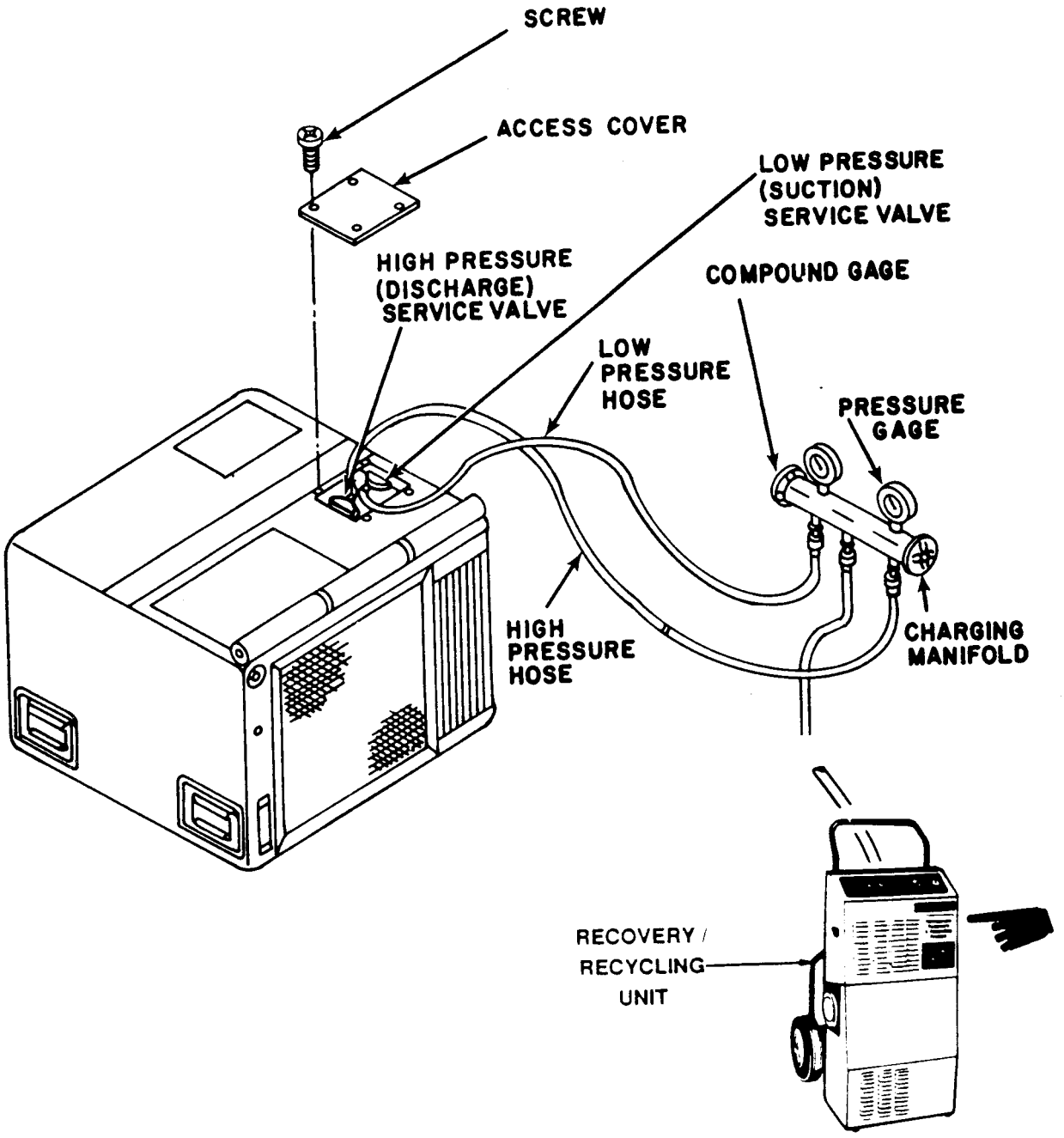
Death or serious injury may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin-eye contact is possible.

Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly poisonous and corrosive gas.

d. Connect the charging manifold hoses to the manifold and air conditioner service valves.

5-10. REFRIGERATION SYSTEM SERVICING - (DISCHARGING) - Continued.

LOCATION/ITEM	ACTION	REMARKS
Service-Continued	e. Attach a hose assembly to the center connection of the manifold.	
	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.	
	f. Connect and operate a rccovery/recycling unit in accordance with the manufactuer's instructions.	


SCREW
ACCESS COVER
LOW PRESSURE (SUCTION) SERVICE VALVE
HIGH PRESSURE (DISCHARGE) SERVICE VALVE
COMPOUND GAGE
LOW PRESSURE HOSE
PRESSURE GAGE
HIGH PRESSURE HOSE
CHARGING MANIFOLD
RECOVERY / RECYCLING UNIT

5-11. REFRIGERATION SYSTEM SERVICING - (PURGING).

This task covers: Service

INITIAL SETUP
Equipment
Condition

Para	Condition Description
5-10	Refrigerant system discharged. Main power source disconnected.

Materials/Parts
Nitrogen (App. D. Item 4)

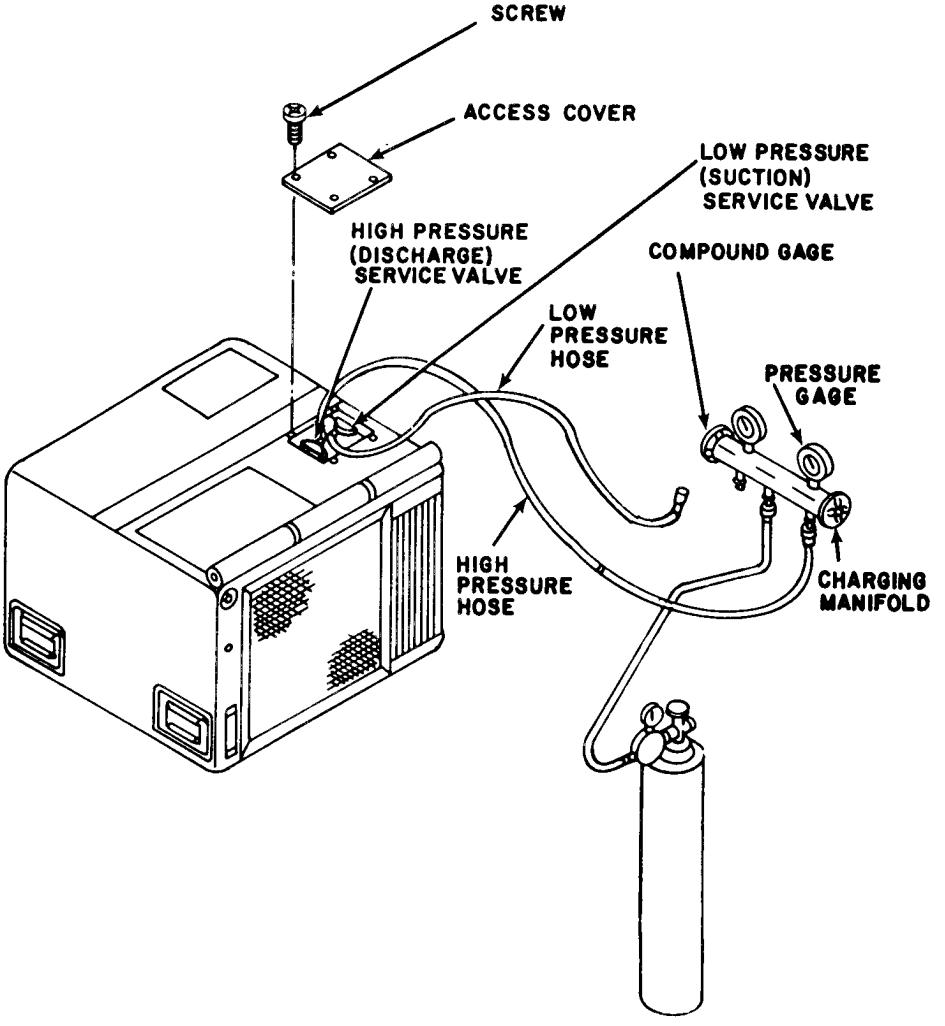
LOCATION/ITEM	ACTION	REMARKS
	The refrigeration system must be purged with dry nitrogen, App. D, Item 4, during any brazing operation performed on any component. A flow of dry nitrogen at the rate of less than 1-2 cfm (0.028-0.057 m^3/minute) should be continued during all brazing operations to minimize internal oxidation and scaling.	
	CAUTION Nitrogen cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 PSI. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations.	
	Nitrogen is an inert gas. However, it also presents danger as a suffocant and therefore, must also be discharged in a ventilated location.	

5-11. REFRIGERATION SYSTEM SERVICING – (PURGING) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	Assuming that the system has been discharged using a manifold as described in paragraph 5-10, proceed as follows: a. See specific component removal/ repair instructions. b. Be sure that refrigerant has been discharged. (See paragraph 5-10.) c. Connect the center hose from the charging manifold to a nitrogen regulator and dry nitrogen tank. d. The hose from the high pressure service valve to the charging manifold must be connected. e. The hose from the low pressure service valve must be disconnected from the charging manifold. f. Open both service valves on the unit. g. Close the unused valve on the charging manifold, and open the one with the nitrogen tank hooked up. h. Open the nitrogen cylinder valve and adjust the regulator so that less than 1-2 cfm (0.028-0.057 m^3/ minute) of nitrogen flows through system. i. Check discharge from hose attached to the low pressure service valve to be sure that no oil is being forced out of the system. j. Allow nitrogen to sweep through the system at the rate of less than 1-2 cfm (0.028-0.057 m^3/ minute) for a minimum of 5 minutes, before starting any brazing operation. Then allow it to continue to flow at the same rate until all brazing operations are completed. (See paragraph 5-12 for brazing/debrazing procedures.)	

5-11. REFRIGERATION SYSTEM SERVICING -(PURGING) -Continued.

LOCATION/ITEM	ACTION	REMARKS
	k. After installation brazing operations are completed, allow nitrogen to flow for a minimum of 5 minutes. l. Close nitrogen cylinder valve, nitrogen regulator, charging manifold valve, and both low and high pressure service valves on the unit. m. Disconnect the hose from the nitrogen tank. n. Assuming that all repairs are completed, go to paragraph 5-12.	



5-12. REFRIGERATION SYSTEM SERVICING -(BRAZING/DEBRAZING).

This task covers: Service

INITIAL SETUP

Equipment Condition

Para	Condition Description
5-10	Refrigeration system discharged.
5-11	Refrigeration system purged.
	Main power source disconnected.

Materials/Parts

Brazing alloy (silver) (App. D, Items 5 & 6)
Nitrogen cylinder (App. D, Item 4)
Brazing flux (App. D, Item 7)
Abrasive cloth (App. D, Item 8)
Rags (App. D, Item 9)

LOCATION/ITEM	ACTION	REMARKS
	a. General. All tubing in the refrigeration system is copper with a finish that permits thorough cleaning. All interconnecting fittings, such as elbows, tees, etc., are also copper. The bodies of all valves and all connections on other components are brass. All joints, except those provided with flare fittings, are made by brazing in accordance with MIL-B-7883, except that radiographic examination is not required. b. Filler Alloy. Grade IV or VI brazing alloy and Type B flux, as specified in MIL-B-7883, must be used for all copper to brass joints. Grade III brazing alloy may be substituted for Grade IV or VI for copper to copper joints; flux is not required for copper to copper joints.	

5-12. REFRIGERATION SYSTEM SERVICING - (BRAZING/DEBRAZING) - Continued.

LOCATION/ITEM	ACTION	REMARKS

c. Debrazing. Debraze joints for removal of refrigeration system components as follows:

WARNING

All refrigerant-22 must be discharged from the system and the entire system must be purged with dry nitrogen before begiming any debrazing operation.

(1) Determine which joints are to be debrazed. Due to the limited work space inside the air conditioner, it may be more convenient to remove a part of the inter-connecting tubing with the component rather than debrazing the joints on the component itself.

(2) Before debrazing a joint on a valve, disassemble the valve to the extent possible, then wrap all but the joint with a wet rag to act as a heat sink.

WARNING

The polyurethane foam used as insulation in the air conditioner will break down to form toxic gases if exposed to the flame of a torch at brazing temperature.

5-12. REFRIGERATION SYSTEM SE RVICING - (BRAZING/DEBRAZING)- Continued.

LOCATION/ITEM	ACTION	REMARKS
	(3) Protect insulation, wiring harnesses, cabinet, and other surrounding components with appropriate shields. (4) Be sure the work area is well ventilated and that dry nitrogen is flowing through the refrigeration system at a rate of less than 1-2 cfm (0.028-0.057 m^3/minute.) (5) Apply sufficient heat uniformly around the joint to quickly melt the filler alloy. If heat is applied slowly, or only on one side, the entire component or length of tubing will be heated and filler alloy in adjacent joints may also be melted. Remove heat as soon as the joint separates.	
	d. Cleaning debrazed joints. All filler alloy must be cleaned from debrazed joints before reassembly. Heat each piece of the joint until the filler alloy is melted and then wipe it away with a dry cloth. Be sure no filler alloy or other debris are left inside any tubing, fitting or component.	

5-12. REFRIGERATION SYSTEM SERVICING - (BRAZING/DEBRAZING) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	e. Reassembly. If tubing sections or fittings were removed with a component, debraze them from the component, clean the joints, and braze them to the new component before reinstallation. f. Brazing. Braze joints within the air conditioner as follows: (1) Position the component to be installed. (2) To prepare a joint on a valve for brazing, disassemble the valve to the extent possible. Then wrap all but the joint with a wet rag to act as a heat sink. (3) Protect insulation, wiring harnesses, and surrounding components with appropriate shields. (4) Be sure the work area is well ventilated and that dry nitrogen is flowing through the refrigeration system at a rate of less than 1-2 cfm (0,028-0.057 m^3/minute). (5) Apply sufficient heat uniformly around the joint to quickly raise it to a temperature that will melt the filler alloy. Remove heat as soon as brazing is completed.	

5-13. REFRIGERATION SYSTEM SERVICING - (LEAK TEST).

This task covers: Test

INITIAL SETUP

Equipment Condition

Para	Condition Description
	Main power source disconnected.

Test Equipment

Electronic refrigerant gas leak detector

Materials/Parts

Nitrogen (App.D, Item 4)
Refrigerant R-22 (App.D, Item 10)

LOCATION/ITEM	ACTION	REMARKS
	a. The entire repaired area should be thoroughly leak tested after repair or replacement of any component, before it is recharged with refrigerant-22. Leak testing is also the method for troubleshooting when a system has lost all or part of its refrigerant charge through an undetermined cause. b. Testing Method. There are two acceptable methods for leak testing the refrigeration system. (1) Refrigerant gas leak detector. If an electronic refrigerant gas leak detector is available it should be used in accordance with the procedures contained in TM 9-4940-435-14, "Leak Detector, Refrigerant Gas."	

5-13. REFRIGERATION SYSTEM SERVICING - (LEAK TEST) - Continued.

LOCATION/ITEM	ACTION	REMARKS

NOTE

The electronic refrigerant gas leak detector is highly sensitive to the presence of a minute quantity of gas in the air: Due to this factor it is quite effective in the detection of a small leak. However, due to the rapid dispersion of refrigerant gas into the surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well ventilated but draft-free area.

CAUTION

If the soap solution testing method is used, thoroughly rinse with fresh water after testing is completed. A residual soap film will attract and accumulate an excessive amount of dust and dirt during operation.

(2) Soap solutions. In this method, a strong solution of a liquid detergent and water is brushed onto all points of possible leakage while closely watching for the formulation of bubbles.

c. Testing procedures. To perform leak testing by use of the electronic detector, it is necessary that the system be pressurized with a proportion of refrigerant gas. To perform leak testing by use of the soap solution method, the system may be pressurized with dry nitrogen alone.

5-l3. REFRIGERATION SYSTEM SERVICING - (LEAK TEST) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	(1) To pressurize a system that has some refrigerant charge, for either leak testing method: (a) Remove the hose connection protective caps from the high and low pressure service valves. (b) Connect the hoses from a charging manifold to the service valves. NOTE If it is possible that the problem may not be a leak and that you may not have to replace a refrigeration system component, refrigerant-22 may be substituted for the nitrogen in the following test. If nitrogen is used, you will have to discharge, evacuate, and recharge the system after this test is completed. (c) Connect a nitrogen pressure regulator and nitrogen bottle to the center hose connection of the charging manifold. (d) Open the unit service valves and the charging manifold valves. (e) Open the nitrogen tank valve and pressurize the system to 300 PSIG (21.2 kg/cm^2)	

5-13. REFRIGERATION SYSTEM SERVICING - (LEAK TEST) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	(f) Perform leak tests. (g) If a leak is found, discharge and purge the system and repair leak. See specific instructions for components to be removed. (h) If a leak was not found and refrigerant-22 was used to pressurize the system, see charging instructions.	(See paragraph 5-15.)
	(2) To pressurize a system that has been discharged and purged for leak testing with an electronic detector: (a) Remove the hose connection protective caps from the high and low pressure service valves. (b) Connect the hoses from a charging manifold to the service valves. (c) Connect a cylinder of refrigerant-22 to the center hose connection of the charging manifold. CAUTION Connect the refrigerant-22 cylinder so that only gas will be used for pressurization. (d) Open both unit service valves and the charging manifold valves.	

5-13. REFRIGERATION SYSTEM SERVICING - (LEAK TEST) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	(e) Open the refrigerant cylinder valve slightly and adjust as necessary to prevent formation of frost, and allow system pressure to build up until the gages read 40-50 PSI (2.8-3.5 kg/cm^2).	
	(f) Close the charging manifold valves and the refrigerant cylinder valve.	
	(g) Remove the refrigerant-22 cylinder from the center hose connection.	
	(h) Connect a nitrogen regulator of dry nitrogen to the center hose connection.	
	(i) Open the charging manifold valves and the nitrogen cylinder and regulator valve. Allow system pressure to build up until gages read 300 PSIG (21.2 kg/cm^2).	

5-l3. REFRIGERATION SYSTEM SERVICING - (LEAK TEST) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	(j) Perform leak tests, then discharge and purge the system, in accordance with paragraphs 5-10 and 5-11 before performing maintenance, or before evacuating and charging the system, as appropriate.	
	(3) Final leak testing. Always perform a final leak test after performing any repair or replacement of components before the air conditioner is reassembled and the refrigeration system is evacuated and charged.	

5-14. REFRIGERATION SYSTEM SERVICING - (EVACUATION).

This task covers: Evacuation

INITIAL SETUP

Equipment
Condit ion

Para	Condition Description
5-13	Refrigerant System Leak Tested.
5-26	New Dehydrator Installed.
5-10	Refrigerant System Discharged.

Test Equipment
Vacuum Pump

Materials/Parts
Nitrogen (App.D, Item 4)

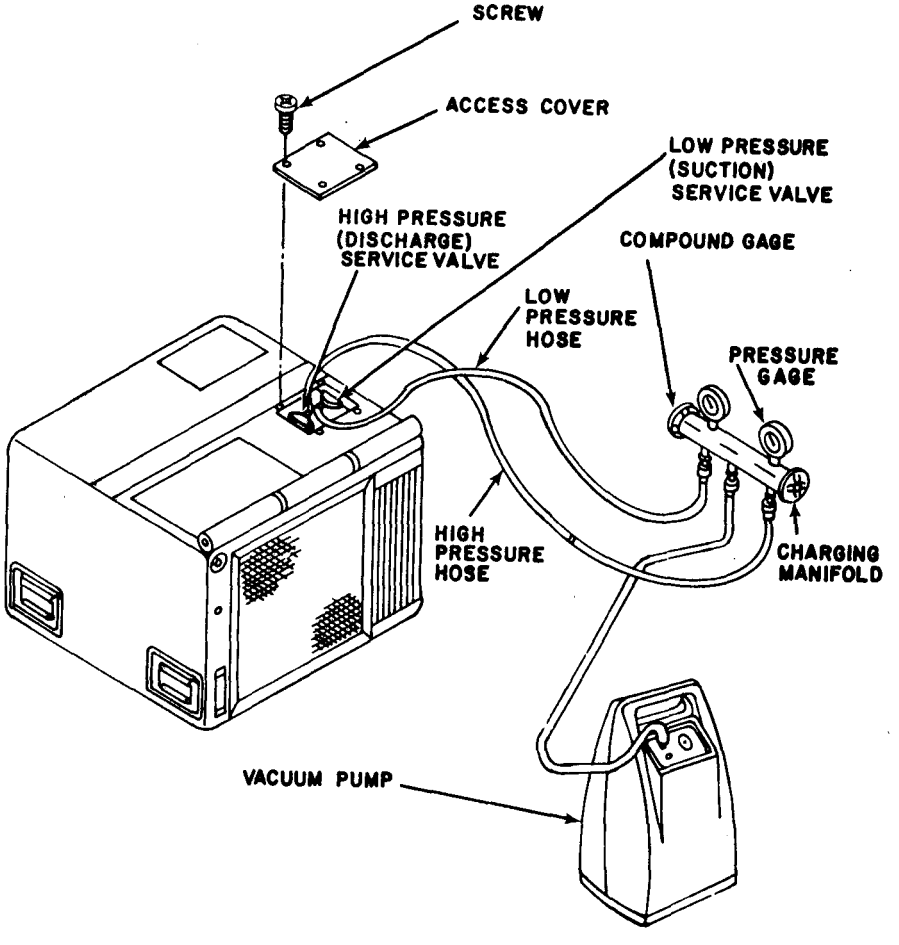
LOCATION/ITEM	ACTION	REMARKS
	CAUTION Do not evacuate a leaking system. The vacuum created can cause air, moisture, and dirt to enter system.	
	NOTE In the event the compressor was replaced as a result of burn-out, check that compressor burn out procedures were followed.	See paragraph 5-28.
	a. Connect the hose from the low pressure service valve to the compound gage side of the charging manifold. The hose from the high pressure service valve shall be connected to the high pressure gage side of the charging manifold.	
	b. Open both service valves.	
	c. Attach center hose assembly charging manifold to vacuum pump.	
	d. Start vacuum pump.	

5-14. REFRIGERATION SYSTEM SERVICING -(EVACUATION) -Continued.

LOCATION/ITEM	ACTION	REMARKS
	e. Open charging manifold valves. f. Run the vacuum pump until approximately a 300 micron vacuum is reached. NOTE Inability to reach 300 microns may indicate either a leak or a problem with the pump. g. Close manifold valves and check compound gage. Record reading. Let unit sit for one hour. Observe compound gage reading. h. If the system holds the vacuum without change of pressure, proceed to step j. i. If the vacuum cannot be held for one hour, one of the following reasons may account for the problem: (1) Presence of water vapor in the system. Continued pumping will correct this condition. (2) Leak in the refrigeration system. Break the vacuum with dry nitrogen and retest for leaks. (3) Internal leakage of vacuum pump. Test the pump by connecting a vacuum gage directly to the vacuum pump intake and continue to pump. If pump still fails to reach approximately 300 microns, the pump is faulty.	See paragraph 5-13.

5-14. REFRIGERATION SYSTEM SERVICING - (EVACUATION) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	j. Close both unit service valves. k. Close charging manifold valves. l. Stop vacuum pump. m. Disconnect pump from center hose connection. n. Charge system with refrigerant-22.	See paragraph 5-15.



5-10. REFRIGERATION SYSTEM SERVICING - (CHARGING).

This task covers: Charging Refrigeration System

INITIAL SETUP

Equipment Condition

Para	Condition Description
5-14	Refrigeration System Evacuated

Test Equipment

Charging Cylinder or Scale

Materials/Parts

Refrigerant-22, R-22 (App.E, Item 10)

LOCATION/ITEM	ACTION	REMARKS

CAUTION

Never introduce liquid refrigerant into the low pressure (suction) service valve.

NOTE

Install top covers before charging unit.

The system must be evacuated before charging. Using only refrigerant-22 to charge the unit. If available use recycled refrigerant.

a. Connect the hose from the low pressure service valve to the compound gage side of the charging manifold. The hose from the high pressure service valve should be connected to the high pressure gage side of the manifold.
b. Connect the center hose from the charging manifold to a well charged cylinder of refrigerant-22, or a charging cylinder.

5-15. REFRIGERATION SYSTEM SERVICING - (CHARGING) - Continued.

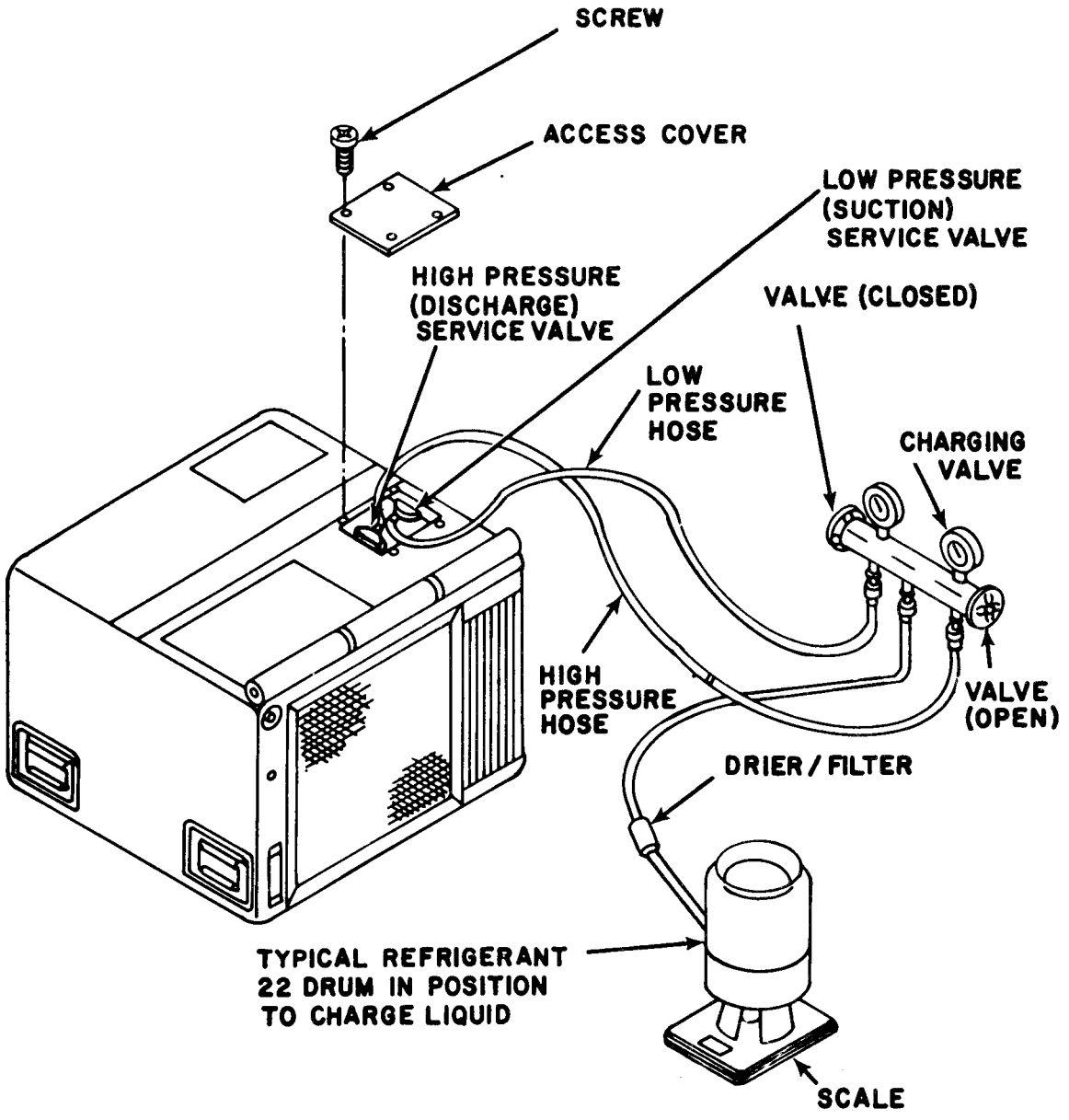
LOCATION/ITEM	ACTION	REMARKS
	c. Loosen the hose connections to the two service valves slightly. d. Open the two charging manifold valves. e. Open the refrigerant-22 or charging cylinder valve slightly to allow a small amount of refrigerant to purge air from the hoses. Tighten the hose connections at the air conditioner service valve. f. Close the low pressure (suction) charging manifold valve. g. Position the refrigerant-22 cylinder so that liquid will be used for charging. (Some cylinders must be inverted and some are equipped with a selection valve.) h. Using accurate scales, measure and record the weight of the charged refrigerant-22 cylinder. i. Fully open the refrigerant-22 cylinder valve. j. Open the high pressure service valve on the air conditioner. Allow liquid refrigerant to enter the system until the charged refrigerant cylinder weight has decreased by 2.3 pounds (1.04 kg) or until system pressure has equalized. k. Close the refrigerant cylinder valve and the high pressure (discharge) manifold valve. l. Connect power to air conditioner. m. Press and release both pressure switch reset buttons. n. Turn air conditioner on and operate in the COOL mode with the temperature control thermostat set at a maximum COOLER position.	

5-15. REFRIGERATION SYSTEM SERVICING - (CHARGING) -Continued.

LOCATION/ITEM REMARKS	ACTION
	o. If the 2.3 pounds (1.04 kg) full charge was obtained, skip steps o through r. If the. system pressure equalized prior to obtaining a full charge of 2.3 pounds (1.04 kg) proceed with step p.
	p. Switch the refrigerant cylinder valve, the low (suction) pressure charging manifold valve, and the low (suction) pressure service valve on the air conditioner.
	q. Open the refrigerant cylinder valve, the low (suction) pressure charging manifold valve, and the low (suction) pressure service valve on the air conditioner.
	r. Monitor the weight of the refrigerant cylinder as the air conditioner compressor pulls additional refrigerant gas into the system until the full 2.3 pounds (1.04 kg) charge is obtained. When the system is fully charged immediately close the refrigerant cylinder valve.
	s. Run the air conditioner in COOL mode with temperature control thermostat in full COOLER position for 15 minutes.
	NOTE Do not skip the next step.
	t. After 15 minutes, observe the liquid sight indicator (sight glass) on left rear of unit. ● Green center means the refrigerant moisture content is acceptable. ● Yellow center means there is too much moisture in the system. It must be discharged, evacuated and charged again.

5-15. REFRIGERATION SYSTEM SERVICING - (CHARGING) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	● Milky white or bubbly liquid means the system has a low charge. ● Clear bubble-free liquid around the center means the system is fully charged. u. If charge is low, add gas refrigerant. ● Switch refrigerant cylinder to vapor position. Open cylinder valve and the manifold low pressure valve. v. Check air conditioner for proper cooling. There should be at least a 5°F temperature difference between evaporator discharge air and inlet air. Turn mode selector switch to OFF. w. Close the high and low pressure service valves and remove charging manifold hoses. x. Install service valve protective caps. y. Secure service valve access cover using four screws.	


SCREW
ACCESS COVER
LOW PRESSURE (SUCTION) SERVICE VALVE
HIGH PRESSURE (DISCHARGE) SERVICE VALVE
VALVE (CLOSED)
LOW PRESSURE HOSE
CHARGING VALVE
HIGH PRESSURE HOSE
VALVE (OPEN)
DRIER / FILTER
TYPICAL REFRIGERANT 22 DRUM IN POSITION TO CHARGE LIQUID
SCALE

5-l6. REFRIGERATION SYSTEM SERVICING - (PRESSURE TESTING).

This task covers: Test

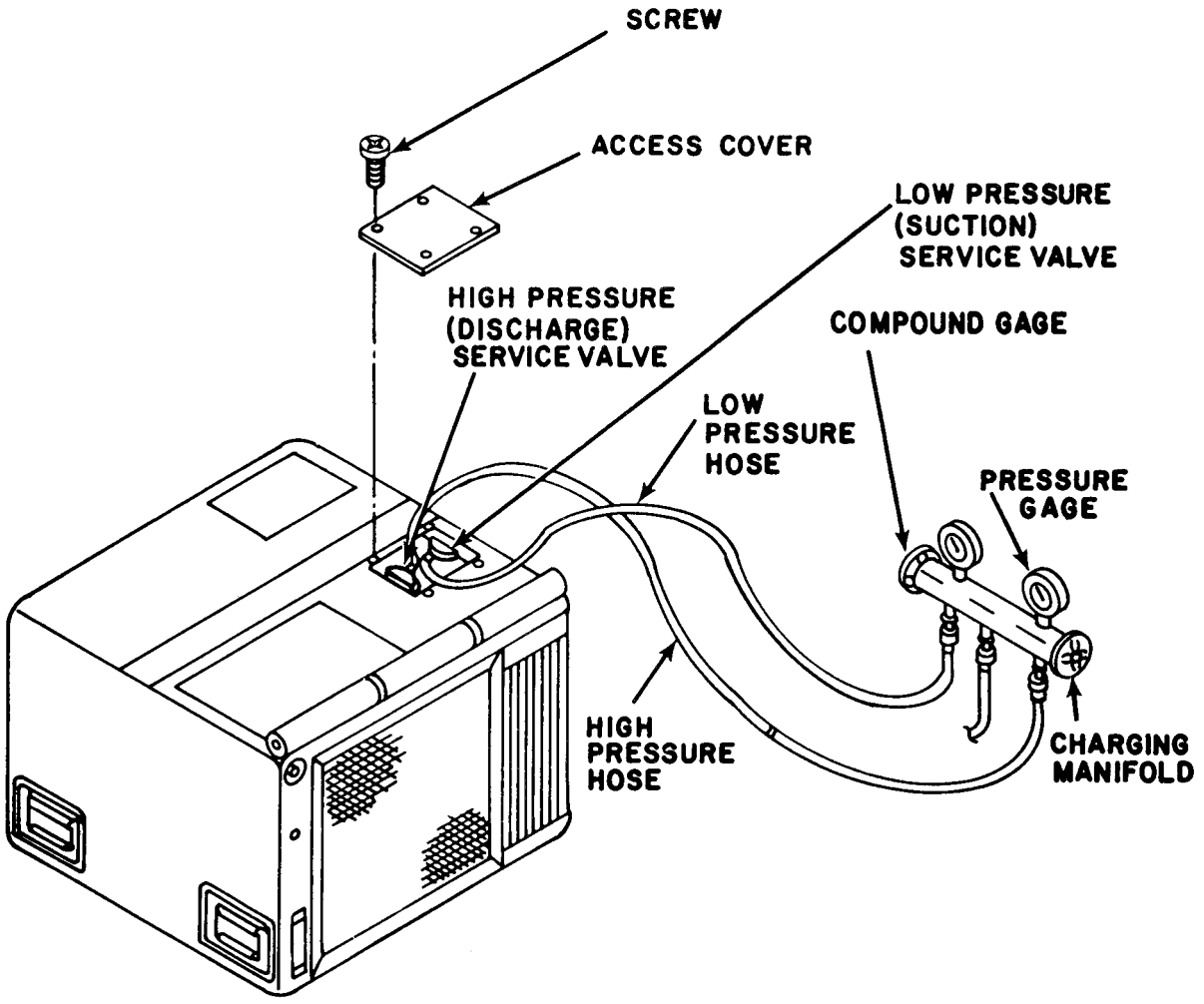
INITIAL SETUP
Equipment Condition

Para	Conditioner Description
4-15	Service Valve Access Cover removed.

LOCATION/ITEM	ACTION	REMARKS
	WARNING Check to see that power is disconnected.	
1. Charging Valve Caps	Remove caps from high and low pressure service valves.	
2. Refrigeration System Pressure	a. Connect low pressure gage hose of manifold valve to suction service valve. b. Connect high pressure hose of manifold valves to discharge service valve. c. Purge hoses - open discharge and suction service valves. d. Check that manifold valves are closed. e. Start air conditioner. f. Compare gage readings with the normal range of system pressure as shown on the following table.	

Table 5-2. Normal Temperature-Pressure Relationships

Temperatures	Pressure Range (PSIG)			
Outdoor Ambient	50°F (10°C)	75°F (24°C)	lOO°F (38°C)	125°F (52°C)
90°F (32°C) Return Airto Unit (Dry Bulb)	55-65 Suction 125-160 Discharge	59-70 Suction 175-210 Discharge	60-75 Suction 255-295Discharge	75-90 Suction 370-425 Discharge
80°F (27°C) Return Airto Unit (Dry Bulb)	58-65 Suction 120-155 Discharge	58-70 Suction 170-205 Discharge	60-75 Suction 250-290 Discharge	65-75 Suction 370-425 Discharge



5-16. REFRIGERATION SYSTEM SERVICING - (PRESSURE TESTING) - Continued.

LOCATION/ITEM	ACTION	REMARKS
	g. Close discharge and suction service valves. h. Disconnect gages. i. Install service valve access cover with screws.	

5-17. DEHYDRATOR - INSPECT/REPLACE.

This task covers:

a. Inspect
b. Removal
c. Installation

INITIAL SETUP

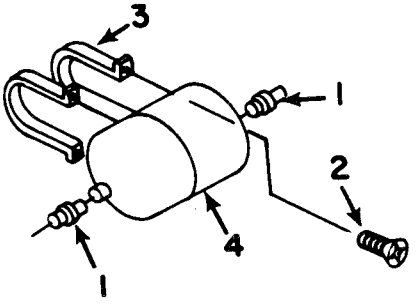
Equipment Condition

Para	Condition Description
4-17	Rear Top Cover Removed.
5-10	Refrigerant System Discharged

Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Dehydrator

LOCATION/ITEM	ACTION	REMARKS
Right Rear Top Of Housing		
Inspect	Check dehydrator for leaks or damage.	
Removal		
	Check that power source is disconnected, Check that refrigerant system is discharged.	
	a. Unscrew flare nuts (1) and remove refrigerant lines from dehydrator. b. Remove two screws (2) and straps (3) to to remove dehydrator (4). c. Remove dehydrator (4).	



5-17. DEHYDRATOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation	a. Position dehydrator (4) between refrigerant lines.	
	b. Tighten flare nuts (l).	
	c. Install straps (3) with screws (2).	
	d. Leak check refrigerant system.	See Para. 5-13.
	e. Evacuate refrigerant system.	See Para. 5-14.
	f. Charge refrigerant system.	See Para. 5-15.
	g. Install top covers.	See Para. 4-17.

5-18. EVAPORATOR COIL - REPLACE/REPAIR.

This task covers:

a. Removal b. Installation

INITIAL SETUP

Equipment Condition

Para	condition Description
4-17	Top Covers removed.
4-18	Evaporator Outlet Louver removed.
5-10	System refrigerant discharged.
4-20	Mist eliminator and bracket removed.

Test Equipment
Halogen Leak Detector

Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Dry cleaning solvent (P-D 680) (App.D, Item 16)
Nitrogen (App.D, Item 4)
Brazing Alloy (App.D, Item 5 or 6)
Brazing Flux (App.D, Item 7)
Warm, soapy water
Brush, wire
Cloth, line free (App.D, Item 9)
Dehydrator

LOCATION/ITEM	ACTION	REMARKS

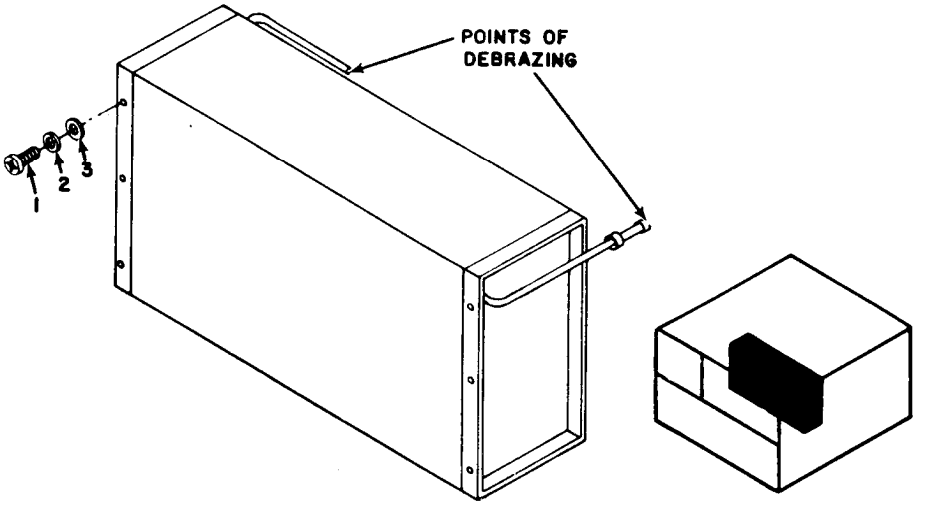
WARNING

Purge system with dry nitrogen prior to soldering; refrigerant heated by flame or hot surfaces creates phosgene gas, a highly toxic gas.

Do not let refrigerant touch you or inhale refrigerant gas. Be especially careful to prevent refrigerant from coming in contact with your eyes. In case of refrigerant leaks, ventilate area at once.

5-18. EVAPORATOR COIL - Continued.

LOCATION/ITEM	ACTION	REMARKS
	WARNING Check that power source is disconnected. Follow general debrazing instructions given in paragraph 5-12. Provide a flow of dry nitrogen through the refrigeration system while debrazing connections. The polyurethane foam used as insulation in the air conditioner will break down to form toxic gases if exposed to the flame of a torch at brazing temperature.	
Removal	a. Remove screws (l), lockwashers, (2) and flat washers (3) securing evaporator coil to housing. b. Debraze tubing from evaporator coil. c. Carefully lift the evaporator coil from the air conditioner. d. Remove dehydrator.	



5-18. EVAPORATOR COIL - Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspection	Inspect the evaporator coil for bent or torn fins and for damaged connections.	
Cleaning	**WARNING** Dry cleaning solvent (App.D, Item 16) used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Clean coil using cleaning solvent (App.D, Item 16) and soft brush.	
Installation	a. Place coil in air conditioner, and secure coil to brackets with screws, lockwashers and flat washers. b. Connect tubing to coil. Before brazing joints, provide a flow of dry nitrogen through refrigeration system to protect internal surfaces of the tubing and fittings. c. Purge, install new dehydrator and charge refrigeration system. d. Install top Covers. e. Install mist eliminator. f. Install evaporator outlet louver.	 See para. 5-12. See Para. 5-11. See Para. 5-15. See Para. 4-17. See Para. 4-20. See Para. 4-18.

5-19. EXPANSION VALVES - REPLACE.

This task covers:

a. Removal
b. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Top Covers removed.
5-10	Discharge refrigerant.
5-20	Solenoid Valve Coil (L1) removed.

Special Tools
Tool Kit SC 5180-90-CL-N18

Test Equipment
Halogen Leak Detector

Materials/Parts
Nitrogen (App.D, Item 4)
Brazing Alloy, Silver (App.D, Item 5 & 6)
Brazing Flux (App.D, Item 7)
Hot Water
Cloth, lint free (App.D, Item 9)
Dehydrator

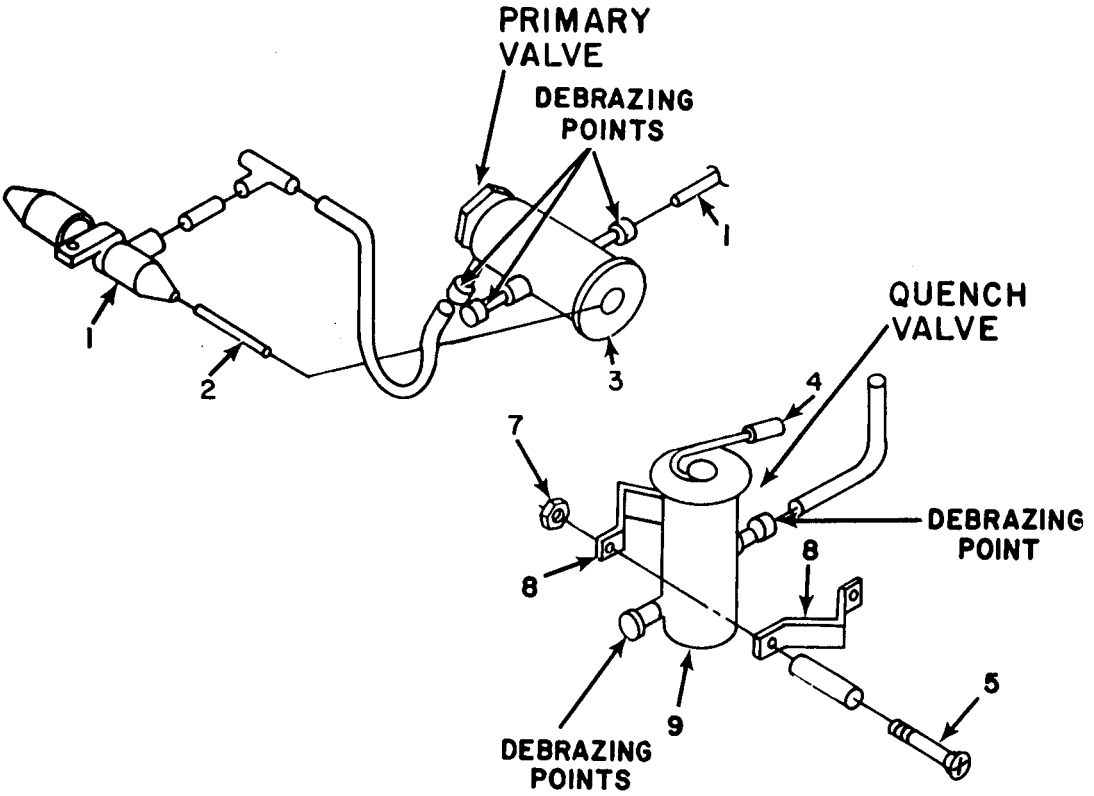
LOCATION/ITEM	ACTION	REMARKS

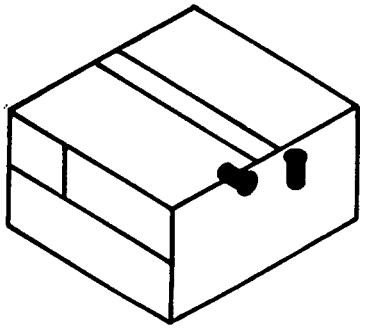
WARNING

The burning of polyurethane foams is dangerous. Due to the chemical composition of a polyurethane foam, toxic fumes are released when it is burned or heated. If it is burned or heated indoors, such as during a welding operation in its proximity, precautions should be taken to adequately ventilate the area. An exhaust system equivalent to that of a spray paint booth should be used. Air supply respirators, approved by the National Institute for Occupational Safety and Health or the U.S. Bureau of Mines should be used for all welding in confined spaces, and when ventilation is inadequate.

5-19. EXPANSION VALVES - Continued.

LOCATION/ITEM	ACTION	REMARKS
	WARNING Individuals who have chronic or recurrent respiratory conditions, including allergies and asthma, should not be employed in this environment. Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with eyes. In case of refrigerant leaks., ventilate area immediately. Check that power source is disconnected. Check that system is discharged of refrigerant. When performing brazing/debrazing operations, wrap valves with wet rags to act as a heat sink.	
Removal 1. Primary Expansion Valve	a. Soften mastic in bulb well (4) if necessary, by warming with a cloth soaked in hot water and wrung out, a heat lamp, or equivalent. b. Withdraw bulb (3) from well taking care to prevent damage to capillary tube. c. With dry nitrogen flowing through refrigerant system, debraze tubing to valve (2) at debrazing point. d. Remove expansion valve (2) from unit.	See Para. 5-11 and 5-12.


PRIMARY
VALVE
DEBRAZING
POINTS
1
1
2
3
QUENCH
VALVE
4
7
DEBRAZING
POINT
8
8
5
9
DEBRAZING
POINTS



5-19. EXPANSION VALVES - Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal-Continued 2. Quench Expansion Valve	a. Soften mastic bulb well if necessary, by warming with a cloth soaked in hot water. b. Withdraw the bulb (10) from the well. Take care to prevent damage to the capillary tube. c. Remove two screws (5), two spacers (7), two self locking nuts (6) and two valve mounting brackets (8). d. Debraze tubing from valve (9) at debrazing points. e. Remove quench valve (9).	See Para. 5-12.
Installation 3. Primary Expansion Valve	a. With dry nitrogen flowing through refrigeration system, braze valve (2) to tubing. **CAUTION** Take care to avoid kinking capillary tube. b. Coil excess tubing. c. Insert approximately 1.0 ounce (28,349 gins) of thermal mastic in bulb well. d. Press sensing bulb (3) into well (4) and work back and forth to distribute mastic thoroughly and until capillary end is approximately 1.0 inch (2.54 cm) beyond open end of well. e. Replace dehydrator.	See Para. 5-17

5-19. EXPANSION VALVES - Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation-Continued		
3. Primary Expansion Valve	f. Leak test refrigeration system.	See Para. 5-13.
	g. Evacuate refrigeration system.	See Para. 5-14.
	h. Charge refrigeration system.	See Para. 5-15.
	i. Install Top Covers.	See Para. 4-17.
4. Quench Expansion Valve	a. With dry nitrogen flowing through refrigerant system, braze valve to tubing.	
	CAUTION	
	Take care to avoid kinking capillary tube.	
	b. Coil excess tubing.	
	c. Insert approximately 1.0 ounces (28.349 gins) of thermal mastic in bulb well.	
	d. Press sensing bulb (10) into well and work back and forth to distribute mastic thoroughly and until capillary end is approximately 1.0 inch (2.54 cm) beyond open end of well.	
	e. Install two valve mounting brackets (8) to housing using two screws (5), two spacers (7) and two locknuts (6).	
	f. Replace dehydrator.	See Para. 5-17
	g. Leak test refrigeration system.	See Para. 5-13.
	h. Evacuate refrigeration system.	See Para. 5-14.
	i. Charge refrigeration system.	See Para. 5-15.
	j. Install Top Covers.	See Para. 4-17.

5-20. SOLENOID VALVES-REPLACE.

This task covers:

a. Removal b. Installation

INITIAL SETUP

Equipment Condition

Para	condition Description
4-17	Rear top cover removed.
5-10	Refrigerant system discharged.

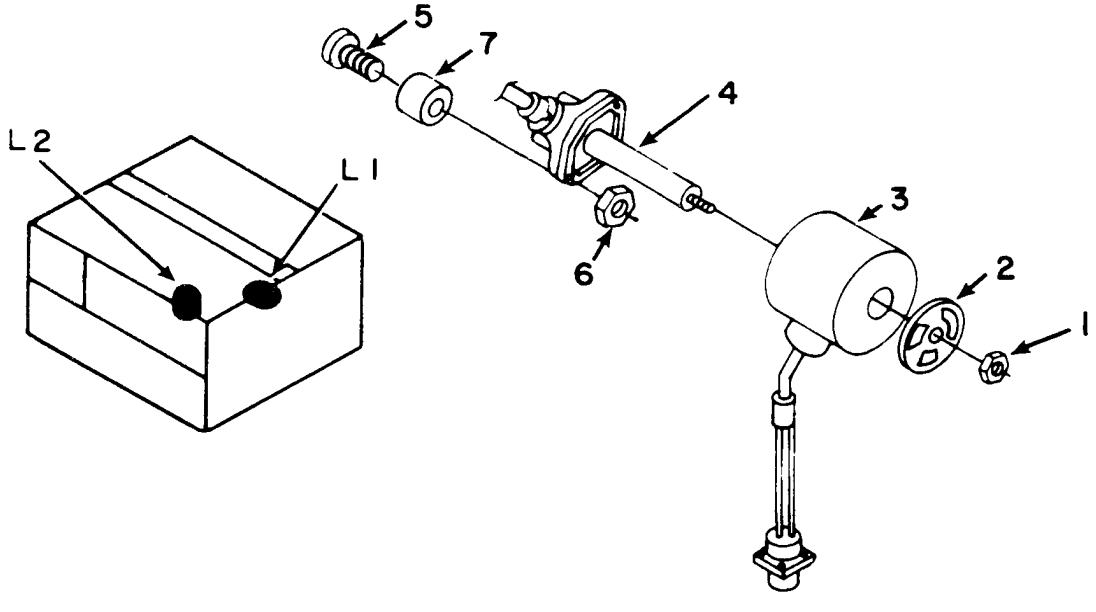
Materials/Parts
- Brazing Alloy, Silver (App. D, Item 5 & 6)
- Flux, Soldering (App.D, Item 7)
- Dehydrator

Special Tools
- Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
TOP OF HOUSING	**WARNING** Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with eyes. In case of refrigerant leaks, ventilate area immediately. Check that power source is disconnected. Check that system is discharged of refrigerant. **CAUTION** When performing brazing/debrazing operations, wrap valves with wet rags to act as a heat sink.	

5-20. SOLENOID VALVES-Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal		
1. Solenoid L2		
	a. Disconnect electrical connector from bulkhead.	
	b. Remove plunger nut (1) and name-plate (2) from plunger (4) and remove coil (3).	
	c. Remove two screws (5), two nuts (6), and two spacers (7) securing the valve body to the housing,	
	d. Purge system.	See Para. 5-11.
	e. Debraze and remove valve.	See Para. 5-12.
2. Solenoid L1		
	a. Disconnect electrical comector of solenoid coil from bulkhead.	
	b. Remove plunger nut (1) and name-plate (2) from plunger (4) and remove coil (3).	
	c. Remove two screws (5), two nuts (6), and two spacers (7) securing the valve body to the housing.	
	d. Purge system.	See Para. 5-11.
	e. Debraze and remove valve.	See Para. 5-12.



5-20. SOLENOID VALVES - Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation 3. Solenoid L2		
	a. Mount valve body (4) to bracket using two screws (5), two nuts (6), and two spacers (7).	
	b. Braze valve body (4) into lines.	
	c. Install coil and secure to plunger with plunger nut (1).	
	d. Connect electrical leads.	
	e. Replace dehydrator.	See Para. 5-17.
	f. Leak test refrigeration system.	See Para. 5-13.
	g. Evacuate refrigeration system.	See Para. 5-14.
	h. Charge refrigeration system.	See Para. 5-15.
	i. Install Rear Top Cover.	See Para. 4-17.
Installation- Continued 4. Solenoid L1		
	a. Solder valve body on tubing with dry nitrogen flowing.	
	b. Secure body to housing with screws and lockwashers. Install from outside of housing into valve body.	
	c. Place diaphragm in the body with the pilot port extension away from body. Hold plunger with synthetic seat against pilot port. Make sure that new preformed packings are in place and lower coil assembly over plunger. Install body screws.	
	d. Connect electrical connector of solenoid coil to bulkhead.	
	e. Replace dehydrator.	See Para. 5-17.
	f. Leak test refrigeration system.	See Para. 5-13.
	g. Evacuate refrigeration system.	See Para. 5-14.
	h. Charge refrigeration system.	See Para. 5-15.
	i. Install Rear Top Cover.	See Para. 4-17.

5-21. PRESSURE REGULATOR VALVE - REPLACE.

This task covers:

a. Removal
b. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Top Covers removed.
5-10	Refrigerant system discharged.
5-22	Condenser louver actuating cylinder removed.
5-20	Solenoid Valve Coil (Ll) removed.

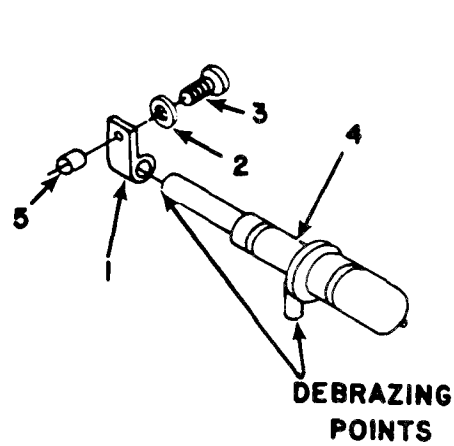
Materials/Parts
- Nitrogen
- Brazing Alloy, Silver (App.D, Item 5 & 6)
- Brazing Flux (App.D, Item 7)
- Dehydrator

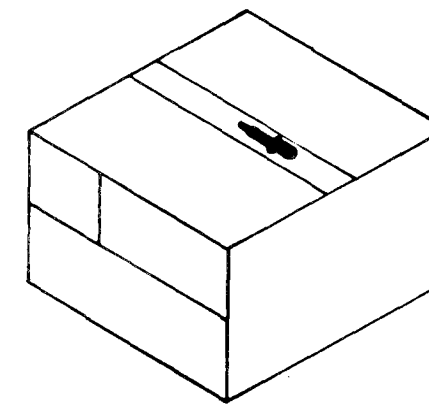
Special Tools
- Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
TOP OF HOUSING	**WARNING** Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with eyes. In case of refrigerant leaks, ventilate area immediately. Check that power source is disconnected. Check that system is discharged of refrigerant.	
Removal	a. Purge system by initiating a flow of dry nitrogen through the refrigerant system.	See Para. 5-11.
	b. Debraze the tubing from the pressure regulator valve at debrazing points.	See Para. 5-12.

5-21. PRESSURE REGULATOR VALVE - Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal- Continued	c. Remove clamp (l), spacer (5), screw (3) and washer (2) holding valve (4). d. Remove valve.	
Installation	a. Connect tubing to valve and, with dry nitrogen flowing through tubing braze connections. b. Fasten clamp (1) to housing wall and valve using screw (3), lockwasher (2) and post spacer (5). c. Install Solenoid coil (Ll). d. Replace dehydrator. e. Leak test refrigerant system. f. Evacuate refrigerant system. g. Charge refrigerant system. h. Install Rear and Center Top Covers.	 See Para. 5-12. See Para. 5-20. See Para. 5-17. See Para. 5-13. See Para. 5-14. See Para. 5-15. See Para. 4-17.





5-22. ACTUATING CYLINDER-INSPECT/ADJUST/REPLACE.

This task covers:

a. Inspect
b. Removal
c. Installation
d. Adjustment

INITIAL SETUP

Equipment Condition

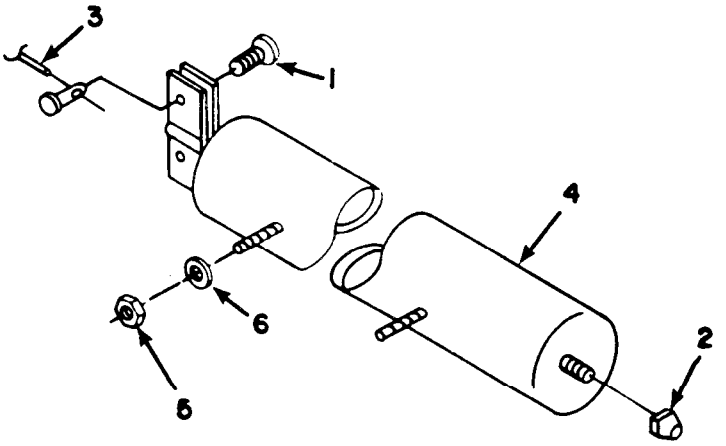
Para	Condition Decription
4-17	Top Covers removed.
5-10	Refrigerant System discharged.
5-20	Solenoid Coil (Ll) removed.

Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Dehydrator

LOCATION/ITEM	ACTION	REMARKS
TOP OF HOUSING	**WARNING** Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with eyes. In case of refrigerant leaks, ventilate area immediately. Check that power source is disconnected. Check that system is discharged of refrigerant.	
Inspect	Check for visible damage to cylinder and actuating wire.	
Removal	a. Loosen mechanical post screw (1) to loosen control wire in flexible cable (3). Straighten control wire. b. Disconnect flare nut (2) from end of actuating cylinder (4).	

5-22. ACTUATING CYLINDER - Continued.

LOCATION/ITEM	ACTION	REMARKS
		
Removal-(Continued)	C. Remove two nuts (5) and two flat washers (6) from evaporator side of partition and remove actuating cylinder.	
Installation	a. Install actuating cylinder (4) with studs through openings in partition. Install two flat washers (6) and two nuts (5) on studs. b. Connect the flare nut (2). c. Insert wire ends into the opening in mechanical post of actuating cylinder.	
Adjustment	a. Extend actuator rod until there is a 1/4 inch (.635 centimeters) space between inner edge of mechanical post bracket and the face of the cylinder. Tighten the screw (1) on the mechanical post. b. Replace dehydrator. c. Leak test refrigeration system. d. Evacuate refrigeration system. e. Charge refrigeration system. f. Install Top Rear and Center Covers.	 See Para. 5-17. See Para. 5-13. See Para. 5-14. See Para. 5-15. See Para. 4-17.

5-23. PRESSURE SWITCHES - INSPECT/TEST/REPLACE.

This task covers:

a. Inspect
b. Removal
c. Test
d. Installation

INITIAL SETUP

Equipment Condition

Para	condition Description
4-17	Top Covers removed.
4-20	Mist eliminator and bracket removed.
4-25	Junction Box removed.
5-10	Refrigerant system discharged.

Test Equipment
Multimeter or Continuity Tester
Halogen Leak Detector

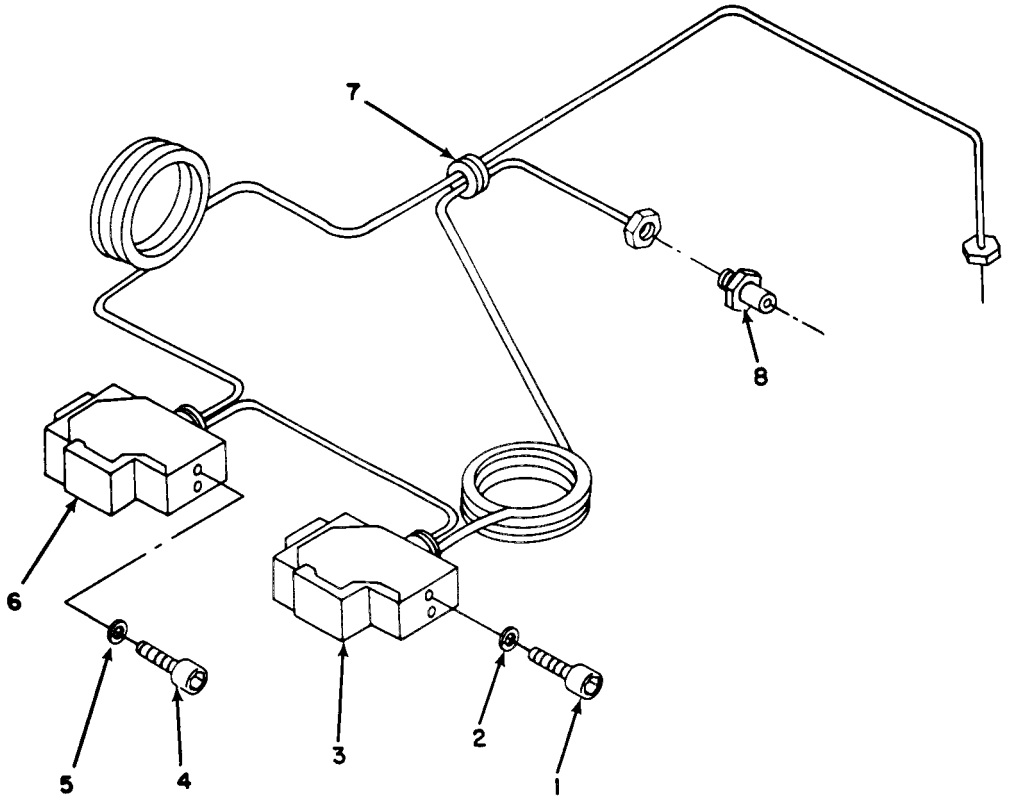
Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Nitrogen (Item 4, App.D)
Dehydrator
Refrigerant

LOCATION/ITEM	ACTION	REMARKS
	WARNING Check that power source is disconnected before doing any maintenance on the air conditioner. Check that refrigerant system is discharged of refrigerant.	
FRONT OF HOUSING		
Inspect	Check wiring and sensing tube for damage.	
Removal	a. Remove two mounting screws (1 and 4) and two lockwashers (2 and 5) from each switch (3 and 6). b. Unhook the electrical leads from the pressure switches. Tag leads for identification at assembly.	

5-23. PRESSURE SWITCHES- Continued.

LOCATION/ITEM	ACTION	REMARKS



Removal-Continued

c. Unscrew flare nuts from capillary tube connections (8). Remove grommet (7) from partition and carefully pull capillary tubes through partition.

d. Remove pressure switches (3 and 6).

Test (Electrical)

a. Test for continuity across terminals of switch. If no continuity exists, press the reset button and retest.

b. If the switch exhibits continuity, switch may be good.

c. If the switch does not indicate continuity, replace.

5-23. PRESSURE SWITCHES-Continued.

LOCATION/ITEM	ACTION	REMARKS
Test-Continued (Pressure)	d. Using nitrogen, pressurize low pressure cutout switch (10-20 PSIG range/.35-.69 kg/cm^2 range).	
	e. Check for no continuity across terminals.	
	f. If continuity exists, replace defective switch.	
	g. Using nitrogen, pressurizing high pressure cutout switch (470-490 PSIG range/16.3-17.0 kg/cm^2 range).	
	h. Check for no continuity across terminals.	
	i. If continuity exists, replace defective pressure switch.	
Installation	a. Insert ends of capillary tubes through hole in partition, being careful to avoid kinking tubes.	
	b. Install grommet (7) in the partition by sliding it over both capillary tubes.	
	c. Connect capillary tube flare nuts to fittings (8).	
	d. Install switches (3 and 6) and secure with two screws (1 and 4) and two lock-washers (2 and 5). Keep excess capillary tubing coiled neatly without kinks.	
	e. Connect electrical leads and remove tags.	See E-1 and E-2, Wiring Diagrams
	f. Install mist eliminator bracket.	
	g. Replace dehydrator.	See Para. 5-17.
	h. Leak test refrigerant system.	See Para. 5-13.
	i. Evacuate refrigerant system.	See Para. 5-14.
	j Charge system.	See Para. 5-15.
	k. Install Junction Box.	See Para. 4-25.
	1. Install mist eliminator.	See Para. 4-20.
	m. Install Evaporator Inlet Louver.	See Para. 4-18.
	n. Install Top Covers.	See Para. 4-17.

5-24. SERVICE VALVES - INSPECT/REPLACE.

This task covers:

a. Inspection
b. Removal
c. Installation

INITIAL SETUP

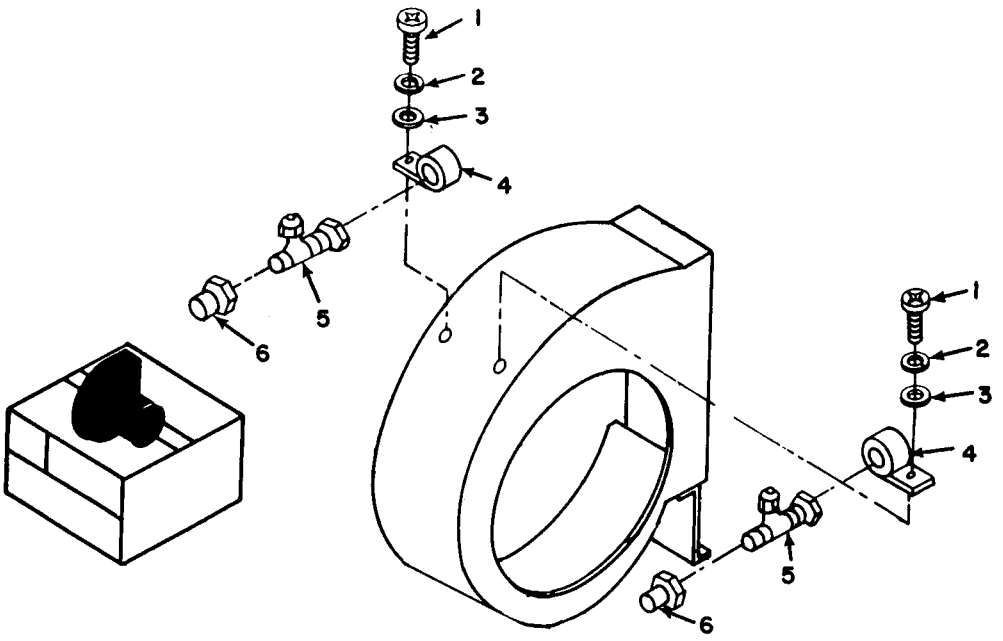
Equipment Condition

Para	Condition Description
4-17	Top Covers removed.
5-10	Refrigerant system discharged.

Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Dehydrator

LOCATION/ITEM	ACTION	REMARKS
INTERIOR OF HOUSING	**WARNING** Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with eyes. In case or refrigerant leaks, ventilate area immediately. Check power source is disconnected. Check that system is discharged of refrigerant.	
Inspection	a. Visually inspect all valves for signs of damage. b. Inspect valve fittings for leaks.	
Removal	a. Remove screw (l), lock washer (2), flat washer (3), and clamp (4) from each service valve (5). b. Unscrew and remove flare nuts from suction and discharge service valves. c. Remove suction and discharge service valves. d. Remove dehydrator.	See Para. 5-17.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5-24. SERVICE VALVES - Continued.

LOCATION/ITEM		ACTION	REMARKS
Repair/Replace		Repair is limited to replacement	
Installation	a.	Connect suction and discharge service valves (5) to refrigerant piping.	
	b.	Tighten flare nuts (6) at suction and discharge service valves (5).	
	c.	Secure suction and discharge service valves (5) to condenser scroll with screws (1), lock washers (2), flat washers (3) and clamps (4).	
	d.	Replace dehydrator,	See Para. 5-17.
	e.	Leak test refrigeration system.	See Para. 5-13.
	f.	Evacuate refrigeration system.	See Para. 5-14.
	g.	Charge refrigeration system.	See Para. 5-15.
	h.	Install Top Covers,	See Para. 4-17.

5-25. PRESSURE RELIEF VALVE - INSPECT/REPLACE.

This task covers:

a. Inspect
b. Removal
c. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Rear Top Cover removed.
5-10	Refrigerant system discharged,

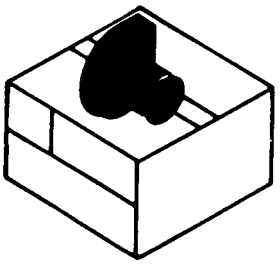
Special Tools
Tool Kit SC 5180-90-CL-N18

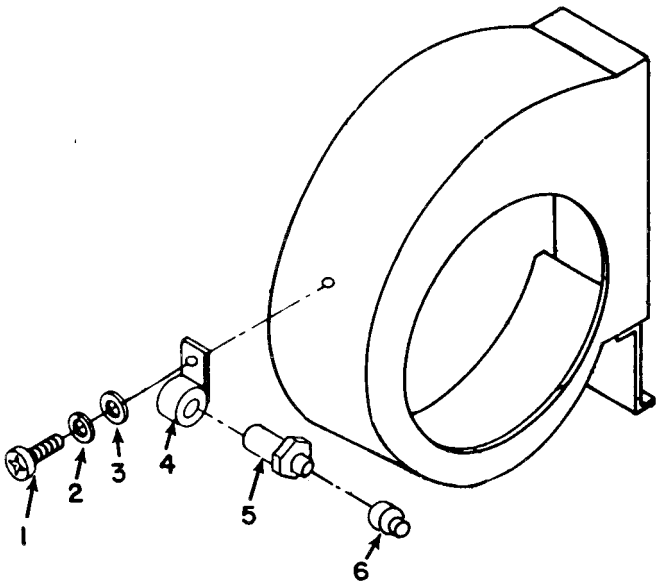
Materials/Parts
Dehydrator

LOCATION/ITEM	ACTION	REMARKS
TOP OF HOUSING	**WARNING** Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with eyes. In case of refrigerant leaks, ventilate area immediately. Check that power source is disconnected. Check that system is discharged of refrigerant.	
Inspect	Check valve and attaching hardware for damage.	
Removal	a. Remove screw (l), lockwasher (2), flat washer (3) and clamp (4). b. Unscrew valve (5) from adapter (6).	
Installation	a. Install pressure relief valve (5) in adapter (6). Install loop clamp (4) on valve and secure clamp with screw (l), lockwasher (2), and flat washer (3).	

5-25. PRESSURE RELIEF VALVE - Continued.

LOCATION/ITEM	ACTION	REMARKS
	b. Replace dehydrator.	See Para. 5-17.
	c. Leak test refrigeration system.	See Para. 5-13.
	d. Evacuate refrigeration system.	See Para. 5-14.
	e. Charge refrigeration system.	See Para. 5-15.
	f. Install Rear Top Cover.	See Para. 4-17.





5-26. CONDENSER COIL - REPLACE.

This task covers:

a. Removal b. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
5-4	Condenser guard removed.
4-17	Top Rear Cover removed.
5-10	Discharge refrigerant system.

Test Equipment
Halogen Leak Detector

Special Tools
Tool Kit SC 5180-90-CL-N18

Materials/Parts
Dry Cleaning Solvent (App.D, Item 16)
Cloth, lint free (App.D, Item 9)
Oil (App.D, Item 14)
Dehydrator

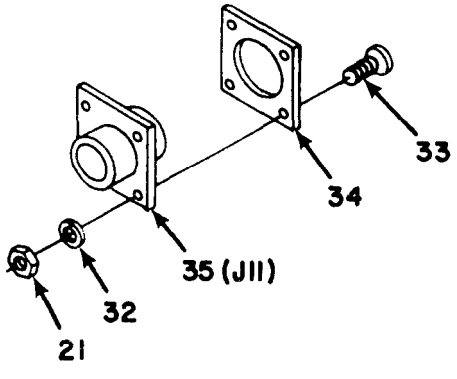
LOCATION/ITEM	ACTION	REMARKS

WARNING

Ensure power source is disconnected.
Ensure refrigerant system is discharged.

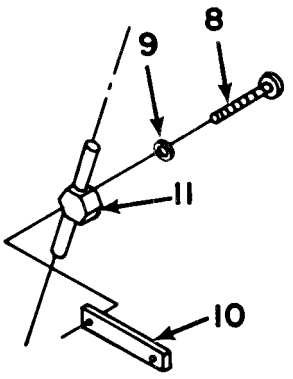
Removal

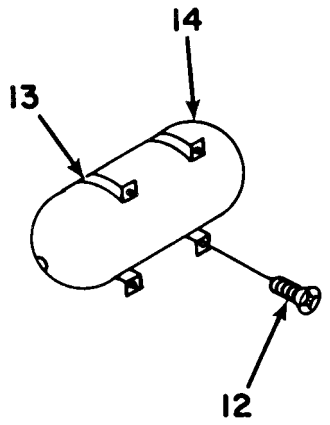
a. Remove screws (33), lockwashers (32), nuts (21) and gasket (34) attaching auxiliary power input receptacle J11 (35) to housing.



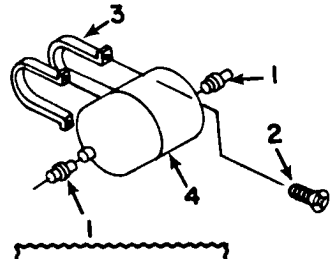
5-26. CONDENSER COIL - Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal- (Continued)		
	b. Remove clamp and mounting hardqare from the low (suction) side of the line.	
	c. Move auxiliary power receptacle J-11 and wiring to aid in condenser coil removal.	See Para. 5-26.
	d. Remove two screws (8), two lockwashers (9), and mounting plate (10) attaching liquid sight indicator (11) to housing.	
	e. Remove. four screws (12) and two mounting clamps (13) attaching receiver tank (14) to housing.	





5-26. CONDENSER COIL - Continued.

LOCATION/ITEM	ACTION	REMARKS
	f. Purge system.	See Para. 5-11.
	g. Reposition electrical wiring away from piping area to be debrazed.	
	h. Debraze condenser inlet tube tee.	See Para. 5-12.
	i. Disconnect flare nut on dehydrator.	
		
	CAUTION Use extreme care in removing condenser coil from housing to avoid damaging fins and coil piping.	
	j. Remove condenser coil from unit.	
	k. With dry nitrogen flowing, debraze receiver tank and liquid sight indicator from condenser coil.	See Para. 5-12.
Installation	a. Install the receiver tank and liquid sight indicator onto the condenser coil.	See Para. 5-27.
	CAUTION Use extreme care in installing condenser coil assembly into housing to avoid damaging fins, coil, piping and refrigerant system tubing.	
	b. Install condenser coil assembly into air conditioner.	
	c. Purge system.	See Para. 5-11.
	d. Braze condenser inlet tube into tee.	See Para. 5-12.

5-26. CONDENSER COIL - Continued.

LOCATION/ITEM	ACTION	REMARKS
	e. Replace dehydrator and. connect flare nuts.	See Para. 5-17.
	f. Leak test refrigeration system.	See Para. 5-13.
	g. Evacuate refrigeration system.	See Para. 5-14.
	h. Charge refrigeration system.	See Para. 5-15.
	i. Install clamps and screws to secure receiver tank, dehydrator, and liquid sight indicator to housing.	
	j. Install condenser guard with screws and lockwashers	
	k. Reposition electrical wiring to original position and tie as required.	
	1. Install auxiliary power receptacle J11 (35) and wiring and secure to housing using four screws (33), four lockwashers (32) and four nuts (21).	
	m. Install clamp and mounting hardware to the low side suction line.	
	n. Install Rear Top Cover.	See Para. 4-17.

5-27. LIQUID SIGHT INDICATOR - REPLACE.

This task covers:

a. Removal
b. Installation

INITIAL SETUP

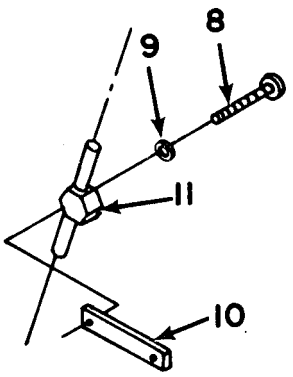
Equipment Condition

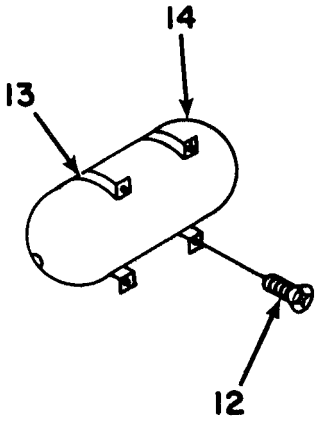
Para	Condition Description
4-17	Rear Top Cover removed.
5-10	Refrigerant system discharged.
5-26	Condenser Coil removed.

Materials/Parts
Nitrogen (App.D, Item 4)
Brazing Alloy, Silver (App.D, Item 5 and 6)
Brazing Flux (App.D, Item 7)
Dehydrator

Special Tools
Tool Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Removal	a. Remove two screws (8), two lockwashers (9), mounting bracket (10), and hardware.	





	b. With a steady flow of dry nitrogen through refrigeration system, debraze liquid sight indicator (11) from condenser coil and attached tubing.	See Para. 5-12.

5-27. LIQUID SIGHT INDICATOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation	a. With a steady flow of dry nitrogen through refrigeration system, braze liquid sight indicator onto condenser coil and tubing.	See Para. 5-12.
	b. Install condenser coil assembly.	See Para. 5-26.
	c. Install dehydrator.	See Para. 5-17.
	d. Leak check refrigerant system.	See Para. 5-13.
	e. Evacuate refrigerant system.	See Para. 5-14.
	f. Charge refrigerant system.	See Para. 5-15.
	g. Install Rear Top Cover.	See Para. 4-17.

5-28. COMPRESSOR - TEST/REPAIR/REPLACE.

This task covers:

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

iNITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Top Covers removed.
5-9	Refrigerant System discharged.
5-26	Condenser Coil removed.

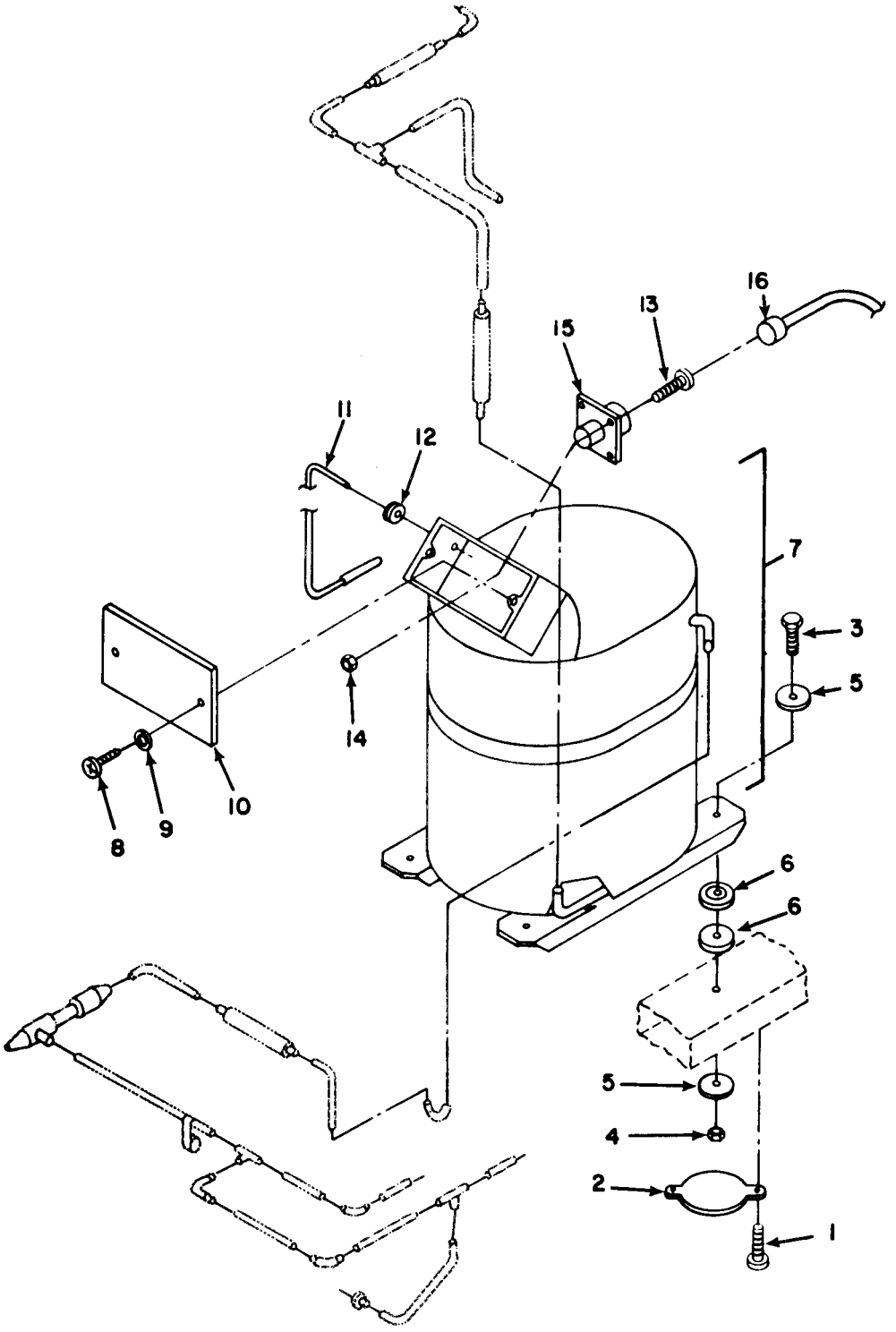
Special Tools

Multimeter or Ohmmeter
Tool Kit SC 5180-90-CL-N18
Heat Gun

Materials/Parts

Nitrogen (App.D, Item 4)
Refrigerant R-22 (App.D, Item 10)
Refrigerant R-11 (App.D, Item 12)
Brazing Alloy, Silver (App.D, Item 5 & 6)
Brazing Flux (App.D, Item 7)
Clean Glass Container
Heat Shrink Tubing
Dehydrator

LOCATION/ITEM	ACTION	REMARKS
	WARNING Disconnect air conditioner power supply before doing maintenance work on the electrical system.	
Test	a. Disconnect the compressor electrical connector plug (P10) (16). b. Using a multimeter, test for continuity between pins A and B, B and C, and C and A of the compressor electrical receptacle (15). Continuity should exist. If not, replace compressor.	See Wiring Diagrams. (Figures E-1 and E-2)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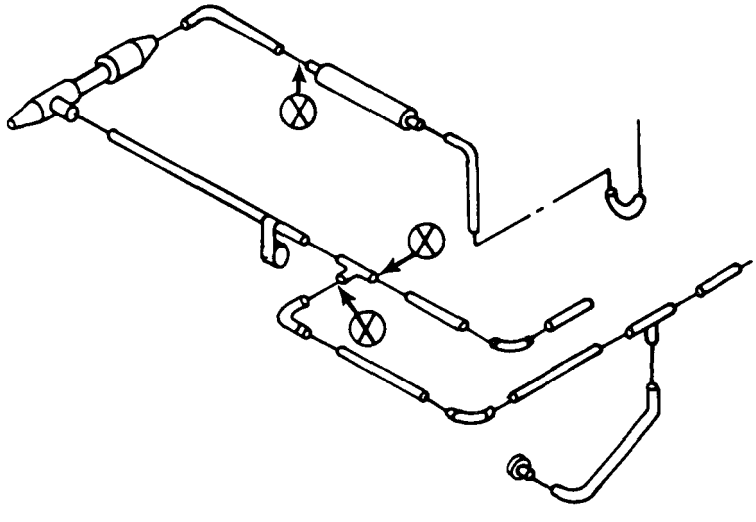
5-28. COMPRESSOR - Continued,

LOCATION/ITEM	ACTION	REMARKS
Test-Continued		
	c. Check for continuity between pins A, B and C and the compressor housing. No continuity should exist. If continuity exists, replace compressor.	
	d. Check for continuity between pins D and E. Continuity should exist. If the high temperature thermostat is open, let the compressor cool, then recheck for continuity. If continuity does not exist after allowing the compressor to cool, replace compressor.	See Para. 5-12.
	e. If compressor windings are bad, check for compressor burn-out prior to installing new compressor.	See Para. 5-28 (Decontamination).
Removal	a. With dry nitrogen flowing through refrigerant system, debraze tubing from connections (X).	See Para. 5-12.
	NOTE The compessor is mounted to the housing by bolts inserted from the inside of the unit, attaching to locknuts which are inserted from the underside of the unit. Thus, it is necessary that the entire air conditioner be raised and placed on blocks of sufficient height to allow for removal of the locknuts below the base.	
	b. Loosen eight screws (1) and open four access covers (2) on bottom of unit.	

5-28. COMPRESSOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Removal-Continued	c. Remove four screws (3), eight flat washers (5) and four self-locking nuts (4) securing compressor to housing.	
	d. Remove compressor wiring harness.	
	WARNING Compressor weighs as much as 55 pounds (25.0 kg) and could cause injury to personnel and damage to equipment if not handled properly while removing from unit.	
	e. Remove compressor horizontally through condenser coil opening at rear of unit.	
	f. Remove eight resilient mounts (6).	
	g. Debraze tubing assemblies from compressor at connections (X).	See Para. 5-12.



5-28. COMPRESSOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
	WARNING Avoid inhaling fumes and burns from any acid formed by burn out of oil and refrigerant.	
Decontamination	a. After removal of a bad compressor from the refrigeration system, tip the compressor toward the discharge port to drain sample of oil into a clear glass container. b. If the oil is clean and clear, and does not have a burnt acid smell, the compressor did not fail because of motor burn out. If a burn out is not indicated, proceed to installing a replacement compressor. c. If the oil is black, contains sludge, and has a burnt acid odor, the compressor failed because of motor burn out. d. You must clean the entire refrigeration system after a burn out has occurred, since contaminants will have been carried to many corners and restrictions in the piping and fittings. These contaminants will soon mix with new refrigerant gas and compressor oil to cause repeated burn outs.	
	WARNING Compressed air used for cleaning purposes will not exceed 30 psi (2.1 kg/cm^2). Do not direct compressed air against skin. Use goggles or full face shield.	

5-28. COMPRESSOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Decontamination-Continued	e. Remove the dehydrator (filter-drier) and blow down each leg of the refrigeration system. To do this, connect a cylinder of dry nitrogen to each dehydrator connection, in turn, and open the cylinder shutoff valve for at least 30 seconds at 50 PSIG (3.5 kg/cm^2) pressure. f. Connect the two dehydrator fittings with a jumper, locally manufactured from refrigerant tubing and fittings. **g.** Clean system by back-flushing with liquid R-11 from pressurized cylinder or circulating pump and reservoir with pressure of at least 100 psig. h. If pump is used, connect the discharge line of the refriferant system to the discharge side of pump. i. Connect a line containing a filter to the suction line in the unit. NOTE An unused dehydrator or other suitable medium may be used as a filter. j. The other end of the temporary suction line should be connected to a small drum or suitable reservoir. k. A line should be run from the bottom of the reservoir to the inlet of the pump.	

5-28. COMPRESSOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Decontamination-Continued	**WARNING** Avoid inhaling fumes and burns from any acid formed by burnout of oil and refrigerant. Wear a gas mask if area is not thoroughly ventilated. Wear protective goggles or glasses to protect eyes. Wear rubber gloves to protect hands. L Fill reservoir with fluorocarbon refrigerant, R-11, and start the pump. Continue filling the reservoir with refrigerant , R-11, until it begins to pour out of the return line. Continue flushing for at least 15 minutes. m. Reverse the pump connections, replace the filter with a new filtering medium, and back-flush the system for an additional 15 minutes. n. Remove the pump, reservoir, filter, and dehydrator jumper. Place an empty container below the compressor connections, and connect a cylinder of dry nitrogen to each filter-drier connection in turn. Blow down each leg of the system at 50 PSIG (3.5 kg/cm^2) for at least 30 seconds. o. Disconnect the dry nitrogen cylinder. Cap or plug open connections if compressor and filter-drier are not to be installed immediately.	

5-28. COMPRESSOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Repair-Wiring	a. Remove the insulation to expose 1/2 inch/1.27 centimeters of bare wire on each side of break or damaged insulation.	
	b. Insert the ends into a splice-connector; splice, and crimp the connector to make firm electrical contact.	
	c. Alternatively, heat-shrink tubing may be slipped over one end of the wire before splicing, then heated after the splice is made and soldered so as to cover the spliced area.	
	d. Be sure that no bare wire is exposed after the splice is complete.	
	e. Replace broken terminal lugs with exact duplicates.	
	f. To replace electrical connector, unsolder wires from the solder-wells of the inserts.	
	g. Insert bare ends of the wires in corresponding holes of new insert, and solder in place.	
	h. Check continuity terminal-to-terminal	
Installation	a. Install eight compressor resilient mounts (6).	
	b. Install new compressor having a full and proper charge of oil.	
	c. Secure compressor with four screws (3), eight flat washers (5), and four locknuts (4).	
	d. Connect piping. Provide a flow of dry nitrogen through the system to protect inside surfaces of refrigerant piping from scaling while brazing.	
	e. Replace dehydrator.	See Para. 5-17.
	f. Leak test unit.	See Para. 5-13.
	g. Evacuate the system.	See Para. 5-14.
	h. Charge unit with refrigerant R-22.	See Para. 5-15.
	i. Start the air conditioner and operate the unit for 24 hours.	

5-28. COMPRESSOR - Continued.

LOCATION/ITEM	ACTION	REMARKS
Installation-(Continued)	j. Discharge system and purge with dry nitrogen.	See Para. 5-10 and Para. 5-11.
	k. Evacuate-the system and recharge it with refrigerant R-22.	See Para. 5-14 and Para. 5-15.
	L Install Top Covers.	See Para. 4-17,

5-29. RECEIVER - INSPECT/REPLACE..

This task covers:

a. Removal
b. Inspection
c. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
5-4	Condenser guard removed.
4-17	Top Rear Cover removed.
5-10	Discharge refrigerant system.

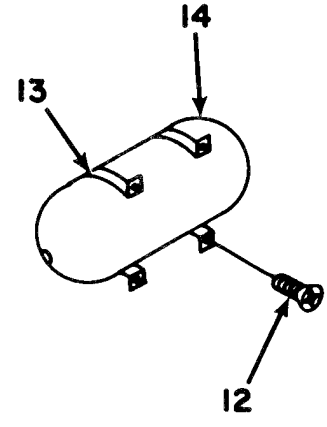
Special Tools

Tool Kit SC 5180-90-CL-N18

Materials/Parts

Dehydrator

LOCATION/ITEM	ACTION	REMARKS
	WARNING Ensure power source is disconnected. Ensure refrigerant system is discharged.	
Removal	Remove four screws (12) and two mounting clamps (13) attaching receiver tank (14) to housing.	



5-29. RECEIVER - Continued.

LOCATION/ITEM	ACTION	REMARKS
Inspection	Inspect receiver for damage.	
Iinstallation	Place receiver tank (14) in unit and braze to tubing. Secure two mounting clamps (13) with four screws (12).	

5-30. REFRIGERATION PIPING - TEST/REPLACE.

This task covers:

a. Test
b. Removal
c. Installation

INITIAL SETUP

Equipment Condition

Para	Condition Description
4-17	Top Covers removed.
5-10	Refrigerant system discharged.

Test Equipment
- Halogen Test Detector
- Leak Standard

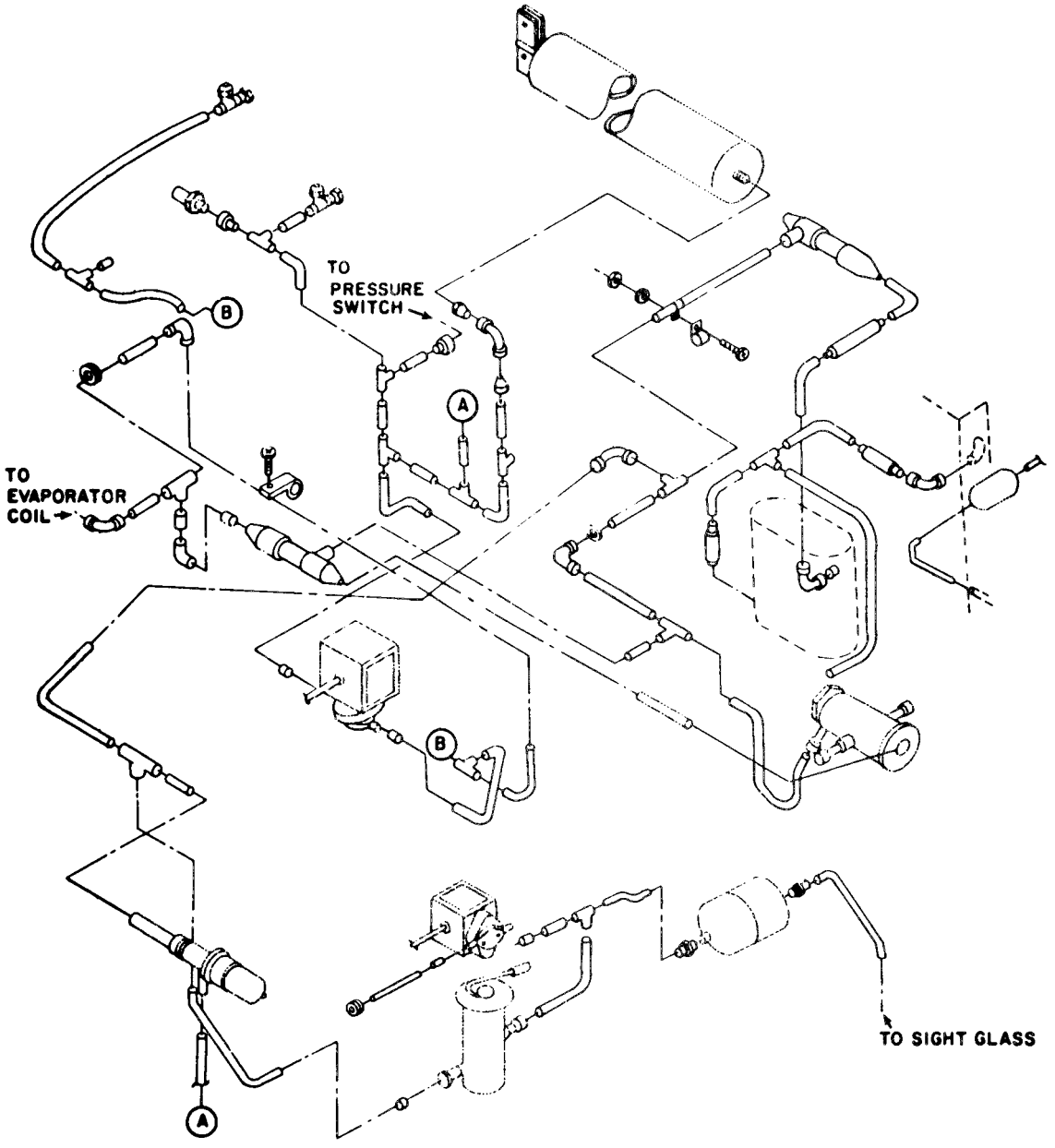
Special Tools
- Tool Kit SC 5180-90-CL-N18

Materials/Parts
- Nitrogen (App.D, Item 4)
- Brazing Alloy, Silver (App.D, Item 5 and 6)
- Brazing Flux (App.D, Item 7)
- Refrigerant-22 (App.D, Item 10)
- Dehydrator

LOCATION/ITEM	ACTION	REMARKS
	WARNING Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with eyes. In case of refrigerant leaks, ventilate area immediately.	
Test	a. Check all piping and connections with a General Electric Type H-2 Halogen Test Detector (or approved equal). b. Calibrate the detector with a General Electric LS-20 leak standard (or approved equal) for a pure refrigerant leak rate of 0.1 ounce per year (2.8349 gms).	

5-30. REFRIGERATION PIPING - Continued.

LOCATION/ITEM	ACTION	REMARKS
Test-(Continued)	C. Replace any piping or connection that is leaking beyond rate of 0.1 ounce (2.8439 gms) per year.	
Removal	a. Debraze and remove tubing only when necessary to remove a defective part.	
	b. When brazing, constantly purge the refrigerant system with dry nitrogen to prevent scale formation within the refrigerant system.	See Para. 5-12.
Installation	a. Braze all copper-to-copper joints with silver solder (App.D, Item 21).	
	b. Braze all copper-to-brass or copper-to-steel with silver solder.	
	c. Braze melting point is 1160°F	
	d. (625°C). Make all braze joints with an atmosphere of inert gas to prevent internal oxidation.	See Para. 5-12.
	e. Service refrigeration system after repairs.	See Para. 5-11 thru 5-16.
	f. Secure Top Covers.	See Para. 4-17.


TO
PRESSURE
SWITCH
TO
EVAPORATOR
COIL
A
B
B
A
TO SIGHT GLASS

CHAPTER 6

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

SECTION I GENERAL INFORMATION

6-1. INTRODUCTION.

Refer to Chapters 3, 4, or 5 for applicable troubleshooting instructions.

SECTION II MAINTENANCE PROCEDURES

6-2. HOUSING - REPAIR/REPLACE.

This task covers:

a. Removal
b. Inspection
c. Repair/Replace

INITIAL SETUP

Materials/Parts
Adhesive (App.D, Item 18)
Cellular Rubber Strips (App.D, Item 19)
Flexible Polyurethane Foam (App.D, Item 20)
Cloth, Lint free (App.D, Item 9)
Acetone (App.D, Item 22)
Methyl-Ethyl-Ketone (MEK) (App.D, Item 23)
Paint, Forest Green (MIL-C-461 68)
Paint Brush
Sandpaper, 240 Grit
Primer (TT-P-1757)

Special Tools
TooI Kit SC 5180-90-CL-N18

LOCATION/ITEM	ACTION	REMARKS
Inspection	a. Inspect for damage. Look for loose, frayed, cracked and missing insulation. b. Visually check for excessive drying of insulation, or shrinkage.	
Removal	a. Scrape and pull off as much of the damaged insulation as possible. **WARNING** Acetone and methyl-ethyl ketone are flammable and their vapors are explosive. Prolonged or repeated inhalation of fumes or contact with the skin can be toxic. Use in a well ventilated area, wear gloves and keep away from sparks or flame.	

6-2. HOUSING - REPAIR/REPLACE.

LOCATION/ITEM	ACTION	REMARKS
Removal-Continued	b. Soften theremaining insulation and adhesive with acetone or MEK (Methyl-Ethyl-Ketone). c. Repeat the softening and scraping process as required. d. Cleanup metal surface with cloth moistened in acetone or MEK.	
Repair/Replace-Insulation	a. Repair loose or torn insulation with adhesive. b. Replace frayed, drying, cracked or missing insulation. c. Cut a sheet of the proper insulating material to correct shape. d. Coat the attaching side with adhesive using a paint brush to ensure complete coverage. e. Coat the metal with adhesive to which the insulation is to be attached. f. Let both surfaces air-dry until the adhesive becomes tacky but will not stick to the fingers. g. Starting at one corner or at a narrow edge, carefully bring the insulation into full contact with the metal. h. Press into firm contact all over. i. Allow sufficient time to dry thoroughly before installation.	
Repair-Housing	a. Visually inspect for nicks gouges, dents, bare spots in paint and other defects which can be repaired. b. Repair/replace handles and associated hardware. c. Sand and paint any repaired area in housing. d. Remove minor dents and paint. e. Remove any rust or other minor corrosive damage and paint.	

APPENDIX A

REFERENCES

A-1. SCOPE.

This appendix lists all forms, field manuals, technical manuals, and miscellaneous publications referenced in this manual.

A-2. FORMS.

Recommended Changes to DA Publications	DA Form 2028-2
Equipment Inspection and Maintenance Work Sheet	DA Form 2404
Quality Deficiency Report	DA Form 368

A-3. FIELD MANUALS.

Electric Motor and Generator Repair	FM 20-31

A-4. MANUALS.

Hand Portable Fire Extinguishers Approved for Army Users	TB 5-4200-200-10
The Army Maintenance Management System (TAMMS)	DA PAM 738-750
Painting Instructions for Field Use	TM 43-0139
Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List	TM 5-4120-386-24P
Administrative Storage of Equipment	TM 740-90-1
Prevent Enemy Use	TM 750-244-3
Leak Detector, Refrigerant Gas	TM 9-4940-435-14

APPENDIX B

MAINTENANCE ALLOCATION CHART

SECTION I I NTRODUCTION

B-1. GENERAL.

a. This section provides a general explanation of all maintenance functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) infection 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 tools and common tool sets) required for each maintenance function as referred from Section II.

d. Section IV contains supplementary instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows (except for ammunition MAC[1]).

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 an 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 grease.

---

[1] Exception is authorized for ammunition MAC to permit the redesignation/ redefinition of maintenance function headings to more adequately identify ammunition maintenance functions. The heading designations and definitions will be included in the appropriate technical manual for each category of ammunition.

B-2. MAINTENANCE FUNCTIONS (Continued).

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 equipment 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 to the instrument being compared.

g. REM0VAL/INSTALL. To remove and install the same item when required to perform service or other maintenance service or other maintenance functions, Install may be the act of emplacing, 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 of the SMR code.

i. REPAIR. The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions 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 material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age requirements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

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 highest assembly. End item group numbers 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.)

d. COLUMN 4, MAINTENANCE CATEGORY. Column 4 specifies, by listing of a work time figure in the appropriate subcolumn(s), the category of maintenance, authorized to perform the functions 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
D	Depot Maintenance

Services-inspect, test, service, adjust, aline, calibrate, and/or replace.
Fault locate/troubleshoot-The process or investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).
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 an SMR code) for the category of maintenance under consideration.
Actions-Welding, grinding, riveting, straightening, facing, remachining and/or resurfacing.

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 associate 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.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II (Continued).

e. COLUMN 5, TOOL 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 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.

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

(1) Group No.	(2) Component/Assembly	(3) Maintenance function	(4) Maintenance Level C	O	F	H	D	(5) Tools and equipment	(6) Remarks
01	HOUSING COVERS, PANELS, GRILLES, SCREENS AND INFORMATION PLATES								
	Cover, Canvas	Inspect	0.1						
		Service		0.5					
		Repair			2.0				NOTE A
		Replace		1.0					
	Panels	Inspect	0.1						
		Service		0.5					
		Repair			2.0				NOTE A
		Replace		1.0					
	Screens and Guards	Inspect	0.1						
		Service	0.2						
		Replace			0.5				NOTE A
		Repair			1.0				
	Louvers	Inspect	0.1						
		Adjust	0.1						
		Service		0.1					
		Replace		1.0					
		Repair			1.0				
	Information Plates	Inspect	0.1						
		Replace			0.5				
02	AIR CIRCULATING AND CONDENSATE DRAIN SYSTEM								
	Air Filter	Inspect		0.2					
		Service		1.0					
		Replace		0.5					
	Mist Eliminator	Inspect		0.3					
		Service		1.0					
		Replace		0.5					
		Repair		1.0					

SECTION II MAINTENANCE ALLOCATION CHART-Continued

(1) Group No.	(2) Component/Assembly	(3) Maintenance function	(4) Maintenance Level C	O	F	H	D	(5) Tools and equipment	(6) Remarks
	Condenser Air Discharge Louver and Linkage	Inspect		0.5					
		Service		1.0					
		Adjust		1.0					
		Replace		2.0					
	Fresh Air Damper and Actuator	Inspect		0.5					
		Service		0.5					
		Adjust	0.1	0.5					
		Replace		2.0					
		Repair		1.5					
	Condensate Drain Tubes	Inspect	0.1	0.5					
		Service		0.5					
		Replace		1.0					
03	ELECTRICAL SYSTEM								
	Control Module	Inspect	0.1						NOTE A
		Adjust	0.1						
		Repair		2.0					
		Replace		0.5					NOTE A
	Temperature Control (Thermostat)	Inspect		0.1					
		Adjust	0.1						
		Test		1.0					
		Replace		l.O					
	Evaporator Fan Speed switch	Inspect		0.1					
		Adjust	0.1						
		Test		0.5					
		Replace		1.0					
	Mode Selector Switch	Inspect		0.1					
		Adjust	0.1						
		Test		0.5					
		Replace		1.0					
	Compressor Circuit Breaker	Inspect		0.1					
		Test		0.5					
		Replace		1.0					
	Control Module Wiring Harness	Inspect		0.5					
		Test		1.0					
		Repair		1.0					

SECTION II MAINTENANCE ALLOCATION CHART - Continued

(1) Group No.	(2) Component/Assembly	(3) Maintenance function	(4) Maintenance Level C	O	F	H	D	(5) Tmls and equipment	(6) Remarks
	Junction Box	Inspect	1.0						NOTE A
		Repair	2.0						
		Replace	2,0						
	Junction Box Wiring Harness	Inspect	0.5						
		Test	1.0						
		Repair	1.0						
		Replace	12.0						
	Relays	Inspect	0.2						
		Test	1.0						
		Replace	1.5						
	Control Circuit Breaker	Inspect	0.1						
		Test	0.5						
		Replace	1.0						
	Unit Wiring Harness	Inspect	1.0						
		Test	2.0						
		Repair	1.0						
		Replace	4.0						
	Rectifier	Inspect	0.1						
		Test	0.5						
		Replace	1.0						
	Transformer	Inspect	0.1						
		Test	0.5						
		Replace	1.0						
04	EVAPORATOR FAN MOTOR AND HEATER								
	Fan and Housing	Inspect	0.5						
		Replace	1.0						
	Motor	Inspect	0.5						
		Test	0.5						
		Repair			2.0				Note A
		Replace	3.0						

SECTION II MAINTENANCE ALLOCATION CHART - Continued

(1) Group No.	(2) Component/Assembly	(3) Maintenance function	(4) Maintenance Level C	O	F	H	D	(5) Tools and equipment	(6) Remarks
	Heater Thermostat	Inspect	0.1						
		Test	1.0						
		Replace	0.5						
	Heater Elements	Inspect	0.4						
		Test	0.5						
		Replace	2.0						
05	CONDENSER FAN, AND MOTOR								
	Fan and Housing	Inspect	0.5						
		Replace	1.0						
	Motor	Inspect	0.5						
		Test	0.5						
		Repair			2.0				Note A
		Replace	3.0						
06	REFRIGERATION SYSTEM								
	Dehydrator	Inspect	0.5						
		Replace	8.0						
	Evaporator Coil	Inspect	0.5						
		Service	1.0						
		Replace			8.0				NOTE A
	Expansion Valves	Replace			8.0				
	Solenoid Valves	Test	0.5						
		Repair	1.0						
		Replace			8.0				
	Pressure Regulator Valve	Replace			8.0				
	Actuating Cylinder	Inspect			0.1				
		Adjust			1.0				
		Replace			8.0				
	Pressure Switches	Inspect			0.1				
		Test			0.5				
		Replace			8.0				
	Service Valves	Inspect			0.5				
		Replace			8.0				

SECTION II MAINTENANCE ALLOCATION CHART - Continued

(1) Group No,	(2) Component/Assembly	(3) Maintenance function	(4) Maintenance Level C	O	F	H	D	(5) Tools and equipment	(6) Remarks
	Pressure Relief Valve	Inspect			0.5				
		Replace			8.0				
	Condenser Coil	Inspect			0.5				
		Service			1.0				
		Replace			8.0				
	Liquid Indicator	Inspect	0.5						
		Replace			8.0				
	Compressor	Test			0.5				
		Repair			1.0				
		Replace			12.0				
	Receiver	Inspect			0.5				
		Replace			8.0				
	Tubing and Fittings	Test			0.5				
		Replace			8.0				
07	HOUSING								
	Housing	Inspect		0.5					
		Service		0.5					
		Repair				1.0			
		Replace				24.0			
08	ACCESSORY/LOOSE ITEMS								
	Installation Hardware	Inspect		0.5					
		Replace		1.0					

SECTION III TOOLS AND TEST EQUIPMENT REQUIRED

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NlJMBER	(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 Seciton ll.		
1	O-F-H	Tool kit, service, refrigeration (SC 5180-90-CL-N18)	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	O-F	Heat Gun		
5	F-H	Recovery and Recycling Unit, Refrigerant	4130-01-338-2707	17500B (07295)

SECTION IV REMARKS

REFERENCE CODE	REMARKS
A	Limited Bearing Replacement

Other than those items listed above, there are no supplemental instructions or explanatory remarks required for the maintenance functions listed in Section II. All functions are sufficiently defined in Section I. Active time listed for maintenance task functions is with the air conditioner in "OFF" position (power off).

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I INTRODUCTION

C-1. SCOPE.

This appendix lists components of end item (COEI) and basic issue items (BII) for the air conditioner to help you inventory items required for safe and efficient operation.

C-2. GENERAL.

The components of end item and basic issue item lists are divided into the following sections:

a. SECTION II, COMPONENTS OF END ITEM. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. SECTION III, BASIC ISSUE ITEMS. These are the minimum essential items required to place the air conditioner in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the air conditioner during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS.

The following provides an explanation of the columns found in the tabular listings:

a. COLUMN (1)-ILLUSTRATION NUMBER (Illus Number). This column indicates the number of the illustration in which the item is shown.

b. COLUMN (2)-NATIONAL STOCK NUMBER. Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

c. COLUMN (3)-DESCRIPTION. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item idicates the FSCM (in parentheses) followed by the part number.

C-3. EXPLANATION OF COLUMNS (Continued).

d. COLUMN (4)-UNIT OF MEASURE. Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr).

e. COLUMN (5)-QUANTITY REQUIRED (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II COMPONENTS OF END ITEM

(Not Applicable)

Section III BASIC ISSUE ITEMS

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) U/M	(5) QTY AUTH
		Department of the Army Technical Manual; Operator's, Organizational, Direct Support and General Support Maintenance Manual TM 5-4120-386-14	EA	1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

(Not Applicable)

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I INTRODUCTION

E-1. SCOPE.

This appendix lists Expendable Supplies and Materials you will need to operate and maintain the Air Conditioner. These items authorized to you by CTA 50-970, Expendable Items (except Medical Class V, Repair Parts and Heraldic Items).

E-2. EXPLANATION OF COLUMNS.

a. COLUMN 1 - ITEM NUMBER. This number is assigned to the entry in the listing and is referenced in the narrative instruction to identify the material.

b. COLUMN 2 - LEVEL. This column identifies the lowest level of maintenance that requires the listed item.

c. COLUMN 3 - NATIONAL STOCK NUMBER. This is the national stock number assigned to the item; use it to request or requisition the item.

d. COLUMN 4 - DESCRIPTION. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. COLUMN 5- Unit of Measure (UM). Indicates the measure used in performing the actual maintenance function. This measurement is expressed by a two-character alphabetical abbreviation e.g., each (ea), inch (in), pair (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
1	O		Silicone Adhesive Sealant RTV General MIL-A-46 106, Type I	
2	O		Solder, Lead-Tin, QQ-S-571 Type SN60WRP2	
3	F	3040-00-664-0439	Adhesive, General Purpose, 1 pint container	EA
4	F	6830-00-292-0732	Nitrogen	CY
5	F		Brazing Alloy, Silver, QQ-B-654, Grade O, I, or II	
6	F		Brazing Alloy, Silver, QQ-B-654, Grade III	
7	F	3439-00-640-3713	Flux, Brazing, O-F-499, Type B	
8	F	5350-00-192-5047	Abrasive Cloth	PG
9	F	7920-00-205-1711	Rags	
			NOTE Whenever available, use recycled refrigerant for charging the refrigeration system.	
10	F	6850-00-837-9927	Monochlorodifluoromethane, Technical: w/cylinder 22 lbs. (Refrigerant-22) BB-F-1421 Type 22 (81348)	**CY**
11	F		Tape PPP-T-60, Type IV, Class I	ROLL
12	F	6830-00-872-5120	Trichloromonofluoromethane Technical: w/cylinder 50 lbs. (Refrigerant- 11) BB-F-1421 Type II (81348)	
13	F	8030-00-889-3534	Tape, Antiseize, Polytetrafluorethylene MIL-T-22730, Size I	ROLL
14	F		Lubricating Oil, VV-L-825 Type IV	QT
15	F	3439-01-045-7940	Flux, Soldering, Liquid Rosin Base MIL-F-14256	QT

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Section II EXPENDABLE SUPPLIES AND MATERIALS LIST - Continued

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(49 DESCRIPTION	(5) U/M
16	O,F	6850-00-264-9037	Dry Cleaning Solvent P-D-680(81348)	QT
17	0		Coater, Air Filter, MIL-L-2104(81348)	
18	H		Adhesive, MMM-A-121	QT
19	H		Cellular Rubber Strips MIL-R-6130 Type I, Grade A	FT
20	H		Flexible Polyurethane Foam (AMS 3570)	SHTS
21	F		Solder, Silver,QQ-S-561, Type 3, 4 or 6A	
22	H		Acetone	PT
23	H		Methyl-Ethyl-Ketone (MEK)	PT
24			Insulation, Sheet, Cellular MIL-I-14511	
25			Plastic Foam, unicellular, sheet form, MIL-P-15280	
26			Adhesive, MMM-A-132, Type I, Class I	
27			Toluolene	
28			Industrial Sealant 800	
29			Acid Swab Brush	

APPENDIX F

DIAGRAMS

F-1. WIRING DIAGRAM.

The wiring diagram for the air conditioner is shown in Figure F-I.

F-2. SCHEMATIC DIAGRAM.

The schematic diagram for the air conditioner is shown in Figure F-2.

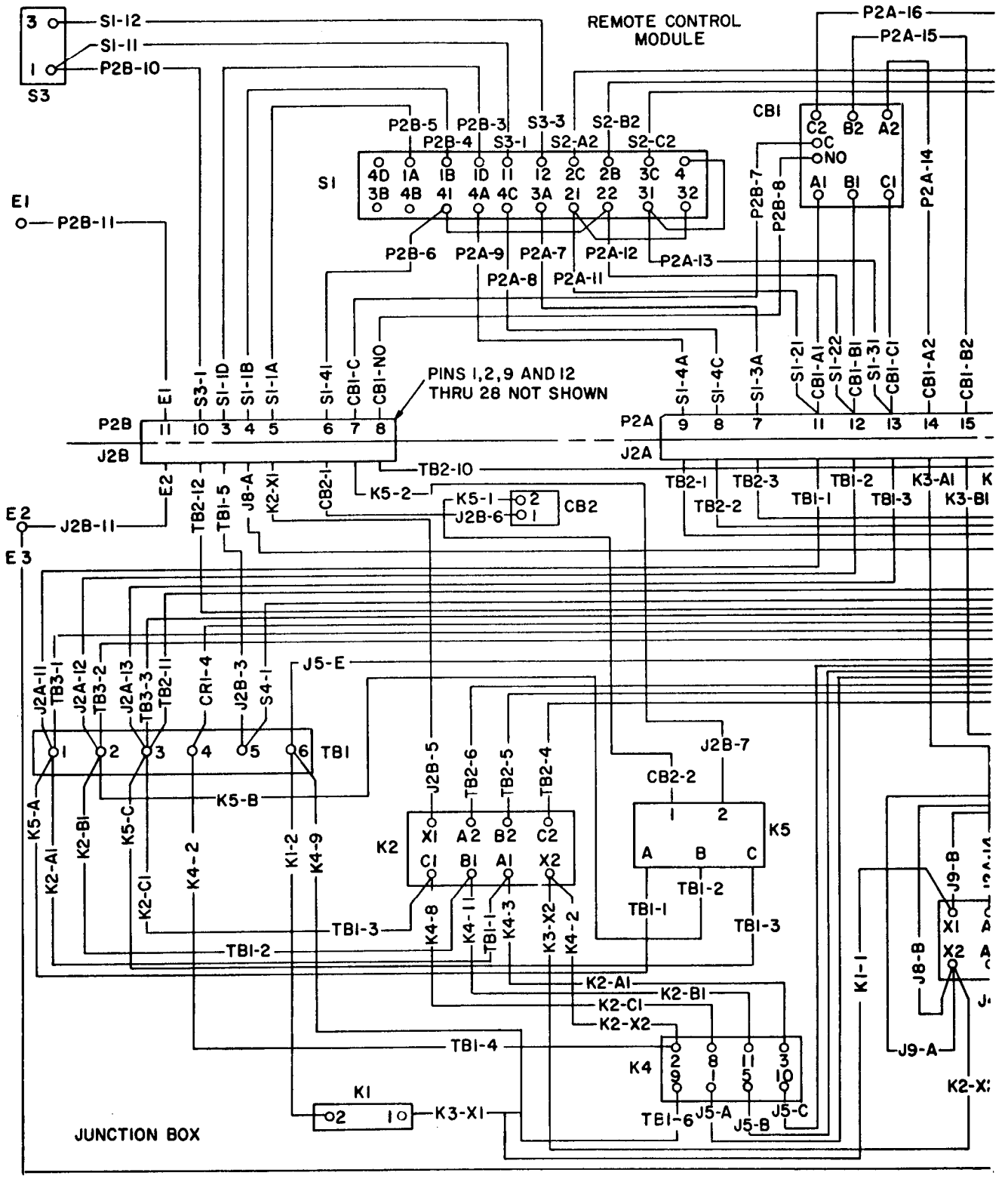


Figure F-1. Wiring Diagram (Sheet 1 of 6)

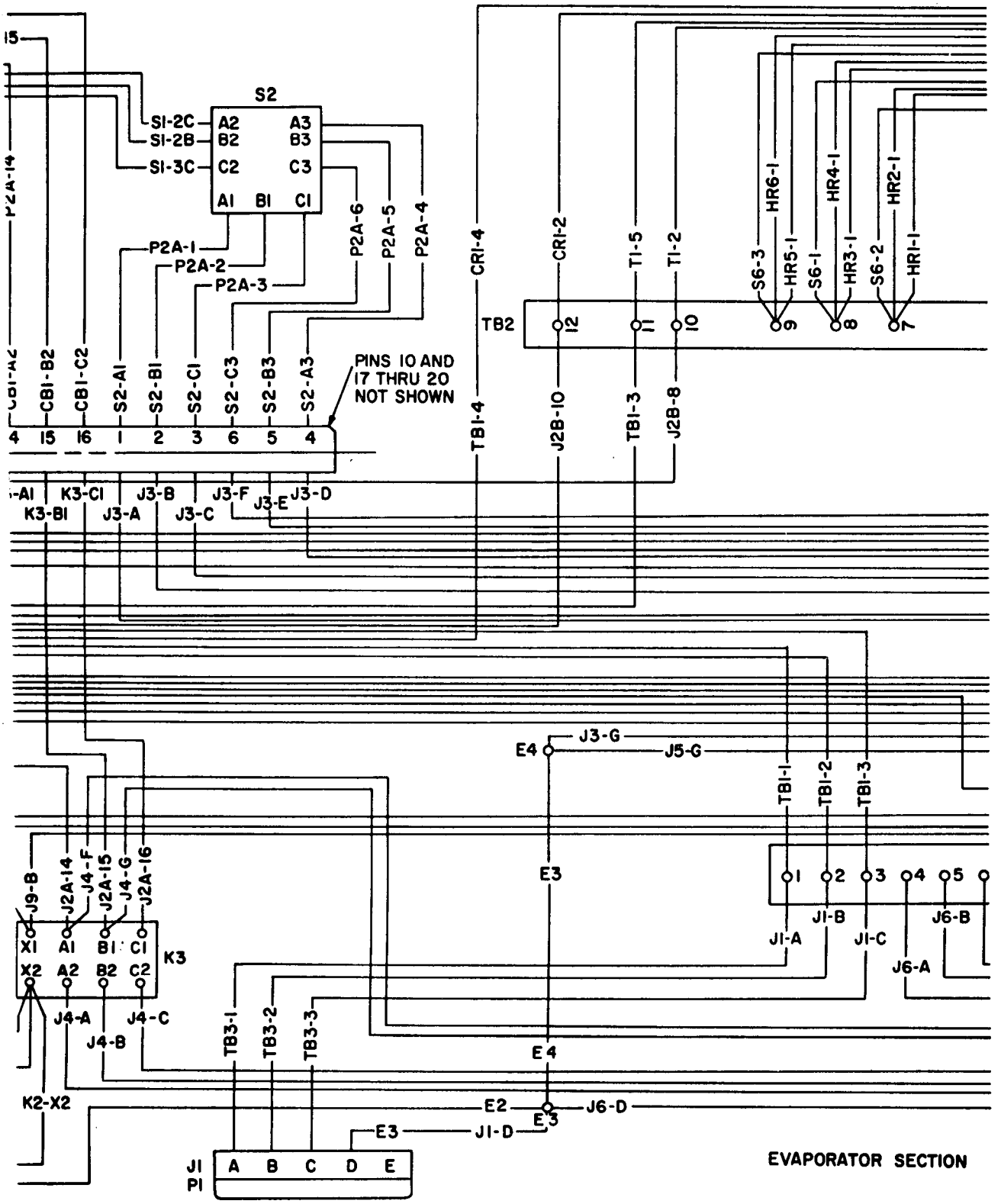


Figure F-l. Wiring Diagram (Sheet 2 of 6)

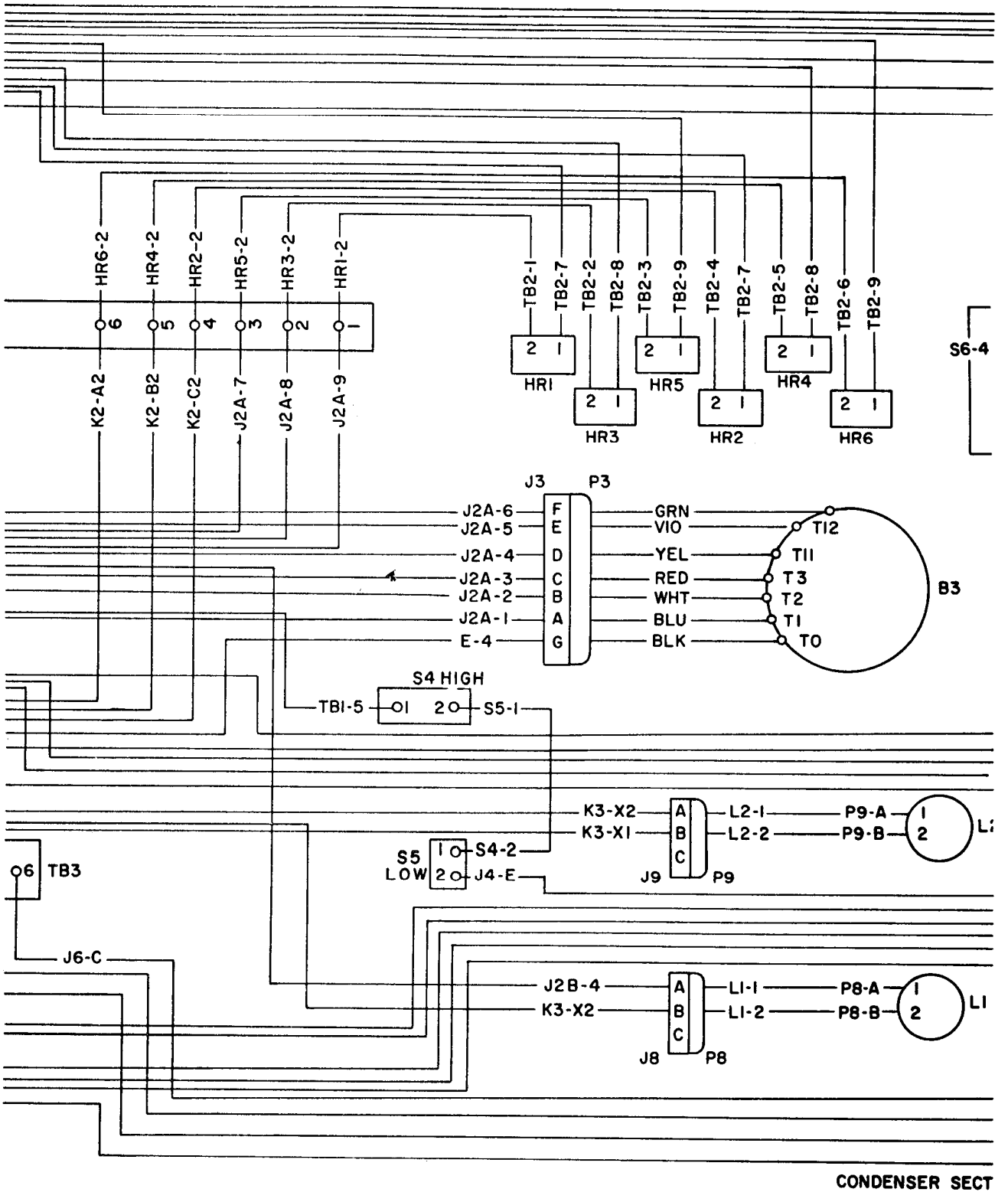


Figure F-1. Wiring Diagram (Sheet 3 of 6)

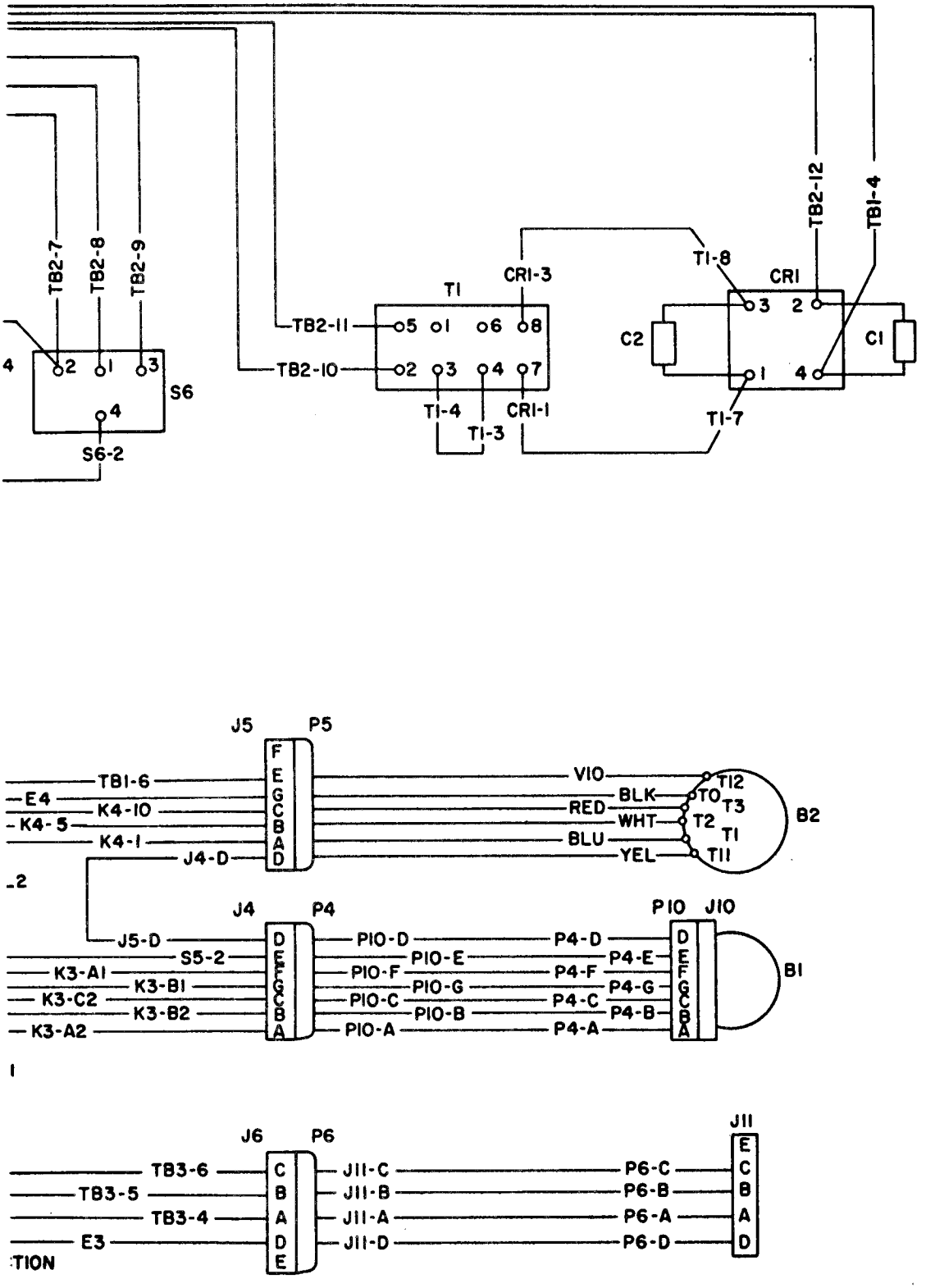


Figure F-1. Wiring Diagram (Sheet 4 of 6)

COMPONENT REFERENCE LIST

ELEC. REF. DES.	PART NUMBER	DESCRIPTION
B1	13208E4182-7	COMPRESSOR,RECIPROCATING
B2	13221E9334-3	MOTOR,CONDENSER FAN
B3	13216E6140-3	MOTOR,EVAPORATOR FAN
C1	M39014/05-2461	CAPACITOR,FILTER
C5	13218E6961	CAPACITOR
CB1	13216E6205-1	CIRCUIT BREAKER,COMPRESSOR
CB2	13216E6178-1	CIRCUIT BREAKER,CONTROL
CR1	13216E6223	RECTIFIER,SEMICONDUCTOR DEVICE
E1	MS24693-S50	TERMINAL STUD (CONTROL MODULE GND)
E2	MS24693-S52	TERMINAL STUD (JUNCTION BOX GND)
E3& E4	MS35206-246	TERMINAL STUD (SYSTEM GND)
HR1 thru HR6	13216E6124-1	HEATER ELEMENT
J1& J11	MS3100R-18-11P	CONNECTOR,RECEPTACLE, POWER INPUT
J2	13216E6177	CONNECTOR,RECEPTACLE, JUNCTION BOX
J3	13216E6193-2	CONNECTOR,RECEPTACLE, EVAPORATOR FAN
J4	13216E6193-3	CONNECTOR,RECEPTACLE, COMPRESSOR
J5	13216E6193-2	CONNECTOR,RECEPTACLE, CONDENSER FAN
J6	13216E6193-5	CONNECTOR,RECEPTACLE, POWER INPUT
J8	13216E6193-1	CONNECTOR,RECEPTACLE, SOLENOID VALVE BYPASS
J9	13216E6193-1	CONNECTOR,RECEPTACLE, SOLENOID VALVE EQUALIZER

Figure F-1. Wiring Diagram (Sheet 5 of 6)

COMPONENT REFERENCE LIST-CONTINUED

ELEC. REF. DES.	PART NUMBER	DESCRIPTION
J1O	PART OF B1	CONNECTOR,RECEPTACLE, COMPRESSOR
K1	13225E8024-2	RELAY,TIMEDELAY
K2	MS24192D1	RELAY,HEATER
K3	MS24192-D1l	RELAY,COMPRESSOR MOTOR
K4	13216E6184	RELAY,CONDENSER FAN
K5	13216E6183	RELAY,PHASESEQUEN CE
L1	13216E6158	VALVE,SOLENOID,BYPASS
L2	13216E6158	VALVE,SOLENOID,PRESSURE EQUALIZER
P1	MS3106R-18-11S	CONNECTOR, PLUG, POWER INPUT
P2	13216E6209-2	CONNECTOR,PLUG CONTROL MODULE
P3	PART OF B3	CONNECTOR,PLUG EVAPORATOR FAN
P4	MS3106R-20-15P	CONNECTOR,PLUG,COMPRESSOR
P5	PART OF B2	CONNECTOR,PLUG, ONDENSER FAN
P6	MS3106R-18-11S	CONNECTOR,PLUG, POWERINPUTSWITCH
P8	13216E6173	CONNECTOR,PLUG,SOLENOID VALVE BYPASS
P9	13216E6173	CONNECTOR,PLUG,SOLENOID VALVE EQUALIZER
P10	MS3106R-20-15S	CONNECTOR,PLUG,COMPRESSOR
S1	13216E6201	SWITCH,ROTARY SELECTOR
S2	13216E6200	SWITCH,TOGGLE
S3	13216E6203	SWITCH,TEMPERATURE CONTROL
S4	13216E6215-3	SWITCH,HIGH PRESSURE CUTOUT
S5	13216E6215-1	SWITCH,LOW PRESSURE CUTOUT
S6	13216E6224	SWITCH,HEATER OUTLET
T1	13221E9117	TRANSFORMER
TB1	13216E6232-6	TERMINAL BOARD, JUNCTION BOX
TB2	13216E6220-1	TERMINAL BOARD
TB3	13216E6232-6	TERMINAL BOARD,POWER INPUT

NOTE: TOENERGIZETHE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (Jl1), THE LEADS ORIGINATING FROM TB1-2 AND TB1-3 ON TB3-1, -2 AND -3 MUST BE CHANGED TO TB3-4 AND -5, AND -6 RESPECTIVELY.

Figure F-1. Wiring Diagram (Sheet 6 of 6)

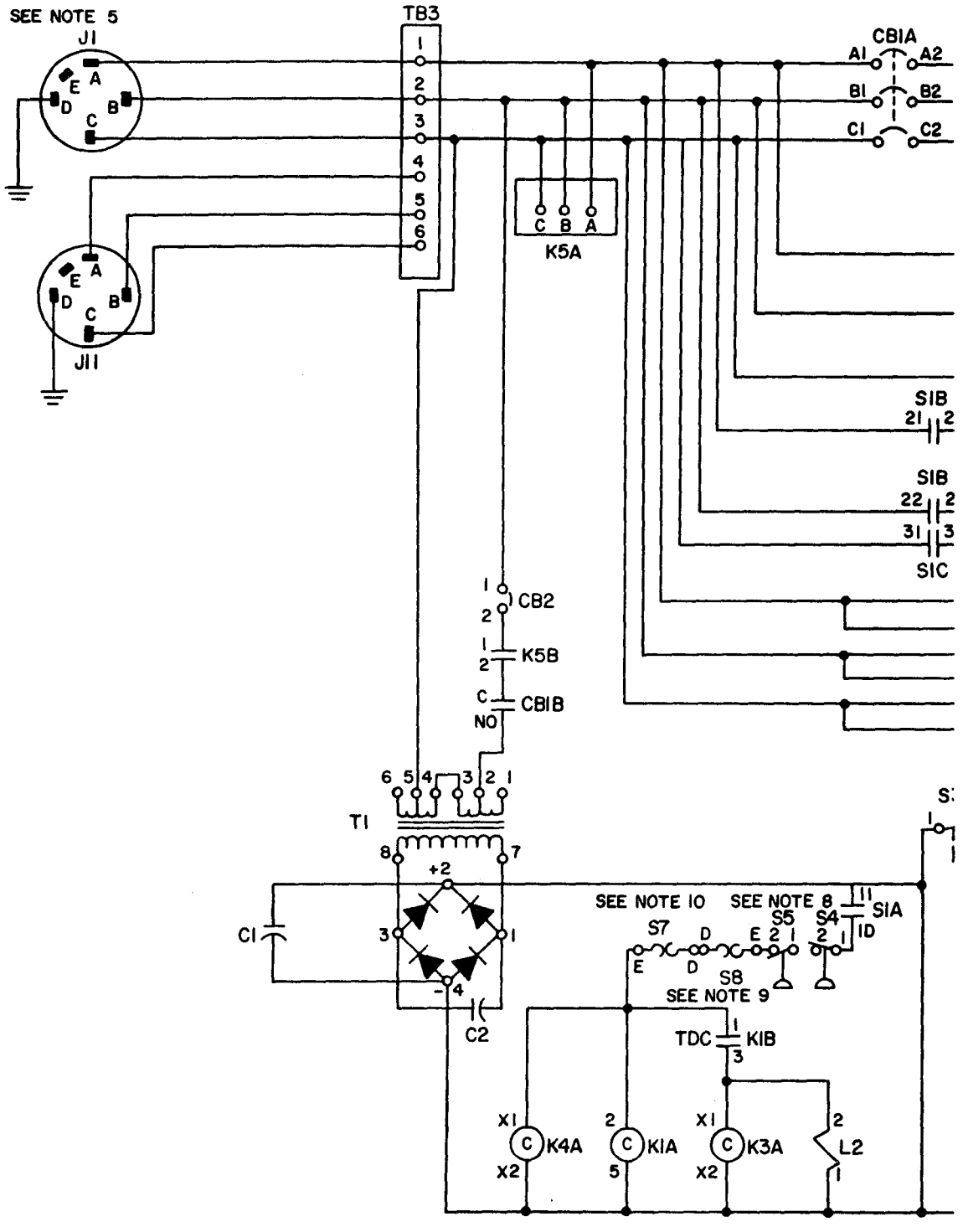
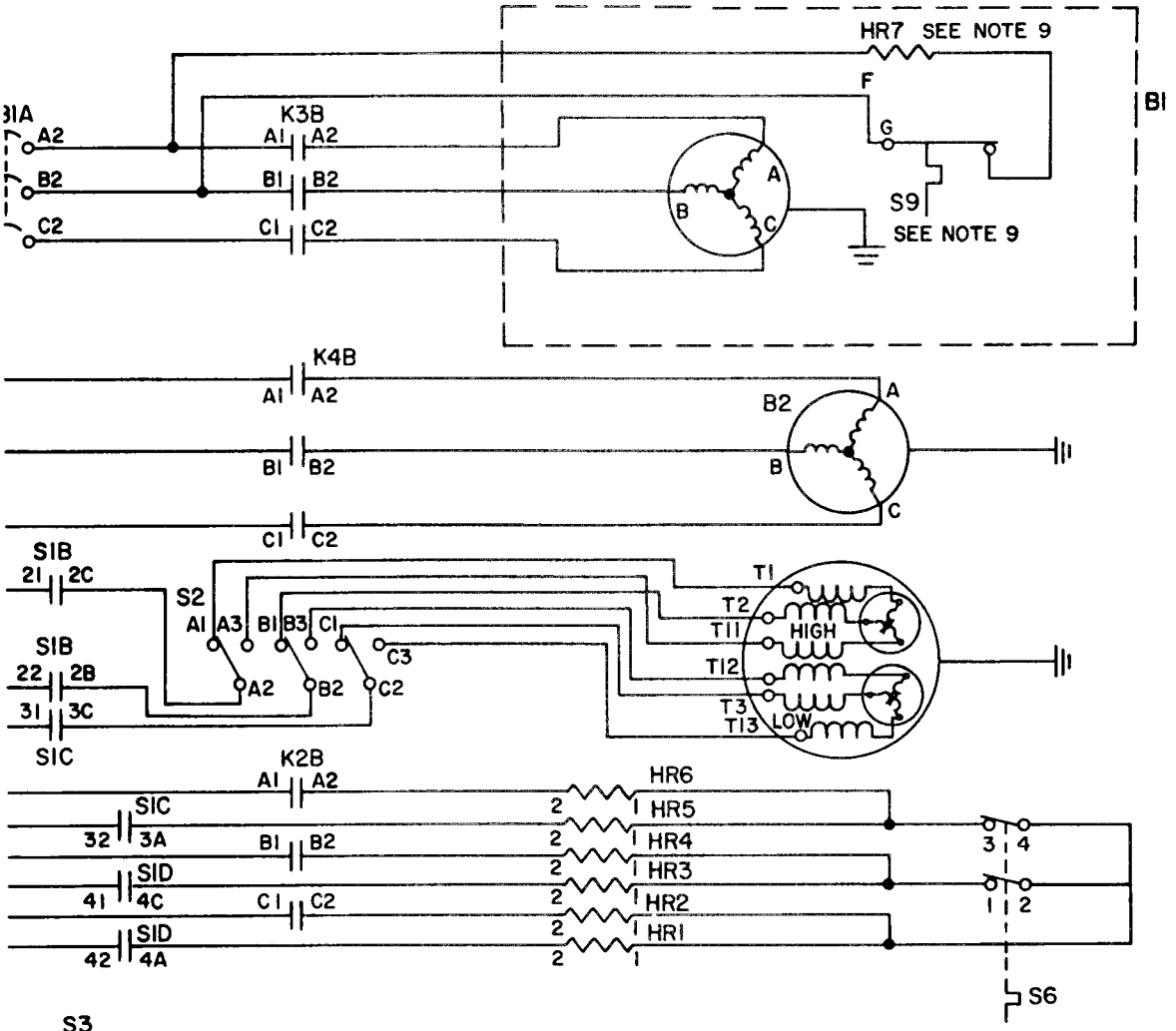


Figure F-2. Schematic Diagram (Sheet 1 of 3)



SELECTOR SWITCH IS POSITION	FUNCTION	SWITCH WAFERS AND TERMINAL CONNECTED			
		SIA	SIB	SIC	SID
1	HEAT (HIGH)	12 AND 1A	21 AND 2C 22 AND 2B	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	NOT USED	21 AND 2C 22 AND 2B	31 AND 3C	NOT USED
5	COOL	12 AND 1B 11 AND 1D	21 AND 2C 22 AND 2B	31 AND 3C 32 AND 3B	41 AND 4D 42 AND 4B

Figure F-2. Schernatic Diagram (Sheet 2 of 3)

COMPONENT REFERENCE LIST

ELEC. REF.DES.	PART NUMBER	DESCRIPTION
B1	13208E4182-7	COMPRESSOR,RECIPROCATING
B2	13221E9334-3	MOTOR,CONDENSER FAN
B3	13216E6140-3	MOTOR,EVAPORATOR FAN
C1	M39014/05/2661	CAPACITOR,FILTER
C2	13218E6961	CAPACITOR
CB1	13216E6205-1	CIRCUIT BREAKER,COMPRESSOR
CB2	13216E6178-1	CIRCUIT BREAKER,CONTROL
CR1	13216E6223	RECTIFIER,SEMICONDUCTOR DEVICE
HR1 THRU HR6	13216E6124-1	HEATER ELEMENT
HR7	PART OF B1	CRANKCASE HEATER
J1 & J11	MS3100R-18-11P	CONNECTOR,RECEPTACLE,POWER INPUT
K1	13225E8024-2	RELAY,TIME DELAY
K2	MS24192D1	RELAY,HEATER
K3	MS24192D1	RELAY,COMPRESSOR MOTOR
K4	13216E6184	RELAY,CONDENSER FAN
K5	13216E6183	RELAY,PHASE SEQUENCE
L1	13216E6158	VALVE,SOLENOID,BYPASS
L2	13216E6158	VALVE,SOLENOID,PRESSURE EQUALIZER
S1	13216E6201	SWITCH,ROTARY SELECTOR
S2	13216E6200	SWITCH,TOGGLE
S3	13216E6203	SWITCH,TEMPERATURE CONTROL
S4	13216E6215-3	SWITCH,HIGH PRESSURE CUTOUT
S5	13216E6215-1	SWITCH,LOW PRESSURE CUTOUT
S6	13216E6224	SWITCH,HEATER CUTOUT
S7	PART OF B2	THERMAL SWITCH
S8	PART OF B3	THERMAL SWITCH
T1	13221E9117	TRANSFORMER
TB3	13216E6232-6	TERMINAL BOARD, POWER INPUT

NOTE: TO ENERGIZE THE UNIT FROM THE AUXILIARY POWER INPUT SOURCE (J11). THE LEADS ORIGINATING FROM TB3-1, -2, AND -3 MUST BE CHANGED TO TB3-4, -5, AND -6 RESPECTIVELY.

Figure F-2. Schematic Diagram (Sheet 3 of 3)

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United Statea Army
Chief of Staff

Official:

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

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✪U.S. GOVERNMENT PRINTING OFFICE: 1987 754- 122/40135

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. LEAVENWORTH, MO 63108

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-4120-386-14	27 March 1987	AIR CONDITIONER HORIZONTAL, COMPACT, 9,000 BTU/HR

BE EXACT. . PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		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. Clange 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

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

TEAR ALONG PERFORATED LINE

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN. . JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-4120-386-14	27 March 1987	AIR CONDITIONER HORIZONTAL, COMPACT, 9,000 BTU/HR

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

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P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

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 = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 062091-003