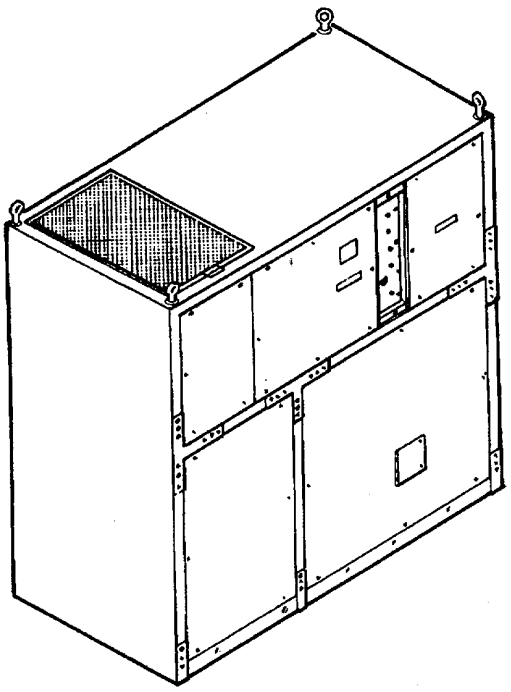
*ARMY TM 9-4120-381-14
NAVY EE-000-CA-MMA-010/7053-AC
AIR FORCE TO 35E9-136-31

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



AIR CONDITIONER, 50,000 BTU
ELECTRIC MOTOR DRIVEN
208 V, 3-PHASE, 50/60 HZ
5 WIRE

MODEL MOAC 640
NSN 4120-01-157-0996

*** This manual supersedes TM 5-4120-381-14, dated 6 October 1989**

HEADQUARTERS, DEPARTMENT OF THE ARMY, THE NAVY AND THE AIR FORCE
1 FEBRUARY 1994

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.

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

Be careful not to contact high-voltage connections of 208 volts ac input when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Do not operate the equipment without all panels and covers in place and tightly secured.

Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

WARNING

Do not allow anyone under equipment suspended from a lifting device. Do not allow the unit to swing while suspended from a lifting device. Failure to observe this warning may result in injury to personnel and damage to the equipment.

Serious injury could occur if heavy equipment is moved/lifted without sufficient personnel to do the job. Use proper physical lifting procedures or use a suitable lifting device or dolly. Wear safety shoes, gloves and other suitable protective clothing.

WARNING

Panels and fitlers installed on unit are there for a purpose. Do not operate unit with them off unless instructions tell you to. When necessary, do so with care.

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear rubber gloves, and keep away from sparks or flame.

WARNING

Industrial process must be evaluated by the Medical Service Bioenvironmental Engineer in accordance with local laws and regulations.

Waste treatment/disposal must be approved by the Medical Service Bioenvironmental Engineer and Civil Engineer in accordance with local laws and regulations.

Solutions will be disposed of in accordance with local State Water Pollution Control Laws. Consult local Medical Services for guidance.

WARNING

DANGEROUS CHEMICAL (R22) is used in this equipment.

DEATH

or severe damage 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.

REFRIGERANT UNDER PRESSURE
is used in the operation of this equipment.

DEATH

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

WARNING

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

WARNING

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

WARNING

The burning of polyurethane foam is dangerous. Toxic fumes are released when it Is burned or heated. If burned or heated indoors, such as during a welding operation nearby, take care to ventilate the area thoroughly. An exhaust system like that of a paint spray booth should be used.

Air-supplied respirators, approved by the National Institute for Occupational Safety and Health Administration or the United States Bureau of Mines, should be used for all welding in confined spaces and in places where ventilation is inadequate. Persons who have chronic or recurrent respiratory conditions, including allergies and asthma, should not work in these areas.

WARNING

Personnel injury and/or equipment damage may result If compressor is started when service valves are not in a backseated (counterclockwise) position.

WARNING

When performing maintenance around condenser or evaporator coil, avoid coming in contact with coil to avoid injury to personnel and to reduce fin damage on the coil.

WARNING

Heating element can bc extremely hot. Severe burns can be caused by touching with bare skin.

WARNING

Compressor weighs approximately 300 lbs. Personnel injury and/or internal components can be damaged if compressor falls off of mounting bracket and shims.

WARNING

Avoid skin contact or inhaling fumes 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.

WARNING

Clean parts in a well ventilated area. Avoid Inhalation of solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly. Dry cleaning solvent (Fed. Spec. P-D 680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100 °F (38°C). Wear eye protection when blowing solvent from parts.

TECHNICAL MANUAL

NO. 9-4120-381-14

HEADQUARTERS
DEPARTMENTS OF THE ARMY, NAVY AND AIR FORCE
WASHINGTON D.C., 1 February 1994

Operator, Unit Direct Support, and General Support Maintenance For AIR CONDITIONER, 50, 000 BTU ELECTRIC MOTOR DRIVEN 208 V, 3-PHASE, 50/60 HZ 5 WIRE MODEL MOAC 640 NSN 4120-01-157-0996

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, 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. A reply will be furnished directly to you.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward to Commander, San Antonio Air Logistics Center, ATTN: SA-ALC/TIRTR, Kelly Air Force Base, TX 78241-5000.

For Navy, mail comments to the Commander, Naval Construction Battalion Center, ATTN: Code 157411, Bldg. 1443, Port Hueneme, CA 93043-5000.

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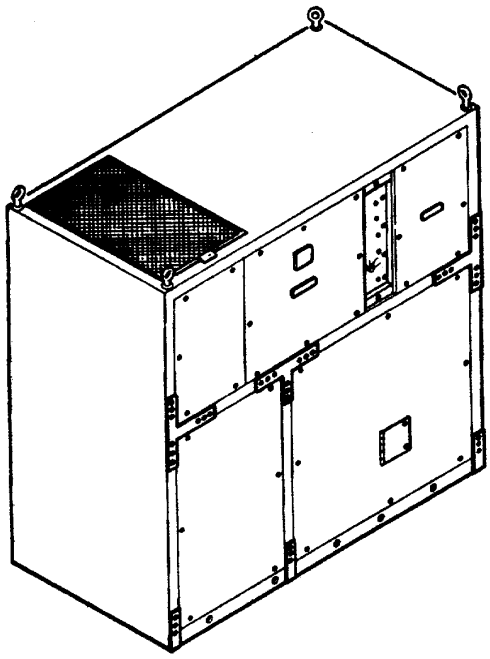
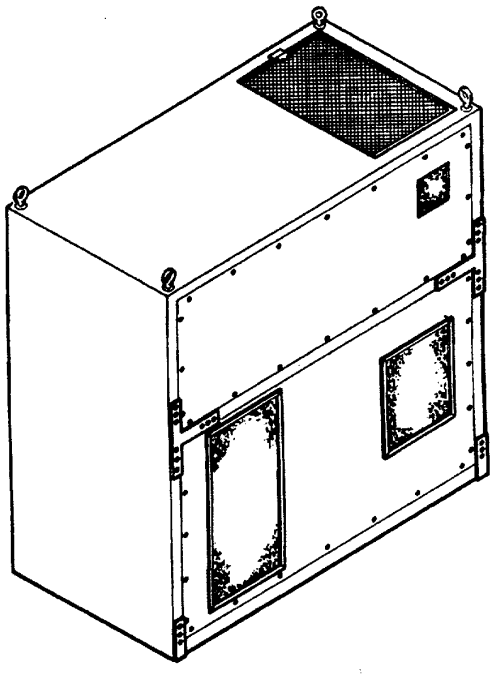


FRONT VIEW



REAR VIEW

Figure 1-0. MOAC 640 50,000 BTU Air Conditioner

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE. This manual is for use by personnel responsible for the operation and maintenance of the MOAC 640 air conditioner.

a. Type of Manual. Operator, Unit, Direct Support and General Support Maintenance Manual.

b. Model Number and Equipment Name. Ellis and Watts, Corporation, Model MOAC 640, 50,000 BTU/HR Cooling, 34,150 BTU/HR Heating, 208 volt, 3 Phase, 50/60 Hertz air conditioner.

c. Purpose of Equipment. The air conditioner is designed for cooling and heating air to a desired predetermined range and circulating the conditioned air to provide heating and cooling of equipment and/or personnel within the conditioned area.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS. 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). Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting. Navy personnel will report maintenance performed utilizing the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2, Vol 3 and unsatisfactory material/conditions (UR submissions) IAW OPNAVINST 4790.2, Vol 2, chapter 17.

1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

a. Army. If your air conditioner needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Blvd., St Louis, Mo. 63120-1798. We'll send you a reply.

b. Air Force. Air Force personnel are encouraged to submit EIR's in accordance with AFR 900-4.

c. Navy. Navy personnel are encouraged to submit EIR's through their local Beneficial Suggestion Program.

1-4. WARRANTY INFORMATION. The air conditioner, model MOAC 640, is warranted by Ellis and Watts Corporation for a period of one year from date of shipment when properly installed. Warranty starts on the date found in block 23 of DA Form 24089 in the logbook. Report all defects in material or workmanship to your supervisor who will take appropriate action.

1-5. LIFT OF ABBREVIATIONS.

CBR	Chemical, biological radiological hazard
CGV	Compound gage valve
EIR	Equipment Improvement Recommendation
EMI	Electro magnetic interference
CV	Charging valve
MAC	Maintenance Allocation Chart
MEK	Methyl ethyl ketone (solvent)
MTOE	Modified Table of Organization and Equipment
PGV	Pressure gage valve
PMCS	Preventive Maintenance Checks and Services
RFI	Radio frequency interference
TMDE	Test, Measurement and Diagnostic Equipment
VAC	Vacuum
VPV	Vacuum/purge valve

1-6. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE. Command decisions, according to tactical situation, will determine when destruction of the air conditioning unit will be accomplished. A destruction plan will be prepared by the user organization unless one has been prepared by higher authority. For general destruction procedures for this equipment, refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

1-7. PREPARATION FOR STORAGE OR SHIPMENT. Contact unit maintenance for air conditioning unit preparation for storage or shipment. See para 4-93 for instructions.

Section II. EQUIPMENT DESCRIPTION

1-6. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES. The MOAC 640 air conditioning unit is designed to ventilate, cool or heat, and to filter and circulate air in enclosures.

a. Provides a maximum of 50,000 BTU/HR of cooling and 34,150 BTU/HR of heating.
b. Has one stage of heat.
c. Provides a source of filtered outside (fresh) ventilation air.
d. Is self contained in single cabinet that is suited for van, shelter or other enclosed areas.
e. Operates in environmental conditions from arctic to tropic.
f. Is EMI/RFI shielded; compatible with electronic equipment.
g. Capable of control and interface for operation with remote control panel.
h. Capable of supply or return air temperature control.
i. Automatic unit shut down in fault condition, with manual reset.
j. Provides for local and remote fault indications.
k. The hot gas bypass system permits continuous running of the compressor.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

a. External Components (Front View).

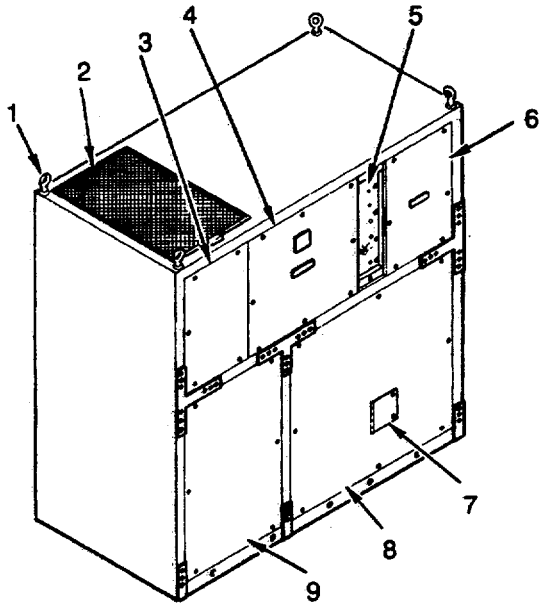


Figure 1-1. External Components (Front and Top Views).

LIFTING EYEBOLTS (1). Used to hoist unit.

RETURN AIR INLET (2). Contains return air filter and circulating air in RFI filter.

LEFT FRONT EVAPORATOR PANEL (3). Covers return air thermostats and electric heater.

CENTER FRONT EVAPORATOR PANEL (4). Covers evaporator coil, control box components, and sight glass located behind control box (5).

OPERATOR'S CONTROL PANEL (5). Contains five position mode switch, service light switch, fault reset switch, and fault indicators.

RIGHT FRONT EVAPORATOR PANEL (6). Covers evaporator fan and motor.

FRONT SERVICE VALVE PANEL (7). Covers service valves.

RIGHT FRONT CONDENSER PANEL (8). Covers compressor and condenser coil.

LEFT FRONT CONDENSER FRONT PANEL (9). Covers condenser fan and motor.

b. External Components (Rear View)

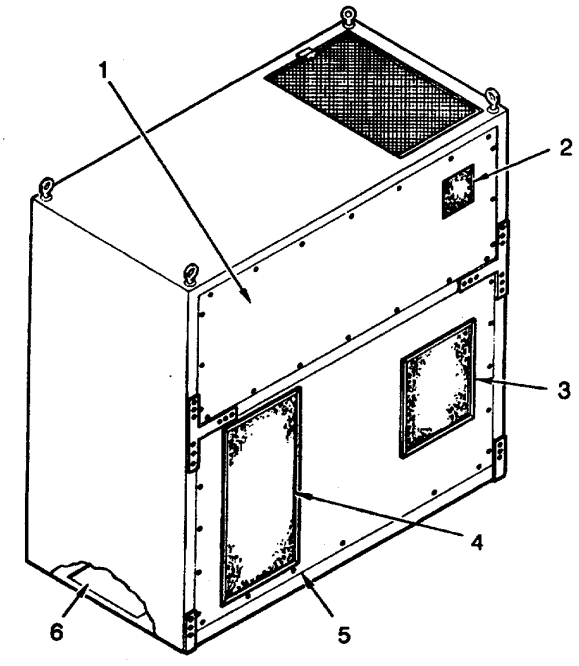


Figure 1-2. External Components (Rear View)

REAR EVAPORATOR PANEL (1). Covers evaporator section components.

FRESH AIR INLET and FRESH AIR RFI FILTER (2). Provides for fresh air and controls RFI.

CONDENSER AIR OUTLET and CONDENSER AIR OUT RFI FILTER (3). Provides for condenser air outlet and controls RFI.

CONDENSER AIR INLET and CONDENSER AIR IN RFI FILTER (4). Provides for condenser air inlet and controls RFI.

REAR CONDENSER PANEL (5). Covers condenser and compressor section components.

SUPPLY AIR OUTLET (6). Provides for conditioned air to equipment or shelter.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS Continued.

c. Internal Components Evaporator Section

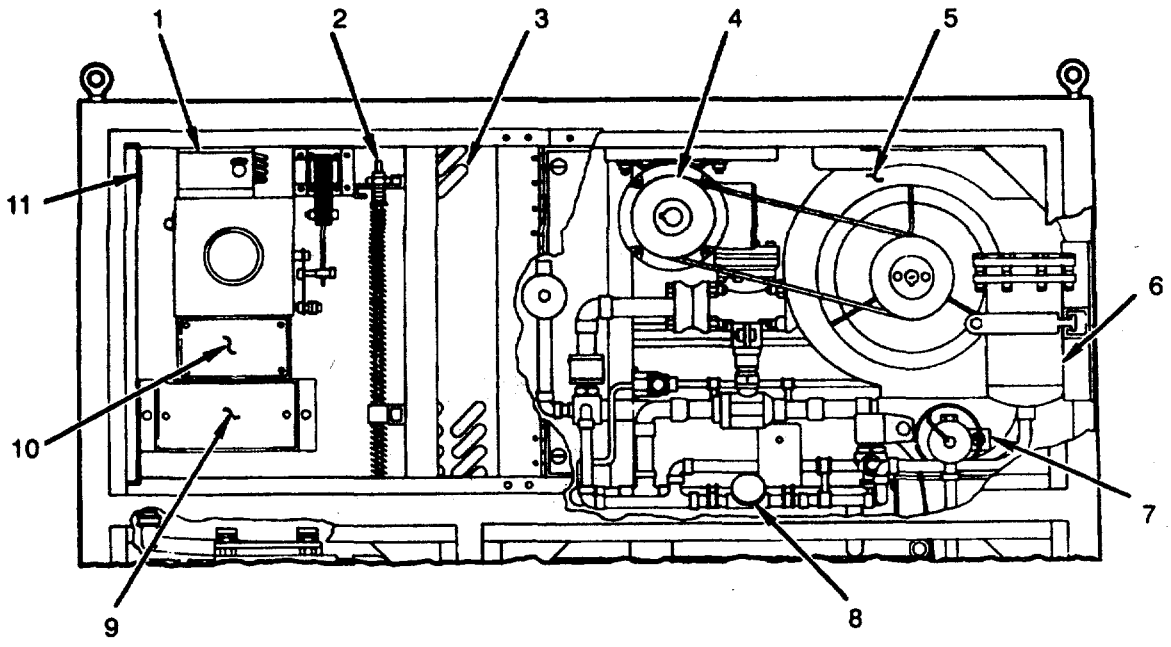


Figure 1-3. Internal Components Evaporator Section

THERMOSTAT (S9) (1). Senses return air temperature. Controls electric heaters and limits space temperature during warm up cycle.

ELECTRIC HEATER (EH) (2). Heats supply air.

EVAPORATOR COIL (3). Cools supply air.

EVAPORATOR FAN MOTOR (B1) (4). Drives evaporator fan.

EVAPORATOR FAN (5). Draws mixed return air through evaporator and electric heater. Forces conditioned supply air through duct work.

DRIER FILTER (6). Used for filtering out refrigerant contaminants in the liquid side of the system.

AIR FLOW SWITCH (S8) (7). Opens if evaporator fan stops and causes EVAPORATOR FAN FAILURE fault light to come on.

SIGHT GLASS (8). Used for checking refrigerant level in air conditioner.

THERMOSTAT (S14) (9). Senses return air temperature. Controls cooling when operating in return air mode.

TERMINAL BOARD (TB4) (10). Interface for remote operation.

RFI FILTER BOX (11). Input for ac power. Holds fuses F1-F4.

d. Internal Components Condenser and Compressor Sections

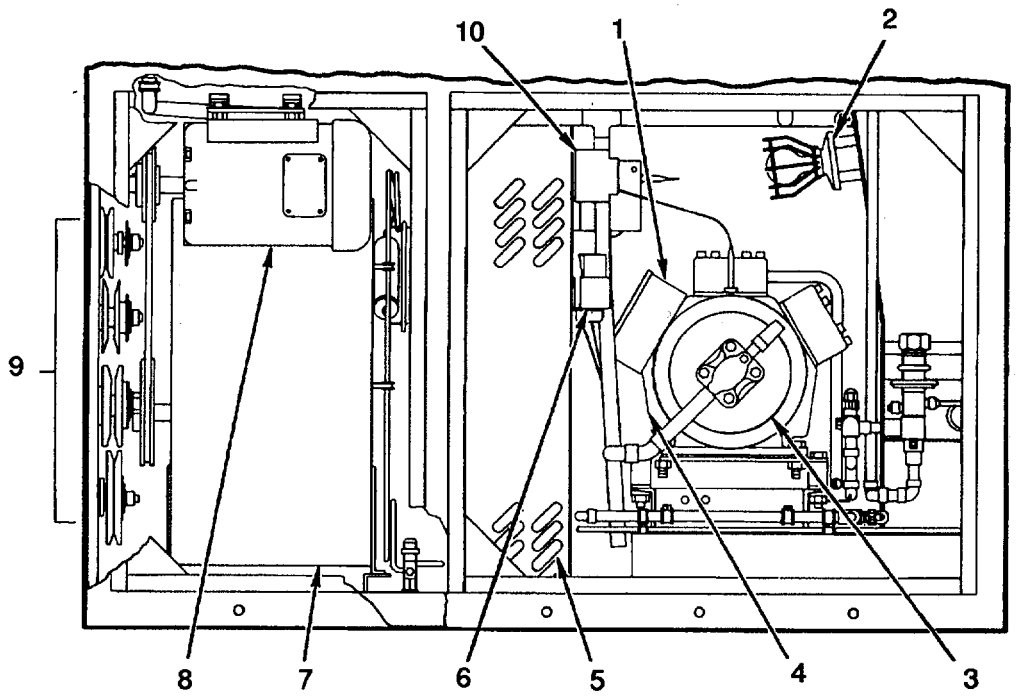


Figure 1-4. Internal Components Condenser and Compressor Section

COMPRESSOR RELAY/JUNCTION BOX (1). Connects power to compressor.
SERVICE LIGHT (DS8) (2). Lights compressor section.
COMPRESSOR (B2) (3). Pumps refrigerant through system during operation.
CRANKCASE HEATER (CCH) (4). Heats crankcase oil for compressor.
CONDENSER COIL (5). Condenses hot refrigerant gas to liquid.
LOW OIL PRESSURE SWITCH (S7) (6). Safety switch, protects compressor when oil pressure is abnormally low.
CONDENSER FAN (7). Draws air through condenser coil. Exhausts hot air.
CONDENSER FAN MOTOR (B3) (8). Drives condenser fan.
PULLEYS (9). Permit 50 Hz or 60 Hz fan motor operation. Green pulleys are for 60 Hz operation. Red pulleys are for 50 Hz operation.
HIGH (S4) AND LOW (S5) PRESSURE SWITCHES (10). Safety switches protect compressor when refrigerant pressure is too high or low.

1-10. EQUIPMENT DATA.

Physical Data

Dimensions (See figure FO-1.)

Height	60 inches (1524.0 mm)
Width	60 inches (1524.0 mm)
Depth	30 inches (762.0 mm)
Weight	1410 pounds (640.0 kg)

Cabinet

Material	Aluminum
Finish	Semi-gloss enamel (air-dried)
	color no. 26250 (gray) per FED-STD-595

1-10. EQUIPMENT DATA - Continued.

Performance Data

Capacities	
Cooling	50,000 Btu/hr at 125°F (52°C) ambient condenser air inlet temperature below the altitude of 10,000 ft.
Supply Air	55°F (dry bulb) ± 3°F 12.7°C (dry bulb)± 1.7°C
Heating	34,150 BTU/HR (10 KW)
Air Circulating	1700 CFM (47.6m³/min) at 1.5 in. (3.81 cm) water gage external static pressure.
Fresh Air Flow	0 to 100 CFM (to 2.8 m³/min, adjustable)
Environmental Limits	
Ambient Air Temperature	
Operating-Cooling	0°F to +125°F (-17.70° to +52°C)
-Heating	-40°F to + 90°F (-40°C to +32°C)

Mechanical Data

Refrigeration,	
Number of stages	One (1)
Refrigerant	R-22
Condenser Section	
Compressor	Reciprocating semi-hermetic, 8 hp motor
Condenser Coil	Copper tubes, fins and end plates; all tin plated
Condenser Fan	Forward curved centrifugal, 1725 rpm with 3-hp motor
Evaporator Section	
Evaporator Valve	Thermostatic
Evaporator Coil	Copper tubes, fins and end plates; all tin plated
Evaporator Fan	Forward curved centrifugal, 1725 rpm with 1-1/2 hp motor
Air Filter	Permanent, cleanable type

Electrical Data

Power	
Input Voltage	208 V ac, 3-phase, 50/60 Hz, 5-wire
Power Consumption (total)	15 KW cooling, 12 KW heating
Continuous Transients	±10% voltage (187.2 to 228.8 V ac) ±5% frequency (47.5 to 52.5/57 to 63 Hz)
Fan Motors	
Type	3-phase, induction, ball bearing
Protection	Currents overloads and internal thermal overloads.
Heating	
Number of stages	One (1)
Type	208 V ac, single phase, six (6) elements
Controls	Thermostat
Safety switches	Air flow and over temperature cutouts
Cooling	
Controls	EPR Valve or thermostat
Safety Switches	High and low refrigerant pressure cutouts, low compressor oil pressure cutout, dirty air filter cutout

1-11. SAFETY, CARE, AND HANDLING. Read and understand all instructions relating to the specific function you are to perform before starting task.

a. Carefully read and understand all notes, cautions, and warnings contained in this manual that pertain to the task you are to perform.

b. Carefully read and understand all WARNING and CAUTION plates located on the air conditioner.

c. Never operate the air conditioner with any covers, air filters, or panels removed unless the instructions specifically instruct you to do so. Then do so only with extreme caution.

d. Carefully plan all maintenance tasks and never take unnecessary risks.

Section III. TECHNICAL PRINCIPLES OF OPERATION

1-12. SCOPE. This section tells how the air conditioner works in its various configurations and operating cycles (see Figure 1-5).

1-13. OPERATING CONFIGURATIONS. This air conditioner can be operated as either a redundant, remotely controlled unit or as a single, locally controlled unit. Two separate control systems are provided in the air conditioner for these configurations.

a. Redundant Unit, Remote Control Configuration. In this configuration, the air conditioner is paired with at least one other air conditioner and controlled from a remotely located control panel. The air conditioner MODE SELECT SWITCH must be positioned to REMOTE. When cooling is remotely selected, a pressure regulator valve (V3) is used to control supply air temperature. When heating is remotely selected, a heat control thermostat located in the return air section of the air conditioner monitors the return air and controls the electric heaters. The heat control thermostat shuts off the electric heaters when the return air reaches 80°F (27°C). The remote control operation modes can be overridden at any time by LOCAL mode selections on the air conditioner MODE SELECT SWITCH.

b. Single Unit, Local Control Configuration. Operation of the air conditioner as a single, stand alone unit requires the installation of three jumper wires on terminal board TB2 and opening the manual bypass valve (V7). With the pressure regulator valve (V3) bypassed, cooling control is performed by the cycling of a solenoid valve (L1) located in the refrigerant line upstream of the primary expansion valve (V12). A cool control thermostat located in the return air section of the air conditioner will deenergize the solenoid valve (L1) when the return air drops below the nominal set point of 70°F (21 °C). This thermostat also provides automatic heat/cool changeover.

1-14. OPERATING CYCLES. Normal operation of this air conditioner includes cooling, bypass, and heating cycles. These cycles are described in the following paragraphs, with explanations added for different modes of operation.

a. Cooling Cycle. Air conditioner operation when cooling is initiated.

(1) Evaporator fan (B1), compressor (B2), and condenser fan (B3) start.

(2) The compressor (B2) receives low pressure superheated refrigerant gas and compresses it to a high pressure, high temperature gas. This gas flows through metal tubing to the condenser coil (C).

(3) The condenser fan (B3) draws outside ambient air over and through the condenser coil (C). The high pressure, high temperature gas from the compressor (B2) is cooled by the flow of air and condensed into a high pressure liquid. If ambient air temperature increases, the gas entering the condenser coil (C) will increase in pressure, causing the condenser fan damper actuator (A) to open the damper and allow an increased flow of air across the condenser coil (C).

(4) The receiver (R) stores excess refrigerant during periods of decreased load or low ambient temperature, or during maintenance pump down procedures.

(5) The high pressure liquid from the condenser is subcooled by the tube-in-tube heat exchanger (H), which at the same time superheats the low pressure refrigerant gas returning to the compressor (B2).

(6) A drier filter (F1) removes any moisture (water vapor) or dirt that may be carried by the refrigerant leaving the heat exchanger (H).

1-14. OPERATING CYCLES - Continued.

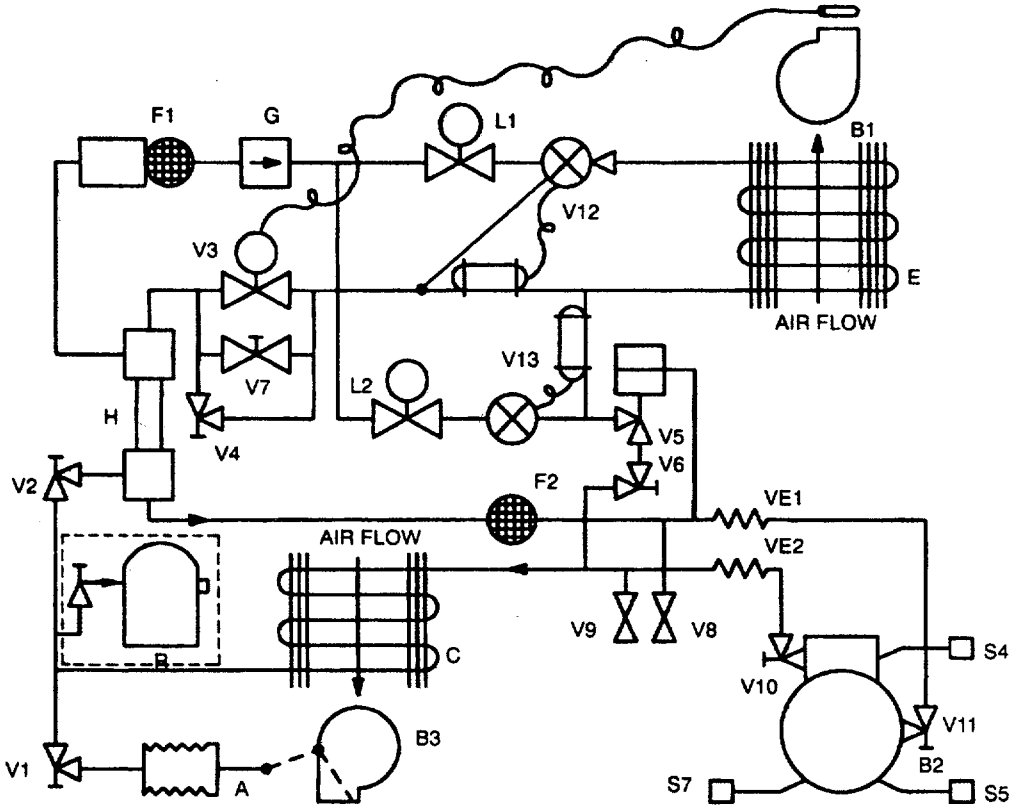


Figure 1-5. Functional Block Diagram (Sheet 1 of 4)

LEGEND			
B1	EVAPORATOR FAN	V10	DISCHARGE VALVE (COMPRESSOR)
B2	COMPRESSOR	V11	SUCTION SERVICE VALVE (COMPRESSOR)
B3	CONDENSER FAN	V12	THERMOSTATIC EXPANSION VALVE (PRIMARY)
F1	DRIER FILTER	V13	THERMOSTATIC EXPANSION VALVE (LIQUID QUENCH)
F2	REFRIGERANT STRAINER	S4	SWITCH, HIGH REFRIG.PRESSURE
L1	SOLENOID VALVE	S5	SWITCH, LOW REFRIG.PRESSURE
L2	SOLENOID VALVE	S7	SWITCH, LOW OIL PRESSURE
V1	SERVICE VALVE (ACTUATOR)	A	CONDENSER FAN DAMPER ACTUATOR
V2	SERVICE VALVE (HEAD)	C	CONDENSER COIL
V3	PRESSURE REGULATOR VALVE	D	DISTRIBUTOR
V4	SERVICE VALVE (EXPANSION)	E	EVAPORATOR COIL
V5	HOT GAS BYPASS VALVE	G	SIGHT GLASS
V6	SERVICE VALVE (HOT GAS BYPASS)	H	HEAT EXCHANGER
V7	MANUAL VALVE (BYPASS)	R	RECEIVER
V8	SERVICE VALVE (SCHRADER)	VE1	VIBRATION ELIMINATOR
V9	SERVICE VALVE (SCHRADER)	VE2	VIBRATION ELIMINATOR

(7) The sight glass (G) indicates the quantity of refrigerant in the system.

(8) A solenoid valve (L1) is used to control refrigerant flow to the primary expansion valve (V12). When the air conditioner is operated in redundant unit, remote control configuration the solenoid valve (L1) is always open. When operated in single unit, local control configuration the solenoid valve (L1) is cycled open and closed by the cool control thermostat located in the return air section of the air conditioner. The cool control thermostat also opens and closes solenoid (L2) during the bypass cycle in all modes of operation.

(9) The primary expansion valve (V12) controls the amount and pressure of liquid refrigerant to the evaporator coil (E). By use of a sensing bulb and external equalizer line, the primary expansion valve (V12) senses the temperature and pressure of the refrigerant as it leaves the evaporator coil (E) and constantly adjusts the flow of liquid refrigerant.

(10) As the liquid refrigerant leaves the primary expansion valve (V12) it passes through a distributor (D) and enters the evaporator coil (E). The evaporator fan (B1) circulates warm air from the conditioned space over and through the evaporator coil (E). As the liquid refrigerant enters the coil at reduced pressure, the combination of pressure reduction and warmer air being forced across the tubes of the coil causes the refrigerant to boil and change from a liquid to a gas. Refrigerant absorbs heat when it changes from a liquid to a gas. As the air from the conditioned space comes in contact with the evaporator coil (E), the air is cooled.

(11) After the refrigerant gas leaves the evaporator coil (E), it flows through the pressure regulator valve (V3) in redundant unit configuration, or through the manual bypass valve (V7) if in single unit configuration. The pressure regulator valve (V3) responds to supply air temperature in redundant unit, remote control configuration and opens or closes to regulate evaporator coil (E) temperature and pressure. A temperature rise in the supply air will cause the pressure regulator valve (V3) to open and decrease the evaporator temperature. A temperature drop will cause the pressure regulator valve (V3) to close and increase evaporator temperature.

In single unit, local control configuration the pressure regulator valve (V3) is bypassed by opening the manual bypass valve (V7). Temperature control is then performed by the return air cool control thermostat and solenoid valve (L1) .

(12) After the refrigerant gas passes through either the pressure regulator valve (V3) or manual bypass valve (V7), the low pressure refrigerant gas then flows through the other half of the heat exchanger (H) where it is superheated by the high pressure liquid refrigerant leaving the condenser coil (C).

(13) The superheated refrigerant gas flows through a refrigerant strainer (F2) to remove any particles from the gas before it flows into the compressor (B2).

(14) The refrigerant gas is then drawn back to the compressor (B2) and the cycle is repeated.

(15) A service valve (V1) allows the condenser fan damper actuator (A) to be isolated from, the refrigerant lines during maintenance. A second service valve (V2) located between the receiver (R) and the heat exchanger (H) isolates the low side-from the high side of the refrigerant lines during pump down. Another service valve (V6) upstream of the hot gas bypass valve (V5) aids in isolating refrigerant flow during pump down.

(16) Service valves (V8, V9) are provided for charging and general servicing of the high and low sides of the refrigerant system.

(17) Discharge service valve (V10) and suction service valve (V11) are provided for isolation of the compressor (B2) during maintenance or replacement procedures.

(18) The high refrigerant pressure switch (S4), low refrigerant pressure switch (S5), and low oil pressure switch (S7) are provided to protect the compressor (B2) from damage due to pressure extremes.

(19) Vibration eliminators (VE1, VE2) are installed in the compressor (B2) suction and discharge lines to isolate compressor vibration from the other refrigerant piping.

1-14. OPERATING CYCLES - Continued.

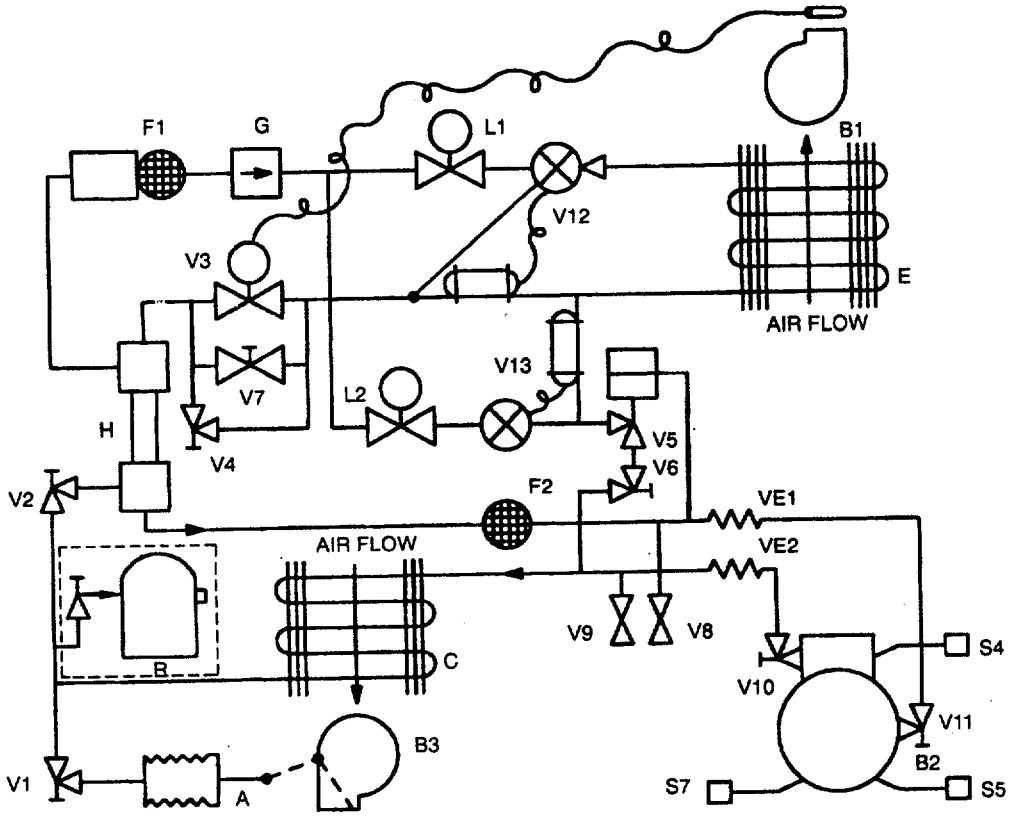


Figure 1-5. Functional Block Diagram (Sheet 2 of 4)

LEGEND			
B1	EVAPORATOR FAN	V10	DISCHARGE VALVE (COMPRESSOR)
B2	COMPRESSOR	V11	SUCTION SERVICE VALVE (COMPRESSOR)
B3	CONDENSER FAN	V12	THERMOSTATIC EXPANSION VALVE (PRIMARY)
F1	DRIER FILTER	V13	THERMOSTATIC EXPANSION VALVE (LIQUID QUENCH)
F2	REFRIGERANT STRAINER	S4	SWITCH, HIGH REFRIG.PRESSURE
L1	SOLENOID VALVE	S5	SWITCH, LOW REFRIG.PRESSURE
L2	SOLENOID VALVE	S7	SWITCH, LOW OIL PRESSURE
V1	SERVICE VALVE (ACTUATOR)	A	CONDENSER FAN DAMPER ACTUATOR
V2	SERVICE VALVE (HEAD)	C	CONDENSER COIL
V3	PRESSURE REGULATOR VALVE	D	DISTRIBUTOR
V4	SERVICE VALVE (EXPANSION)	E	EVAPORATOR COIL
V5	HOT GAS BYPASS VALVE	G	SIGHT GLASS
V6	SERVICE VALVE (HOT GAS BYPASS)	H	HEAT EXCHANGER
V7	MANUAL VALVE (BYPASS)	R	RECEIVER
V8	SERVICE VALVE (SCHRADER)	VE1	VIBRATION ELIMINATOR
V9	SERVICE VALVE (SCHRADER)	VE2	VIBRATION ELIMINATOR

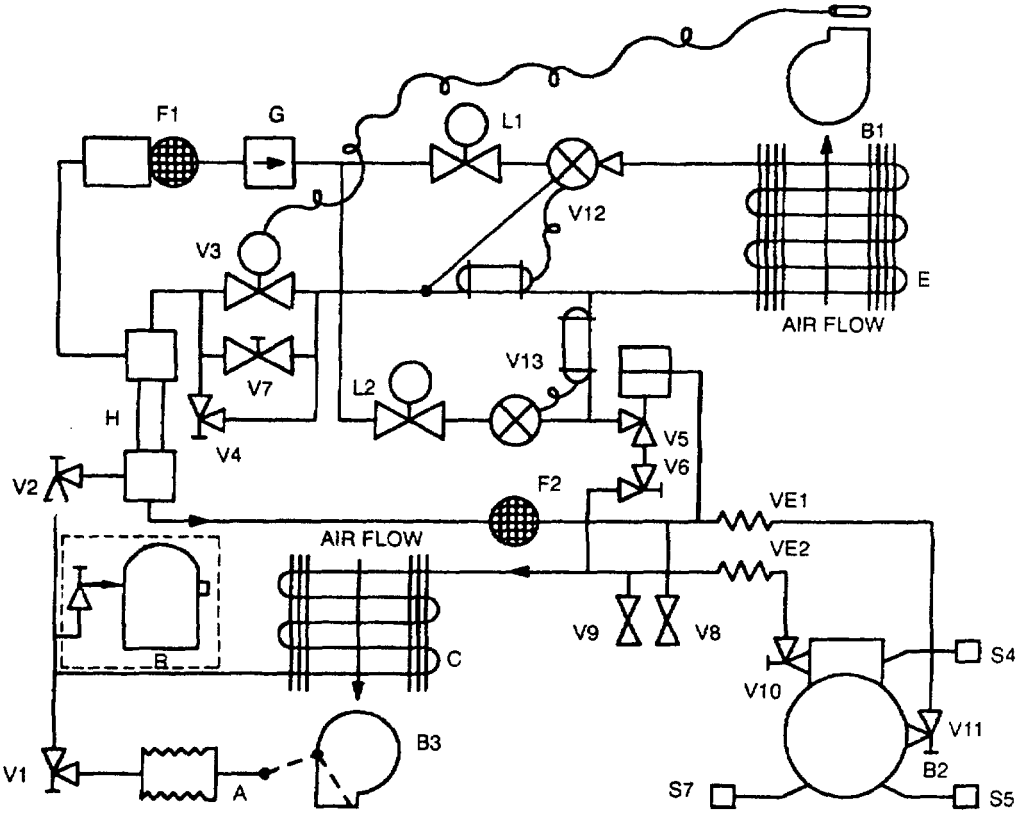


Figure 1-5. Functional Block Diagram (Sheet 3 of 4)

LEGEND			
B1	EVAPORATOR FAN	V10	DISCHARGE VALVE (COMPRESSOR)
B2	COMPRESSOR	V11	SUCTION SERVICE VALVE (COMPRESSOR)
B3	CONDENSER FAN	V12	THERMOSTATIC EXPANSION VALVE (PRIMARY)
F1	DRIER FILTER	V13	THERMOSTATIC EXPANSION VALVE (LIQUID QUENCH)
F2	REFRIGERANT STRAINER	S4	SWITCH, HIGH REFRIG.PRESSURE
L1	SOLENOID VALVE	S5	SWITCH, LOW REFRIG.PRESSURE
L2	SOLENOID VALVE	S7	SWITCH, LOW OIL PRESSURE
V1	SERVICE VALVE (ACTUATOR)	A	CONDENSER FAN DAMPER ACTUATOR
V2	SERVICE VALVE (HEAD)	C	CONDENSER COIL
V3	PRESSURE REGULATOR VALVE	D	DISTRIBUTOR
V4	SERVICE VALVE (EXPANSION)	E	EVAPORATOR COIL
V5	HOT GAS BYPASS VALVE	G	SIGHT GLASS
V6	SERVICE VALVE (HOT GAS BYPASS)	H	HEAT EXCHANGER
V7	MANUAL VALVE (BYPASS)	R	RECEIVER
V8	SERVICE VALVE (SCHRADER)	VE1	VIBRATION ELIMINATOR
V9	SERVICE VALVE (SCHRADER)	VE2	VIBRATION ELIMINATOR

1-14. OPERATING CYCL.ES Continued.

b. Bypass Cycle. The air conditioner has a bypass cycle which allows cooling operation during low cooling loads without cycling the compressor (B2) on and off. In bypass cycle, the refrigerant is routed from the compressor discharge (high) side to the suction (low) side of the compressor, bypassing the evaporator coil (E).

(1) During low load cooling conditions, excess cooling capacity causes a reduction in suction line pressure. This low pressure condition is caused by closing the pressure regulator valve (V3) during redundant unit, remote control operation or closing of the solenoid valve (L1) during redundant unit, remote control operation.

(2) The low cooling loads produce decreasing return air temperature, causing the cool air thermostat to open solenoid valve (L2). As the compressor suction pressure starts to drop, the hot gas bypass valve (V5) opens to allow flow of hot gas to the suction line between the evaporator coil (E) and pressure regulator valve (V3).

(3) The liquid quench expansion valve (V13) senses the temperature of the hot gas being bypassed through the hot gas valve (V5) to the suction line. To prevent excessively hot gas from reaching the compressor, the liquid quench expansion valve (V13) opens when necessary to allow liquid refrigerant to mix with the hot gas.

c. Heating Cycle. In redundant unit, remote control configuration, the heating cycle is designed to warm the conditioned area to approximately 80°F (27°C) and to provide a load before the cooling cycle is started. In this configuration, the heating cycle is not used for personnel comfort. Duct heaters in the conditioned area external to this air conditioning unit provide for personnel space heating.

In the single unit, local control configuration, two levels of heating control can be provided. In all modes of operation, heating is controlled by return air temperature only.

(1) In redundant unit, remote control configuration, the air conditioner MODE SELECT SWITCH is normally set to REMOTE. Selection of heating function is made at the evaporator coil (E) to be energized. Heating is then controlled to a nominal 80°F (27 °C) by the heat control thermostat located in the return air section of the air conditioner.

(2) In single unit, local control configuration, the heating cycle can be controlled by two methods. When MODE SELECT SWITCH is positioned to either AUTO or REMOTE, the electric heating element is automatically capable of being energized. The electric heating element is then controlled to a nominal 70°F (21°C) return air temperature by the cool control thermostat located in the return air section of the air conditioner.

When MODE SELECT SWITCH is positioned to HEAT in this configuration, the electric heating element is controlled to a nominal 80°F (27°C) return air temperature by the heat control thermostat located adjacent to the cool control thermostat.

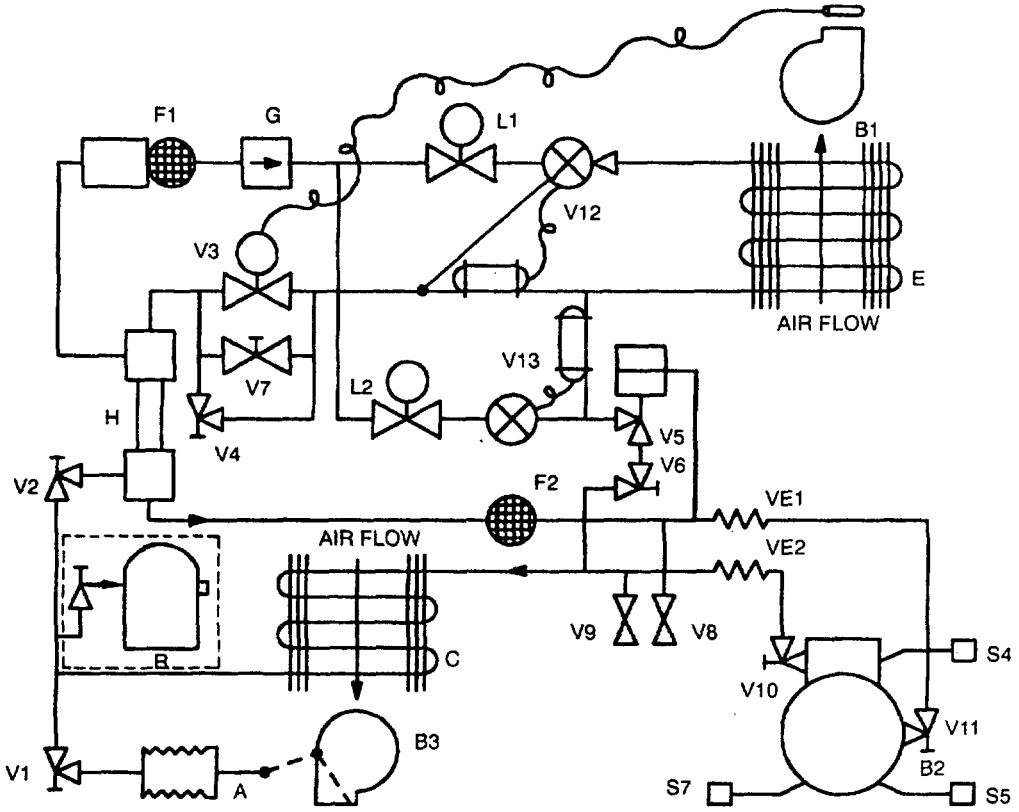


Figure 1-5. Functional Block Diagram (Sheet 4 of 4)

LEGEND			
B1	EVAPORATOR FAN	V10	DISCHARGE VALVE (COMPRESSOR)
B2	COMPRESSOR	V11	SUCTION SERVICE VALVE (COMPRESSOR)
83	CONDENSER FAN	V12	THERMOSTATIC EXPANSION VALVE (PRIMARY)
F1	DRIER FILTER	V13	THERMOSTATIC EXPANSION VALVE (LIQUID QUENCH)
F2	REFRIGERANT STRAINER	S4	SWITCH, HIGH REFRIG.PRESSURE
L1	SOLENOID VALVE	S5	SWITCH, LOW REFRIG.PRESSURE
L2	SOLENOID VALVE	S7	SWITCH, LOW OIL PRESSURE
V1	SERVICE VALVE (ACTUATOR)	A	CONDENSER FAN DAMPER ACTUATOR
V2	SERVICE VALVE (HEAD)	C	CONDENSER COIL
V3	PRESSURE REGULATOR VALVE	D	DISTRIBUTOR
V4	SERVICE VALVE (EXPANSION)	E	EVAPORATOR COIL
V5	HOT GAS BYPASS VALVE	G	SIGHT GLASS
V6	SERVICE VALVE (HOT GAS BYPASS)	H	HEAT EXCHANGER
V7	MANUAL VALVE (BYPASS)	R	RECEIVER
V8	SERVICE VALVE (SCHRADER)	VE1	VIBRATION ELIMINATOR
V9	SERVICE VALVE (SCHRADER)	VE2	VIBRATION ELIMINATOR

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. GENERAL. The air conditioner is designed for a variety of installations and for operation under a wide range of climate conditions. Operators must be aware of any peculiarities or operational limitations for their specific installation. See the appropriate shelter or system manual for instructions peculiar to your specific installation.

2-2. OPERATOR'S CONTROLS AND INDICATORS. See Figure 2-1 for a general description of the controls and indicators with which an operator will normally be concerned. For specific operating instructions, see Section III and Section IV of this chapter.

CRANKCASE HEATER (CB1). Provides circuit breaker protection for crankcase heater.

CONTROL CIRCUIT (CB2). Provides circuit breaker protection for the control circuitry.

NOTE

Circuit breakers CB1 and CB2 are located behind the center front evaporator panel.

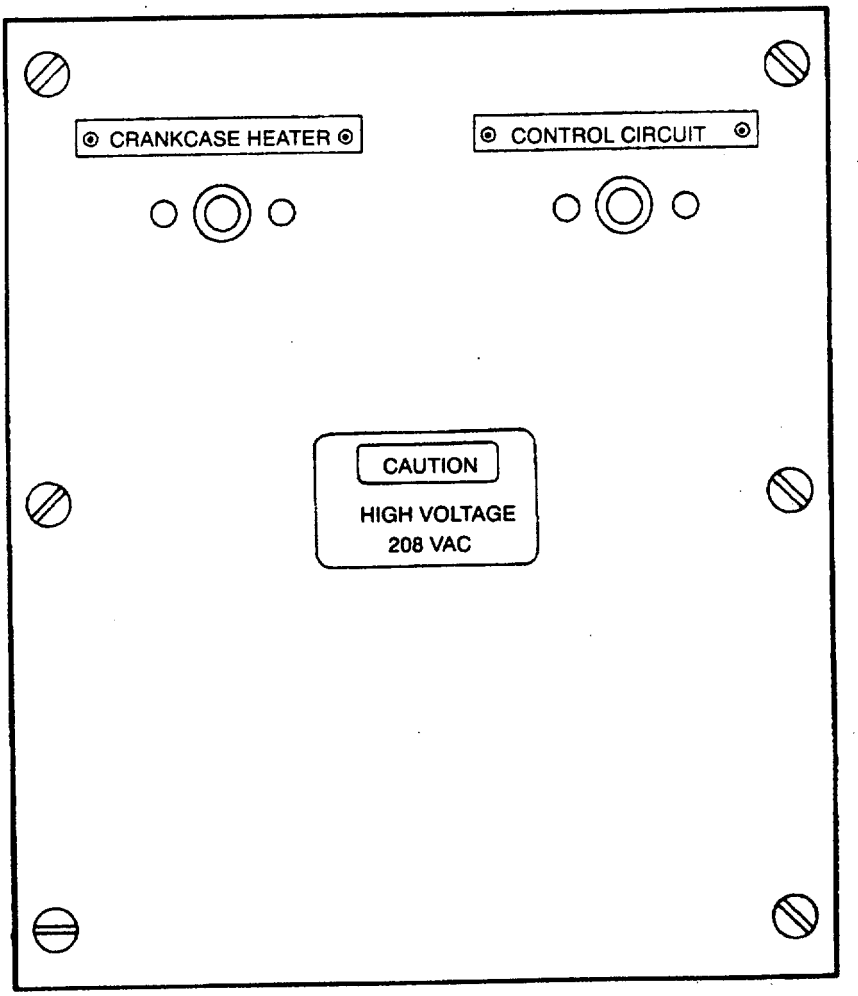


Figure 2-1. Controls and Indicators (Sheet 1 of 2)

2-2. OPERATOR'S CONTROLS AND INDICATORS Continued.

AC POWER ON (1) (green). Indicates ac input power on.

CONTROL POWER (24 VDC) FAULT (2) (red). Indicates dc power supply failure.

HIGH DISCHARGE PRESSURE (3) (red). Indicates excessive refrigerant pressure in compressor discharge line.

DIRTY FILTER (4) (red). Indicates dirty return air filter.

EVAPORATOR FAN FAILURE (5) (red). Indicates loss of air flow in supply air duct.

MODE SELECT Rotary SWITCH (6). Allows operation of air conditioner in LOCAL (HEAT, COOL and AUTO) or REMOTE modes.

FAULT RESET Push Button (7). Used to reset fault indication circuits after repair.

SERVICE LIGHT Toggle Switch (8). Operates lamp in compressor compartment. Used for illumination during servicing.

LOW OIL PRESSURE (9) (red). Indicates loss of oil pressure in compressor crankcase.

HIGH AIR TEMPERATURE (10) (red). Indicates excessive air temperature at electric heater.

LOW SUCTION PRESSURE (11) (red). Indicates excessive low pressure in compressor suction line.

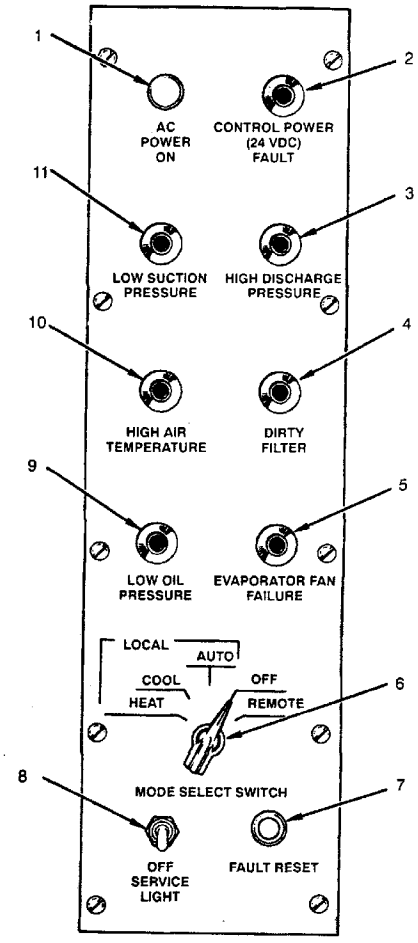


Figure 2-1. Controls and Indicators (Sheet 2 of 2)

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-3. INTRODUCTION.

a. General. Operator preventive maintenance checks and services (PMCS) are essential to the efficient operation of the air conditioner and to prevent possible damage that might occur through neglect or failure to observe warning symptoms in a timely manner. Checks and services performed by operators are limited to these functions which are described in Table 2-1. Your preventive maintenance checks and services table lists the inspections and care of your equipment required to keep it in good operating condition.

(1) Before you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your before PMCS.

(2) While you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your during PMCS

(3) After you operate. Be sure to perform your after PMCS.

(4) If your equipment fails to operate. If your equipment does not perform as required, refer to Table 3-1 for possible problems. Report any malfunctions or failures on the proper DA Form 2404, or refer to DA PAM 738-750.

b. PMCS columnar entries. The PMCS table column headings and column entries are defined in the following subparagraphs.

(1) Item number column. This is the order in which you perform checks and services on the air conditioner. The entry in this column will also be used as a source of item numbers for the "TM Item number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

(2) Interval columns. The interval column of your PMCS table tells you when to do a certain check or service.

(3) Item to check/service column. Identification of item to be inspected.

(4) Procedures column. The procedures column of your PMCS table tells you how to do the required checks and services. Carefully follow these instructions. If you do not have the tools, or if the procedure tells you to, have the next higher level of maintenance do the work.

(5) Not fully mission capable if: column. Entries in this column will be keyed specifically to checks listed in the "procedures" column for the purpose of identifying, for the check, the criteria that will cause the equipment to be classified as not fully mission capable because of inability to perform its primary combat mission. An entry in this column will:

- Identify conditions that make the equipment not fully mission capable for readiness reporting.
- Deny use of the equipment until corrective maintenance has been performed.

NOTE

Within designated interval, these checks are to be performed in the order listed. 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

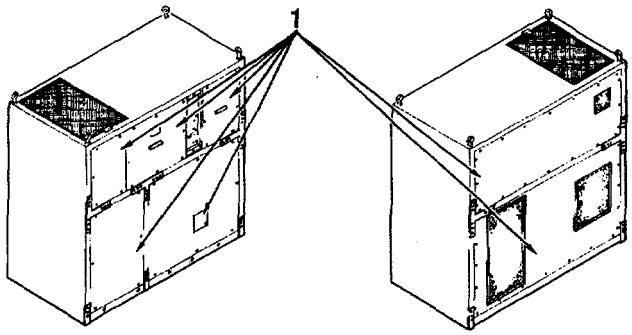
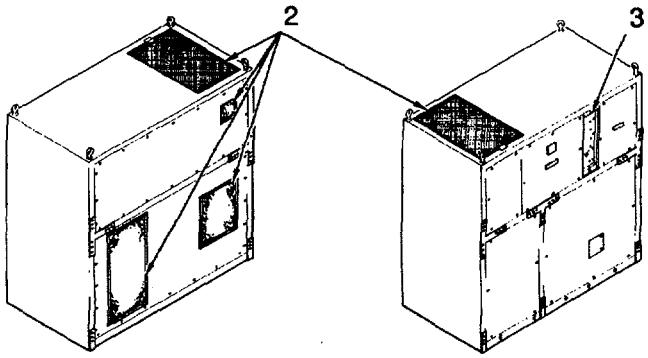
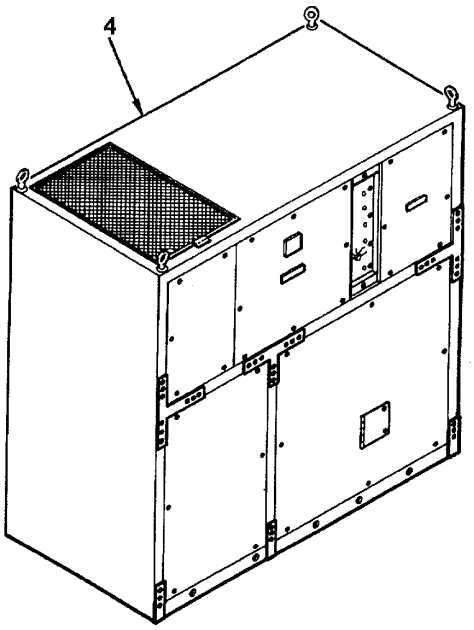
Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
1	Before Panels	Outside	a. Check that panels are in place. b. Check panels for cracks, dents, or missing hardware.	Panels missing or damage that would cause operating hazard.
				
2	Before	Inlets/ Outlets	a. Check for obvious damage and missing parts. b. Check for obstructions, damage and loose or missing hardware.	Control panel damaged. Obstructions exist.
				

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

Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
3	Before	Control Panel	a. Check for obvious damage and missing parts.	Control panel damaged.
	During		b. Check for proper operation.	Unit not operating properly.
4	After	Air Conditioner	Check for obstructions, damage, and loose or missing hardware	Obstructions, damage, loose or missing hardware.



Section III. OPERATION UNDER USUAL CONDITIONS

2-4. GENERAL. The following section covers initial setup procedures and the modes of operation for the air conditioner.

2-5. ASSEMBLY AND PREPARATION FOR USE. Contact unit maintenance personnel for original unpacking, installation,
and preparation for use.

2-6. INITIAL ADJUSTMENTS AND CHECKS. Inspect panels for loose mounting or shipping damage. Report any deficiencies to unit maintenance.

2-7. OPERATING PROCEDURE.

CAUTION

Before operating the air conditioner, ensure that MODE SELECT SWITCH is in the OFF position and that ac power has been applied to air conditioner for at least 30 minutes. This is necessary so that the crankcase heater has sufficient time to operate. Heating the compressor is necessary to remove all liquid refrigerant from the crankcase, thereby eliminating the possibility of damage during starting operations at low ambient temperatures.

a. Before Operation.

(1) Perform the before (B) operator preventive maintenance checks and services listed in Table 2-1.

(2) Check to see that the power cable has been connected from a source of 208 V ac, 3-phase, 50/60 hertz power to the input power connector on the unit.

(3) Check that the following air inlet and outlet openings are clear (Figure 2-2):

- Return air inlet
- Fresh air inlet
- Supply air outlet
- Condenser air outlet
- Condenser air inlet

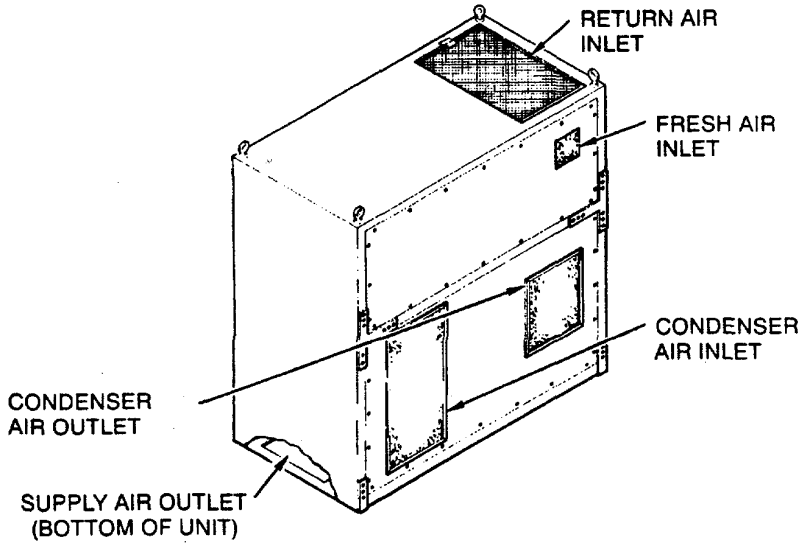


Figure 2-2. Air Inlets and Outlets

b. General Information.

(1) During warm or cold weather (air conditioner operation in AUTO mode):

- Limit traffic through doors as much as possible.
- Keep doors and windows tightly closed.

(2) During cold weather. Adjust shades, blinds, etc., (when applicable); admit sunlight during day. Close them at night.

(3) During hot weather. Adjust shades, blinds, etc., (when applicable); block out sunlight during day.

2-8. OPERATION IN AUTO MODE (See Figure 2-3).

a. Check that AC POWER ON light is on.

CAUTION

Ensure ac power has been on a minimum of 30 minutes for compressor crankcase heater warmup. If compressor slugs, turn mode select switch to OFF, then turn to AUTO position.

b. Turn MODE SELECT SWITCH to AUTO.

c. Check the following lights are off:

- CONTROL POWER (24VDC) FAULT
- LOW SUCTION PRESSURE
- HIGH DISCHARGE PRESSURE
- HIGH AIR TEMPERATURE
- DIRTY FILTER
- LOW OIL PRESSURE
- EVAPORATOR FAN FAILURE

NOTE

If any light (except AC POWER ON) is on, turn MODE SELECT SWITCH to OFF. Contact unit maintenance.

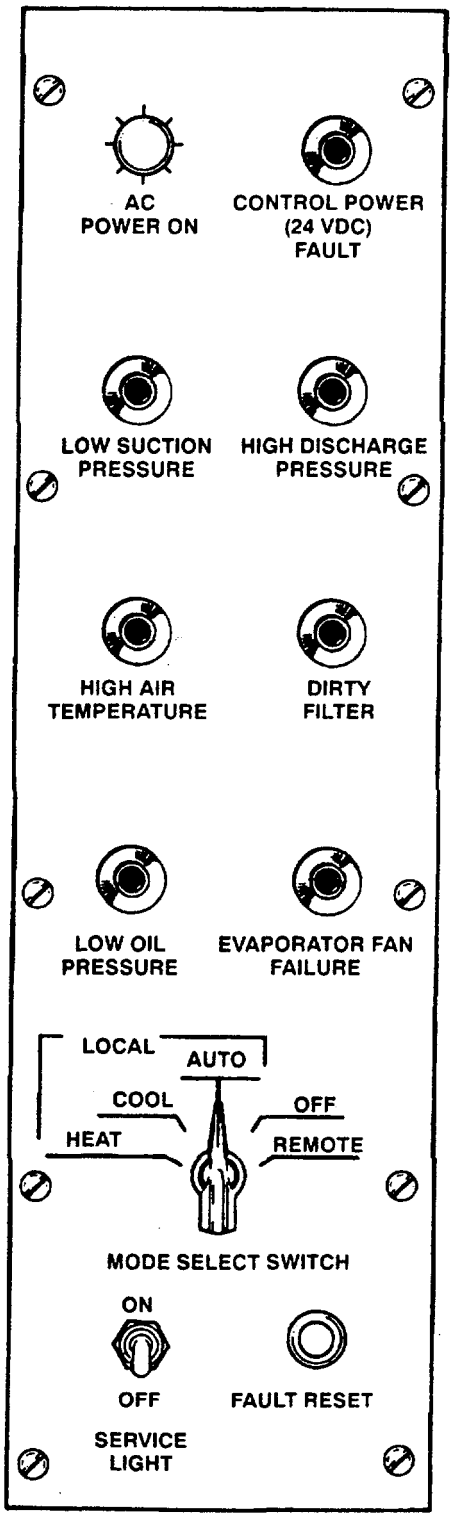


Figure 2-3. Auto Mode (Settings and Indicators)

2-9. OPERATION IN COOL MODE (See Figure 2-4).

a. Check that AC POWER ON light is on.

CAUTION

Ensure ac power has been on a minimum of 30 minutes for compressor crankcase heater warmup. If compressor slugs, turn mode select switch to OFF, then turn to AUTO position.

b. Turn MODE SELECT SWITCH to COOL.

c. Check the following lights are off:

- CONTROL POWER (24VDC) FAULT
- LOW SUCTION PRESSURE
- HIGH DISCHARGE PRESSURE
- HIGH AIR TEMPERATURE
- DIRTY FILTER
- LOW OIL PRESSURE
- EVAPORATOR FAN FAILURE

NOTE

If any light (except AC POWER ON) is on, turn MODE SELECT SWITCH to OFF. Contact unit maintenance.

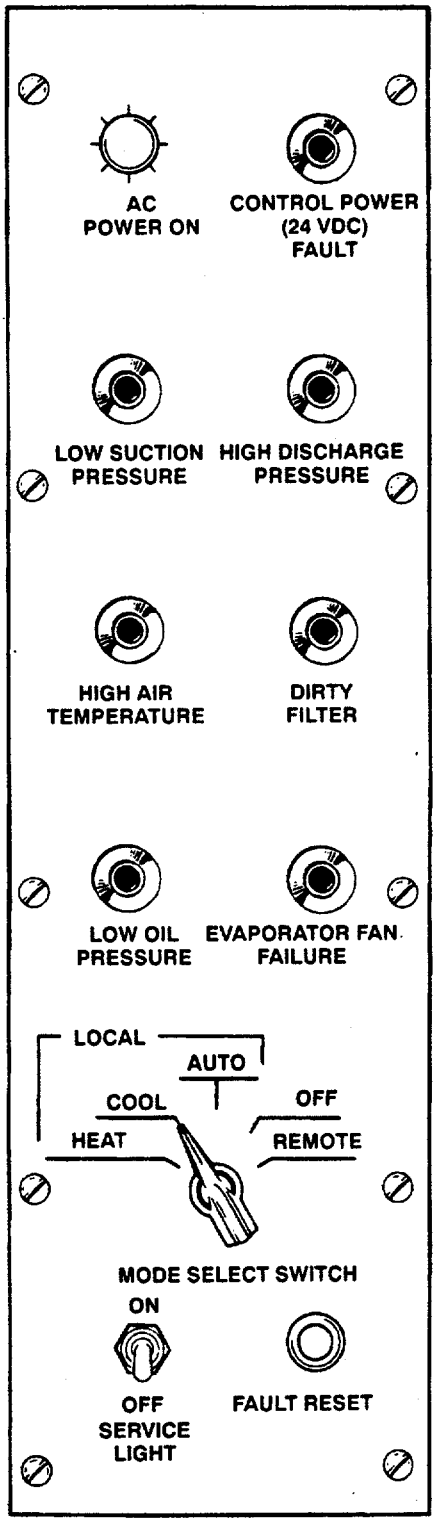


Figure 2-4. Cool Mode (Settings and Indicators)

2-10. OPERATION IN HEAT MODE (See Figure 2-5).

a. Check that AC POWER ON light is on.

CAUTION

Ensure ac power has been on a minimum of 30 minutes for compressor crankcase heater warmup. If compressor slugs, turn mode select switch to OFF, then turn to AUTO position.

b. Turn MODE SELECT SWITCH to HEAT.

c. Check the following lights are off:

- CONTROL POWER (24VDC) FAULT
- LOW SUCTION PRESSURE
- HIGH DISCHARGE PRESSURE
- HIGH AIR TEMPERATURE
- DIRTY FILTER
- LOW OIL PRESSURE
- EVAPORATOR FAN FAILURE

NOTE

If any light (except AC POWER ON) is on, turn MODE SELECT SWITCH to OFF. Contact unit maintenance.

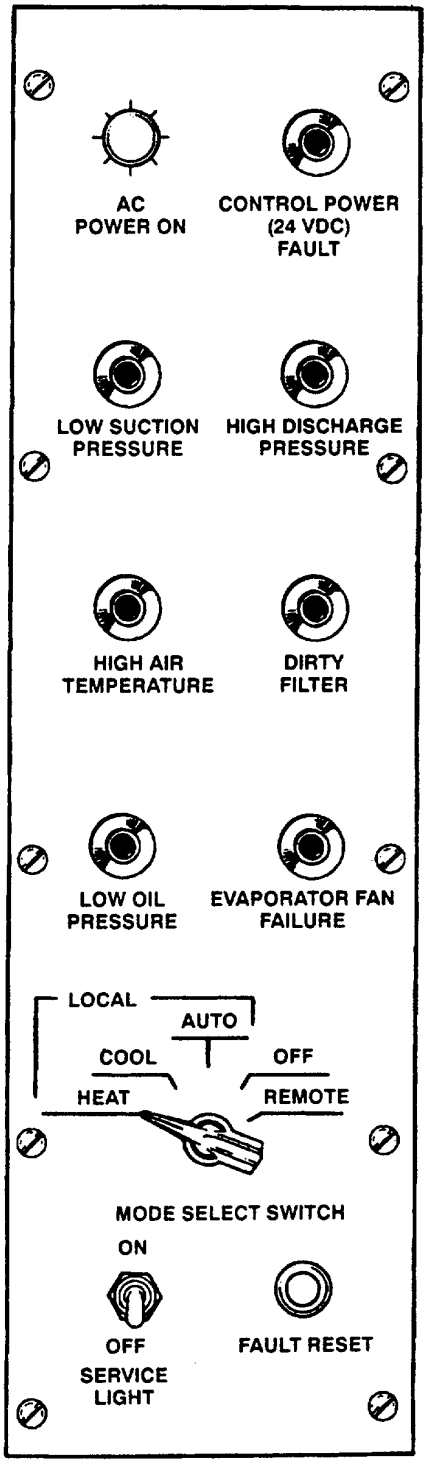


Figure 2-5. Heat Mode (Settings and Indicators)

2-11. OPERATION IN REMOTE MODE (See Figure 2-6).

a. Check that AC POWER ON light is on.

CAUTION

Ensure ac power has been on a minimum of 30 minutes for compressor crankcase heater warmup. If compressor slugs, turn mode select switch to OFF, then turn to AUTO position.

b. Turn MODE SELECT SWITCH to REMOTE.

c. Check the following lights are Off:

- CONTROL POWER (24VDC) FAULT
- LOW SUCTION PRESSURE
- HIGH DISCHARGE PRESSURE
- HIGH AIR TEMPERATURE
- DIRTY FILTER
- LOW OIL PRESSURE
- EVAPORATOR FAN FAILURE

NOTE

If any light (except AC POWER ON) is on, turn MODE SELECT SWITCH to OFF. Contact unit maintenance.

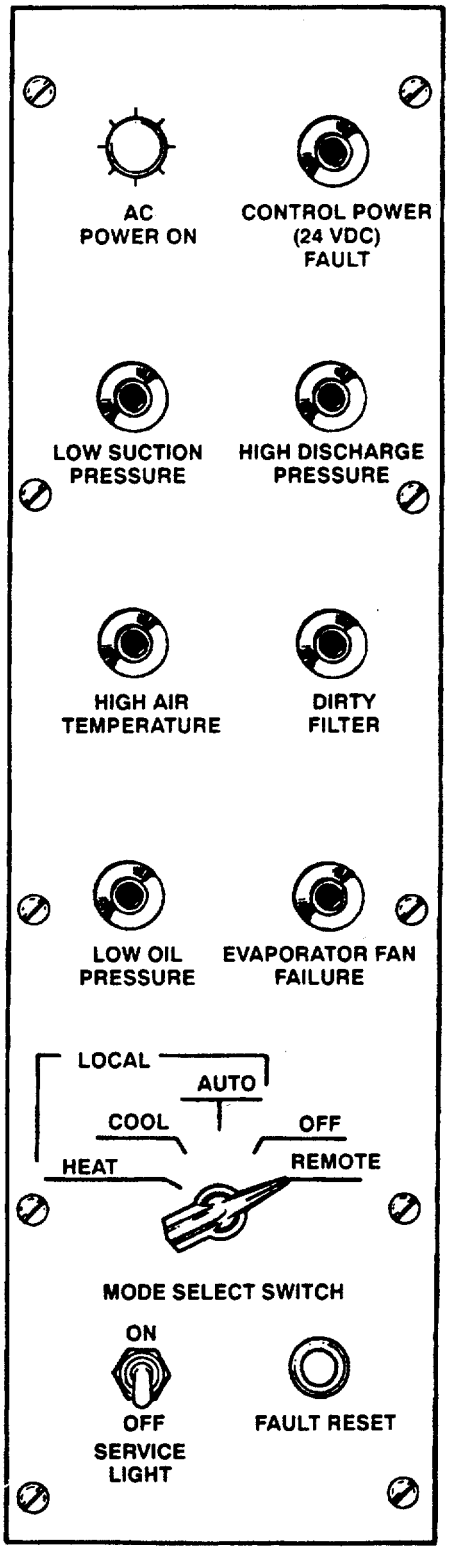


Figure 2-6. Remote Mode (Settings and Indicators)

2-12. SHUTDOWN (OFF) (See Figure 2-7).

NOTE

Do not disconnect or turn off power to the air conditioner during periods of normal shutdown. Power should be disconnected only for maintenance, if unit is to be serviced during emergency conditions, or during periods of extended shutdown.

a. Turn MODE SELECT SWITCH to OFF.

b. Check that AC POWER ON light is on.

CAUTION

To prevent equipment damage, always turn MODE SELECT switch to OFF before breaking the main power supply to the unit.

c. Perform "after operation (A)" preventive maintenance checks and services (Table 2-1).

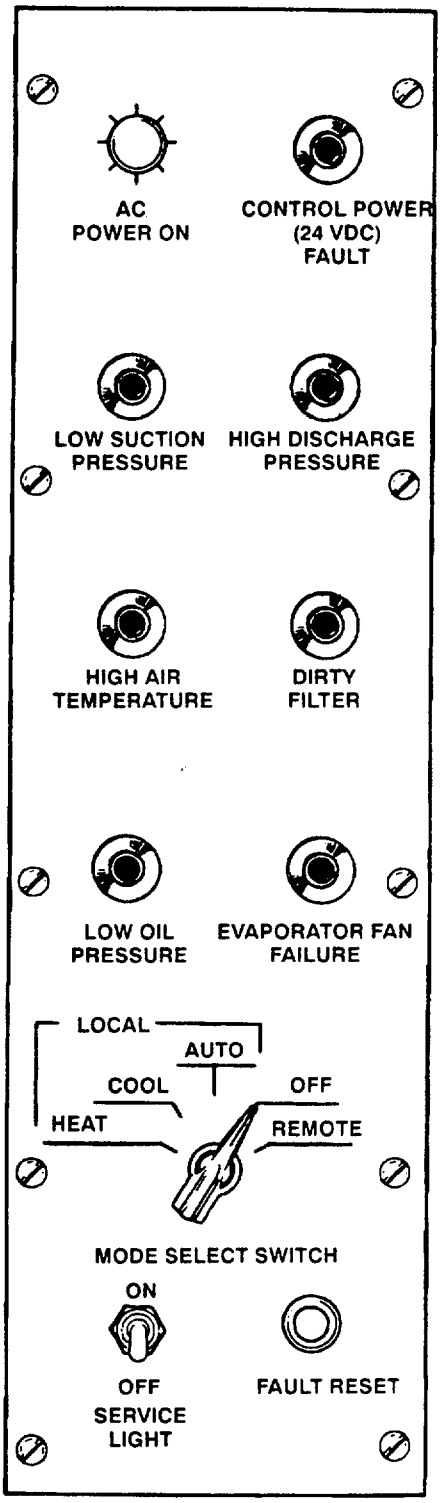
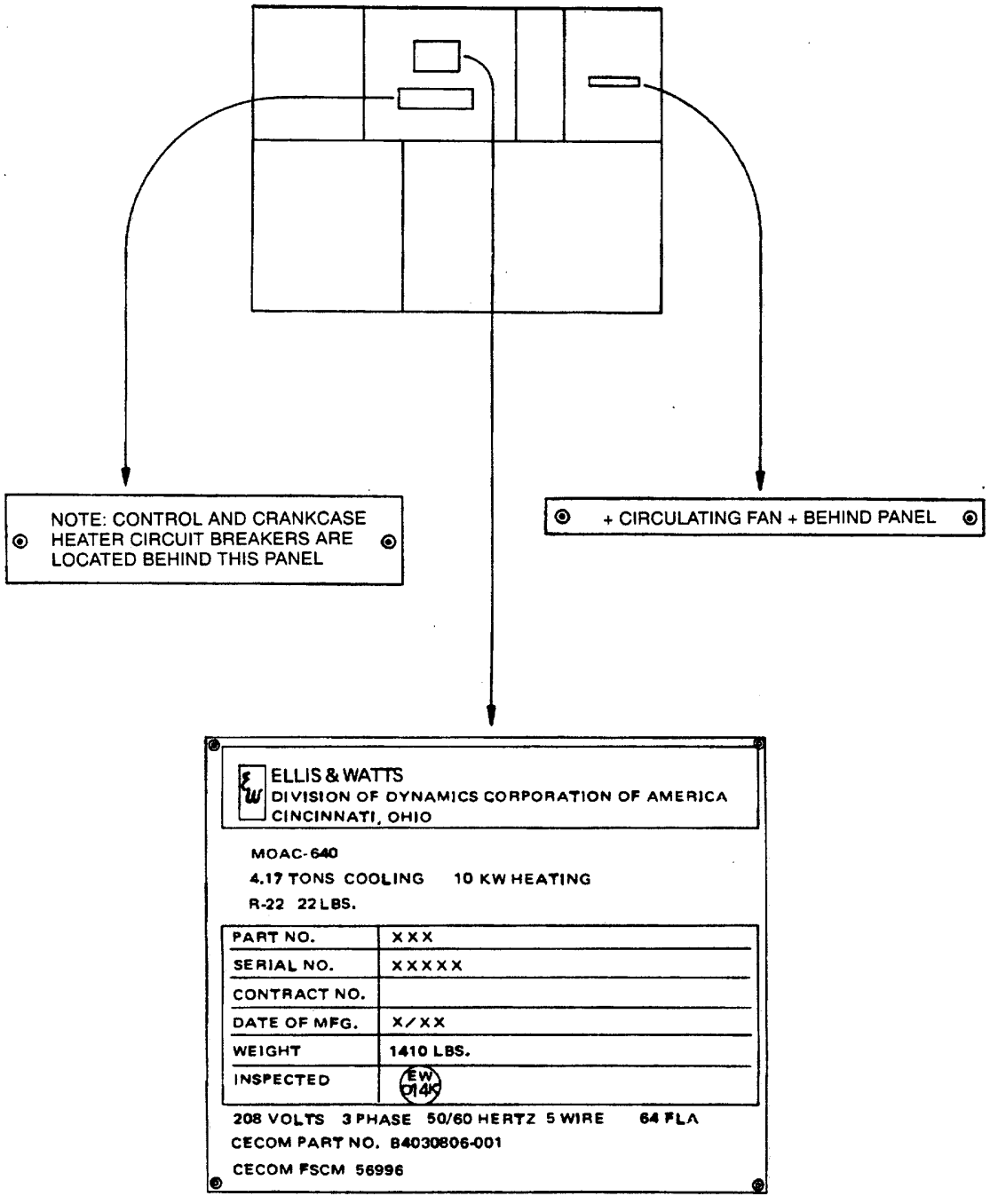
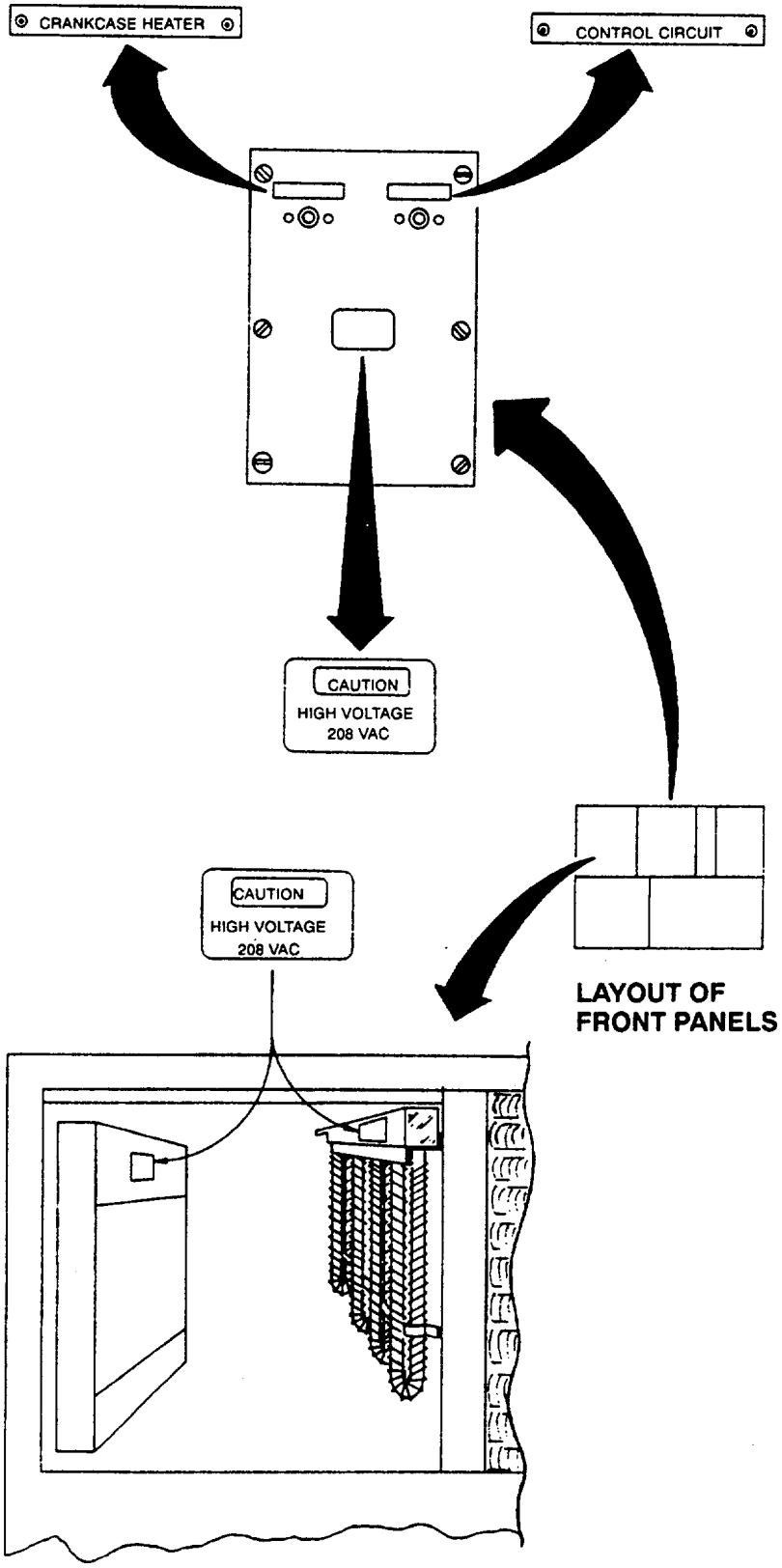


Figure 2-7. OFF Mode (Settings and Indicators)

2-13. PREPARATION FOR MOVEMENT. When the unit is to be moved, the services of unit maintenance shall be employed for the necessary preparation.

2-14. INFORMATION PLATES. A number of instructions and identification plates are provided with the unit.




CRANKCASE HEATER
CONTROL CIRCUIT
CAUTION
HIGH VOLTAGE
208 VAC
CAUTION
HIGH VOLTAGE
208 VAC
LAYOUT OF
FRONT PANELS

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-15. GENERAL. The air conditioner is designed to operate normally within a wide range of climatic conditions. However, some extreme conditions require special operating and servicing procedures to prevent undue loading and excessive wear in the equipment.

2-16. OPERATION IN EXTREME HEAT. The air conditioner is designed to operate in temperatures up to 125°F (52°C). Extra care should be taken to minimize the cooling load when operating in extremely high temperatures. Some of the steps that may be taken are:

NOTE

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

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

b. When possible, use shades or awnings to shut out direct rays of the sun.

c. Limit the use of electric lights and other heat producing equipment.

d. Limit the amount of hot, outside air introduced through the fresh air inlet to that needed for ventilation.

2-17. OPERATION IN EXTREME COLD. The air conditioner is designed to operate in temperatures down to -40°F (-40°C). Extra care should be taken to minimize the heating load when operating in extremely low temperatures. Some steps that may be taken are:

CAUTION

Do not disturb electrical wiring that has been exposed to extremely low temperatures. Both the wire and insulation become brittle when cold and are easily broken.

Before operating the air conditioner, ensure that MODE SELECT SWITCH is in the OFF position and that ac power has been applied to air conditioner for at least 30 minutes (can take up to 24 hours). This is necessary so that the crankcase heater has sufficient time to operate. Heating the compressor is necessary to remove all liquid refrigerant from the crankcase thereby eliminating the possibility of damage during starting operations at low ambient temperatures.

If compressor begins to slug, turn MODE SELECT SWITCH to OFF, wait a few minutes, then turn MODE SELECT SWITCH to AUTO position. Turning the MODE SELECT SWITCH to OFF then to AUTO mode prevents the compressor from slugging, thereby eliminating the possibility of damage during starting operations at low ambient temperatures.

NOTE

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

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

b. Open shades and awnings to permit entry of direct rays of the sun, if appropriate.

c. Limit the amount of cold, outside air introduced through the fresh air inlet to that needed for ventilation.

2-18. OPERATION IN DUSTY OR SANDY CONDITIONS. Dusty and sandy conditions can seriously reduce the efficiency of the air conditioner by clogging the air filters and thereby causing a restriction of the volume of airflow. Accumulation of dust or sand in the condenser coil and/or in the compressor compartment may cause overheating of the refrigeration system. Dust or sand may also clog the condensate trap, and water drain lines. Some of the steps that may be taken are:

a. Frequent cleaning of filters and all other areas of dust and sand accumulation. In extreme conditions, daily cleaning of filters may be necessary.

b. Limit the amount of dusty or sandy outside air introduced through the fresh air inlet to that essential for ventilation.

2-19. OPERATION IN UNUSUALLY WET CONDITIONS. The air conditioner is designed for normal exposure to the elements, so it is reasonably waterproof. Some of the steps that should be taken in an extremely wet climate are:

a. More frequent inspection and cleaning of the condensate trap and drain lines to insure proper drainage and prevent accumulation of water inside the cabinet.

b. Cover the fresh air inlet on the back of the cabinet during periods of wet windy weather when the air conditioner is not in operation.

2-20. OPERATION IN SALT AIR OR SEA SPRAY. Salt air or sea spray may cause many of the same clogging problems encountered when operating in a dusty or sandy environment. In addition, the nature of salt presents serious corrosion problems. Frequent cleaning is necessary during which all exposed surfaces should be thoroughly spray rinsed or sponged with fresh water to remove salt.

2-21. OPERATION UNDER EMERGENCY CONDITIONS.

a. Chemical, Biological, Radiological Hazard (CBR). Should it be necessary to operate in conditions requiring use of CBR filtration equipment, see specific instructions for your shelter or facility installation. The following are general suggestions and do not apply if they conflict with instructions for your shelter or facility installation.

(1) The fresh air inlet should be closed, the opening should be covered with a suitable material, and sealed air tight.

(2) The return air inlet should be partially or completely closed with a suitable material. This will cause a more positive pressure on inside of shelter or enclosure and keep air from being drawn in from outside the enclosure.

b. Power Conservation. During periods when full 208 V ac, 3-phase power is in critically short supply, if the air conditioner cannot be turned off completely, it should be operated in AUTO mode only.

CHAPTER 3
OPERATOR MAINTENANCE

Section I. OPERATOR LUBRICATION INSTRUCTIONS

3-1. GENERAL. There are no lubrication instructions at operator level.

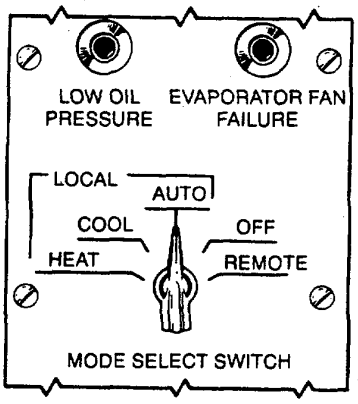
Section II. OPERATOR TROUBLESHOOTING

3-2. The table 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.

3-3. 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.

Table 3-1. Operator Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. AIR CONDITIONER WILL NOT START IN AUTO MODE.
Step 1. Check that MODE SELECTOR is set to AUTO. Set switch to AUTO.
Step 2. Check that AC POWER ON light is ON. Contact Unit Maintenance.



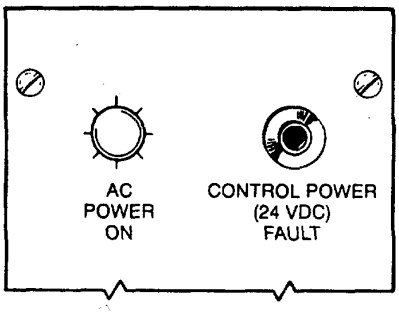


Table 3-1. Operator Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. REDUCED COOLING CAPACITY.

Step 1. Check that all doors, windows, and other openings in the room or enclosure are tightly closed.

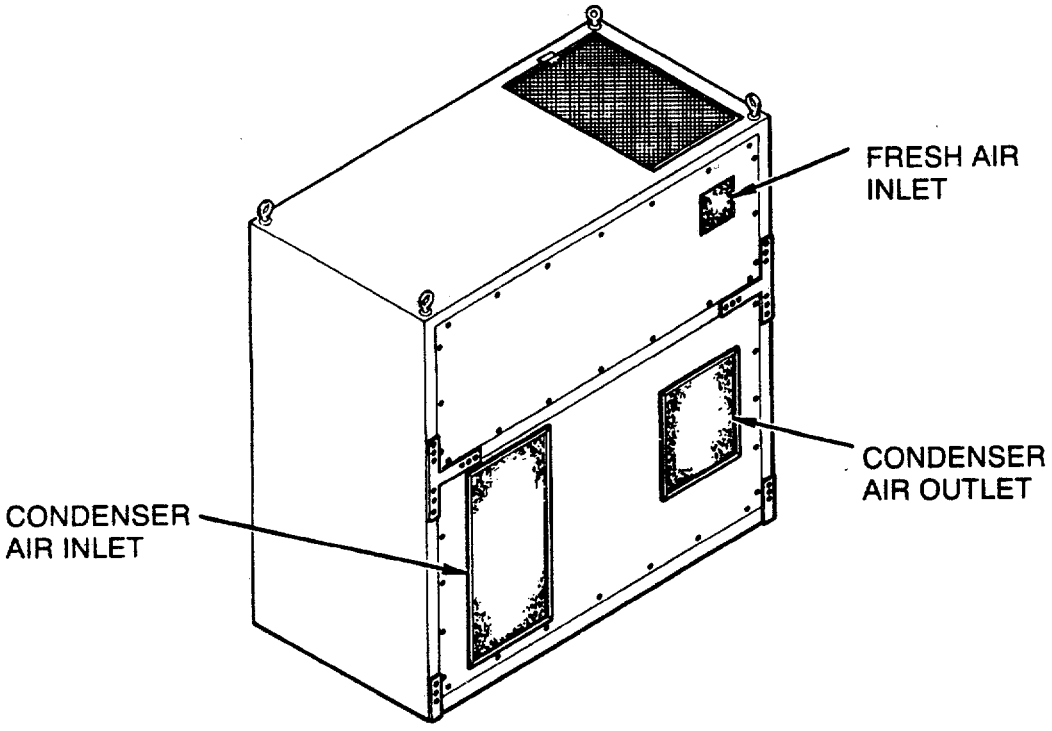
Tightly close all openings.

Step 2. Check to be sure that excessive hot outside air is not being introduced through the fresh air inlet.

Shade inlet; then, if condition improves adjust fresh air damper to limit amount of hot air intake.

Step 3. Check to be sure condenser air inlet and outlet are not obstructed.

Remove obstructions.



3. REDUCED HEATING CAPACITY.

Step 1. Check that all doors, windows, and other openings in the room or enclosure are tightly closed.

Tightly close all openings.

Step 2. Check to be sure that excessive cold, outside air is not being introduced through fresh air inlet.

Partially cover inlet; then, if condition improves, adjust fresh air damper to reduce amount of cold air intake.

Table 3-1. Operator Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

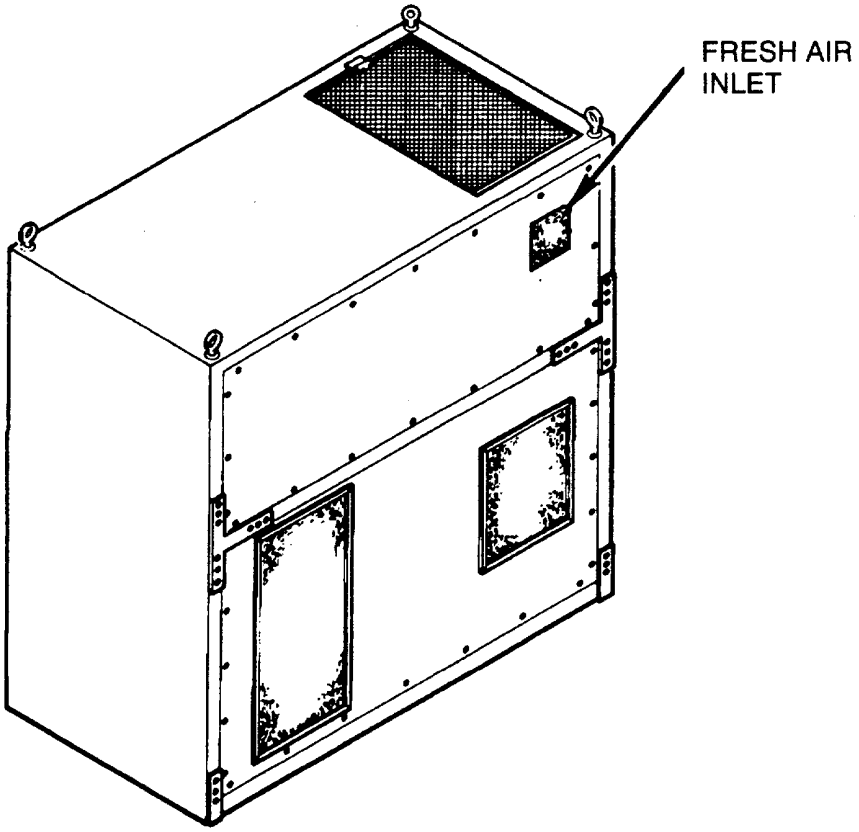
4. ONE OR MORE CONTROL PANEL FAULT INDICATOR LIGHTS ARE ON.

Step 1. Check that AC POWER ON light is on.

If it is not on, contact Unit Maintenance.

Step 2. Check that no red light on control panel is on.

If a red light is on, contact Unit Maintenance.



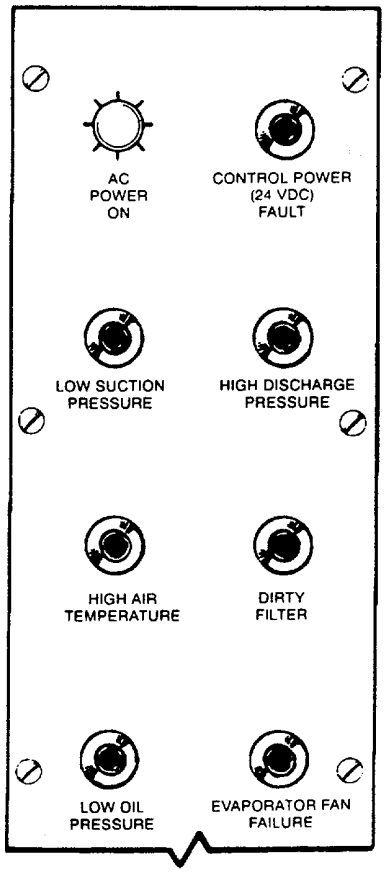


Table 3-1. Operator Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

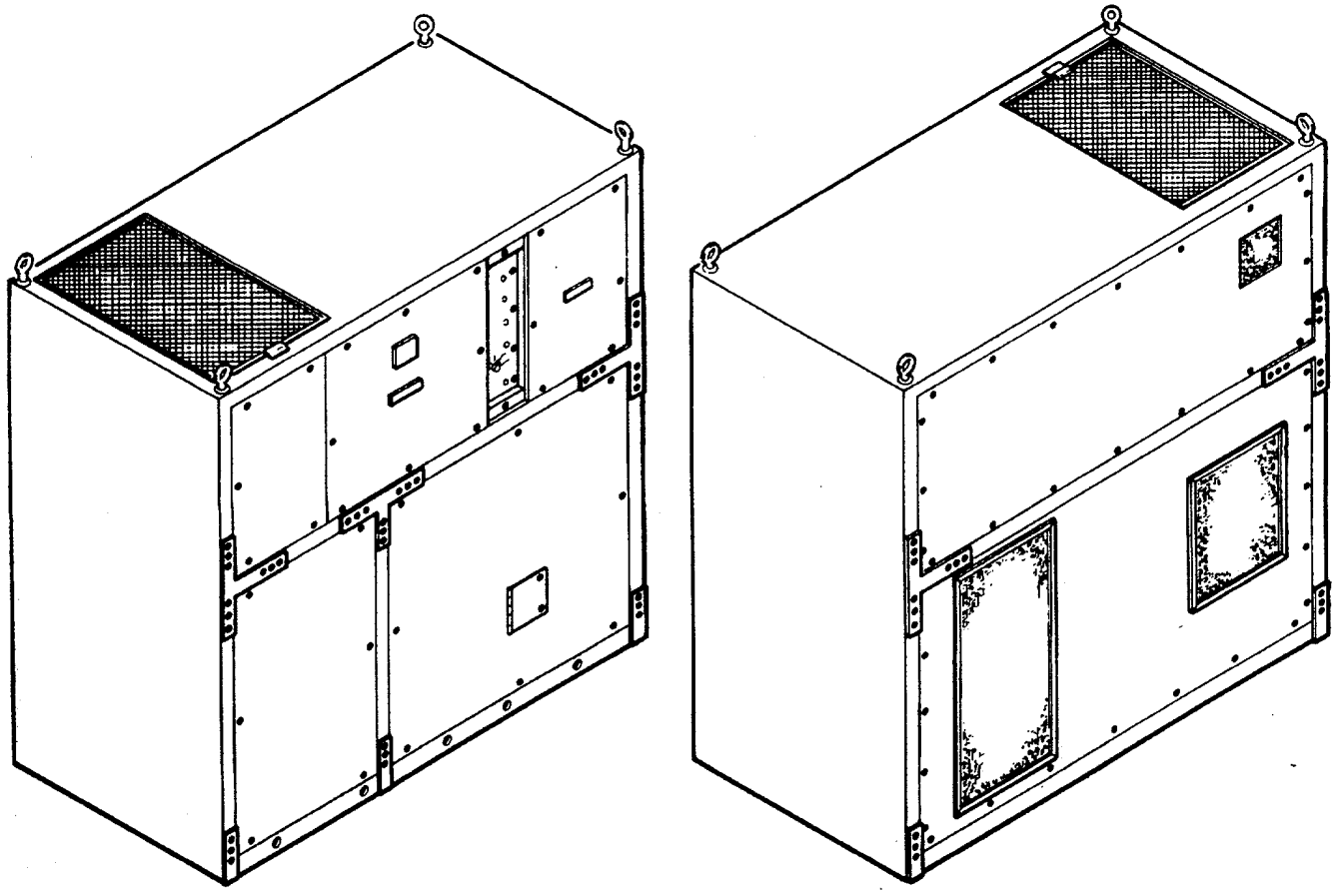
5. EXCESSIVELY NOISY OPERATION.

Step 1. Isolate source of noise as near as possible, both by ear and touch.

Contact Unit Maintenance.

Step 2. Check all external panels and filters for looseness, vibration, and security.

Contact Unit Maintenance.



Section III. OPERATOR MAINTENANCE PROCEDURES

3-4. This section contains maintenance procedures which are authorized to operator (C) by the Maintenance Allocation Chart (MAC) Appendix B.

3-5. RETURN AIR FILTER.

This task consists of: **Removal** **Inspection** **Cleaning** **Installation**

INITIAL SET-UP:

Personnel : 1

Materials:

Rags (Item 12, Appendix E)
Detergent, dishwashing (Item 20, Appendix E).
Oil, air filter (Item 23, Appendix E)

REMOVAL

1. Open latch (2).
2. Remove filter (1).

INSPECTION

1. Check filter for punctures, cuts and damaged edges that would allow passage of unfiltered air.
2. Check filter for packed or mashed areas that would block air flow.
3. Replace filter if defective.

CLEANING

1. Wash filter in mild detergent and water solution.
2. Rinse thoroughly in water.
3. Shake out excess water.
4. Spray filter with air filter oil.

INSTALLATION

1. Position filter (1)in place.
2. Close latch (2).

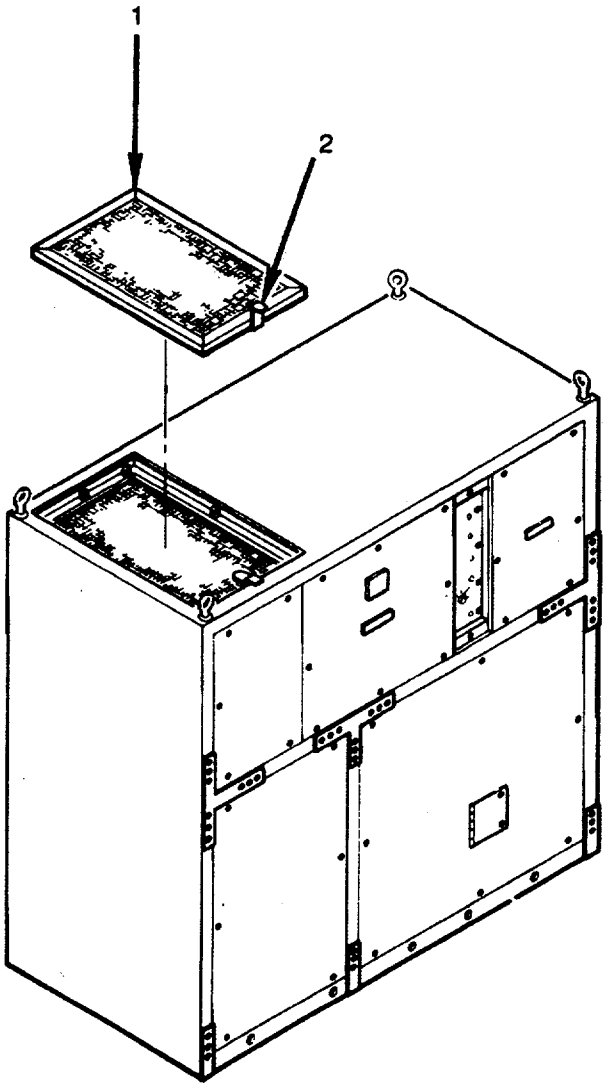


Figure 3-1. Return Air Filter

CHAPTER 4
UNIT MAINTENANCE

Section I. UNIT LUBRICATION INSTRUCTIONS

4-1. GENERAL. The compressor crankcase oil level should be checked quarterly and oil added by Direct Support Maintenance as necessary during preventive maintenance service. The evaporator and condenser fan motors should be checked and lubricated as necessary during preventive maintenance service.

4-2. MOTOR LUBRICATION/COMPRESSOR CRANKCASE OIL.

a. Condenser and Evaporator Motor Unit Lubrication.

Quarterly, Access condenser motor (para 4-76) and evaporator motor (para 4-70). Apply two strokes of grease (Item 2, Appendix E) at lubrication fittings.

b. Compressor Crankcase Oil.

Quarterly. Check compressor sight glass (Figure 5-34) for proper refrigerant oil level.

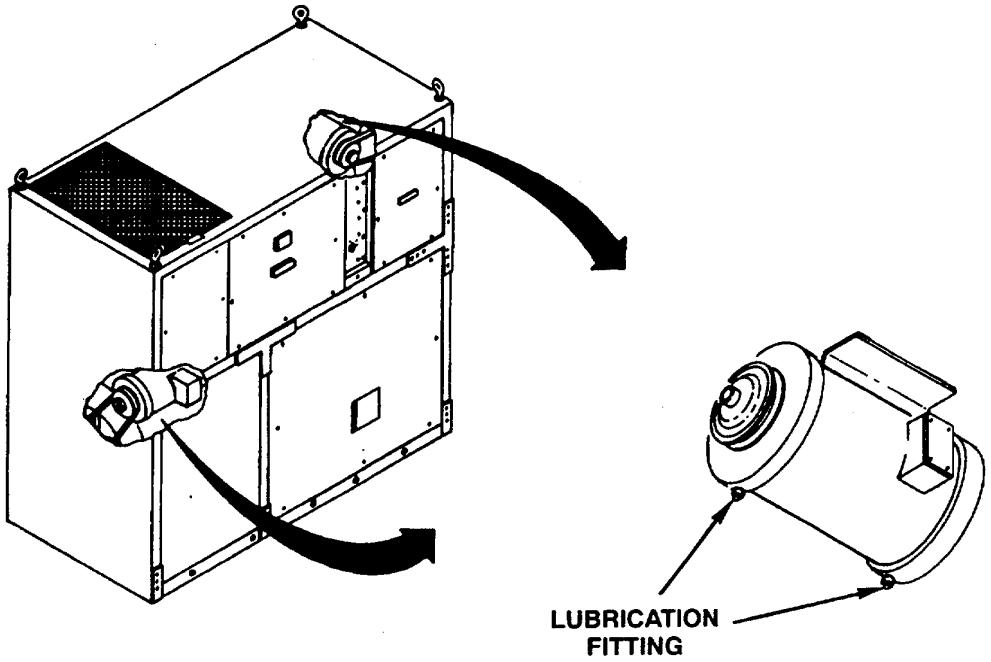


Figure 4-1. Unit Lubrication

Section II. REPAIR PARTS, SPECIAL TOOLS, TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

4-3. COMMON TOOLS AND EQUIPMENT. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-4. SPECIAL TOOLS, TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT. Special tools required for maintenance of the equipment are listed in Appendix B. Test, measurement, and diagnostic equipment (TMDE), and support equipment include standard equipment found in any unit maintenance shop. Appendix B, Section III, contains a list of the tools.

4-5. REPAIR PARTS. Repair parts are listed and illustrated in the Repair Parts and Special Tools List (RPSTL) TM 9-4120-381-24P, covering unit, direct support, and general support maintenance for this equipment.

Section III. SERVICE UPON RECEIPT

4-6. UNLOADING. The air conditioner is packaged in a container designed for shipment and handling with the cabinet in an upright position. The base of the container is constructed as a shipping pallet with provisions for the insertion of the tongs of a fork on material handling equipment (see Figure 4-2).

a. Remove Tiedowns. Remove all blocking and tiedowns that may have been used to secure the container to the carrier.

WARNING

Do not allow anyone under equipment suspended from a lifting device. Do not allow the unit to swing while suspended from a lifting device. Failure to observe this warning may result in injury to personnel and damage to the equipment.

CAUTION

Use care in handling to avoid damage to the air conditioner. If an overhead lifting device must be used, use an appropriate sling so that the weight of the unit is supported by the shipping container. b. Material Handling. Use a forklift truck or other suitable material handling equipment to remove the unit from the carrier.

4-7. UNPACKING. Normally, the packaged air conditioner should be moved into the immediate area in which it is to be installed before it is unpacked.

NOTE

The shipping container is of such a design that it may be retained for reuse if frequent relocation of the air conditioner is anticipated.

a. Remove shipping container. Cut the metal bands that hold the top and sides of the container to the base. Lift the container vertically and remove it from the base and cabinet.

b. Remove packaging. Remove the cushioning around the top of the cabinet and retain, if reuse is anticipated. Remove the technical publications envelope and accessory sack that are taped to the cabinet and put them in a safe place.

WARNING

Do not allow anyone under equipment suspended from a lifting device. Do not allow the unit to swing while suspended from lifting device. Failure to observe this warning may result in injury to personnel and damage to the equipment.

c. Remove pallet. Attach an overhead hoist with an appropriate sling and spreader bar to the lifting eyes provided at top of the cabinet. Raise the cabinet and remove the carriage bolt assemblies that hold the tiedown boards to the pallet from the underside of the pallet. Remove the bolts that hold the tiedown boards to the unit base. Remove and retain the pallet and carriage bolt assemblies and the tiedown boards and bolts, if reuse is anticipated. Be sure to remove all remaining barrier material from the underside of the cabinet base. Lower the cabinet to the floor in the desired position and remove the sling and hoist.

NOTE

Bolts used to anchor cabinet base to tiedown bars may be used to anchor it in place in installed location if installation method allows for anchoring from beneath.

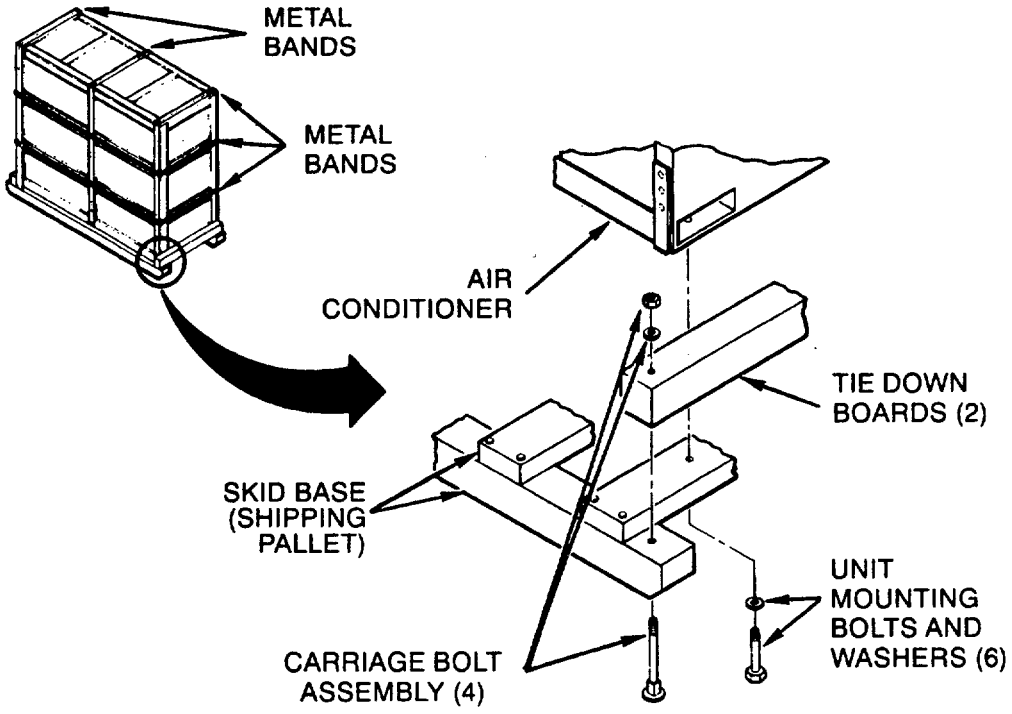


Figure 4-2. Typical Crated Air Conditioner

4-8. RECEIVING INSPECTION. Perform receiving inspection of the air conditioner as follows:

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

b. Check. Check the unit against the packing slip to see if shipment is complete. Report all discrepancies in accordance with the instructions of DA PAM 738750.

c. Modified. Check to see whether the equipment has been modified.

4-9. INSTALLATION SITE PREPARATION. The air conditioner is designed so that it is adaptable to a variety of installation arrangements. Most typical installations are made by preparing an opening in an exterior wall of the room or enclosure to be conditioned and positioning the air conditioner so that the front of the cabinet is inside the room or enclosure and the back is outside. Alternate installations may be made with the entire cabinet either inside or outside the conditioned area.

a. General. The following are minimum requirements for all installations. (See Figure FO-2 for installation dimensions).

(1) A relatively level surface capable of bearing the weight of the air conditioner on which to set the base. To insure proper condensation drainage, the surface should be level within 5 degrees from front to back and side to side.

(2) An unobstructed flow of air from outside the conditioned area to the inlet and outlet of the condenser.

(3) An unobstructed flow of air from inside the conditioned area to the conditioned air intake and discharge.

(4) An unobstructed flow of air from outside the conditioned area to the fresh air intake.

(5) The supply air outlet is discharged from the bottom of the air conditioner (see Figure FO-2).

(6) Access to the front (and back, if possible) of the cabinet for routine operation and servicing and for necessary maintenance actions.

4-9. INSTALLATION SITE PREPARATION - Continued.

(7) Access to the top of the cabinet for removal of the return air filter.

(8) A source of 208 V ac, 3-phase, 50/60 hertz input power rated at 60 amps. The power source outlet should be located as near as possible to the installed location of the air conditioner. The power source wiring must include a disconnect switch. However, provisions should be made to insure that power is not disconnected during normal operation and that the disconnect is not used to turn off the air conditioner for normal shutdown.

(9) An earth ground capable of handling 60 amps.

(10) Remove four shipping bolts from evaporator motor fan mounting bracket (refer to Figure FO-2).

(11) Check that no source of dangerous or objectionable fumes is located near the fresh air intake.

(12) If possible, make use of terrain features such as trees and buildings to provide a shaded location. This will minimize the cooling load on the air conditioner.

(13) If possible, avoid locations where the condenser and fresh air intakes will be laden with dust, dirt, soot, smoke, or other debris.

b. Inside Installation. Manufacture an arrangement of ducts for the condenser intake and discharge air openings, and the fresh air intake.

NOTE

Easy access to fresh or return air filters must be provided. Filters may be left in position in unit or relocated in duct work. Some installations (filters relocated in duct work) may require different size filters. Access to underside of air conditioner is required for electrical, ground wire, drain line, etc.

c. Outside Installation. Manufacture an arrangement of ducts for the conditioned air intake and discharge air. Ducts may be made for attachment to the air conditioner cabinet using the mounting holes for the conditioned air intake or some other arrangement may be made. Ducts may also be made for installation of conditioned air intake on the inside ends or replacements ducts may be used. Prepare appropriate openings in the wall for the ducts.

4-10. PREPARATION OF AIR CONDITIONER FOR INSTALLATION. No preparation is necessary if the air conditioner is to be installed by the typical exterior wall method and operated as a self contained unit. For alternate installation methods, some preparation is necessary.

Instructions. The unit is designed to provide for limited basic types of installation. See the following paragraphs for instructions only if they are applicable to your requirements.

a. Access panels removed (para 4-11).

b. Pulley checks (para 4-12).

c. Installation Instructions (para 4-13).

d. Front access panel installation (para 4-14).

4-11. ACCESS PANELS REMOVED.

WARNING

Be sure input power is disconnected before doing any work inside the air conditioner cabinet. Voltages used can KILL.

a. Remove Center Front Evaporator Panel. Loosen eight captive fasteners (1)and remove panel (2)(see Figure 4-3).

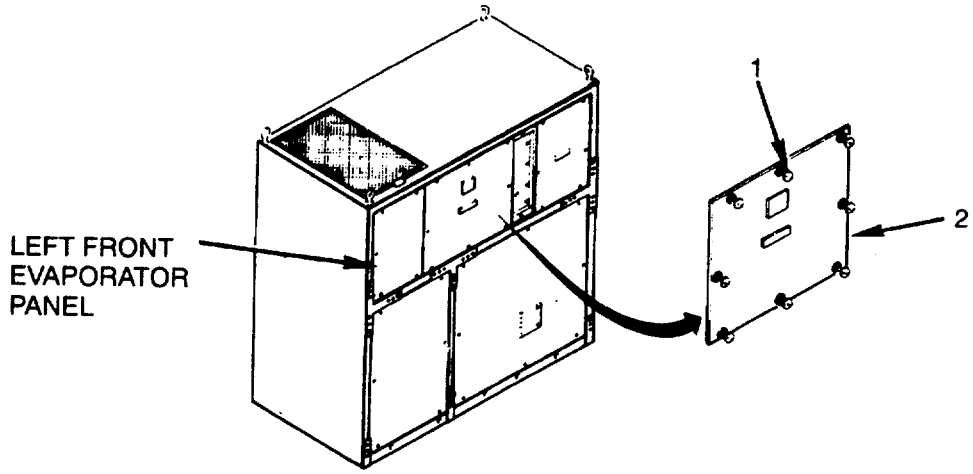


Figure 4-3. Center Front Evaporator Panel Removal

b. Remove Left Front Evaporator Panel. Loosen five captive fasteners (1), loosen clamp (2), disconnect hose (3), and remove panel (4)(see Figure 4-4).

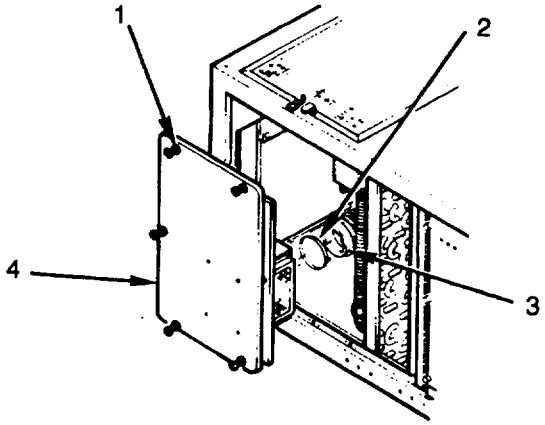


Figure 4-4. Left Front Evaporator Panel Removal

c. Remove Right Front Evaporator Panel. Loosen six captive fasteners (1)and remove panel (2)(see Figure 4-5).

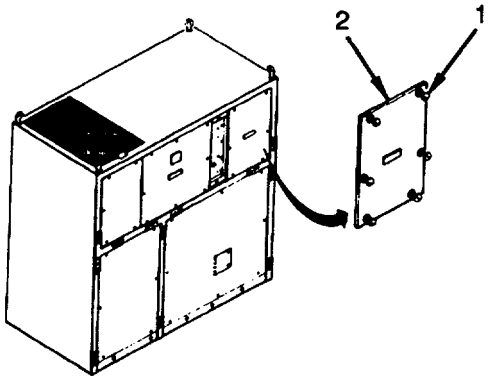


Figure 4-5. Right Front Evaporator Panel Removal

4-11. ACCESS PANEL REMOVED - Continued.

d. Remove Right Front Condenser Panel. Loosen eight captive fasteners (1)and remove panel (2)(see Figure 4-6).

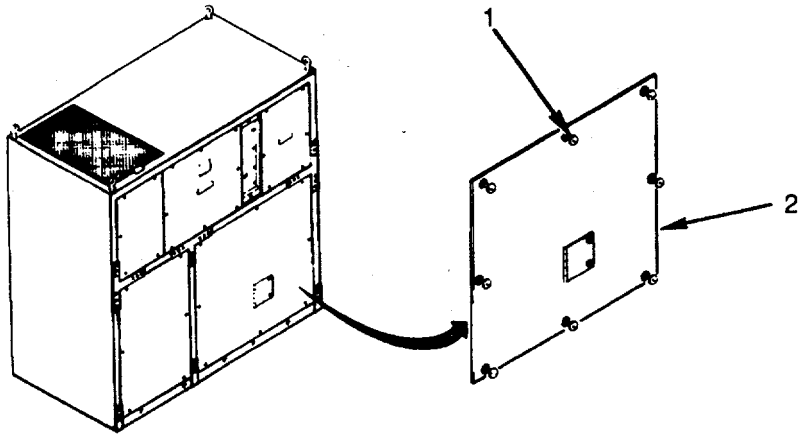


Figure 4-6. Right Front Condenser Panel Removal

e. Remove Left Front Condenser Panel. Loosen six captive fasteners (1)and remove panel (2)(see Figure 4-7).

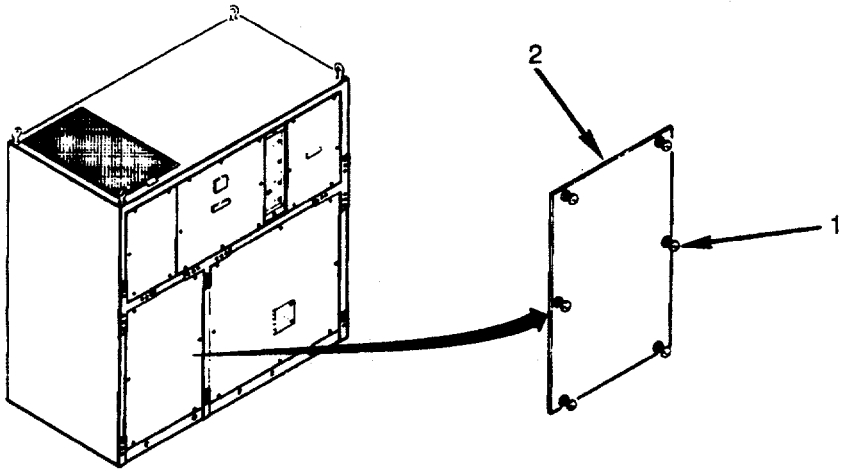


Figure 4-7. Left Front Condenser Panel Removal

f. Open Left Electric Plate. Loosen six captive fasteners (1)and open panel (2)(see Figure 4-8).

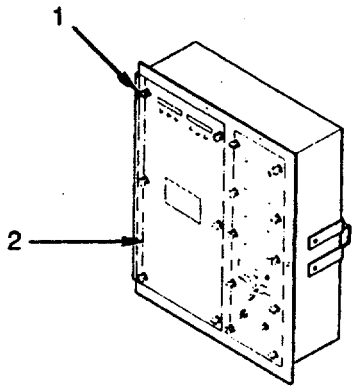


Figure 4-8. Left Electric Plate

g. Open Right Electric Plate. Loosen ten captive fasteners (1)and open panel (2)(see Figure 4-9).

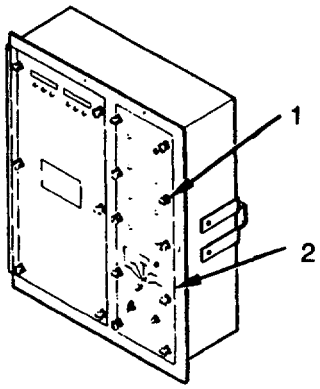


Figure 4-9. Right Electric Plate

h. Open Rear Evaporator Panel. Remove 10 screws (1), lockwashers (2), flat washers (3), and open panel (4). Support panel with cables and fresh air hose connected (see Figure 4-10).

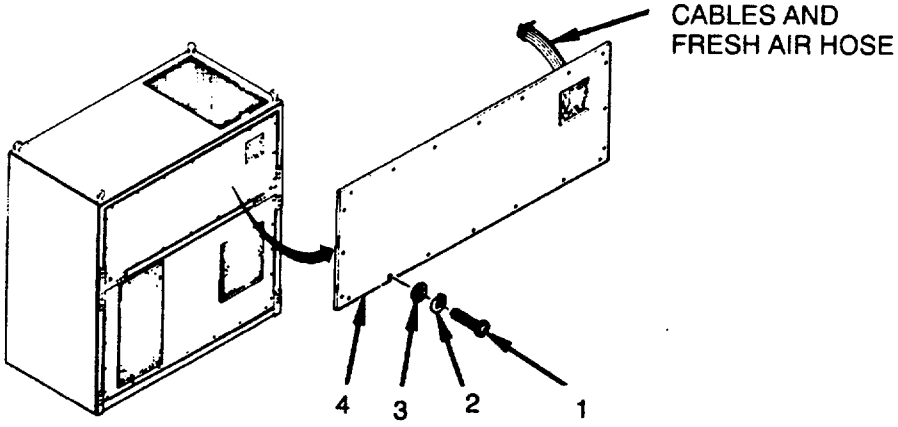


Figure 4-10. Rear Evaporator Panel Removal

i. Remove Rear Condenser Panel. Remove 42 screws (3), lockwashers (2), flat washers (1), and remove panel (4)(see Figure 4-11).

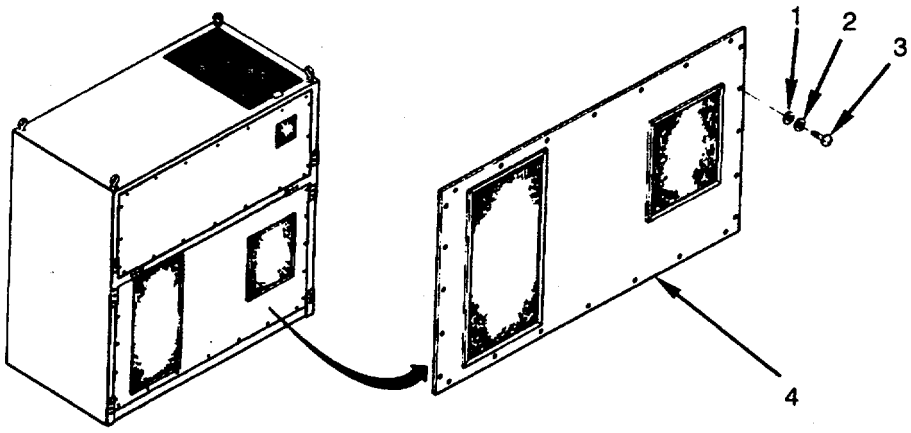


Figure 4-11. Rear Condenser Panel Removal

4-12. PULLEY CHECKS. Two sets of color-coded pulleys are provided with the unit. Green pulleys are for 60 Hz operation. Red pulleys are for 50 Hz operation. One set of pulleys (either the 50 Hz or 60 Hz) is installed on each of the two fans and fan motors within the unit. The other set is bolted to the side panel inside the unit. See Figure 4-12 for pulley locations.

CAUTION

Do not operate unit on 60 Hz power with 50 Hz pulleys installed. Fans will over-speed resulting in fan motor overload.

a. Determine operating frequency of unit.

NOTE

Measure the diameters of the pulleys to ensure that dimensions are as follows:

Pulley	50 Hz (red) Dia (inches)	60 Hz (green) Dia (inches)
Condenser fan	6-1/2	6-3/4
Condenser motor	5-1/4	4-1/2
Evaporator fan	4-3/4	4-7/8
Evaporator motor	4-3/4	4-7/8

b. Check that correct pulleys are installed on fans and fan motors.

c. If correct pulleys are installed, go to paragraph 4-14. If pulleys must be exchanged, go to paragraph 4-72 and 4-78 (60 Hz pulley), or 4-73 and 4-79 (50 Hz pulley).

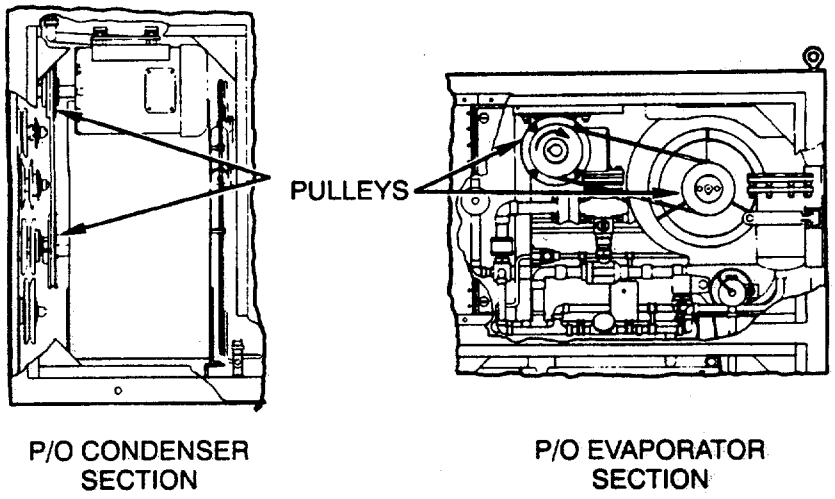


Figure 4-12. Pulley Locations

4-13. INSTALLATION INSTRUCTIONS. All alterations to the enclosure into which the air conditioner is to be installed should be complete before installation of the air conditioner.

a. Install Rear Condenser Panel. Position panel (1)and install 42 screws (4), lockwashers (3), and flat washers (2)(see Figure 4-13).

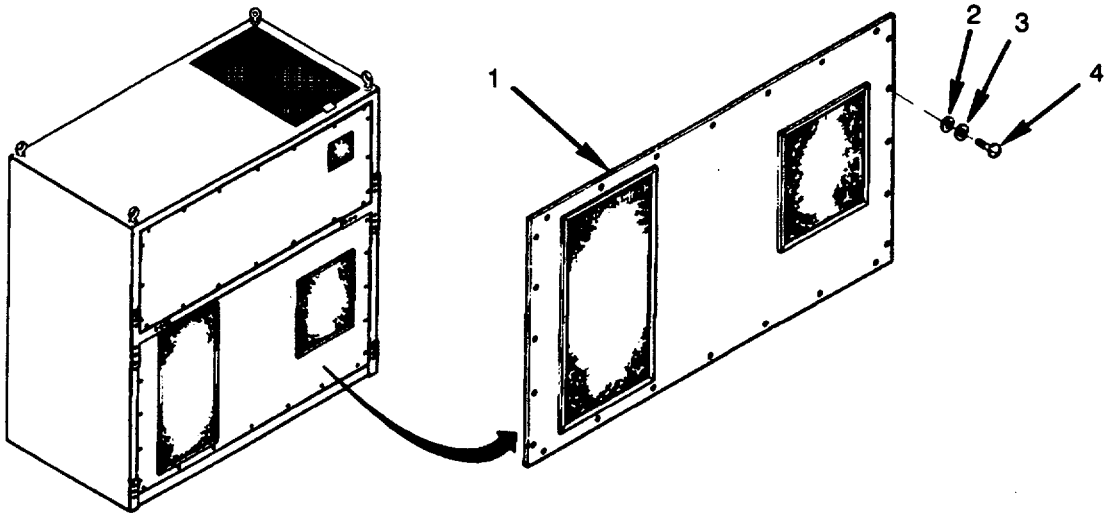


Figure 4-13. Rear Condenser Panel Installation

b. Install Rear Evaporator Panel. Rotate and position panel (1)and install 14 screws (2), lockwashers (3), flat washers (4)(see Figure 4-14).

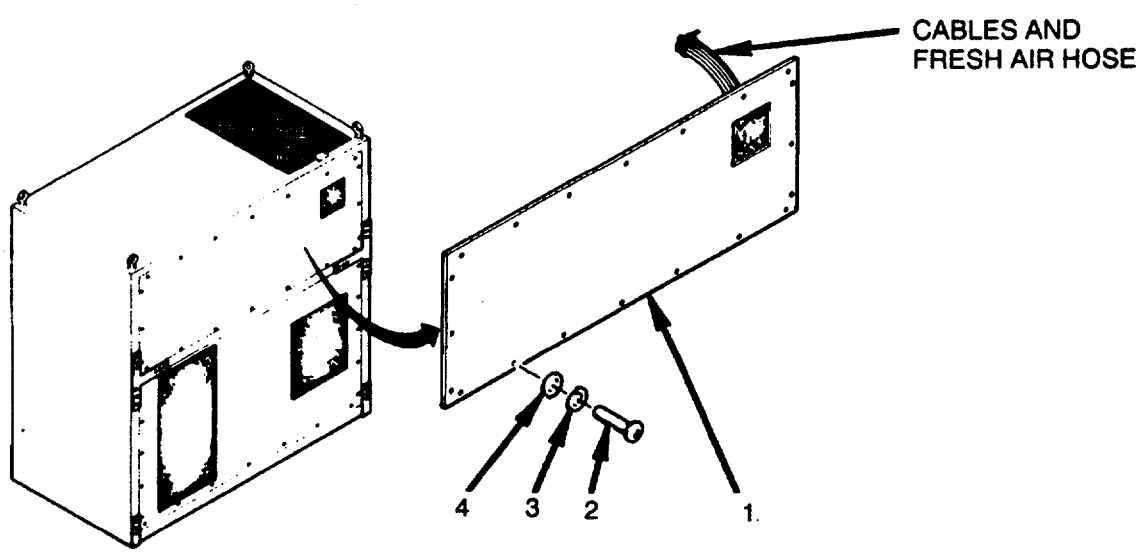


Figure 4-14. Rear Evaporator Panel Installation

4-13. INSTALLATION INSTRUCTIONS - Continued.

WARNING

Do not allow anyone under equipment suspended from a lifting device. Do not allow the unit to swing while suspended from a lifting device. Failure to observe this warning may result in injury to personnel and damage to the equipment.

CAUTION

Use care in handling to avoid damage to the air conditioner. If an overhead lifting device must be used, use an appropriate sling and spreader bar so that the weight of the unit is supported equally by the lifting eyes.

c. Position Unit. Position unit with an overhead hoist or fork lift per site installation instructions.

NOTE

For van or some shelter installations the lifting eyebolts must be removed.

(1) Overhead Hoist. Attach an overhead hoist, sling and spreader bar to the lifting rings on top of cabinet and move the air conditioner into position with supply air duct work fastened and sealed to bottom of unit and align mounting holes (see Figure FO-2).

(2) Fork lift. Position fork lift on either end of cabinet and move the air conditioner into position with supply air duct work fastened and sealed to bottom of unit and align mounting holes (see Figure FO-2).

(3) Pull site input power cables through conduit.

d. Secure Unit. Secure unit with appropriate mounting hardware per site installation instructions.

e. Seal Unit. Seal all openings around cutouts for air conditioner, air and water tight. Use gasket, caulking, or other suitable material. _.

f. Prepare Drain Hole. The air conditioner is provided with one drain hole in the base. Install 4-inch long drain tube with four self-tapping screws (#8 X 3/8). Connect drain line to 4-inch long drain tube. The drain line should lead to an appropriate facility drain, storm sewer, dry sump, or an acceptable outside area. Be sure the entire length of the drain line is slightly lower than the unit base and sloping away to ensure gravity drainage.

g. Install Ground. Install a 6-AWG minimum ground wire between the air conditioner cabinet and an adequate earth ground.

h. Connect Electrical Connections (see Figure 4-15).

(1) Turn control panel MODE SELECT SWITCH to OFF.

WARNING

Shut off input power source to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

(2) Using No.6 AWG wires, route wires from power source through 1-inch fitting located in bottom of condenser section to terminals within RFI box. Connect wires as shown in Figure 4-15.

(3) Connect wires to a power source of 208 V ac, 3-phase, 50 or 60 Hz.

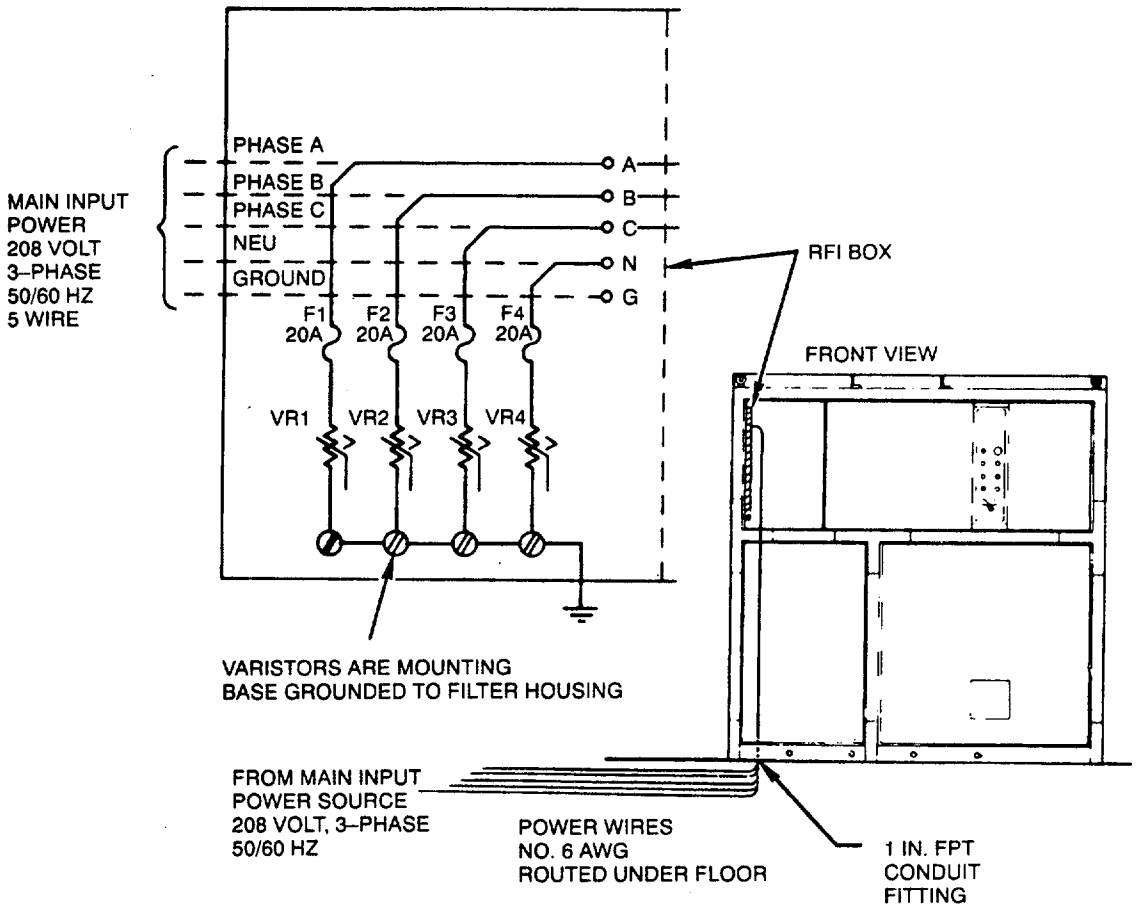
i. See air conditioner schematic Figure FO-1 and wiring diagram Figure FO-3 for additional wiring information.

j. Fan Contactors (K8 and K9). Set four AUTO/MAN switches to MAN (see Figure 4-16).

k. Condenser and Evaporator Fan Rotation (see Figure 4-17).

(1) Momentarily turn MODE SELECT SWITCH to COOL then back to OFF.

(2) Verify fan rotation is clockwise viewed from front of left condenser section.
(3) If fan rotation is backward unit power is not wired properly. Disconnect power at source and exchange wires connected to RFI box terminals A and B. (see step h above)



4-15. Electrical Connections

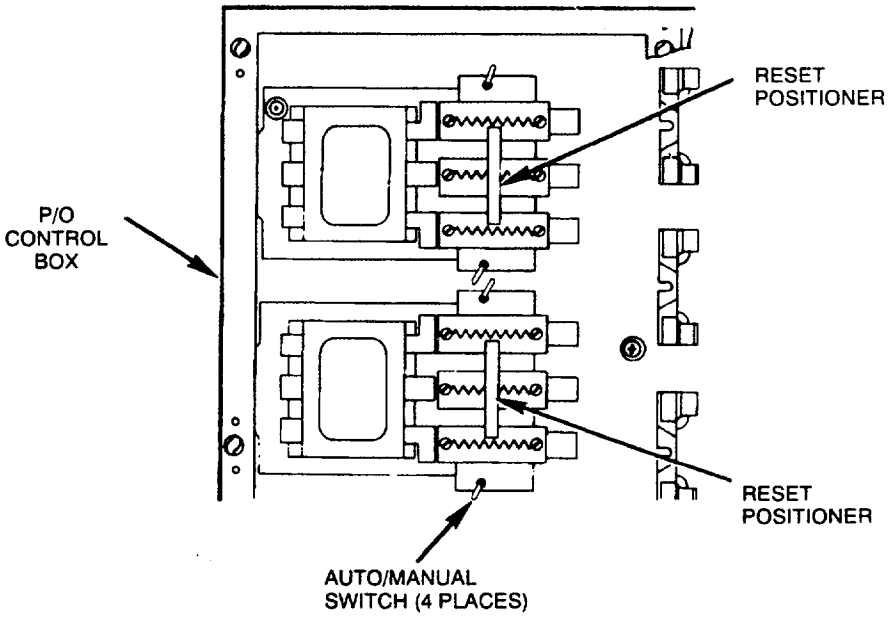


Figure 4-16. Fan Contactors (K8 and K9) Switches

4-13. INSTALLATION INSTRUCTIONS - Continued.

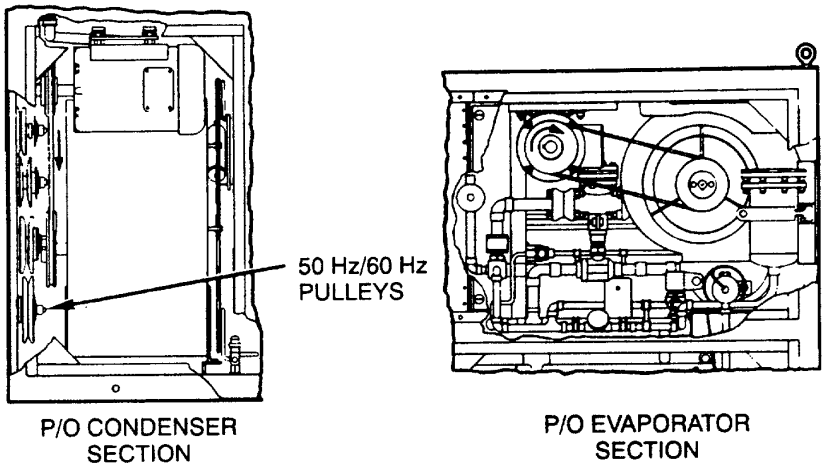


Figure 4-17. Condenser and Evaporator Fan Rotation

4-14. FRONT ACCESS PANELS INSTALLATION.

a. Close Right Electric Plate. Close panel (1) and tighten ten captive fasteners (2) (see Figure 4-18).

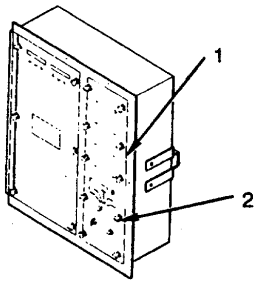


Figure 4-18. Right Electric Plate

b. Close Left Electric Plate. Close panel (1) and tighten six captive fasteners (2) (see Figure 4-19).

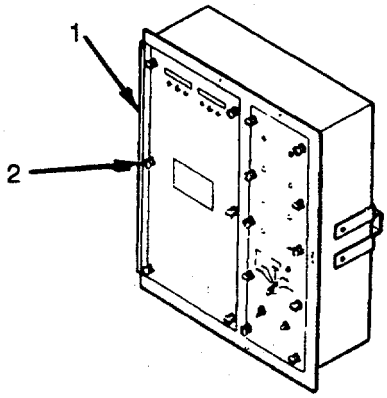


Figure 4-19. Left Electric Plate

c. Install Right Front Condenser Panel. Install panel (1) and tighten eight captive fasteners (2). Ensure inspection/ service door (3) is closed (see Figure 4-20).

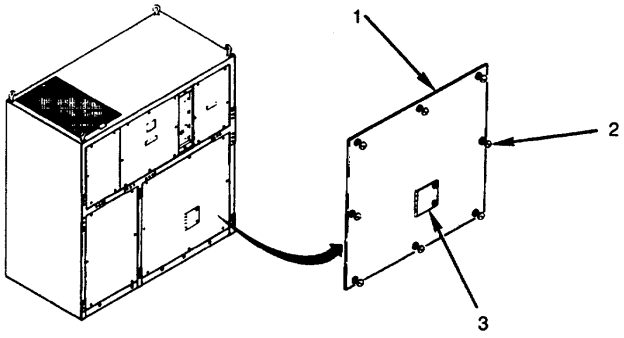


Figure 4-20. Right Front Condenser Panel Installation

d. Install Right Front Evaporator Panel. Install panel (2) and tighten six captive fasteners (1) (see Figure 4-21).

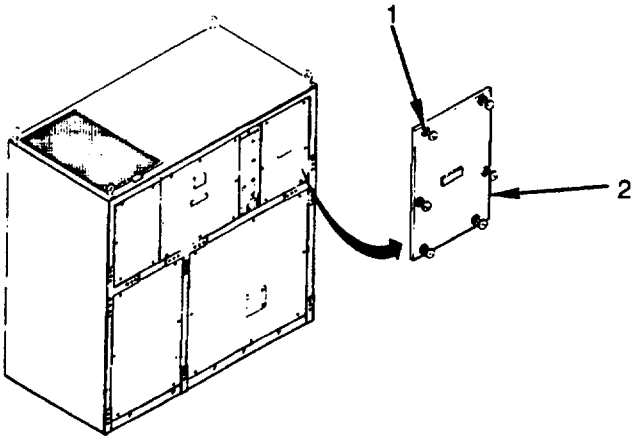


Figure 4-21. Right Front Evaporator Panel Installation

e. Install Left Front Condenser Panel. Install panel (1) and tighten six captive fasteners (2) (see Figure 4-22).

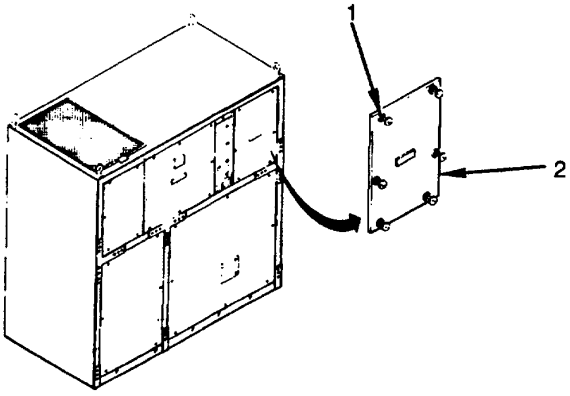


Figure 4-22. Left Front Condenser Panel Installation

4-14. FRONT ACCESS PANELS INSTALLATION - Continued.

f. Install Left Front Evaporator Panel. Connect hose (1), tighten clamp (2), install panel (3), and tighten five captive fasteners (4) (see Figure 4-23).

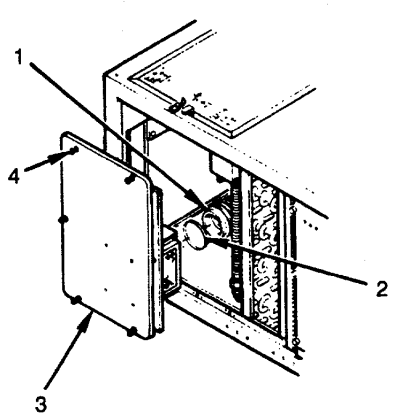


Figure 4-23. Left Front Evaporator Panel Installation

g. Install Center Front Evaporator Panel. Install panel (1) and tighten eight captive fasteners (2) (see Figure 4-24).

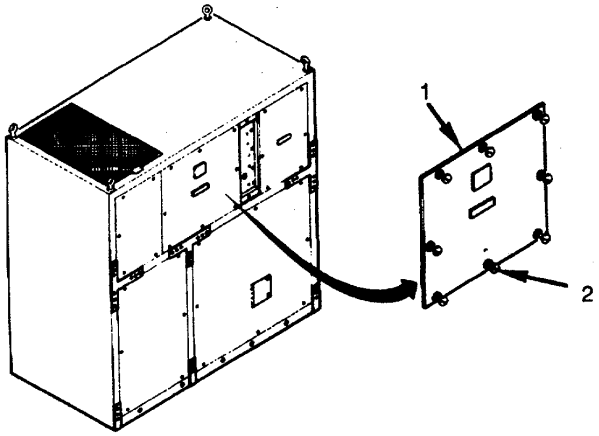


Figure 4-24. Center Front Evaporator Panel Installation

Section IV. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-15. INTRODUCTION.

a. General

(1) Systematic, periodic, preventive maintenance checks and services (PMCS) are essential to ensure that the air conditioner is ready for operation at all times. The purpose of a preventive maintenance program is to discover and correct defects and deficiencies before they can cause serious damage or complete failure of the equipment. Any effective preventive-maintenance program must begin with the indoctrination of operators to report all unusual conditions noted during daily checks or actual operation to unit maintenance. All defects and deficiencies discovered during maintenance inspections must be recorded, together with corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

(2) A schedule for unit preventive maintenance inspection and service should be established immediately after installation of the air conditioner. A quarterly interval, equal to three calendar months or 250 hours of operation (whichever occurs first) is recommended for usual operating conditions. When operating under unusual conditions, such as very dusty or sandy environment, it may be necessary to reduce the interval to monthly or even less if conditions are extreme.

(3) Table 4-1 lists the unit preventive maintenance checks and services that should be performed at quarterly (or otherwise established) intervals. The PMCS items in the table have been arranged and numbered in a logical sequence to provide for greater personnel efficiency and the least amount of required maintenance downtime.

b. PMCS Columnar Entries.

(1) Item number column. This is the order in which you perform checks and services on the air conditioner. The entry in this column will also be used as a source of item numbers for the "'TM Item Number" column on DA form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

(2) Interval. This is the timeframe when a certain check or service should be performed.

(3) Item to check/service column. Identification of item to be inspected.

(4) Procedures column. The procedures column of your PMCS table tells you how to do the required checks and services. Carefully follow these instructions. If you do not have the tools, or if the procedure tells you to, have the next higher level of maintenance do the work.

(5) Not fully mission capable if: Entries in this column will be keyed specifically to checks listed in the "procedures" column for the purpose of identifying, for the check, the criteria that will cause the equipment to be classified as not fully mission capable because of inability to perform its primary combat mission.

WARNING

Disconnect input power before disassembly of the air conditioner for PMCS to prevent dangerous, possible fatal, electrical shock.

Table 4-1. Unit Preventive Maintenance Checks and Services

Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
1	Quarterly	Information Plates	a. Check that information plates are readable and in place. b. Replace plates if damaged (para 4-26).	Plates are damaged.

Table 4-1. Unit Preventive Maintenance Checks and Services - Continued

Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
2	Quarterly	Left Electric Plate	a. Access panel (para 4-27).	
			b. Check that plate is not bent, cracked or punctured.	Plate is damaged.
			c. Repair plates (para 4-27).	
			d. Replace plate if damaged (para 4-27).	
3	Quarterly	Right Electric Plate	a. Access panel (para 4-28).	
			b. Check that plate is not bent, cracked or punctured.	Plate is damaged.
			c. Repair plate (para 4-28).	
			d. Replace plate if damaged (para 4-28).	
4	Quarterly	Control Wire J-Box	Inspect, repair, and replace as necessary (para 4-33).	Equipment is damaged.
5	Quarterly	Fresh Air Connecting Link Assembly	Inspect, adjust, repair, and replace as necessary (para 4-34).	Assembly is out of adjustment or damaged.
6	Quarterly Damper Solenoid	Fresh Air	Inspect and replace as necessary (para 4-66).	Equipment is damaged.
7	Quarterly Bracket	Thermostat	Inspect, repair, and replace as necessary (para 4-35).	Bracket is damaged or missing.
8	Quarterly	Circulating Air In RFI Filter	a. Access filter (para 4-36).	
			b. Vacuum filter.	
			c. Replace filter and RFI gasket if damaged (para 4-36).	Filter is dogged or damaged.
9	Quarterly	Fresh Air Filter	a. Access filter (para 4-37).	
			b. Check filter for punctures, cuts, and damaged areas that would allow for entry of unfiltered air.	Filter is damaged or dogged. Replace if damaged.
			c. Wash filter in mild detergent and water solution. Rinse thoroughly in clean water. Shake out excess water. Spray filter with air filter oil.	

Table 4-1. Unit Preventive Maintenance Checks and Services - Continued

Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
		Fresh Air Filter (cont.)	d. Replace captive fastener, ejector spring, thermoplastic wear washer, and split ring retainer.	Captive fastener, ejector spring, thermo plastic wear washer or split ring retainer are damaged.
			e. Replace filter if damaged (para 4-37).	
10	Quarterly	Fresh Air RFI Filter	a. Access filter (para 4-38).	
			b. Check filter for punctures, cuts, and damaged areas that would allow for entry of unfiltered air. Replace if damaged.	
			c. Vacuum filter.	
			d. Replace filter and gasket. If damaged, contact General Support Maintenance.	Filter is clogged or damaged.
11	Quarterly	Condenser Air Out RFI Filter	a. Access filter (para 4-39).	
			b. Check filter for punctures, cuts, and damaged areas that would allow for entry of unfiltered air. Replace if damaged.	
			c. Vacuum filter.	
			d. Replace filter and gasket. If damaged, contact General Support Maintenance.	Filter is clogged or damaged.
12	Quarterly	Condenser Air Out RFI Filter	a. Access filter (para 4-40).	
			b. Check filter for punctures, cuts, and damaged areas that would allow for entry of unfiltered air. Replace if damaged.	
			c. Vacuum filter.	
			d. Replace filter and gasket. If damaged, contact General Support Maintenance.	Filter is clogged or damaged.
13	Quarterly	Circulating Air Out RFI Filter	a. Access filter (para 4-41).	
			b. Check filter for punctures, cuts, and damaged areas that would allow for entry of unfiltered air. Replace if damaged.	
			c. Vacuum filter.	
			d. Replace filter and gasket if damaged (para 4-41).	Filter is clogged or damaged.
14	Quarterly	RFI Filter	a. Access filter (para 4-42).	
			b. Check filter for punctures, cuts, and damaged areas. If damaged contact General Support Maintenance.	Filter is clogged or damaged.
			c. Inspect varistors for signs of overheating or other obvious damage (para 4-42).	Varistors are damaged or overheating.

Table 4-1. Unit Preventive Maintenance Checks and Services - Continued

Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
		RFI Filter (cont.)	d. Inspect fuses and fuse holders (para 4-42).	Fuses are burnt out.
15	Quarterly	Control Box	a. Check operations of controls for stiffness or binding (para 4-45).	Controls are stiff or bind.
			b. Inspect wiring harness for damage or chafing, and all electrical connections for tightness.	Wiring harness is damaged.
			c. Repair control box (para 4-63).	
			d. Replace control box if damaged (para 4-63).	Control box is damaged.
16	Quarterly	Fan Belts	a. Access fan belts (para 4-69 and 4-75).	
			b. Check that belts are not cut, worn, frayed, or cracked. Replace if damaged. At a point halfway between the motor pulley and fan pulley, press the belt by hand. Belt should not depress more than ½ inch. Adjust if loose.	Belts are damaged or belt depresses more than ½ inch.
			c. Adjust belts (para 4-69 and 4-75).	
			d. Replace belt if damaged (para 4-69 and 4-75).	
17	Quarterly	Evaporator Motor	a. Access motor (para 4-70).	
			b. Check motor for rotational freedom by spinning shaft. If there is stiffness or binding, replace motor. Check motor bearings for shaft end play. If there is excessive end play, replace motor.	There is stiffness or binding, or there is excessive end play in motor bearings.
			c. Lubricate motor (para 4-2).	
			d. To repair motor contact Direct Support Maintenance.	
			e. Replace motor if damaged (para 4-70).	Motor is damaged.
18	Quarterly	Evaporator Fan	a. Access fan (para 4-71).	
			b. Check fan for cracked or broken blades. Replace if damaged.	Fan blades are cracked or broken.
			c. Repair fan (para 4-71).	
			d. Replace fan if damaged (para 4-71).	Fan is damaged.

Table 4-1. Unit Preventive Maintenance Checks and Services - Continued

Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
19	Quarterly	Pulleys	a. Access pulleys; evaporator fan motor (50/60 Hz) para 4-72 and 4-73, condenser fan motor (50/60 Hz) para 4-78 and 4-79.	
			b. Check pulleys for dents and burrs. Replace if damaged. Check that 60 Hz pulleys are painted red and 50 Hz pulleys are painted green.	
			c. Adjust pulleys.	
			d. Replace pulleys if damaged.	Pulleys are damaged.
20	Quarterly	Condenser Motor	a. Access motor (para 4-76).	
			b. Check motor for rotational freedom by spinning shaft. If there is stiffness or binding, replace motor. Check motor bearings for shaft end play. If there is excessive end play, replace motor.	There is stiffness or binding. There is excessive shaft end play.
			c. Lubricate motor (para 4-2).	
			d. To repair motor contact Direct Support Maintenance.	
			e. Replace motor if damaged (para 4-76).	Motor is damaged.
21	Quarterly	Condenser Fan	a. Access fan (para 4-77).	
			b. Check fan for cracked or broken blades. Replace if damaged.	Blades are cracked or broken.
			c. Repair fan (para 4-77).	
			d. Replace fan if damaged (para 4-77).	Fan is damaged.
22	Quarterly	Electric Heater	a. Access heater (para 4-80).	
			b. Check heater elements for deformation, damaged terminals, threads, cracked or broken terminals. Replace if damaged.	Heater elements are deformed, terminals damaged.
			c. Replace heater if damaged (para 4-80).	Heater is damaged.

Table 4-1. Unit Preventive Maintenance Checks and Services - Continued

Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
23	Quarterly	Compressor Crankcase Heater	a. Access heater (para 4-81).	
			b. Visually inspect for damage.	
			c. Replace heater if damaged (para 4-81).	Heater is damaged.
24	Quarterly	Heat Control Thermostat	a. Access heat control thermostat (para 4-85).	
			b. Check that leads are properly connected (see Figure FO-3).	Leads are improperly connected.
			c. Check that sensing coil is not damaged.	Sensing coil is damaged.
			d. Replace heat control thermostat if damaged (para 4-85).	Heat control thermostat is damaged.
25	Quarterly	Low Ambient Temperature Thermostat	a. Access low ambient temperature thermostat (para 4-86).	
			b. Check that leads are properly connected (see Figure FO-3).	Leads are improperly connected.
			c. Check that sensing coil is not damaged.	Sensing coil is damaged.
			d. Replace low ambient temperature thermostat (para 4-86).	Thermostat is damaged.
26	Quarterly	Cool Control Thermostat	a. Access cool control thermostat (para 4-87).	
			b. Check that leads are properly connected (see Figure FO-3).	Leads are improperly connected.
			c. Check that sensing coil is not damaged.	Sensing coil is damaged.
			d. Replace cool control thermostat if damaged (para 4-87).	Cool control thermostat is damaged.
27	Quarterly	High/Low Refrigerant and Low Oil Pressure Switches	a. Access switch, remove right front condenser panel (para 4-11).	
			b. Check that clamp is not dented, broken, or split. Check that switch cover is not dented, broken, or cracked.	Switches are damaged.

Table 4-1. Unit Preventive Maintenance Checks and Services - Continued

Item No.	Inter-Val	Items to Check/ Service	Procedure	Not Fully Mission Capable If:
		High/Low Refrigerant and Low Oil Pressure Switches (cont.)	c. To replace switch contact Direct Support Maintenance.	
28	Quarterly	Compressor	a. Remove right front condenser panel (para 4-11) to access compressor. b. Check compressor sight glass (see Figure 4-1). Refrigerant oil should be between ¼ min and ½ max levels.	Improper refrigerant oil level.
			c. To add or remove compressor oil contact Direct Support Maintenance. **WARNING** **This inspection performed with power on. Proceed with extreme caution to prevent dangerous possible fatal shock.**	
29	Quarterly	Sight Glass	a. Access sight glass, remove right front evaporator panel (para 4-11).	
			b. Check that glass window is not broken or cracked. Check for evidence of leakage. Check for bubbles. Contact Direct Support Maintenance for any deficiency.	Glass window is broken or leakage is evident.
			c. Check for milky appearance.	Milky appearance in sight glass.
			d. If sight glass has milky appearance, dean the condenser air in RFI filter (para 4-40) and condenser coil (para 4-90).	
			e. To repair or replace sight glass contact Direct Support Maintenance	Sight glass is damaged.

Section V. UNIT TROUBLESHOOTING

4-16. GENERAL. This section contains unit troubleshooting information for locating and correcting most of the operating troubles which may develop in the air conditioner.

NOTE

Before you use the table, be sure you have performed all applicable PMCS (Table 4-1).

4-17. TROUBLESHOOTING. Each malfunction for an individual component is listed in Table 4-2. The malfunction is followed by a list of tests or inspections which help to determine probable causes and corrective actions to take. All malfunctions that may occur and all tests or inspections and corrective actions may not be listed. If a malfunction is not listed or is not corrected by corrective action, notify your supervisor.

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.**
- **Whenever possible, the input power supply to equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.**
- **Be careful not to contact high-voltage connections of 208 volts ac input when installing or operating this equipment.**
- **Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.**
- **Do not operate the equipment without all panels and covers in place and tightly secured.**
- **Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions**.

Table 4-2. Unit Maintenance Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. AIR CONDITIONER DOES NOT START IN ANY MODE.

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages used can be deadly.

Step 1. Check to see if input power has been disconnected.

Connect input power.

Step 2. Make sure that power is 208 V ac, 3-phase, 50/60 hertz.

Connect correct input power (para 4-13).

Step 3. Check to see if control circuit breaker (CB1) is tripped (para 4-62).

Reset control circuit breaker (CB1).

Step 4. Check operation of control circuit breaker (CB1).

Test control circuit breaker (para 4-62). Replace control circuit breaker, if defective.

Step 5. Check operation of MODE SELECT SWITCH (S1).

Test switch (para 4-56). Replace switch, if defective.

Step 6. Check for loose or damaged electrical connections or damaged wires in wiring harnesses (see Figure FO-3).

Tighten or replace lugs, or repair damaged wires.

Step 7. Check RFI filter (para 4-42).

Replace bad fuses (para 4-43).

Step 8. Check all terminals (para 4-42) and internal wiring within RFI filter for tightness and damage.

Tighten electrical connections. Perform RFI test (para 4-42). If wires are damaged, replace as necessary.

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltage used can be deadly.

Step 9. Check operation of transformer (T1).

Check output (25.2 to 30.8 V ac) and input (120 V ac) voltages (see Figure FO-3); if output voltages are not correct, test transformer (T1) (para 4-60). Replace transformer, if defective.

Step 10. Check operation of rectifier (CR1).

Test rectifier (para 4-46). Replace defective rectifier.

Table 4-2. Unit Maintenance Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. EVAPORATOR AND CONDENSER FANS BOTH RUN, BUT COMPRESSOR DOES NOT START AFTER TIME DELAY.

Step 1. Check operation of MODE SELECT SWITCH (S1) (para 4-56).

Set switch to OFF, then reset to COOL.

NOTE
Allow 60 seconds time delay before compressor starts.

WARNING
Disconnect input power before performing Internal electrical troubleshooting. Voltage used can be deadly.

Step 2. Check for loose or damaged electrical connections, or damaged wires in wiring harnesses (see Figure FO-3).

Tighten or replace connections and lugs. If wires are damaged, replace as necessary.

Step 3. Check operation of time delay relay (K22).

Test relay (para 4-54). Replace relay, if defective.

Step 4. Check operation of compressor contactor (K10).

Test contactor (para 4-52). Replace contactor, if defective.

Step 5. Check operation of compressor (B1).

If not operating, contact Direct Support Maintenance for refrigeration system troubleshooting.

3. COMPRESSOR STARTS NORMALLY, BUT CONTROL CIRCUIT BREAKER (CB1) SOON TRIPS.

Check circuit breaker (CB1).

Test circuit breaker (para 4-62). Replace circuit breaker if defective. Restart air conditioner in COOL mode.

CAUTION
If circuit breaker trips again soon after restart in COOL mode, do not attempt another restart, damage may occur to compressor. Contact Direct Support Maintenance for refrigeration system troubleshooting.

4. REDUCED COOLING CAPACITY.

Step 1. With unit operating in COOL mode, check condition of refrigerant in sight glass (Table 4-1, item 28).

a. Check sight glass (Table 4-1, item 28).

b. Clean condenser coil (para 4-90).

Step 2. Check operation of cool control thermostat (SI4).

Test thermostat (para 4-87). Replace thermostat, if defective.

Table 4-2. Unit Maintenance Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

5. REDUCED HEATING CAPACITY.

Step 1. Check that all doors, windows, and other openings in the room or enclosure are tightly closed.

Tightly close all openings.

Step 2. Check to be sure that excessive cold, outside air is not being introduced through the fresh air inlet.

Cover inlet; then, if condition improves, adjust damper as required.

Step 3. Check operation of heat control thermostat (S9).

Test thermostat (para 4-85). Replace thermostat, if defective.

WARNING
Disconnect unit power before performing internal electrical troubleshooting.
Voltages used can be deadly.

Step 4. Check for loose or damaged electrical connections or damaged wires in wiring harnesses (see Figure FO-3).

Tighten or replace lugs, or repair damaged wires.

Step 5. Check individual elements of heater (EH).

Test electric heater elements (para 4-80). Replace element(s), if defective.

Step 6. Check operation of heater contactor (K11).

Test contactor (para 4-53). Replace contactor, if defective.

6. EVAPORATOR FAN MOTOR (B1) DOES NOT OPERATE.

WARNING
Disconnect input power before performing internal electrical troubleshooting.
Voltages used can be deadly.

Step 1. Using wiring diagram (see Figure FO-3), check electrical connections and individual wires for tightness.

Tighten or replace electrical connectors, or repair damaged wires.

Step 2. Check operation of fan motor contactor (K8).

Test contactor (para 4-51). Replace contactor, if defective.

Step 3. Check operation of evaporator fan motor (B1).

Test motor (para 4-70). Replace motor, if defective.

Table 4-2. Unit Maintenance Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

6. EVAPORATOR FAN MOTOR (B1) DOES NOT OPERATE - Continued.

Step 4. Check operation of MODE SELECT SWITCH (Si).

Inspect switch (para 4-56). Replace switch, if defective.

7. CONDENSER FAN MOTOR (B3) DOES NOT OPERATE.

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages used can be deadly.

Step 1. Using wiring diagram (see Figure FO-3), check electrical connections and individual wires for tightness.

Tighten or replace electrical connectors, or repair damaged wires.

Step 2. Check operation of fan motor contactor (K9).

Test contactor (para 4-51). Replace contactor, if defective.

Step 3. Check operation of condenser fan motor (B3).

Test motor (para 4-76). Replace motor, if defective.

Step 4. Check operation of MODE SELECT SWITCH (S1).

Inspect switch (para 4-56). Replace switch, if defective.

8. EXCESSIVE NOISE.

Step 1. Examine noises heard during compressor operation.

CAUTION

If a knocking or hammering sound Is heard when compressor starts, turn MODE SELECT SWITCH to OFF, immediately. Such noise is usually caused by liquid refrigerant in compressor, which can seriously damage or destroy compressor.

a. If knocking or hammering sound is heard when compressor starts, turn MODE SELECT SWITCH to OFF IMMEDIATELY.

b. Isolate source of noise as near as possible, both by ear and touch. Listen and feel at both front and back of cabinet.

Table 4-2. Unit Maintenance Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

WARNING

**Disconnect input power before performing internal electrical troubleshooting.
Voltages used can be deadly.**

8. EXCESSIVE NOISE - Continued.

Step 2. Check fans for looseness or damage, and for rotational clearance.

Tighten loose fans (para 4-71 and 4-77).

Step 3. Check all internal components for looseness, vibration, and security.

Tighten, adjust, and secure as necessary.

9. FAULT RESET SWITCH (S12) DOES NOT RESET.

WARNING

**Disconnect input power before performing internal electrical troubleshooting.
Voltages used can be deadly.**

Step 1. Check operation of reset switch (S12).

Test switch (para 4-59). Replace switch, if defective.

Step 2. Check operation of fault relay (K6).

Test relay (para 4-49). Replace relay, if defective.

Step 3. Check operation of relay (K6).

Test socket (para 4-50). Replace socket, if defective.

Step 4. Check operation of suppression diode (CR11).

Test diode (para 4-47). Replace diode, if defective.

10. DIRTY FILTER LIGHT (DS2) ON.

Step 1. Check return air filter.

Clean filter (para 3-5).

Step 2. Check operation of dirty filter relay (K20).

Test relay (para 4-49). Replace relay, if defective.

Step 3. Check operation of relay (K20) 11-pin socket.

Test socket (para 4-50). Replace socket, if defective.

Step 4. Check operation of suppression diode (CR5).

Test diode (para 4-47). Replace diode, if defective.

Step 5. If dirty filter light is still on, unit has possible defective air flow switch (S3).

Test dirty filter switch (S3) (para 4-82). Replace dirty filter switch, if defective.

Table 4-2. Unit Maintenance Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

11. LOW OIL PRESSURE LIGHT (DS6) ON.

Step 1. Check operation of low oil pressure relay (K4).

Test relay (para 4-49). Replace relay, if defective.

Step 2. Check operation of relay (v(4) 11-pin socket.

Test socket (para 4-50). Replace socket, if defective.

Step 3. Check operation of suppression diode (CR9).

Test diode (para 4-47). Replace diode, if defective.

Step 4. Check operation of low oil pressure switch (S7).

To test switch contact Direct Support Maintenance.

Step 5. Check operation of time delay relay (K22).

Test relay (para 4-54). Replace relay, if defective.

Step 6. If low oil pressure light is still on, notify Direct Support Maintenance that compressor crankcase has low oil pressure.

12. HIGH DISCHARGE PRESSURE LIGHT (DS3) ON.

Step 1. Check that condenser fan motor (B3) runs.

Go to malfunction No. 7.

WARNING

**Disconnect input power before performing internal electrical troubleshooting.
Voltages used can be deadly.**

Step 2. Feel condenser coil.

If coil is exceptionally hot, contact Direct Support Maintenance for refrigeration system troubleshooting.

Step 3. Check condenser coil for cleanliness.

If dirty, clean coil (para 4-90).

Step 4. With unit operating in COOL mode, check condition of refrigerant in sight glass (Table 4-1, item 28).

Check sight glass (Table 4-1, item 28).

Step 5. Check operation of high discharge pressure relay (K1).

Test relay (para 4-49). Replace relay, if defective.

Table 4-2. Unit Maintenance Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

12. HIGH DISCHARGE PRESSURE LIGHT (DS3) ON - Continued

Step 6. Check operation of relay (K1) 11-pin socket.

Test socket (para 4-50). Replace socket, if defective.

Step 7. Check operation of suppression diode (CR6).

Test diode (para 4-47). Replace diode, if defective.

Step 8. If high discharge pressure light (DS3) is still on, contact Direct Support Maintenance for refrigeration system troubleshooting.

13. LOW SUCTION PRESSURE LIGHT (DS4) ON.

Step 1. With unit operating in COOL mode, check condition of refrigerant in sight glass (Table 4-1, item 28).

a. Check sight glass (Table 4-1, item 28).

b. Clean evaporator coil (para 4-91).

Step 2. Feel outlet line of drier filter (1-9).

If outlet line is much cooler than inlet line, contact Direct Support Maintenance.

Step 3. Check all piping and connections for leaks.

If leaks are suspected, contact Direct Support Maintenance for refrigeration system troubleshooting.

Step 4. Check operation of low pressure relay (K2).

Test relay (para 4-49). Replace relay, if defective.

Step 5. Check operation of relay socket (K2).

Test socket (para 4-50). Replace socket, if defective.

Step 6. Check operation of suppression diode (CR7).

Test diode (para 4-47). Replace diode, if defective.

Step 7. If low suction pressure light (DS4) is still on, contact Direct Support Maintenance.

Table 4-2. Unit Maintenance Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

14. CONTROL POWER (24 VDC) FAULT LIGHT (DS9) ON.

Step 1. Check operation of transformer (T1).

Test transformer (para 4-60). Replace transformer, if defective.

Step 2. Check operation of control power faults relay (K19).

Test relay (para 4-49). Replace relay, if defective.

Step 3. Check operation of relay (K19) 11-pin socket.

Test socket (para 4-50). Replace socket, if defective.

Step 4. Check operation of suppression diode (CR4).

Test diode (para 4-47). Replace diode, if defective.

Step 5. Check operation of rectifier (CR1).

Test rectifier (para 4-46). Replace rectifier, if defective.

15. COMPRESSOR STARTS NORMALLY, BUT CRANKCASE HEATER CIRCUIT BREAKER (CB2) SOON TRIPS.

Step 1. Check operation of circuit breaker (CB2).

Test circuit breaker (para 4-62). Replace circuit breaker, if defective.

Step 2. Check operation of compressor crankcase heater (CCH).

Test heater (para 4-81). Replace heater, if defective.

16. SERVICE LIGHT (DS8) DOES NOT COME ON WHEN LIGHT SWITCH (S2) IS SET TO ON.

Step 1. Check operation of service light (DS8).

Test light (para 4-65). Replace bulb, guard or holder, if defective.

Step 2. Check operation of service light switch (S2).

Test switch (para 4.58). Replace switch, if defective.

Section VI. UNIT MAINTENANCE PROCEDURES

4-18. FUNCTIONAL DESCRIPTION. The air conditioner control circuits are described in the following paragraphs (see NO TAG and Figure FO-1).

4-19. AIR CONDITIONER CONTROL.

NOTE

The air conditioner utilizes a hot gas bypass system to maintain temperature control instead of switching the compressor on and off each time air temperature crosses the threshold of the control setting.

a. Control Power. Transformer (T1) and rectifier (CR1) form a simple, unfiltered power supply providing +24 V dc for operation of control relays and LED fault indicators. When +24 V dc is present in the unit, control relay (K19) remains energized and interrupts ac power to fault lamp indicator (DS9) (control power fault). When control power fails, K19 is de-energized and restores ac power to DS9.

b. Mode Select Switch. When set to AUTO or REMOTE, MODE SELECT SWITCH (St) applies ac power to thermostats, contactors, and solenoids. When set to cool, S1 applies dc control power (+24 V dc) to energize control relay (K1 8), and operate contactors (K8 thru K10), and relay (K21). When set to COOL, only cooling or pumpdown operations are allowed. When set to HEAT position, S1 applies dc control power to energize control relay (K7) and operates contactor (Kl1). When set to HEAT, cooling thermostat (S14) is disabled, and switch (S9) controls heating operation.

c. Evaporator Fan Circuit. Three phase ac power is applied to evaporator fan motor (81) when contactor (K8) is energized. The contactor may be energized by select switch (S1), control relay (K7), or control relay (K18). Current overloads (K12 thru K14) are integral to the contactor (K8).

d. Heater Circuit. Three phase ac power is applied to electric heater elements (EH) when contactor (K 1) is energized.

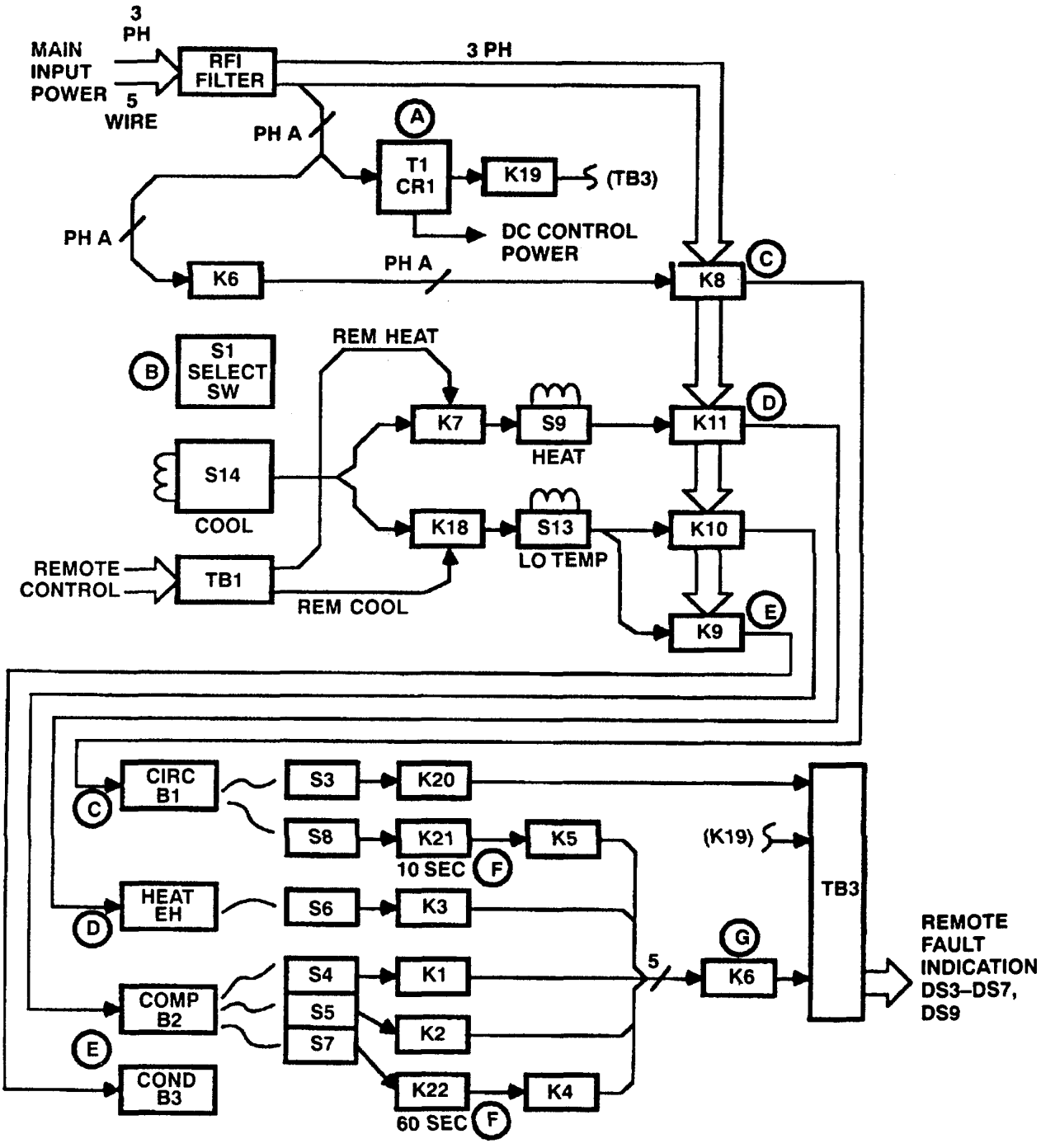


Figure 4-25. Control Circuits

4-19. AIR CONDITIONER CONTROL - Continued.

e. Compressor Circuit. Three phase ac power is applied to compressor motor (B2) when contactor (K10) is energized. The contactor may be energized by cooling thermostat (S14) or by control relay (K18). Contactor (K9) is wired in parallel with contactor K10, and when energized, applies three phase ac power to condenser fan motor (B3). Current overloads (K15 thru K17) are integral to contactor (K9). Current overloads (K23. K24, and S15) are integral to motor (B2). Circuit breaker (CB2) protects compressor crankcase heater.

f. Time Delay. Time delay relays (K21 thru K22) temporarily disable two fault detection circuits on start-up. Time delay relay K21 disables evaporator fan failure circuit for 10 seconds to allow the fan to reach normal operating speed. Time delay relay K22 disables low oil pressure circuit for 60 seconds to allow compressor to build up oil pressure in the crankcase.

g. Fault Circuits. Control relays (K1 thru K6) are part of critical fault circuits. If any of five critical faults occurs, the appropriate relay (K1 thru K5) is energized by the fault-detecting sensor. The relay applies dc power to the appropriate LED fault indicator and to summary fault relay (K6). These relays remain energized until FAULT RESET switch (S1 2) is pressed. When energized, K6 interrupts ac power to MODE SELECT SWITCH (S1) and contactors (K8 thru K11). Loss of ac power causes unit to shutdown heating or cooling operation if a critical fault occurs. Control relay (K20), when energized, does not cause a complete shutdown of unit operations. The remote fault signal is generated if K6 or K20 is energized. Control relay K20 will also remain energized until S12 is pressed. Sensors are provided to automatically shut down the air conditioner as follows:

CRITICAL FAULT	SENSOR SWITCH	CONTROL RELAY	FAULT INDICATOR
HIGH DISCHARGE PRESSURE	S4	K1	DS3
LOW SUCTION PRESSURE	S5	K2	DS4
HIGH AIR TEMPERATURE	S6	K3	DS5
LOW OIL PRESSURE	S7	K4	DS6
EVAPORATOR FAN FAILURE	S8	K5	DS7
CONTROL POWER	-	K19	DS9

4-20. HEATER CONTROL.

a. The heater section of the air conditioner uses six electric heaters. The heaters are thermostatically controlled by heating control thermostat (S9) in redundant configuration and (S14) in single configuration.

b. Single Configuration. When heating is selected by placing MODE SELECT SWITCH (S1) into either the HEAT or the AUTO position, and the temperature is below the minimum thermostat (S14) setting, the heaters are activated by energizing heater contactor (K11) and thus closing K11 contactors and applying power to the heating elements. The elements will remain on as long as the air temperature is below the thermostat (S14) setting.

c. Dual Configuration (Remotely Controlled). When heating is selected from a remotely located control panel (air conditioner MODE SELECT SWITCH in REMOTE), and the temperature is below the minimum heat control thermostat (S9) setting, the heaters are activated by energizing heater contactor (Kl1) and thus closing K11 contactors and applying power to the heating elements. The heating elements will remain on as long as the air temperature is below the heat control thermostat (S9) setting.

d. A safety circuit is provided to ensure that if, for any reason, the heating elements remain on after the thermostat (S9) or (S14) should have deactivated them, high air temperature switch (S6) will open and activate the fault circuit (see 4-19 g).

4-21. GENERAL MAINTENANCE. This section contains maintenance procedures which are authorized to Unit Maintenance (0) by the Maintenance Allocation Chart (MAC) Appendix B and Source Maintenance and Recoverability (SMR) coded items. Each paragraph covers a complete maintenance procedure but may require other tasks to be included (i.e. initial setups, references and follow on procedures). Perform procedures/tasks in designated order. Table 4-3 shows air conditioner control settings and results of switch settings.

WARNING

* Panels, covers, screens, grilles and guards installed on unit are there for a purpose. Do not operate unit with them off unless instructions tell you to. When necessary, do so with care.

* Moving machinery exists behind front and back condenser panels, and front and back evaporator panels. Don't stick your fingers in, get your loose apparel or jewelry caught. Failure to observe this warning could cause injury to personnel.

Table 4-3. MODE SELECT SWITCH Positions and Results

Operating Cycles	Redundant Unit, Remote Control	Redundant Unit, Local Override	Single Unit, Local Control	Remarks
AUTO	REMOTE (AUTO selected remote on control panel)	*		Supply air temperature control; nominal 55°F (12.8°C) output.
AUTO			AUTO or REMOTE	Return air temperature control; nominal 70°F (21°C).
COOL	**	COOL		Supply air temperature control; nominal 55°F (12.8°C) output.
COOL			COOL	No control; maximum cooling. Compressor runs continuously.
HEAT	REMOTE selected on remote control panel)	HEAT	HEAT	Return air temperature control; nominal 80°F (26.7°C).
HEAT			AUTO or REMOTE	Return air temperature control; nominal 70°F (21°C).

* AUTO mode inoperative in redundant unit configuration.

** COOL mode not selectable from remote control panel.

4-22. CENTER FRONT EVAPORATOR PANEL.

This task consists of: Removal Inspection Repair/Replace Installation

INITIAL SET-UP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:

Adhesive (Item 1, Appendix E)
Bulk gasket material
Bulk insulation material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

REMOVAL

1. Loosen eight captive fasteners (1) (see Figure 4-26).
2. Remove panel (2).

INSPECTION

1. Check that panel is not bent, cracked, or punctured, replace if damaged.
2. Check that gaskets (3) and insulation (5) are not torn, loose, or missing.
3. Check that information plates are readable and in place.
4. For replacement of information plates refer to para 4-26.

NOTE

Repair consists of replacing gasket, insulation, and captive fasteners.

REPAIR/REPLACE

1. Gasket.

   a. Remove captive fasteners (1).
   b. Remove gasket (3) from panel (2).

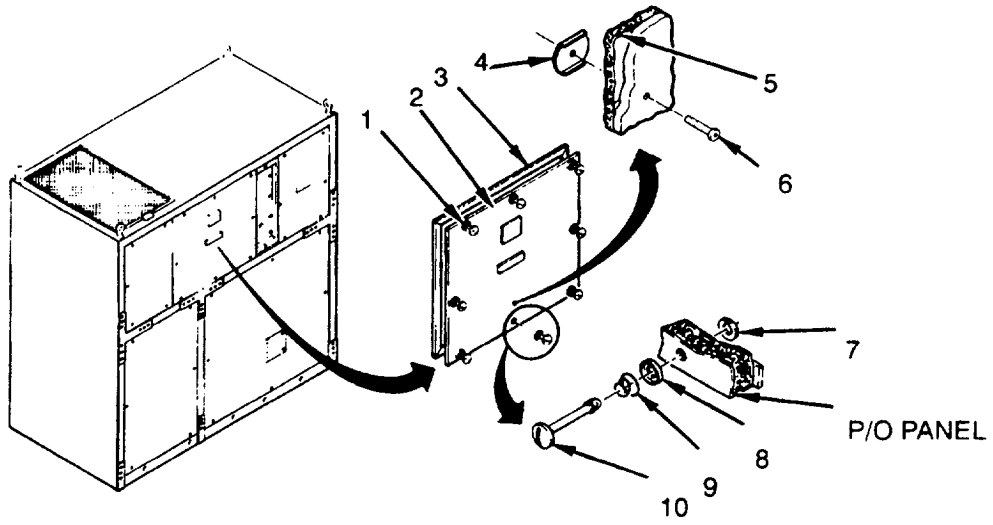


Figure 4-26. Center Front Evaporator Panel

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

c. Clean area for new gasket, using acetone or MEK and a stiff brush.

d. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.

e. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.

f. Install captive fasteners.

2. Insulation.

a. Cut and remove damaged section of insulation (5).

b. Clean area for new insulation, using acetone or MEK and a stiff brush.

c. Cut replacement insulation to fit.

d. Coat surfaces of metal and insulation with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.

e. Starting with an end, carefully attach insulation to metal surface. Press into firm contact all over.

f. If insulation retainer (4) is removed, install new retainer (4) with rivet (6).

3. Captive Fasteners.

a. Remove split ring retainer (7), fastener (10), themoplastic wear washer (8), and ejector spring (9).

b. Install ejector spring (9), thermoplastic wear washer (8), fastener (10), and split ring retainer (7).

INSTALLATION

1. Position panel (2) in place.
2. Tighten eight captive fasteners (1).

FOLLOW ON PROCEDURE

Connect air conditioner input power at source.

4-23. LEFT FRONT EVAPORATOR PANEL.

This task consists of: Removal Inspection Repair/Replace Installation

INITIAL SET-UP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:

Adhesive (Item 1, Appendix E)
Bulk gasket material
Bulk insulation material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).

REMOVAL

1. Loosen five captive fasteners (1) (see Figure 4-27).
2. Loosen clamp (15) and remove hose (16).
3. Remove panel (3).

INSPECTION

1. Check that panel is not bent, cracked, or punctured.

2. Check that gaskets (2) and insulation (9) are not torn, loose, or missing.

REPAIR/REPLACE

NOTE

Repair consists of replacing flange, gasket, insulation, captive fasteners and panel.

1. Flange.

   a. Remove two rivets (6) and receptacle (7).
   b. Remove ten rivets (5).
   c. Remove flange (4).
   d. Position replacement flange (4) in place.

e. Install ten rivets (5).
f. Install receptacle (7) with two rivets (6).

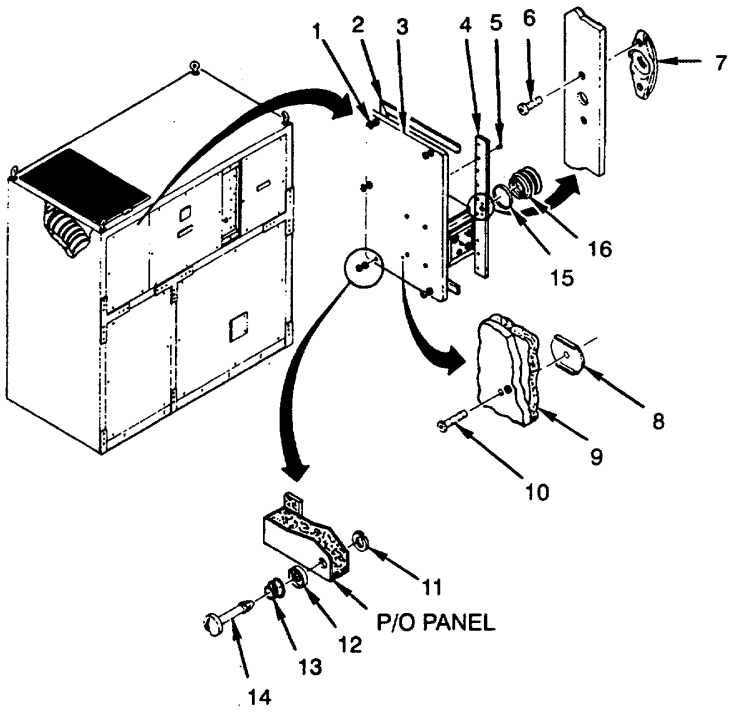


Figure 4-27. Left Front Evaporator Panel

2. Gasket.

a. Remove captive fasteners.

b. Remove damaged gasket (2) from panel (3).

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

c. Clean area for new gasket, using acetone or MEK and a stiff brush.

d. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.

e. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.

f. Install captive fasteners.

4-23. LEFT FRONT EVAPORATOR PANEL - Continued.

3. Insulation.

   a. Remove fresh air inlet hose and filter box (para 4-24), if necessary.

   b. Remove damaged section of insulation (9).

   c. Clean area for new insulation, using acetone or MEK and a stiff brush.

   d. Cut replacement insulation to fit.

   e. Coat surfaces of metal and insulation with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.

   f. Starting with an end, carefully attach insulation to metal surface. Press into firm contact all over.

   g. If insulation retainer (8) is removed, install new insulation retainer (8) with rivet (10).

4. Captive Fasteners.

   a. Remove split ring retainer (11), fastener (14), thermoplastic wear washer (12), and ejector spring (13).

   b. Install ejector spring (13), thermoplastic wear washer (12), fastener (14), and split ring retainer (11).

INSTALLATION

1. Position panel (3) in place.
2. Install hose (16) and tighten clamp (15).
3. Tighten five captive fasteners (1).

FOLLOW ON PROCEDURES

1. Install center front evaporator panel (para 4-22).
2. Connect air conditioner input power at source.

4-24. FRESH AIR INLET FILTER BOX (EVAPORATOR FRONT PANEL).

This task covers:
Inspection Removal Repair/Replace Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)

Personnel : 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

INSPECTION

1. Check that box (3) is not bent, cracked, or punctured (see Figure 4-28).
2. Check for damaged, loose, or missing mounting hardware.

REMOVAL

1. Loosen clamp (1) and remove hose (2).
2. Remove four screws (8) and lockwashers (7).
3. Remove fresh air filter box (3).

REPAIR/REPLACE

NOTE
Repair consists of replacing receptacles (9), rivnuts (6), and filter box (3).

1. Loosen two captive fasteners (4).
2. Remove filter (5).
3. Remove four rivets (10).
4. Remove two receptacles (9).
5. Remove four rivnuts (6).
6. Install four rivnuts (6) on replacement filter box (3).
7. Position two receptacles (9) in place.
8. Install four rivets (10).
9. Position filter (5) in place.
10. Tighten two captive fasteners (4).

4-24. FRESH AIR INLET FILTER BOX (EVAPORATOR FRONT PANEL) - Continued

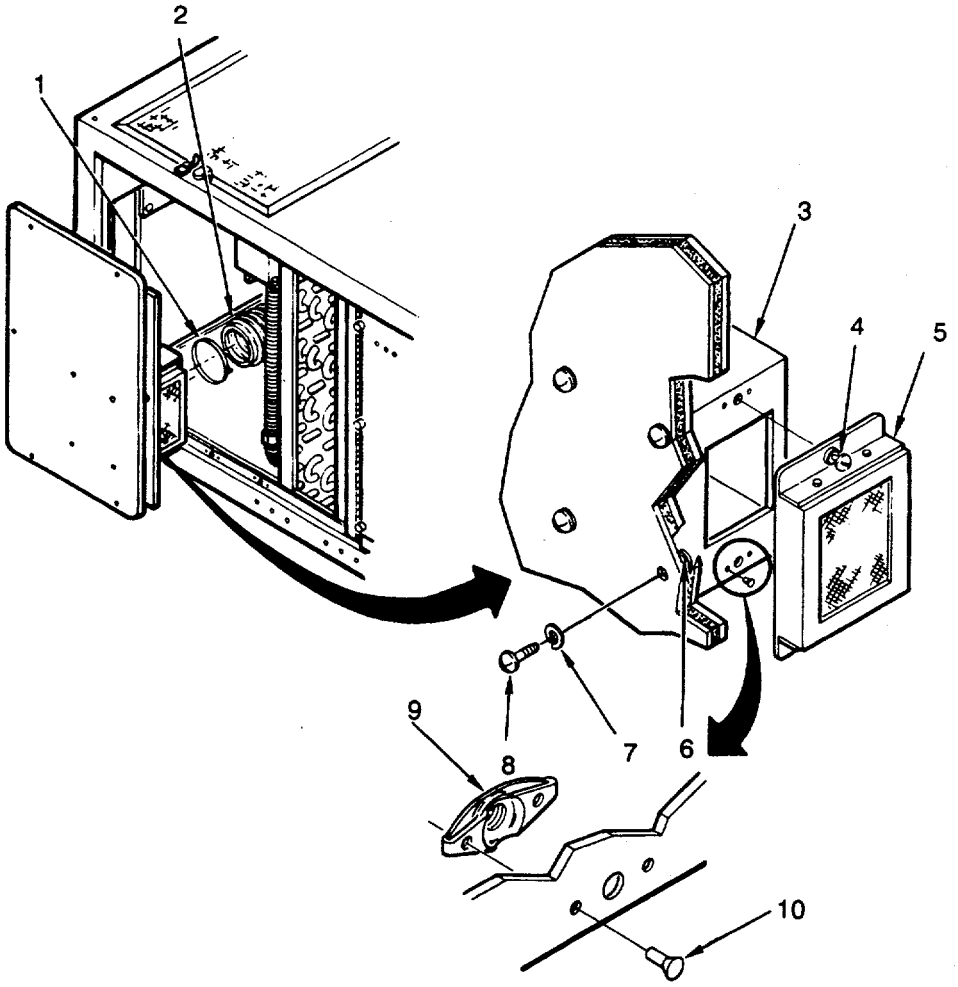


Figure 4-28. Fresh Air Inlet Filter Box (Evaporator Front Panel)

INSTALLATION

1. Position fresh air filter box (3) in place.
2. Install four lockwashers (7) and screws (8).
3. Install hose (2) and clamp (1).

FOLLOW ON PROCEDURE

1. Close left front evaporator panel (para 4-23).
2. Connect air conditioner input power at source.

4-25. RIGHT FRONT EVAPORATOR PANEL.

This task covers:

Removal **Inspection** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:

Adhesive (Item 1, Appendix E)
Bulk gasket material
Bulk insulation material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

WARNING

Disconnect Input power to the air conditioner before performing any internal maintenance. Voltages used can KILL Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

REMOVAL

1. Loosen six captive fasteners (1) (see Figure 4-29).
2. Remove panel (3).

INSPECTION

1. Check that panel is not bent, cracked, or punctured.
2. Check that gaskets (2) and insulation (7) are not torn, loose, or missing.
3. Check that information plates are readable and in place.
4. For replacement of information plates, refer to para 4-26.

REPAIR/REPLACE

NOTE

Repair consists of replacing gasket, insulation, and captive fasteners or panel.

1. Gasket.

   a. Remove captive fasteners.
   b. Remove damaged gasket (2) from panel (3).

4-25. RIGHT FRONT EVAPORATOR PANEL-Continued.

REPAIR/REPLACE-Continued.

1. Gasket-Continued.

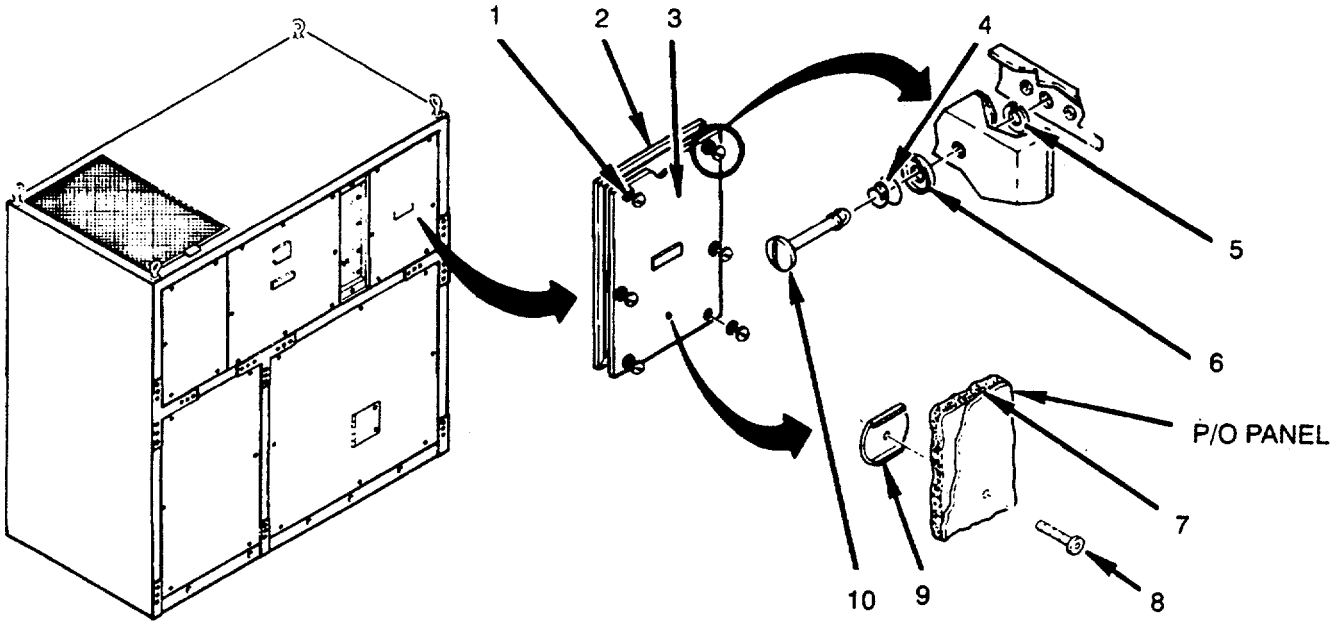


Figure 4-29. Right Front Evaporator Panel

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

c. Clean area for new gasket, using acetone or MEK and a stiff brush.
d. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
e. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
f. Install captive fasteners

2. Insulation.

a. Cut and remove damaged section of insulation (7).
b. Clean area for new insulation, using acetone or MEK and a stiff brush.
c. Cut replacement insulation to fit.
d. Coat surfaces of metal and insulation with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
e. Starting with an end, carefully attach insulation to metal surface. Press into firm contact all over.
f. If insulation retainer (9) is removed, install new retainer (9) with rivet (8).

3. Captive Fasteners.

   g. Remove split ring retainer (4), fastener (10), thermoplastic wear washer (6), and ejector spring (3).
   h. Install ejector spring (3), thermoplastic wear washer (6), fastener (10), and split ring retainer (4).

INSTALLATION

1. Position panel (3) in place.
2. Tighten six captive fasteners (1).

FOLLOW ON PROCEDURE

Connect air conditioner input power at source.

4-25. RIGHT FRONT EVAPORATOR PANEL-Continued.

This task covers:

Inspection **Replace**

INITIAL SETUP:

Tools

Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)

Personnel : 1

Equipment Conditions:

Disconnect air conditioner input power at source.

INSPECTION

1. Check that information plates are readable and in place (see Figure 4-30).
2. Check for missing rivets.

REPLACE

NOTE

Replace consists of replacing rivets or damaged information plates.

1. Remove rivets (2).
2. Remove information plate (1).
3. Position replacement information plate (1) in place.
4. Install rivets (2).

FOLLOW ON PROCEDURE

Connect air conditioner input power at source.

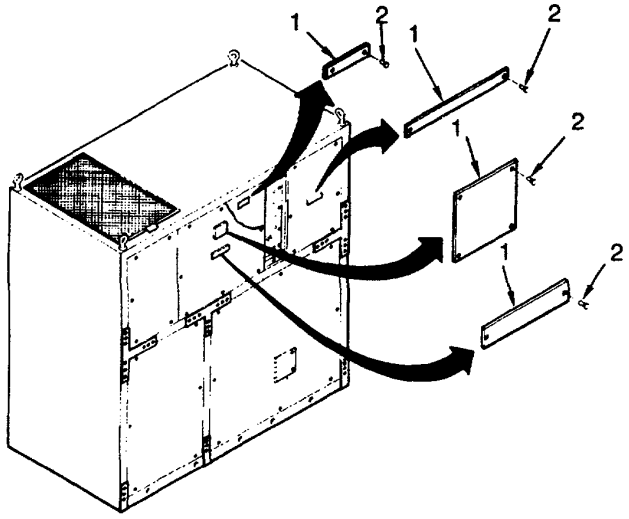


Figure 4-30. Information Plates

4-27. LEFT FRONT CONDENSER PANEL.

This task covers:

Removal Inspection Repair/Replace Installation

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:

Adhesive (Item 1, Appendix E)
Bulk gasket material
Bulk insulation material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

REMOVAL

1. Loosen six captive fasteners (1) (see Figure 4-31).
2. Remove panel (2).

INSPECTION

1. Check that panel (2) is not bent, cracked, or punctured.
2. Check that gaskets (3) and insulation (5) are not torn, loose, or missing.
3. Check that captive fasteners (1) are not damaged or missing.

REPAIR/REPLACE

NOTE

Repair consists of replacing gasket, insulation, captive fasteners or panel.

1. Gasket.
   a. Remove captive fasteners
   b. Remove damaged gasket (3) from panel (2).

4-27. LEFT FRONT CONDENSER PANEL-Continued.

REPAIR/REPLACE-Continued.

1. Gasket-Continued.

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

a. Clean area for new gasket, using acetone or MEK and a stiff brush.
b. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
c. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
d. Install captive fasteners.

2. Insulation.

a. Cut and remove damaged section of insulation (5).
b. Clean area for new insulation, using acetone or MEK and a stiff brush.
c. Cut replacement insulation to fit.
d. Coat surfaces of metal and insulation with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
e. Starting with an end, carefully attach insulation to metal surface. Press into firm contact all over.
f. If insulation retainers were removed, install new retainers (4) with rivet (6).

3. Capture Fasteners.

a. Remove split ring retainer (7), fastener (10), thermoplastic wear washer (8), and ejector spring (9).
b. Install ejector spring (9), thermoplastic wear washer (8), fastener (10), and split ring retainer (7).

INSTALLATION

1. Position panel (2) in place.
2. Tighten six captive fasteners (1).

FOLLOW ON PROCEDURE

Connect air conditioner input power at source.

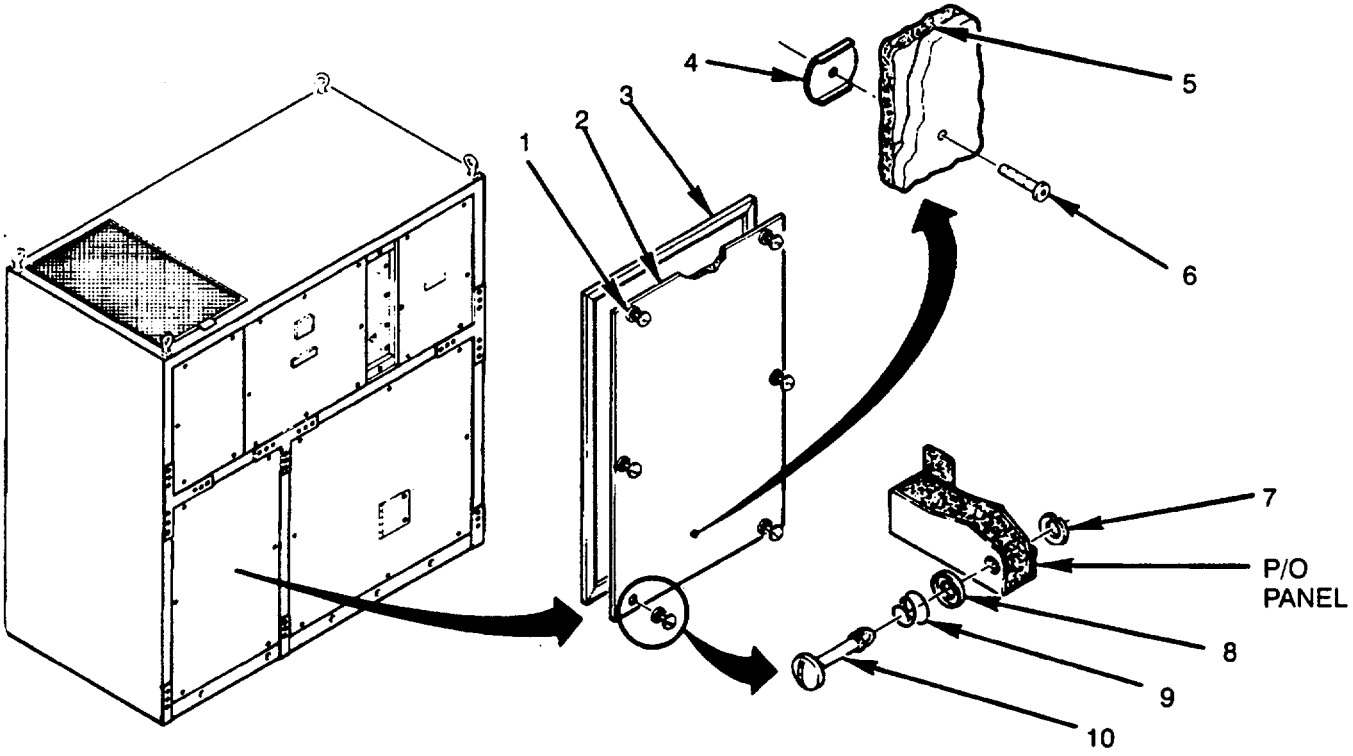


Figure 4-31. Left Front Condenser Panel

4-28. RIGHT FRONT CONDENSER PANEL.

This task covers:

Removal **Inspection** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools
- Tool kit, service, refrigeration unit (Item 1, Appendix B)
- Electric portable drill (Item 6, Appendix B)
- Twist drill set (Item 7, Appendix B)
- Blind riveter (Item 8, Appendix B)
- Gloves, chemical (Appendix C)

Personnel: 1

Materials:
- Adhesive .(Item 1, Appendix E)
- Bulk gasket material
- Bulk insulation material
- Rags (Item 12, Appendix E)
- Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

REMOVAL
1. Loosen eight captive fasteners (6) (see Figure 4-32).
2. Remove panel (1).

INSPECTION
1. Check that panel (1) is not bent, cracked, or punctured.
2. Check that gasket (5) and insulation (3) are not torn, loose, or missing.
3. Check that captive fasteners (6) are not damaged or missing.
4. Check front service valve panel for missing rivets (8) or damaged hinge (7).
5. For removal and repair of front service valve panel refer to paragraph 4-29.

NOTE

Repair consists of replacing gasket, insulation, captive fasteners, rivets or panel.

REPAIR/REPLACE.
1. Gasket.
   a. Remove captive fasteners.
   b. Remove damaged gasket (5) from panel (1).

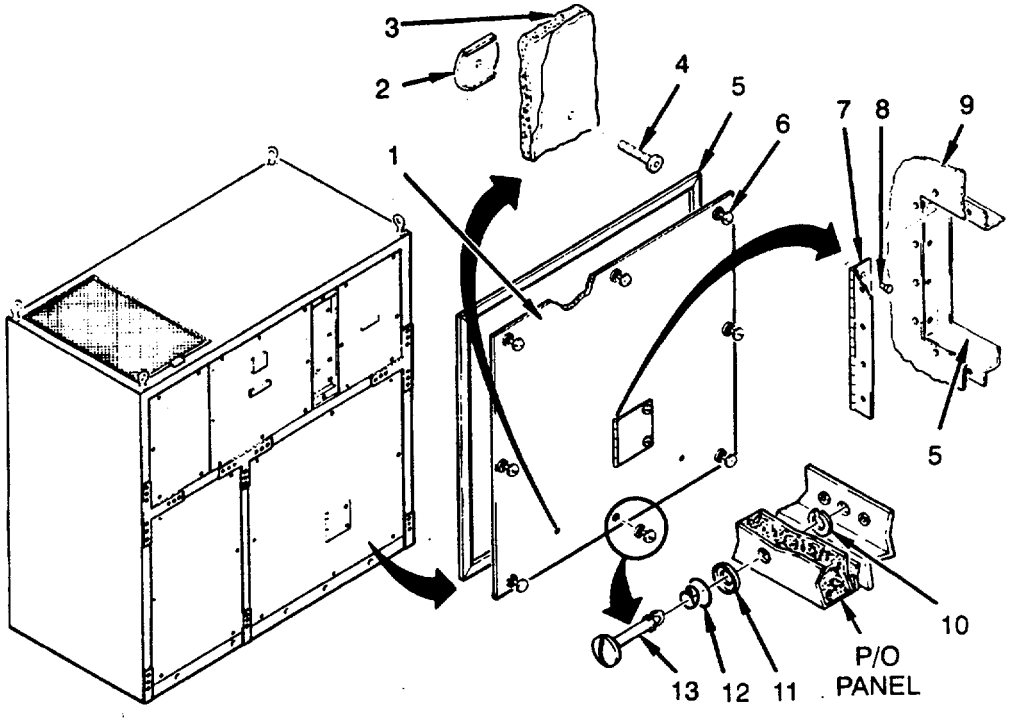


Figure 4-32. Right Front Condenser Panel

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

c. Clean area for new gasket, using acetone or MEK and a stiff brush.
d. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
e. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
f. Install captive fasteners.

2. Insulation.

a. Cut and remove damaged section of insulation (3).
b. Clean area for new insulation, using acetone or MEK and a stiff brush.
c. Cut replacement insulation to fit.
d. Coat surfaces of metal and insulation with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
e. Starting with an end, carefully attach insulation to metal surface. Press into firm contact all over.
f. If insulation retainer (2) is removed, install new retainer (2) with rivet (4).

4-28. RIGHT FRONT CONDENSER PANEL-Continued.

REPAIR/REPLACE-Continued.

3. Captive Fasteners.

    g. Remove split ring retainer (10), fastener (13), thermoplastic wear washer (11), and ejector spring (12).
    h. Install ejector spring (12), thermoplastic wear washer (11), fastener (13) and split ring retainer (10).

4. Hinge.

    a. Remove eight rivets (8)
    b. Remove hinge (7) from panel and door.
    c. Cut replacement hinge (7) to length.
    d. Position hinge (7) in place.
    e. Install eight rivets (8).

INSTALLATION

1. Position panel (1) in place.
2. Tighten eight captive fasteners (6).

FOLLOW ON PROCEDURE
Connect air conditioner input power at source.

4-29. FRONT SERVICE VALVE PANEL.

This task covers:

Inspection **Removal** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:

Adhesive (Item 1, Appendix E)
Bulk gasket material
Bulk insulation material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any Internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

INSPECTION

1. Check that panel (2) is not bent, cracked, or punctured (see Figure 4-33).
2. Check that insulation (NO TAG) is not tom, loose, or missing.
3. Check that gasket (4) is not tom, loose, or missing; replace gasket if damaged or missing (para 4-28)
4. Check that captive fasteners (5) or receptacles (7) are not damaged or missing.
5. Check front service valve panel (2) for missing rivets (1) or damaged hinge.
6. If hinge needs to be replaced, refer to para 4-28.

REMOVAL

1. Loosen two captive fasteners (5) and open panel (2).
2. Remove four rivets (1) from front service valve panel (2).
3. Remove front service valve panel (2).

NOTE

Repair consists of replacing insulation, captive fasteners receptacle, receptacle or panel.

4-29. FRONT SERVICE VALVE PANEL-Continued.

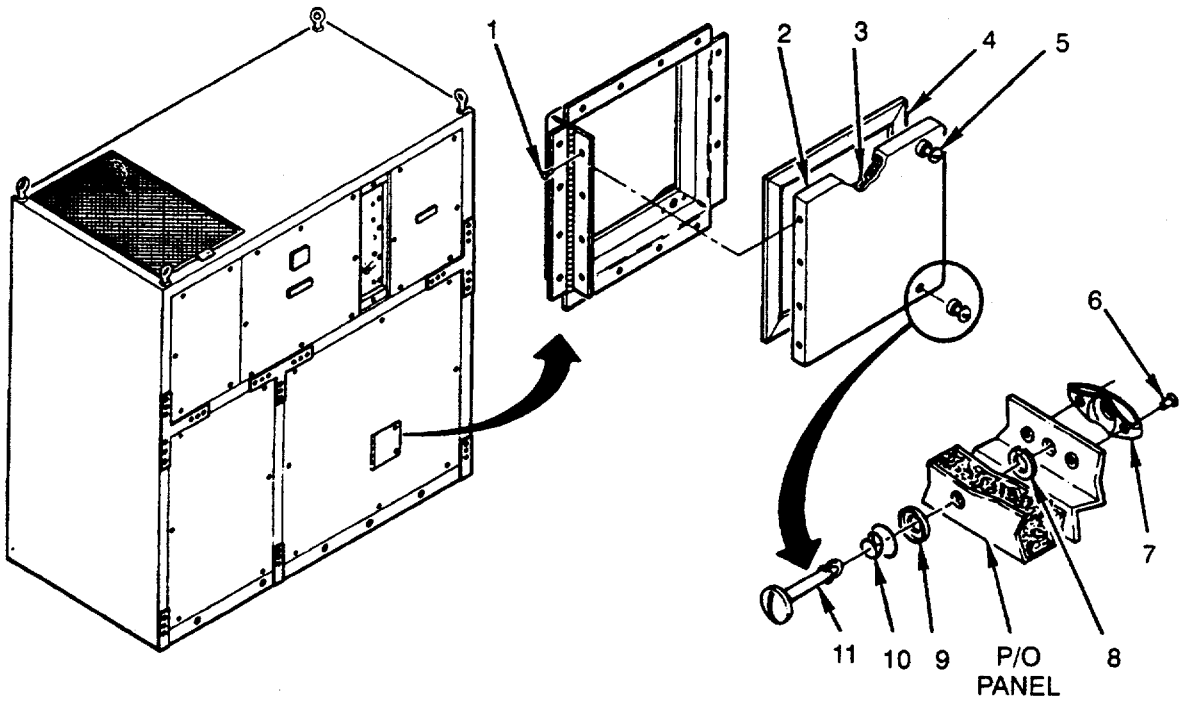


Figure 4-33. Front Service Valve Panel

REPAIR/REPLACE

1. Insulation.

   a. Cut and remove damaged section of insulation (3).

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

   b. Clean area for new insulation, using acetone or MEK and a stiff brush.
   c. Cut replacement insulation to fit.
   d. Coat surfaces of metal and insulation with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
   e. Starting with an end, carefully attach insulation to metal surface. Press into firm contact all over.

2. Captive Fastener.

   a. Remove split ring retainer (8), fastener (11), ejector spring (10), and thermoplastic wear washer (9).
   b. Install ejector spring (10), thermoplastic wear washer (9), fastener (11), and split ring retainer (8).

REPAIR/REPLACE-Continued.

3. Receptacle.

   c. Remove two rivets (6).
   d. Remove turn receptacle (7).
   e. Position replacement receptacle (7) in place.
   f. Install two rivets (6).

INSTALLATION

1. Position front service valve panel (2) in place.
2. Install four rivets (1).
3. Close panel (2) and tighten two captive fasteners (5).

FOLLOW ON PROCEDURE

Connect air conditioner input power at source.

4-30. LEFT ELECTRIC PLATE.

This task covers:

Inspection **Removal** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:
Adhesive (Item 1, Appendix E)
Bulk gasket material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (4-22).

INSPECTION

1. Check that electric plate (3) is not bent, cracked, or punctured (see Figure 4-34).
2. Check that gasket (2) is not torn, loose, or missing.
3. Check that captive fasteners (1) are not damaged or missing.

REMOVAL

1. Loosen six captive fasteners (1).
2. Open electric plate (3).

REPAIR/REPLACE

NOTE

Repair consists of replacing gasket, captive fasteners or electric plate.

1. Gasket.
   a. Remove captive fasteners.
   b. Remove damaged gasket (2) from plate (3).

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flames.

   c. Clean area for new gasket, using acetone or MEK and a stiff brush.

d. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
e. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
f. Install captive fasteners.

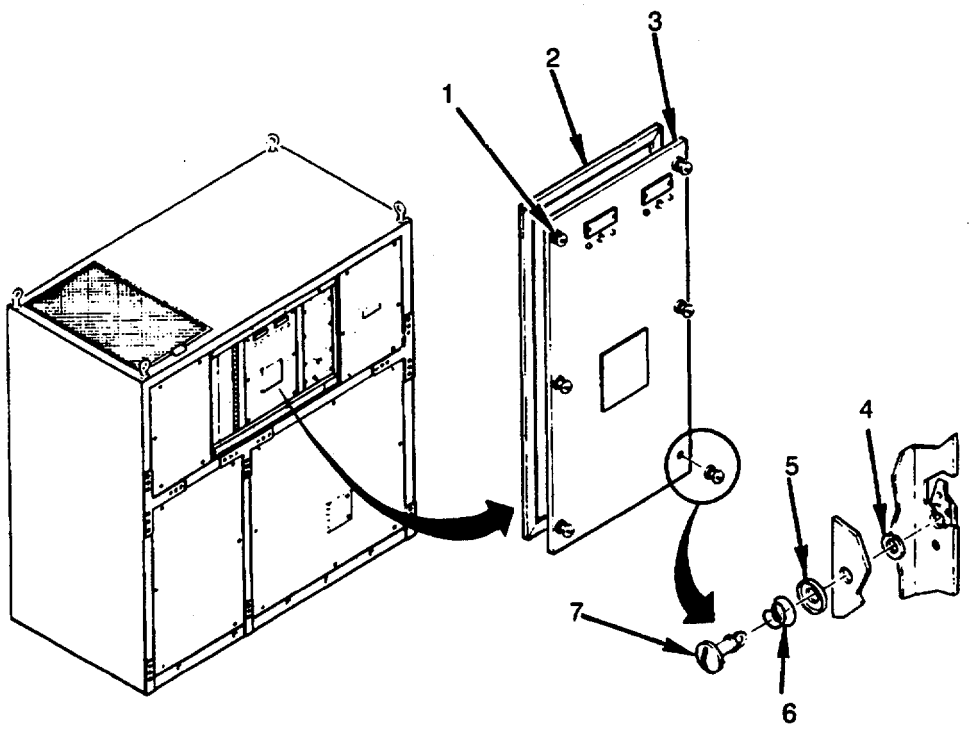


Figure 4-34. Left Electric Plate

2. Captive Fasteners.
   a. Remove split ring retainer (4), fastener (7), thermoplastic wear washer (5), and ejector spring (6).
   b. Install ejector spring (6), thermoplastic wear washer (5), fastener (7), and install split ring retainer (4).

3. Electric Plate.
   a. Remove circuit breakers CB1 and CB2 (para 4-62) from damaged plate (3).
   b. Remove electric plate (3).
   c. Install six captive fasteners (1).
   d. Install gasket (2).
   e. Install circuit breakers CB1 and CB2 (para 4-62).

INSTALLATION

1. Close electric plate (3).
2. Tighten six captive fasteners (1).

FOLLOW ON PROCEDURE

1. Install center front evaporator panel (4-22).
2. Connect air conditioner input power at source.

4-31. RIGHT ELECTRIC PLATE.

This task covers:

Inspection **Removal** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:
Adhesive (Item 1, Appendix E)
Bulk gasket material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (4-22).

INSPECTION

1. Check that plate (3) is not bent, cracked, or punctured (see Figure 4-35).
2. Check that gasket (2) is not torn, loose, or missing.
3. Check that captive fasteners (1) are not damaged or missing.

REMOVAL

1. Loosen ten captive fasteners (1).
2. Open electric plate (3).

REPAIR/H/REPLACE

NOTE

Repair consists of replacing gasket, fasteners, or electric plate.

1. Gasket.
   a. Remove captive fasteners (1).
   b. Remove damaged gasket (2) from plate (3).

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

   c. Clean area for new gasket, using acetone or MEK and a stiff brush.

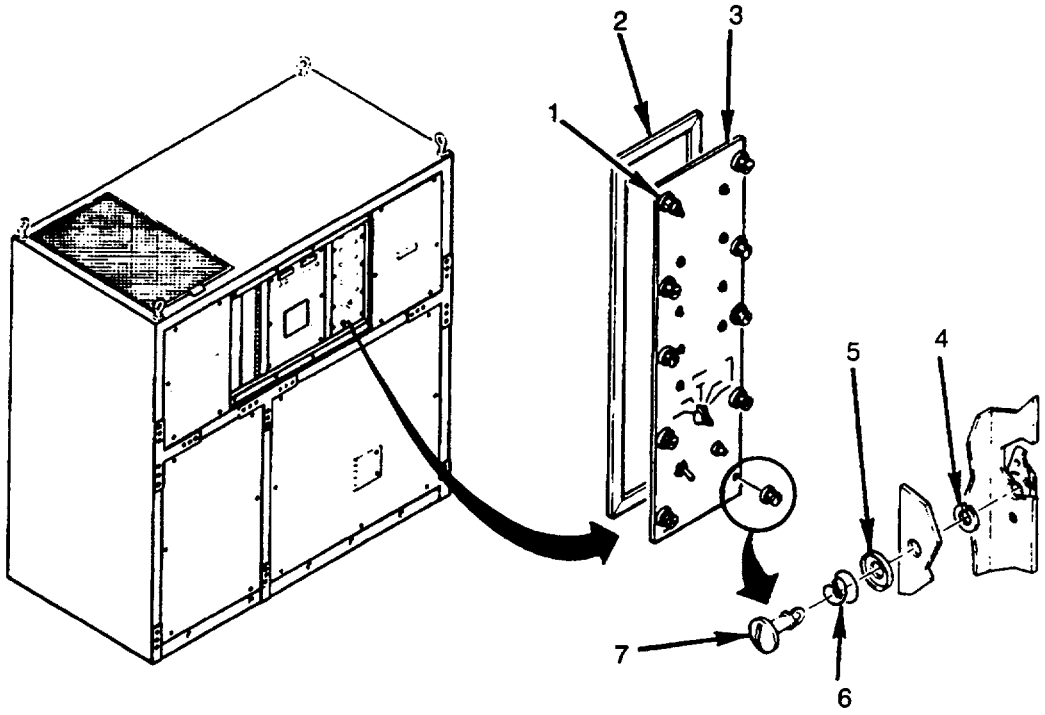


Figure 4-35. Right Electric Plate

d. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
e. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
f. Install captive fasteners (1).

2. Captive Fasteners.
   a. Remove split ring retainer (4), fastener (7), thermoplastic wear washer (5), and ejector spring (6).
   b. Install ejector spring (6), thermoplastic wear washer (5), fastener (7), and split ring retainer (4).

3. Electric Plate.
   a. Remove indicator lights, mode select switch, service light switch, and fault reset switch (para 4-45).
   b. Remove electric plate (3).
   c. Install ten captive fasteners (1).
   d. Install gasket (2).
   e. Install service lights, mode select switch, service light switch, and fault reset switch (para 4-45).

INSTALLATION

1. Close electric plate (3).
2. Tighten ten captive fasteners (1).

FOLLOW ON PROCEDURE

1. Connect air conditioner input power at source.
2. Install center front evaporator panel (para 4-22).

4-32. REAR EVAPORATOR PANEL.

This task covers:
Inspection

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

INSPECTION

NOTE

See the following paragraphs for individual component inspection and replacement.

1. Control wire J-box (para 4-33).
2. Fresh air connecting link assembly (para 4-34).
3. Thermostat bracket (para 4-35).

FOLLOW ON PROCEDURE
Connect air conditioner input power at source.

4-33. CONTROL WIRE J-BOX.

This task covers:
Inspection **Removal** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:
Adhesive (Item 1, Appendix E)
Bulk gasket material
Rags (Item 12, Appendix E)
Sealing compound (Item 6, Appendix E)
Methyl-ethyl ketone (Item 13, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

INSPECTION
1. Check that box (6) is not bent, cracked, or punctured (see Figure 4-36).
2. Check for damaged, loose, or missing mounting hardware.

REMOVAL
1. Loosen clamp and remove hose (19).
2. Remove four screws (1), lockwashers (2), and flat washers (3).
3. Remove control wire J-box cover (18).
4. Remove two screws (16), lockwashers (15), and thermostat box cover (14).
5. Remove terminal board (para 4-64).
6. Remove two screws (10), lockwashers (9), and flat washers (8) from top of J-box (6).
7. Remove two screws (11), four flat washers (12), and two locknuts (13) from bottom of J-box (6).
8. Remove control wire J-box (6).

4-33. CONTROL WIRE J-BOX-Continued.

REPAIR/REPLACE

NOTE

Repair consists of replacing bushing, gasket, conduit fitting, rivnuts, and/or J-box.

1. Remove insulator bushing (4).
2. Install insulator bushing (4).
3. Remove damaged gasket (17) from cover (18).

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

4. Clean area for new gasket, using acetone or MEK and a stiff brush.
5. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
6. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
7. Remove conduit fitting (5).
8. Install conduit fitting (5).
9. If J-box is replaced, install eight rivnuts (7).

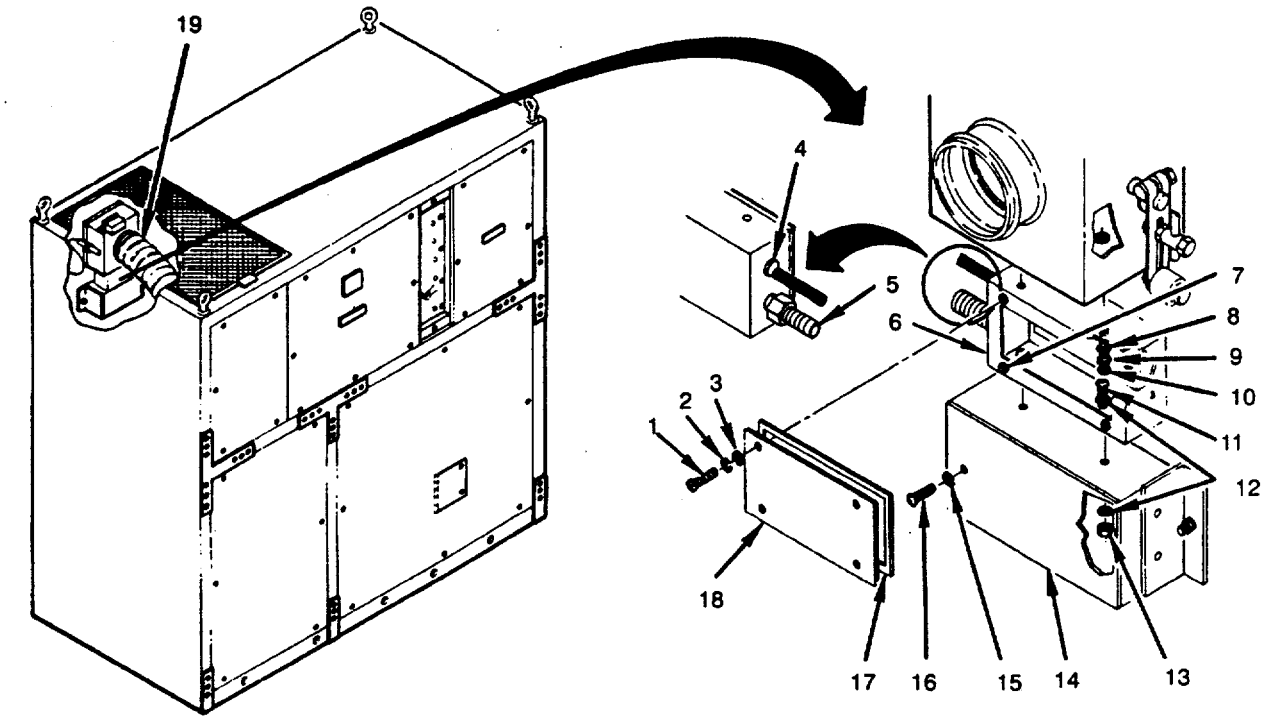


Figure 4-36. Control Wire J-Box

INSTALLATION

1. Position Control wire J-box (6) in place.
2. Install two flat washers (8), lockwashers (9), and screws (10) to top of J-box.
3. Install four flat washers (12), two screws (11), and locknuts (13) to bottom of J-box.
4. Position control wire J-box cover (18) in place.
5. Install four flat washers (3), lockwashers (2), and screws (1).
6. Use sealing compound to seal holes between boxes, bushing, and conduit fitting.
7. Install hose and tighten clamp (19).

FOLLOW ON PROCEDURE

1. Install terminal board (para 4-64).
2. Install left front evaporator panel (para 4-23).
3. Connect air conditioner input power at source.

4-34. FRESH AIR CONNECTING LINK ASSEMBLY.

This task covers:
Inspection **Adjust** **Removal** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

INSPECTION
1. Check that connecting link rod (6) is not bent or damaged (see Figure 4-37).
2. Check that connector swivel (11), damper operator (12), and counter weight (10) are not damaged.
3. Check for damaged, loose, or missing mounting hardware.

ADJUST
1. Adjust damper operator counter weight (10) to line up with outside edge of fresh air inlet box (16)
2. Loosen bolt (7) on damper connector swivel (11).
3. Pull solenoid switch arm (3) to full out position and close damper (17).
4. Tighten bolt (7) on damper connector swivel (11).

REMOVAL
1. Loosen screw (4) and locknut (2) On solenoid connector (3).
2. Loosen bolt (7) on damper connector swivel (11);
3. Remove control rod (6) and note location of spacers (5).
4. Loosen nut (1) and remove damper operator (12).
5. Remove locknut (15) and connector swivel (11).
6. Remove locknut (13), two flat washers (9), bolt (8), and counter weight (10).

REPAIR/REPLACE
Repair consists of replacing damper operator (12), counter weight (10), control rod (6), and connector swivel (11).

INSTALLATION

1. Install counter weight (10), two flat washers (9), bolt (8), and locknut (13).
2. Install connector swivel (11) with flat washer (14) and locknut (15).
3. Install damper operator (12) and tighten nut (1).
4. Install control rod (6) and align spacers (5) noted in removal.
5. Tighten screw (4) and locknut (2) on solenoid connector.
6. Adjust fresh air connecting link.

FOLLOW ON PROCEDURE

1. Install left front evaporator panel (para 4-23).
2. Connect air conditioner input power at source.

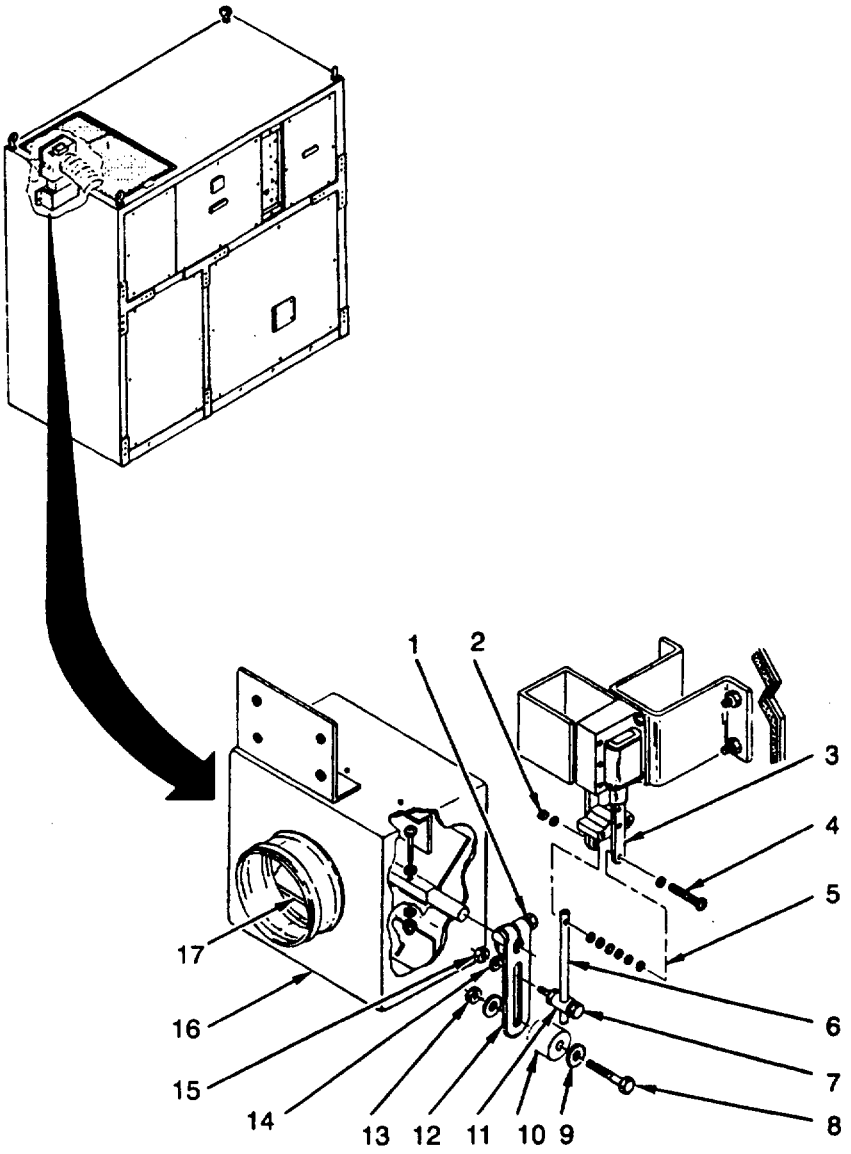


Figure 4-37. Fresh Air Connecting Link

4-35. THERMOSTAT BRACKET.

This task covers:
Inspection **Removal** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

INSPECTION
1. Check that bracket (2) is not cracked or punctured (see Figure 4-38).
2. Check for damaged or missing rivnuts or missing mounting hardware.

REMOVAL
1. Remove low ambient temperature thermostat (para 4-86).
2. Remove three screws (3), lockwashers (4), and flat washers (5).
3. Remove bracket (2).

REPAIR/REPLACE
Repair consists of replacing damaged or missing rivnuts (1), or bracket.

INSTALLATION
1. Position bracket (2) in place.
2. Install three lockwashers (4), flat washers (5), and screws (3).
3. Install low ambient temperature thermostat (para 4-86).

FOLLOW ON PROCEDURE
1. Install left front evaporator panel (para 4-23).
2. Connect air conditioner input power at source.

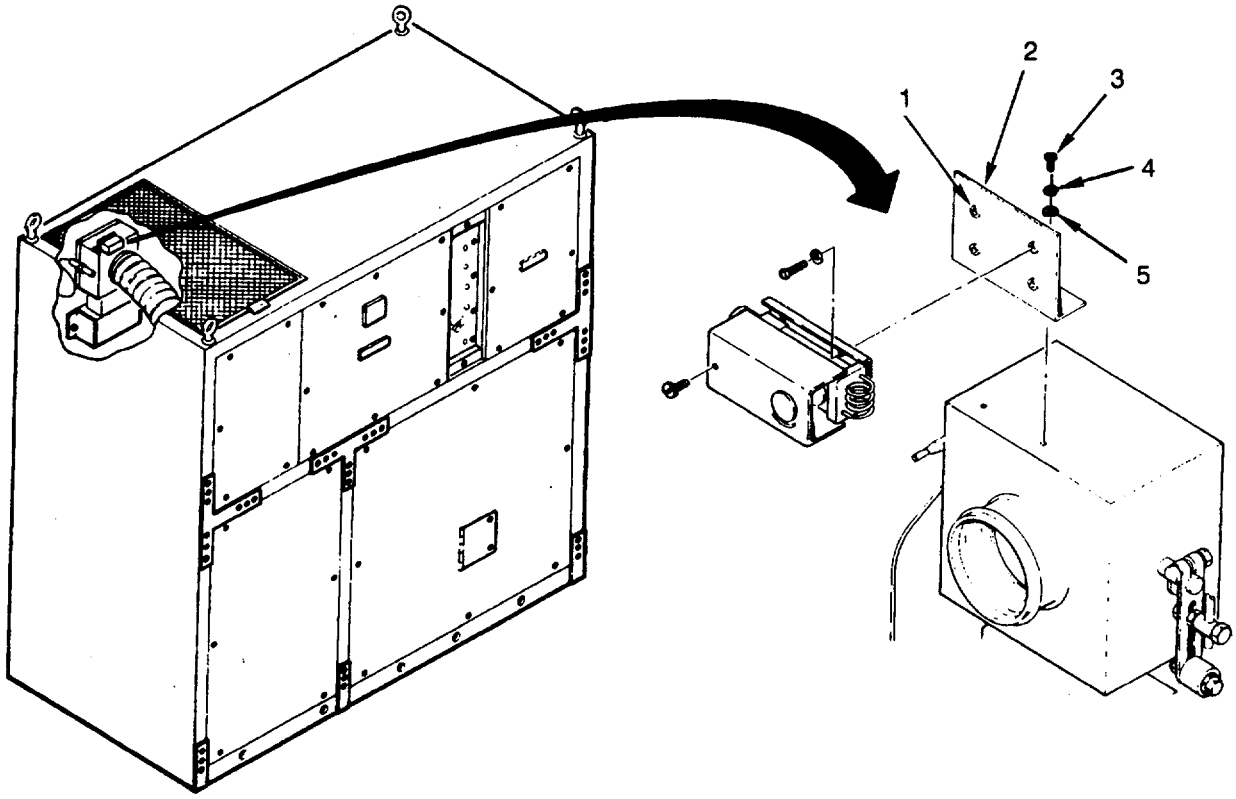


Figure 4-38. Thermostat Bracket

4-36. CIRCULATING AIR IN RFI FILTER.

This task covers:
Removal **Service** **Inspection** **Replace** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Materials:
Adhesive (Item 1, Appendix E)
Bulk gasket material
Rags (Item 12, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove return air filter (para 3-5).

REMOVAL
1. Remove seven screws (1) (see Figure 4-39).
2. Remove filter (2).

SERVICE
Vacuum all dust or dirt from filter.

INSPECTION
1. Check filters for punctures, cuts and damaged edges that would allow passage of unfiltered air.
2. Check filters for packed or mashed areas that would block air flow.
3. Replace filter if defective.

REPLACE
Replace filter if found to be damaged.

INSTALLATION
1. If RFI gasket is not to be installed on replacement filter, proceed to step 4.
2. On replacement filter, coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
3. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
4. Position filter (2) in place.
5. Install seven screws (1).

FOLLOW ON PROCEDURE

1. Install return air filter (para 3-5)
2. Connect air conditioner input power at source

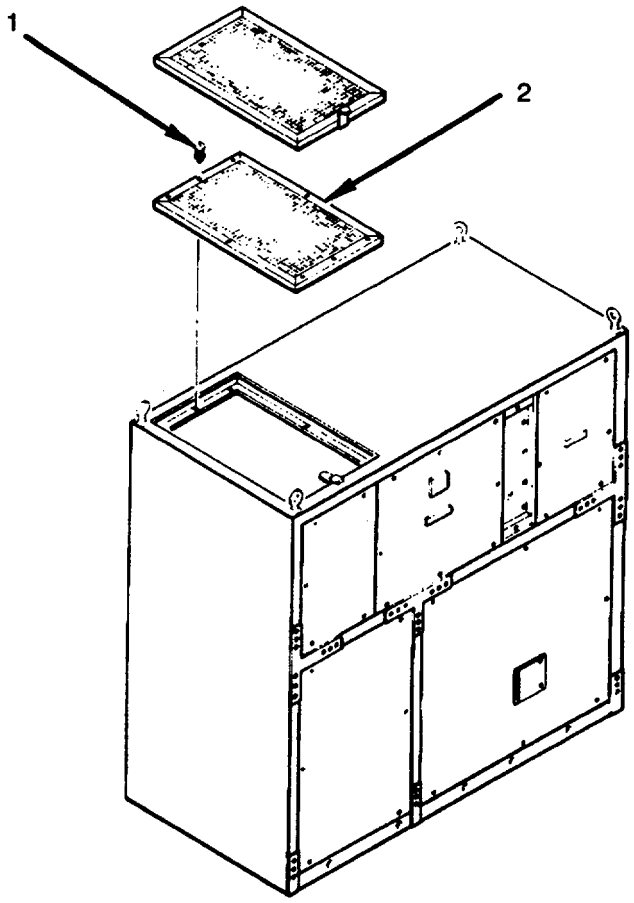


Figure 4-39. Circulating Air in RFI Filter

4-37. FRESH AIR FILTER

This task covers:
Removal **Service** **Inspection** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Materials:
Rags (Item 12, Appendix E)
Detergent, dishwashing (item 20, Appendix E)
Oil, air filter (Item 23, Appendix E)

Equipment Conditions:

WARNING

Disconnect Input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

REMOVAL
1. Loosen two captive fasteners (5) (see Figure 4-40).
2. Remove filter (6).

SERVICE
1. Wash filter in mild detergent and water solution.
2. Rinse thoroughly in water.
3. Shake out excess water.
4. Spray filter with air filter oil.

INSPECTION
1. Check filters for punctures, cuts and damaged edges that would allow passage of unfiltered air.
2. Check filters for packed or mashed areas that would block air flow.
3. Replace filter if defective.

REPAIR/REPLACE
Repair consists of replacing, captive fastener (1), ejector spring (2), thermoplastic wear washer (3), and split ring retainer (4), or fresh air filter (6).

INSTALLATION
1. Position filter (6) in place.
2. Tighten two captive fasteners (5).

FOLLOW ON PROCEDURE

1 Install left front evaporator panel (para 4-23).

2. Connect air conditioner input power at source.

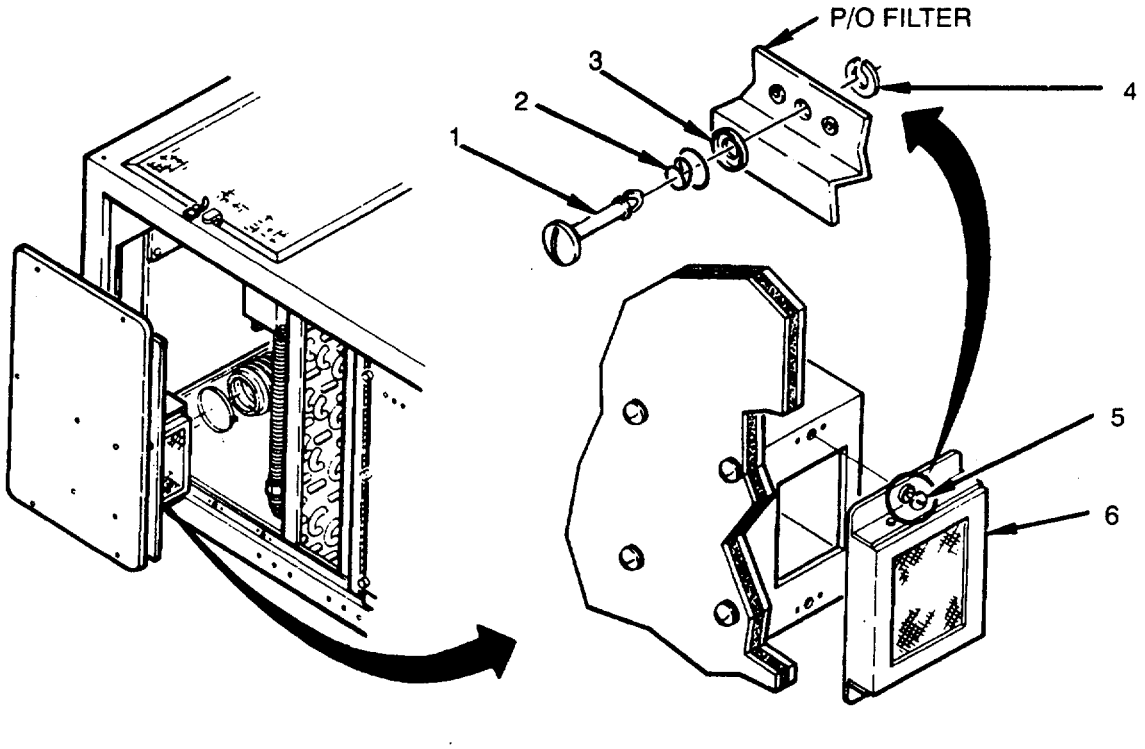


Figure 4-40. Fresh Air Filter

4-38. FRESH AIR RFI FILTER.

This task consists of: Service **Inspection**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Vacuum (Item 13, Appendix B)

Personnel: 1
Materials:
Rags (Item 12, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

SERVICE
Vacuum all dust or dirt from filter (see Figure 4-41).

INSPECTION
1. Check filters for punctures, cuts and damaged edges that would allow passage of unfiltered air.
2. Check filters for packed or mashed areas that would block air flow.
3. If filter is defective and needs to be replaced, contact General Support Maintenance.

FOLLOW ON PROCEDURE
Connect air conditioner input power at source.

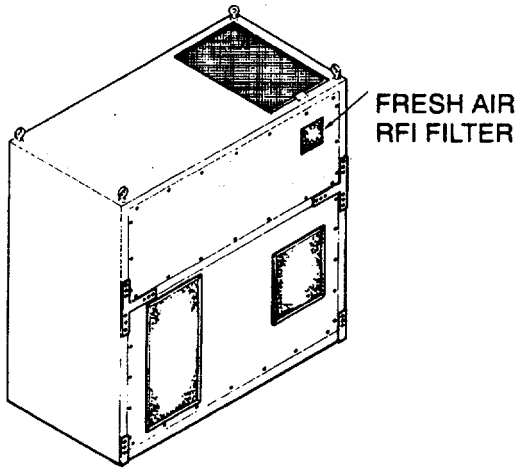


Figure 4-41. Fresh Air RFI Filter

4-39. CONDENSER AIR OUT RFI FILTER.

This task consists of: Service **Inspection**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Vacuum (Item 13, Appendix B)

Personnel: 1
Materials:
Rags (Item 12, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

SERVICE
Vacuum all dust or dirt from filter (see Figure 4-42).

INSPECTION
1. Check filters for punctures, cuts and damaged edges that would allow passage of unfiltered air.
2. Check filters for packed or mashed areas that would block air flow.
3. If filter is defective and needs to be replaced, contact General Support Maintenance.

FOLLOW ON PROCEDURE
Connect air conditioner input power at source.

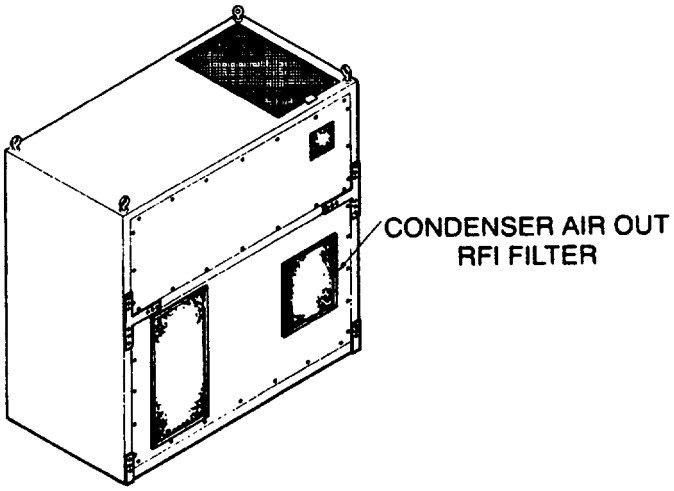


Figure 4-42. Condenser Air Out RFI Filter

4-40. CONDENSER AIR IN RFI FILTER.

This task consists of: Service **Inspection**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Vacuum (Item 13, Appendix B)

Personnel: 1
Materials:
Rags (Item 12, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

SERVICE
Vacuum all dust or dirt from filter (see Figure 4-43).

INSPECTION
1. Check filters for punctures, cuts and damaged edges that would allow passage of unfiltered air.
2. Check filters for packed or mashed areas that would block air flow.
3. If filter is defective and needs to be replaced, contact General Support Maintenance.

FOLLOW ON PROCEDURE
Connect air conditioner input power at source.

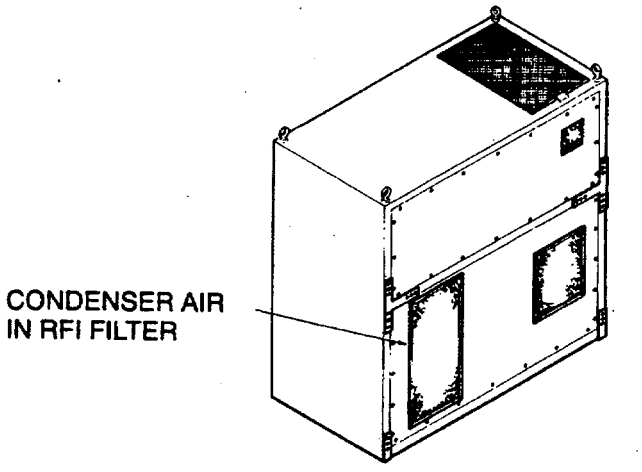


Figure 4-43. Condenser Air In RFI Filter

4-41. CICULATING AIR OUT RFI FILTER.

This task consists of: Removal Service Inspection Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Vacuum (Item 13, Appendix B)

Personnel: 1
Materials:
Rags (Item 12, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1 Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

REMOVAL
1. Remove six screws (3), lockwashers (2), and flat washers (4) (see Figure 4-44).
2. Remove cover (1).
3. Remove eight screws (5), flat washers (7), and lockwashers (6).
4. Remove filter (8).

SERVICE
Vacuum all dust or dirt from filter

INSPECTION
1. Check filters for punctures, cuts and damaged edges that would allow passage of unfiltered air.
2. Check filters for packed or mashed areas that would block air flow.

INSTALLATION
1. Install filter (8).
2. Install eight flat washers (7), lockwashers (6), and screws (5).
3. Position cover (1) in place.
4. Install six lockwashers (2), flat washers (4), and screws (3).

FOLLOW ON PROCEDURE
1. Install right front condenser panel (para 4-28).
2. Connect air conditioner input power at source.

4-41. CICULATING AIR OUT RFI FILTER. - Continued

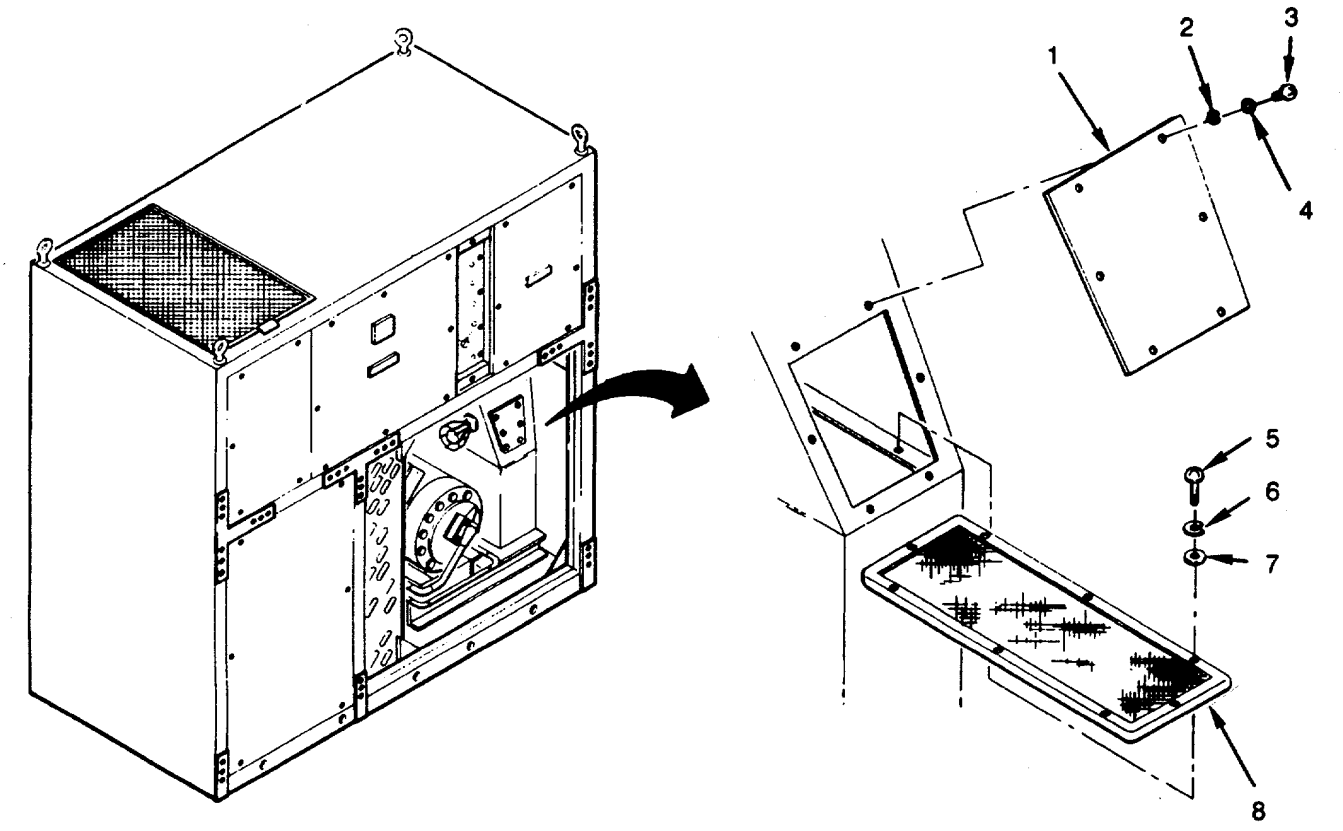


Figure 4-44 Circulating Air Out RFI Filter

4-42. RFI FILTER.

This task consists of: Inspection Testing Repair

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1
Materials:
Bulk gasket
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open left front evaporator panel (para 4-23).
3. Remove 22 screws (1) and top cover (2) (see Figure 4-45).
4. Remove 10 screws (NO TAG) and bottom cover (3).

INSPECTION

1. Check for signs of overheating or other visible damage.
2. Verify fuses F1-F4 are 20A, 250V.
3. Inspect fuses (para 4-43), varistors (para 4-44), area for cracks, corrosion, loose electrical terminal connections (6), and loose mounting hardware. If wires are damaged, replace as necessary.
4. Check RFI gasket (5) on top cover. Replace gasket if damaged.

TESTING

Check input and output voltages (208 ± 20.8 V ac) (see Figure FO-3).

REPAIR

NOTE
Repair consists of replacing fuses, or gaskets and inspecting varistors.

1. Fuses F1-F4 (para 4-43).
2. Varistors (para 4-44).
3. Remove damaged gasket (5) from panel (2).
4. Install replacement gasket (5).

4-42. RFI FILTER - Continued..

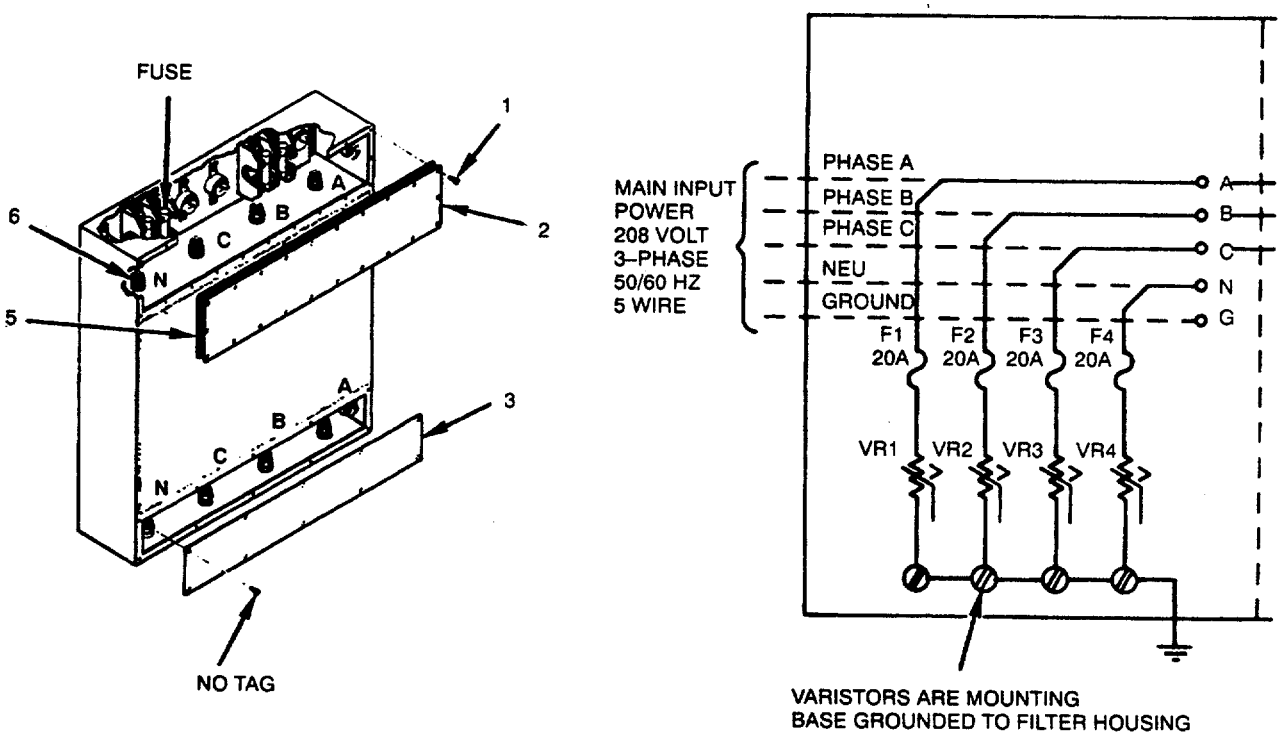


Figure 4-45. RFI Filter

FOLLOW ON PROCEDURE

1. Install top cover (2) with 22 screws (1).
2. Install bottom cover (3) with 10 Screws (4).
3. Close left front evaporator panel (para 4-23).
4. Connect air conditioner input power at source.

4-43. FUSES (F1-F4).

This task consists of: **Removal** **Inspection** **Testing** **Replace** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1 Disconnect air conditioner input power at source.
2. Open left front evaporator panel (para 4-23).
3. Remove RFI filter top cover (para 4-42).

REMOVAL
Remove fuses (F1- F4) (see Figure 4-46).

INSPECTION
Check fuse and fuse holder for cracks, corrosion; loose electrical connections, and loose mounting hardware.

TESTING
1. Using multimeter, check fuse continuity. If there is no continuity, replace fuse.
2. Using multimeter on R x 10,000 position, measure between each terminal and ground and note resistance measurement. If continuity exists, contact General Support Maintenance.

REPLACE
Replace defective fuses.

INSTALLATION
Install fuses (F1-F4).

4-43. FUSES (F1-F4). - Continued

FOLLOW ON PROCEDURE

1. Install RFI filter top cover (para 4-42).
2. Close left front evaporator panel (para 4-23).
3. Connect air conditioner input power at source.

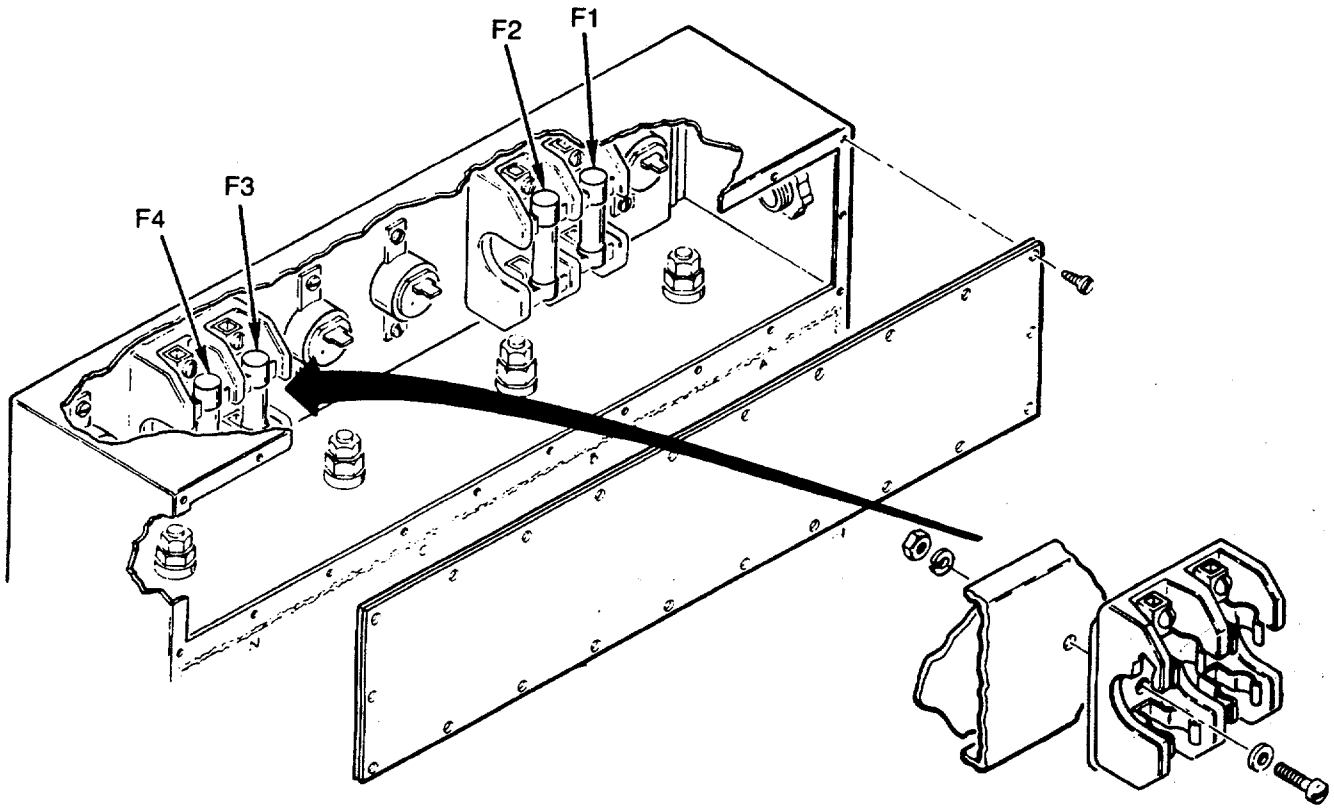


Figure 4-46. Fuses (F1 -F4)

4-44. VARISTORS (VR-1 THRU VR-4).

This task consists of: Inspection Testing

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open left front evaporator panel (para 4-23).
3. Remove RFI filter top cover (para 4-42).

INSPECTION

1. Check varistors for cracks, corrosion, loose electrical connections, and loose mounting hardware (see Figure 4-47).
2. Check for signs of overheating or other visible damage. Contact General Support Maintenance to replace varistors.

TESTING

Using multimeter, check varistors continuity (Figure FO-3). If there is no continuity, contact General Support Maintenance to replace varistors.

4-44 VARISTORS (VR-1 THRU VR-4) - Continued.

FOLLOW ON PROCEDURE

1. Install RFI filter top cover (para 4-42).
2. Close left front evaporator panel (para 4-23).
3. Connect air conditioner input power at source.

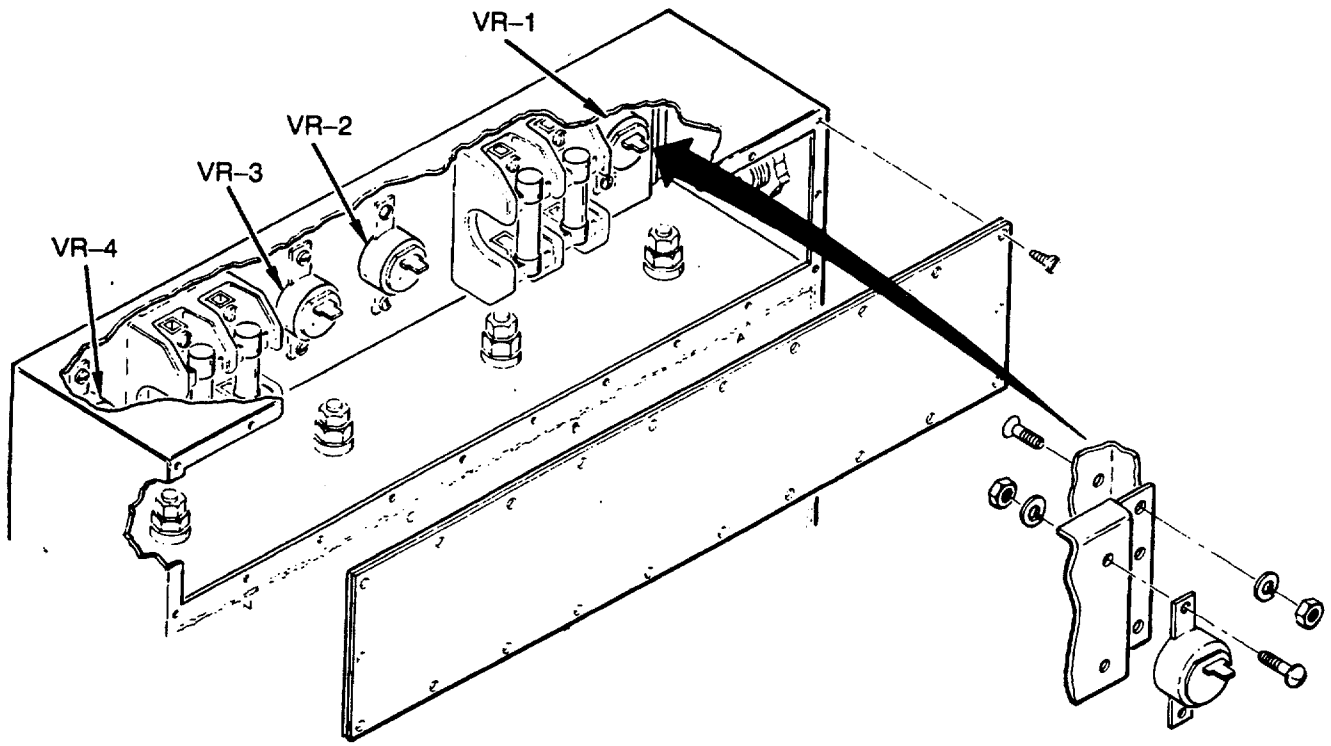


Figure 4-47. Varistors (VR-1 thru VR-4)

4-45. CONTROL BOX AND COMPONENTS.

This task consists of: Inspection Testing Repair Replacement

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open right front evaporator panel (para 4-25).
3. Remove center front evaporator panel (para 4-22).

NOTE

Access can be made to components located on right electric plate without removing right front evaporator panel.

4. Open left electric plate (para 4-30).
5. Open right electric plate (para 4-31).
6. Remove two screws (1) (see Figure 4-48).
7. Swing open control box (2).

INSPECTION TESTING AND REPLACEMENT

NOTE

Applicable inspection, testing, repair, and replacement of the control box components and control box is covered in the following referenced paragraphs.

1. Control Box.
   a. Rectifier CR1 (para 4-46).
   b. Suppression diodes' CR2-CR11 (para 4-47).
   c. Control relays K1-K7, K18-K20 (para 4-49).
   d. Relay sockets (11-pin) (para 4-50).
   e. Fan contactors K8 and K9 (para 4-51).
   f. Compressor contactor K10 (para 4-52).
   g. Heater contactor K11 (para 4-53).
   h. Time delay (10 and 60 sec) relays K21 and K22 (para 4-54).
   i. Resistors R1 and R2 (para 4-55).
   j. Transformer T1 (para 4-60).
   k. Terminal boards TB1-TB3 (para 4-61).
   l. Control box (para 4-63).

4-45. CONTROL BOX AND COMPONENTS. - Continued

INSPECTION, TESTING, REPAIR, AND REPLACEMENT - Continued.

2. Left Electric Plate.
   Circuit breakers CB1 and CB2 (para 4-62).
3. Right Electric Plate.
   a. Indicator lights DS1-DS7, DS9 (para 4-48).
   b. Mode Select Switch SI (para 4-56).
   c. Knob (para 4-57).
   d. Service light switch S2 (para 4-58).
   e. FAULT RESET switch S12 (para 4-59).

FOLLOW ON PROCEDURE

1. Close left electric plate (para 4-30).
2. Close right electric plate (para 4-31).
3. Close control box (2).
4. Install two screws (1).
5. Install center front evaporator panel (para 4-22).
6. Install right front evaporator panel (para 4-25).

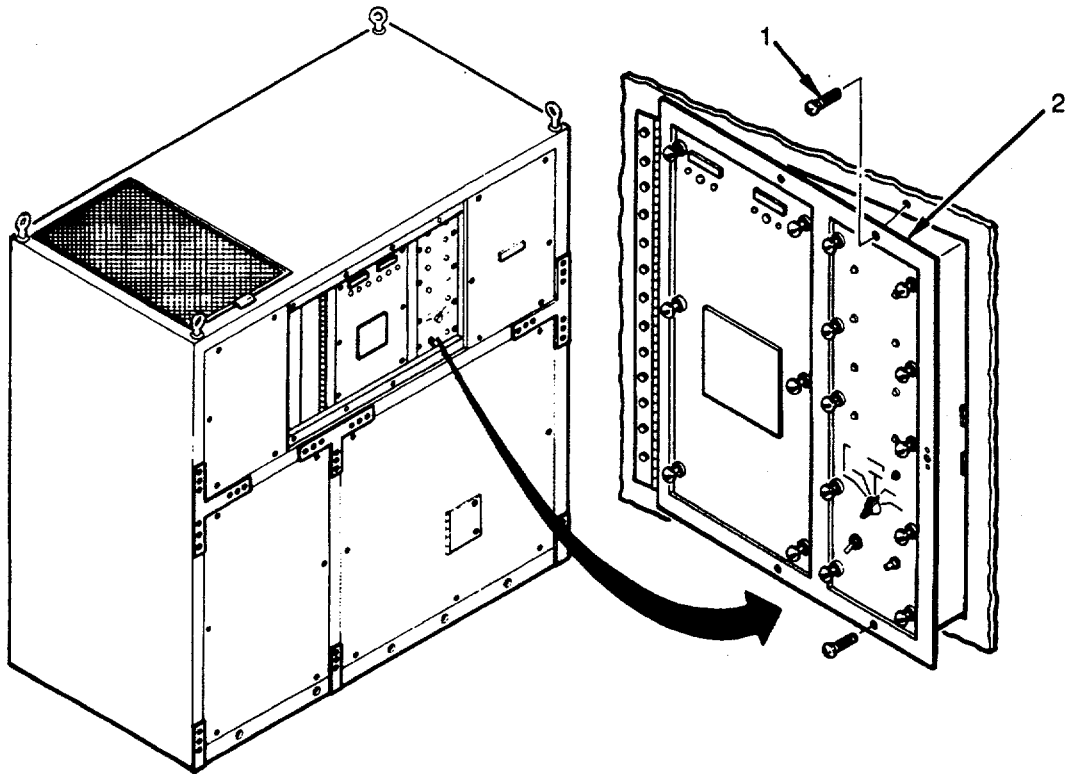


Figure 4-48. Control Box and Components

4-46. RECTIFIER (CR1).

This task consists of: Inspection / Testing Removal Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Materials:
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open left electric plate (para 4-30).
3. Open right electric plate (para 4-31).

INSPECTION / TESTING

1. Check that wire leads are properly connected to rectifier and are not damaged (see Figure 4-49 and Figure FO-3).
2. If rectifier is suspected bad, tag and remove rectifier leads.

NOTE
A diode bridge will sometimes act differently under a power test than resistance test.

3. Apply 28 volts ac across terminals 1 and 4 and use a dc voltmeter with negative probe on terminal 2 and positive probe on terminal 3 to test output voltage. The meter should read 24 ± 5 V dc. If output voltage is not within limits, replace rectifier.
4. Use multimeter to test for continuity between each of four rectifier terminals and mounting plate. If continuity is found between any rectifier terminal and mounting plate, replace rectifier.
5. Use multimeter to test forward and reverse resistance across rectifier bridge terminals 1 and 4, and 2 and 3. If resistance is less than 1000 ohms, replace rectifier.

REMOVAL

1. Tag and disconnect leads.
2. Remove screw (1), two flat washers (3), and nut (4).
3. Remove rectifier (2).

INSTALLATION

1. Fungus proof replacement rectifier per MIL-V-173.
2. Place rectifier (2) in mounting position.
3. Reconnect leads and remove tags.
4. Install screw (1), two flat washers (3), and nut (4).

4-46. RECTIFIER (CR1) - Continued.

FOLLOW ON PROCEDURE

1. Close right electric plate (para 4-31).
2. Close left electric plate (para 4-30).
3. Install center front evaporator panel (para 4-22).
4. Install right front evaporator panel (para 4-25).
5. Connect air conditioner input power at source.

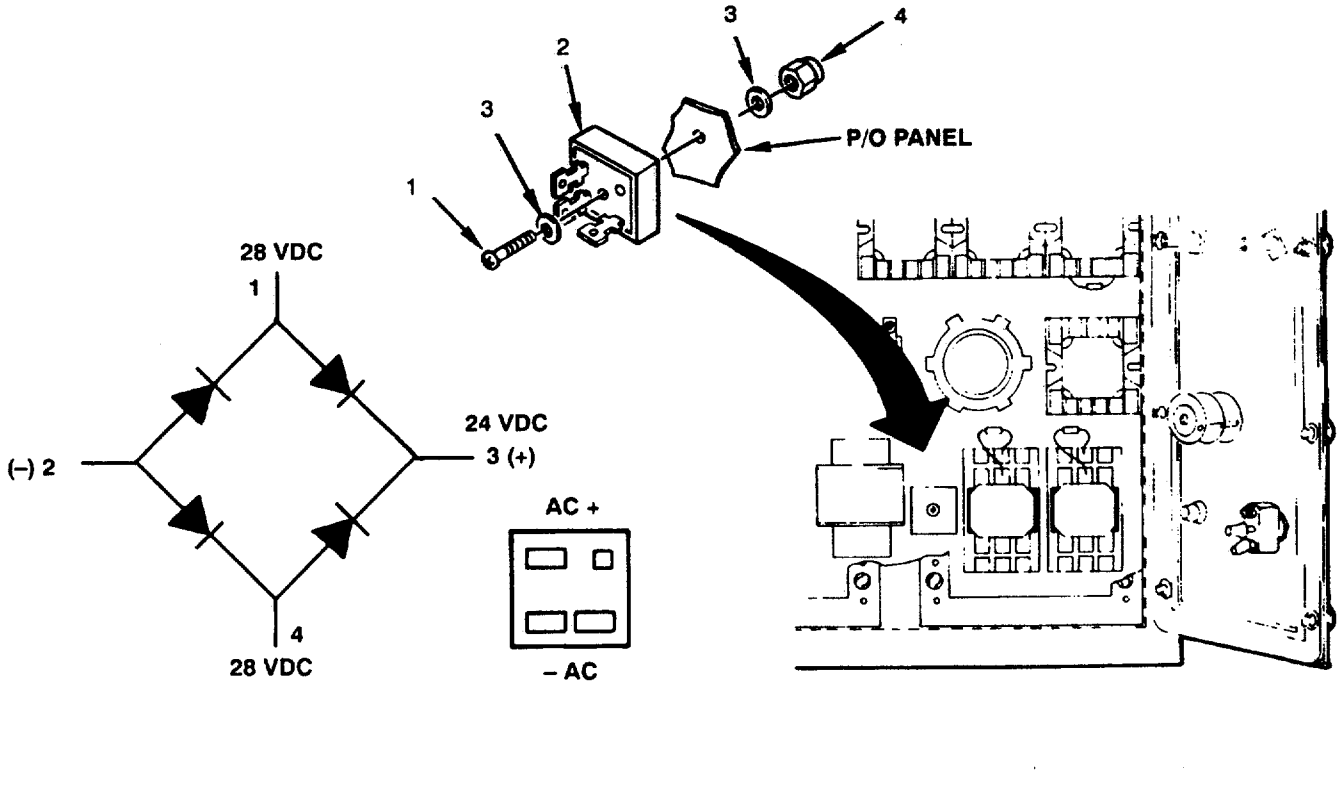


Figure 4-49. Rectifier (CR1)

4-47. SUPPRESSION DIODES (CR2-CR11)

This task consists of: **Inspection** **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Heat gun (Item 2, Appendix B)
Soldering iron (Item 16, Appendix B)
Goggles, industrial (Appendix C)
Personnel: 1
Materials:
Solder, lead-tin alloy (Item 18, Appendix E)
Flux, solder, liquid rosin base (Item 19, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open left electric plate (para 4-30):
3. Open right electric plate (para 4-31).

INSPECTION

1. Check diode for cracks, evidence of overheating, and other visible damage. Replace, if damaged (see Figure 4-50).
2. Check that diode is connected between terminals 3 and 10 for control relays K1- K5, and K20 (see Figure FO-3). 3. Check that diode is connected between terminals 2 and 10 for control relays K6, K7, K18, and K19 (see Figure FO-3).

TESTING

1. Use multimeter to check forward-and-back resistance of diode.
   - Back resistance should be 900 to 1100 ohms.
   - Forward resistance should be 0 to 5 ohms.
2. . Replace diode, if defective.

REMOVAL

1. Remove two screws (2) from relay.
2. Remove diode (1).

INSTALLATION

1. Assemble replacement diode with wire terminals and shrink tubing. Color band denotes cathode end.
2. Place diode (1) in mounting position.
3. Install two screws (2).

4-47. SUPPRESSION DIODES (CR2-CR11) - Continued

FOLLOW ON PROCEDURE

1. Close right electric plate (para 4-31).
2. Close left electric plate (para 4-30).
3. Install center front evaporator panel (para 4-22).
4. Install right front evaporator panel (para 4-25).
5. Connect air conditioner input power at source.

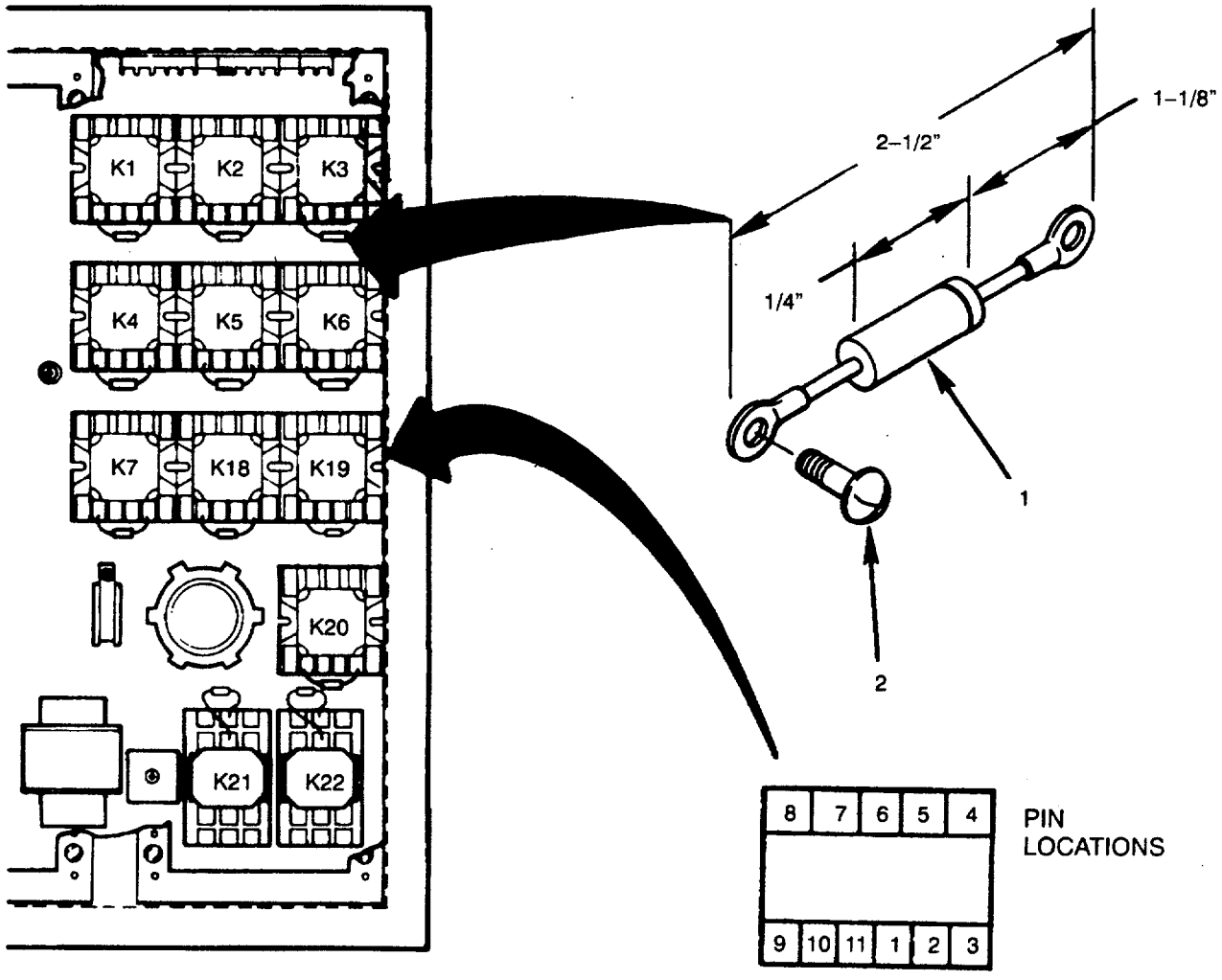


Figure 4-50. Suppression Diodes (CR2 - CR11)

4-48. INDICATOR LIGHTS (DSII-DS7, DS9).

This task consists of: Inspection Removal Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Crimping tool (pigtail) (Item 10, Appendix B)
Personnel :1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open left electric plate (para 4-30).
3. Open right electric plate (para 4-31).

INSPECTION

1. Check that light lenses are not cracked or broken. Replace light, if damaged (see Figure 4-51).
2. Check that leads are properly connected (see Figure FO-3). Repair all broken leads. If wiring harness is damaged, repair as necessary.

REMOVAL

1. Tag and disconnect leads.
2. Remove clip (1).
3. Remove light assembly (2) through front of panel.

INSTALLATION

1. Install light assembly (2) through front of panel.
2. Install clip (1).
3. Reconnect leads and remove tags.

FOLLOW ON PROCEDURE

1. Close left electric plate (para 4-30).
2. Close right electric plate (para 4-31).
3. Install right front evaporator panel (para 4-25).
4. Connect air conditioner unit power at source.

4-48. INDICATOR LIGHTS (DS1-DS7, DS9).- Continued

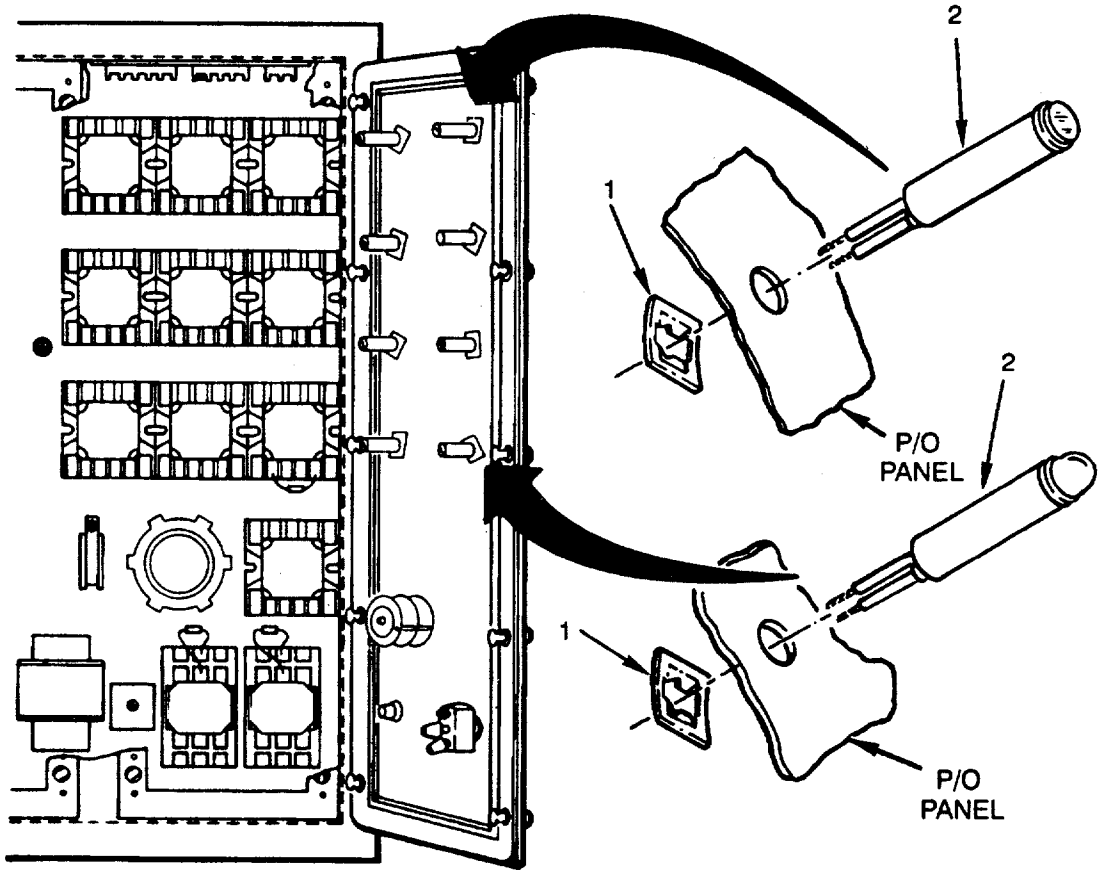


Figure 4-51. Indicator Lights (DS1-DS7, DS9)

4-49. CONTROL RELAYS (K1-K7, K18-K20).

This task consists of: **Removal** **Inspection** **Testing** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1
Materials:
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open left electric plate (para 4-30).
3. Open right electric plate (para 4-31).

REMOVAL
1. Slip wire retaining clip (1) off relay (2) (see Figure 4-52).
2. Pull relay (2) from 11-pin socket (3).

INSPECTION
1. Check for loose, corroded, missing or broken pins.
2. Check relay for cracks, signs of overheating and other visible damage. Replace relay, if damaged.

TESTING
Use multimeter to check continuity between following pins. If relay condition is not correct, replace relay.

PINS	CLOSED	OPEN
1-4	x	
5-6	x	
2-10	500 ± 50 ohms	
1-3		x
6-7		x
8-11	x	
9-11		x

INSTALLATION
1. Fungus proof replacement relay per MIL-V-173.
2. Plug relay (2) into 11-Pin socket (3).
3. Secure with wire retaining clip (1).

4-49. CONTROL RELAYS (K1-K7, K18-K20). - Continued

FOLLOW ON PROCEDURE

1. Close right electric plate (para 4-31).
2. Close left electric plate (para 4-30).
3. Install center front evaporator panel (para 4-22).
4. Install right front evaporator panel (para 4-25).
5. Connect air conditioner input power at source.

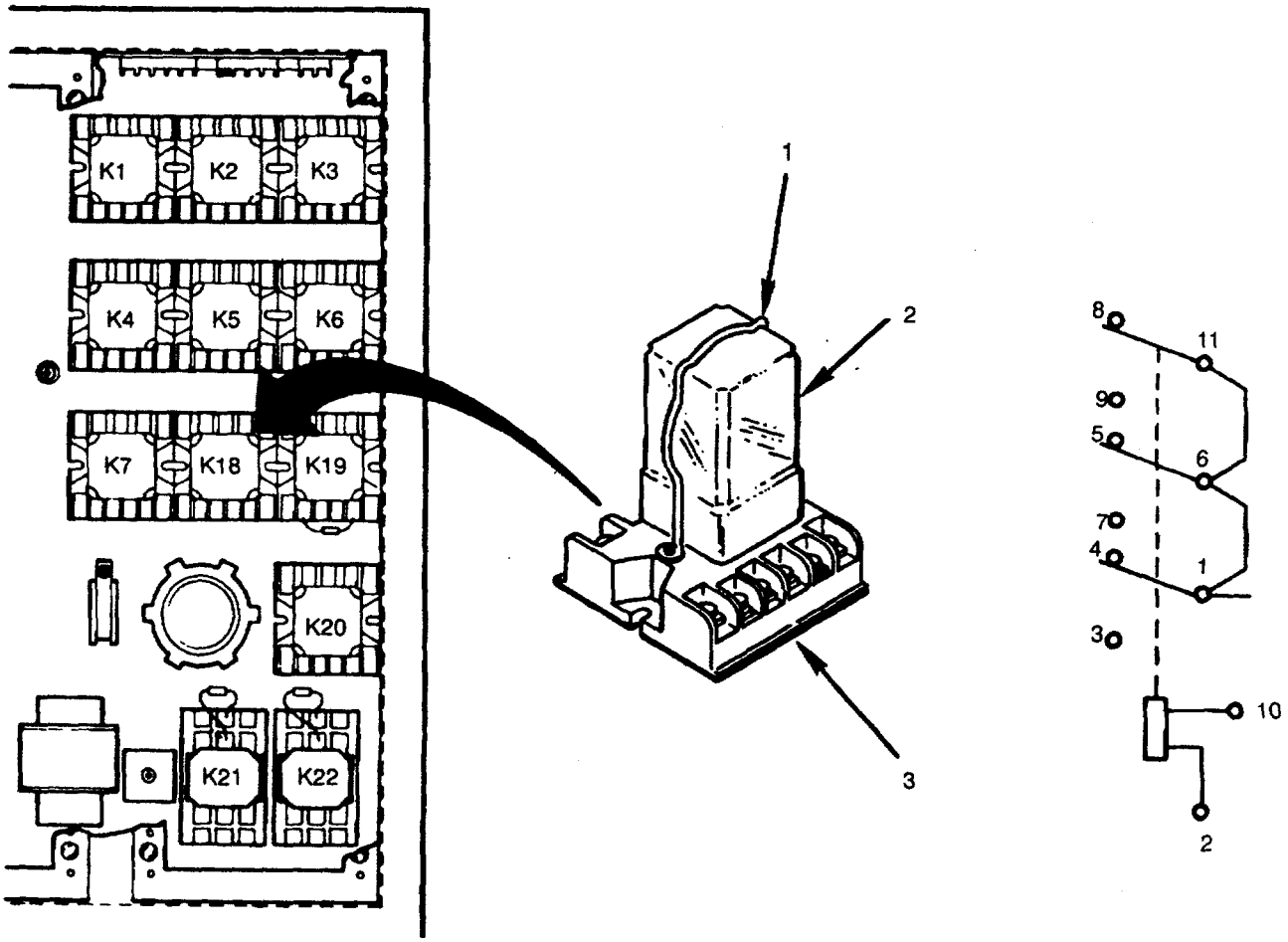


Figure 4-52. Control Relays (K1 - K7, K18 - K20)

4-50. RELAY SOCKETS.

This task consists of: Inspection Removal Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box, left and right electric plates (para 4-45).

INSPECTION/TEST

1. Pull relay from socket (para 4-49 or 4-54).
2. Check that relay socket and terminals are not cracked, broken, loose, or corroded (see Figure 4-53).
3. Use multimeter to measure resistance from each socket contact to its associated terminal (see Figure FO-3). Resistance should be 0.5 ohm or less. Replace socket, if defective.

REMOVAL

1. Remove relay from socket (para 4-49 or 4-54).
2. Tag and disconnect leads.
3. For K7, K18 or K19 socket removal, remove control box brace (para 4-63).
4. Remove suppression diode (para 4-47).
5. For K1-K7, K18-K20, remove two screws (1), locknuts (4), flat washers (5), clip (2), and socket (3).
6. Remove resistor (para 4-55).
7. For K21 or K22, remove two screws (6), clips (9), locknuts (8), and four flat washers (10) and socket (7).

INSTALLATION

1. Install K21 or K22 socket (7) with two screws (6), clips (9), four flat washers (10), and two locknuts (8).
2. Install resistor (para 4-55).
3. Install K1-K7, K18-K20 socket (3) with two screws (1), flat washers (5), clip (2), and two locknuts (4).
4. Install suppression diode (para 4-47).
5. Plug relay into socket (para 4-49 or 4-54).
6. If sockets K7, K18 or K19 were replaced, install control box brace (para 4-63) as required.
7. Reconnect leads and remove tags.

4-50. RELAY SOCKETS.- Continued

FOLLOW ON PROCEDURE

1. Close control box, left and right electric plates (para 4-45).
2. Install center front evaporator panel (para 4-22).
3. Install right front evaporator panel (para 4-25)
4. Connect air conditioner input power at source.

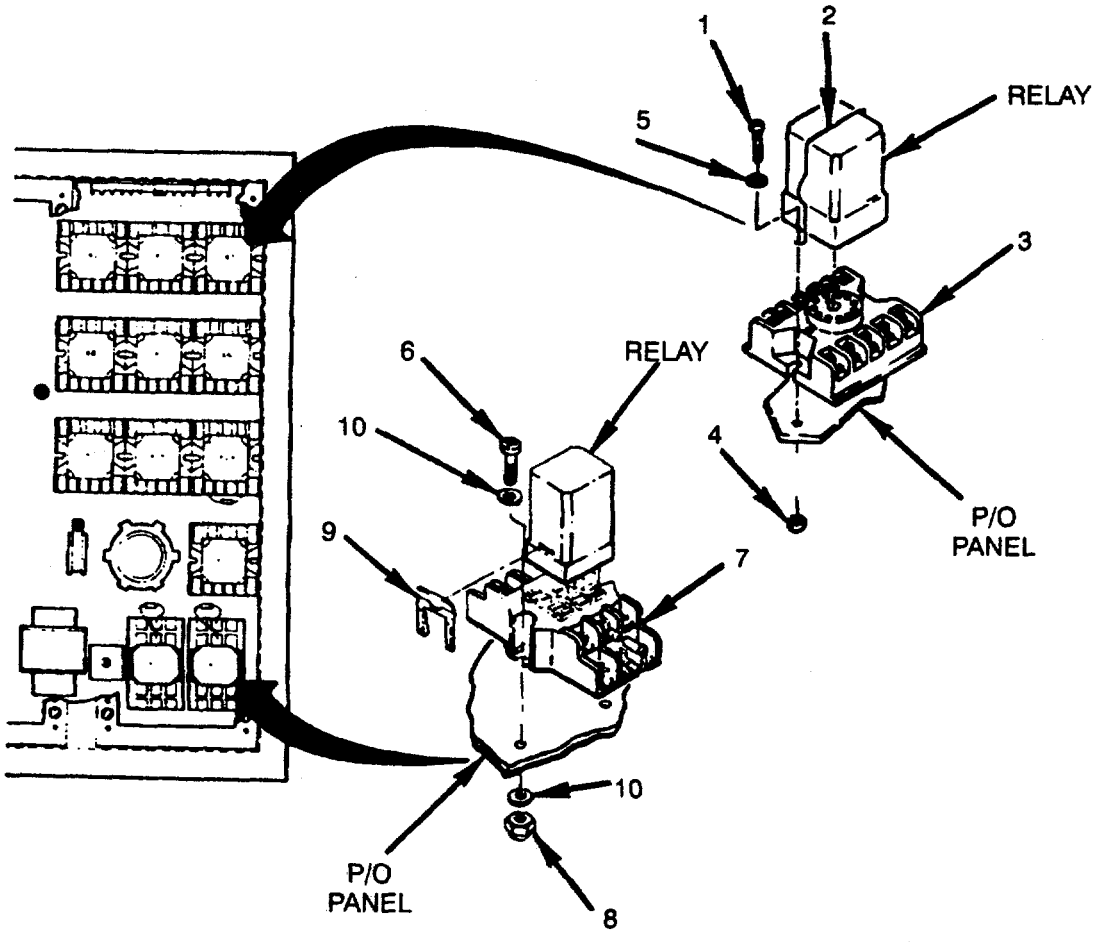


Figure 4-53. Relay Sockets (11-Pin)

4-51. FAN CONTACTORS (K8 AND K9).

This task consists of: Inspection Testing Removal Repair/ Replace Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Materials:
Varnish, moisture and fungus resistant (Item 16, Appendix)
Equipment Conditions:

WARNING

Disconnect Input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Open left electric plate (para 4-30).

INSPECTION

Inspect contactor for cracks, corrosion, loose electrical connections, and loose mounting hardware. Replace contactor if cracked, broken, or badly corroded (see Figure 4-54).

TESTING

1. Tag and disconnect wires from thermal overload.
2. Using multimeter, test for continuity across each individual overload element. If no continuity is indicated, replace element.
3. Using multimeter, check continuity between input terminal of thermal overload and contactor output terminal while pressing reset bar. If continuity is not indicated, replace contactor assembly.
4. Using multimeter, measure continuity across contactor coil with one wire disconnected from coil terminal. If meter does not read 60 - 10 ohms, replace contactor.
5. Reconnect coil wire and tag wires.

REMOVAL

1. Tag and disconnect leads.
2. Remove four screws (4), locknuts (6), eight flat washers (5).
3. Remove contactor assembly (3).

4-51. FAN CONTACTORS (K8 AND K9).- Continued

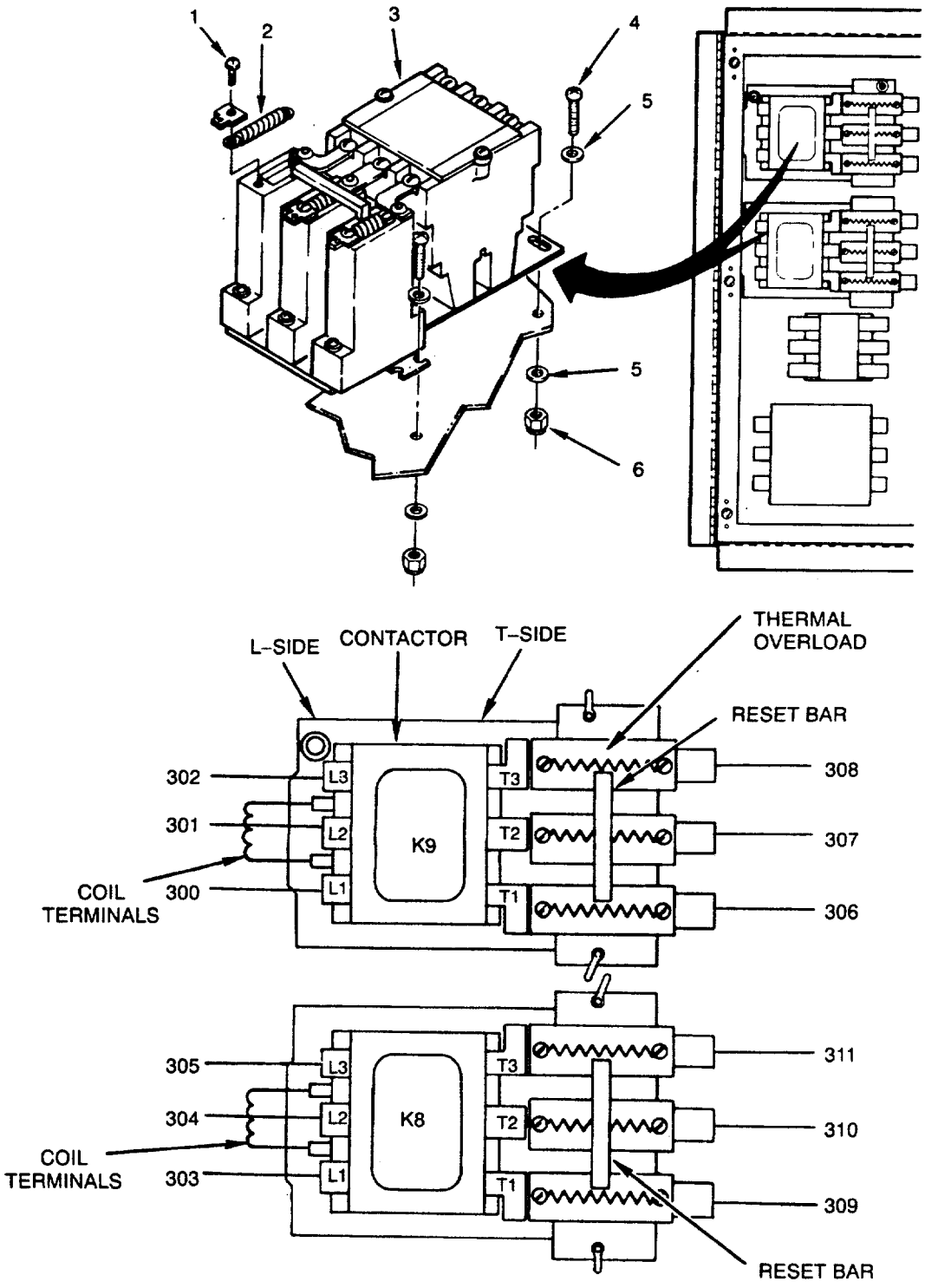


Figure 4-54 Fan Contactors (K8 and K9)

REPAIR/REPLACE

NOTE

Repair consists of replacing thermal overload or fan contactor.

1. Remove two screws (1).
2. Remove thermal overload (2).
3. Place thermal overload (2) in mounting position.
4. Install two screws (1).

INSTALLATION

1. Fungus proof replacement fan contactor per MIL-V-173.
2. Place fan contactor (3) in mounting position.
3. Install four screws (4), eight flat washers (5), and four locknuts (6).
4. Reconnect contactor assembly leads and remove tags.

FOLLOW ON PROCEDURE

1. Close left electric plate (para 4-30).
2. Install center front evaporator panel (para 4-22).
3. Install right front evaporator panel (para 4-25)
4. Connect air conditioner input power at source.

4-52. COMPRESSOR CONTRACTOR (K 10).

This task consists of: **Inspection** **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1
Materials:
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4 -22).
3. Open left electric plate (para 4-30).

INSPECTION
Inspect contactor for cracks, corrosion, loose electrical connections, and loose mounting hardware. Replace contactor if cracked, broken, or badly corroded (see Figure 4-55).

TESTING
Using multimeter, measure continuity across contactor coil with one wire disconnected from coil terminal. If meter does not read 60 ± 10 ohms, replace contactor.

REMOVAL
1. Tag and disconnect leads.
2. Remove three screws (1), locknut (4), and six flat washers (3).
3. Remove contactor and mounting plate (2).

INSTALLATION
1. Fungus proof replacement compressor contactor per MIL-V-173.
2. Place contactor and mounting plate (2) in mounting position.
3. Install three screws (1), locknuts (4), and six flat washers (3).
4. Reconnect leads and remove tags.

FOLLOW ON PROCEDURE
1. Close left electric plate (para 4-30).
2. Install center front evaporator panel (para 4-22).
3. Install right front evaporator panel (para 4-25).
4. Connect air conditioner input power at source.

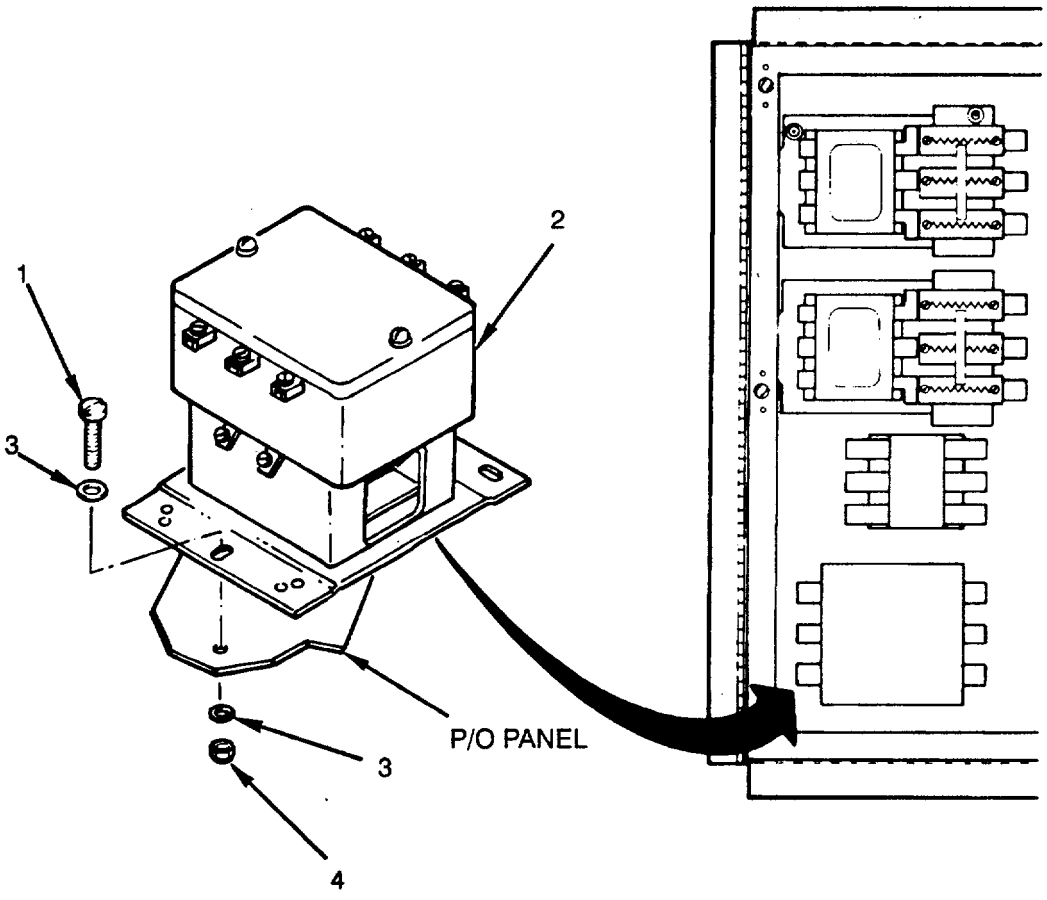


Figure 4-55. Compressor Contractor (K10)

4-53. HEATER CONTRACTOR (K11).

This task consists of: **Inspection** **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1
Materials:
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Open left electric-plate (para 4-30).

INSPECTION
Inspect contactor for cracks, corrosion, loose electrical connections, and loose mounting hardware. Replace contactor if cracked, broken, or badly corroded (see Figure 4-56).

TESTING
Using multimeter, measure continuity across contactor coil with one wire disconnected from coil terminal. If meter does not read 60 ± 10 ohms, replace contactor.

REMOVAL
1. Tag and disconnect leads.
2. Remove three screws (1), locknuts (3), and six flat washers (2).
3. Remove contactor and mounting plate (4).

INSTALLATION
1. Fungus proof replacement heater contactor per MIL-V-173.
2. Place contactor and mounting plate (4) in mounting position.
3. Install three screws (1), locknuts (3), and six flat washers (2).
4. Reconnect leads and remove tags.

FOLLOW ON PROCEDURE
1. Close right electric plate (para 4-31).
2. Close left electric plate (para 4-30).
3. Install center front evaporator panel (para 4-22).
4. Install right front evaporator panel (para 4-25).
5. Connect air conditioner input power at source.

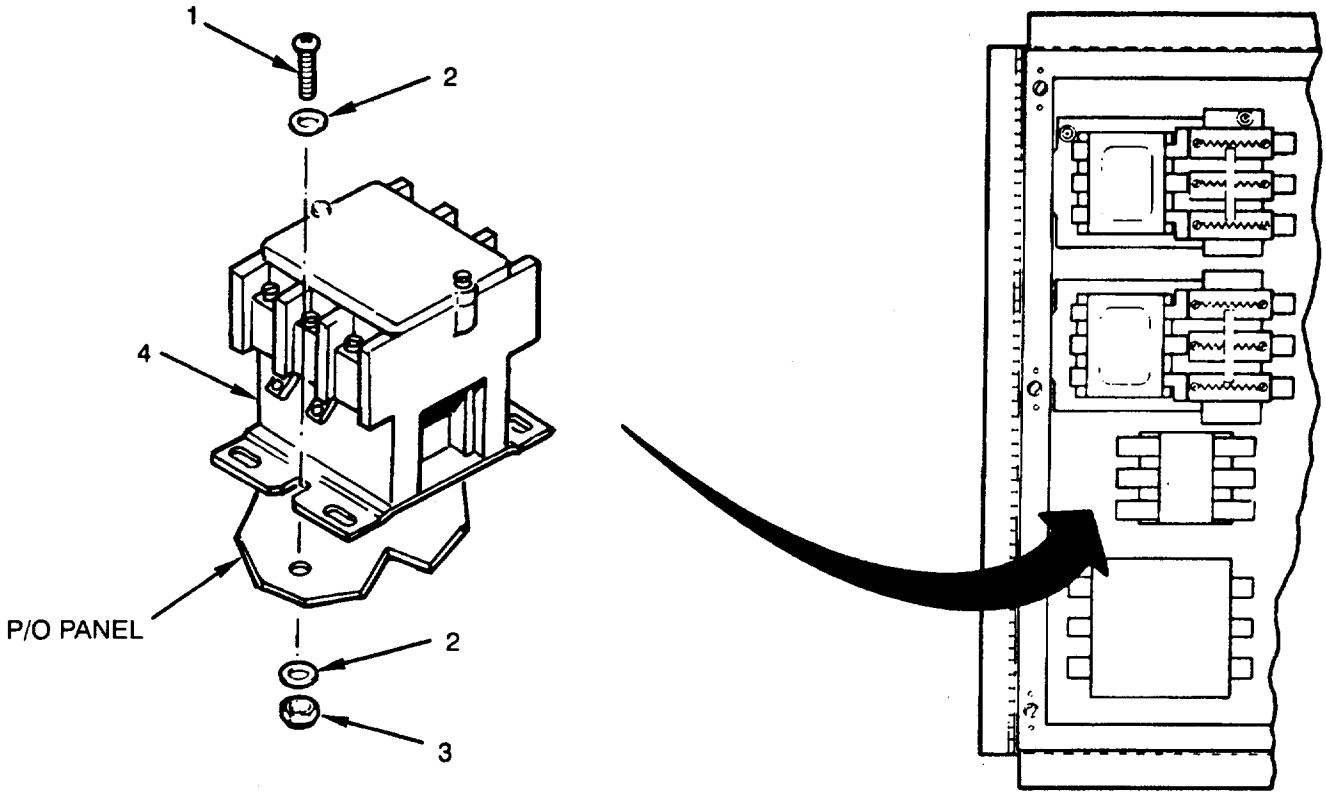


Figure 4-56. Heater Contactor (K11)).

4-54. TIME DELAY (10 AND 60 SEC) RELAYS (K21 AND K22).

This task covers:

Inspection **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Materials:

Varnish, moisture and fungus resistant (Item 16, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Open right electric plate (para 4-31).

INSPECTION

1. Check for loose wire connections (see Figure 4-57).
2. Check for cracks, signs of overheating, and other visible damage. Replace relay, if defective.

TESTING

1. Using multimeter, check continuity:
   Terminal A (+) to B (-): continuity

   1 to 4 : no continuity
   1 to 7 : continuity
   3 to 6 : no continuity
   3 to 9 : continuity

   If conditions are not shown above, replace relay.
2. Apply 24 volts dc across terminals A(+) and B(-) (prime power can be used).
3. Using multimeter, measure voltage drop between terminals 2 and 5. Voltage indicated should be 19 to 29 volts dc. After about 10 seconds (K21) or 60 seconds (K22), voltage should drop to less than two volts with external resistor installed.
4. Replace relay if it fails above tests.

REMOVAL

Pull relay (1) out of socket by spreading two holding brackets (2).

INSTALLATION

1. Fungus proof replacement time delay relay per MIL-V-173.
2. Plug relay (1) into socket.

FOLLOW ON PROCEDURE

1. Close right electric plate (para 4-31).
2. Install center front evaporator panel (para 4-22).
3. Connect air conditioner input power at source.

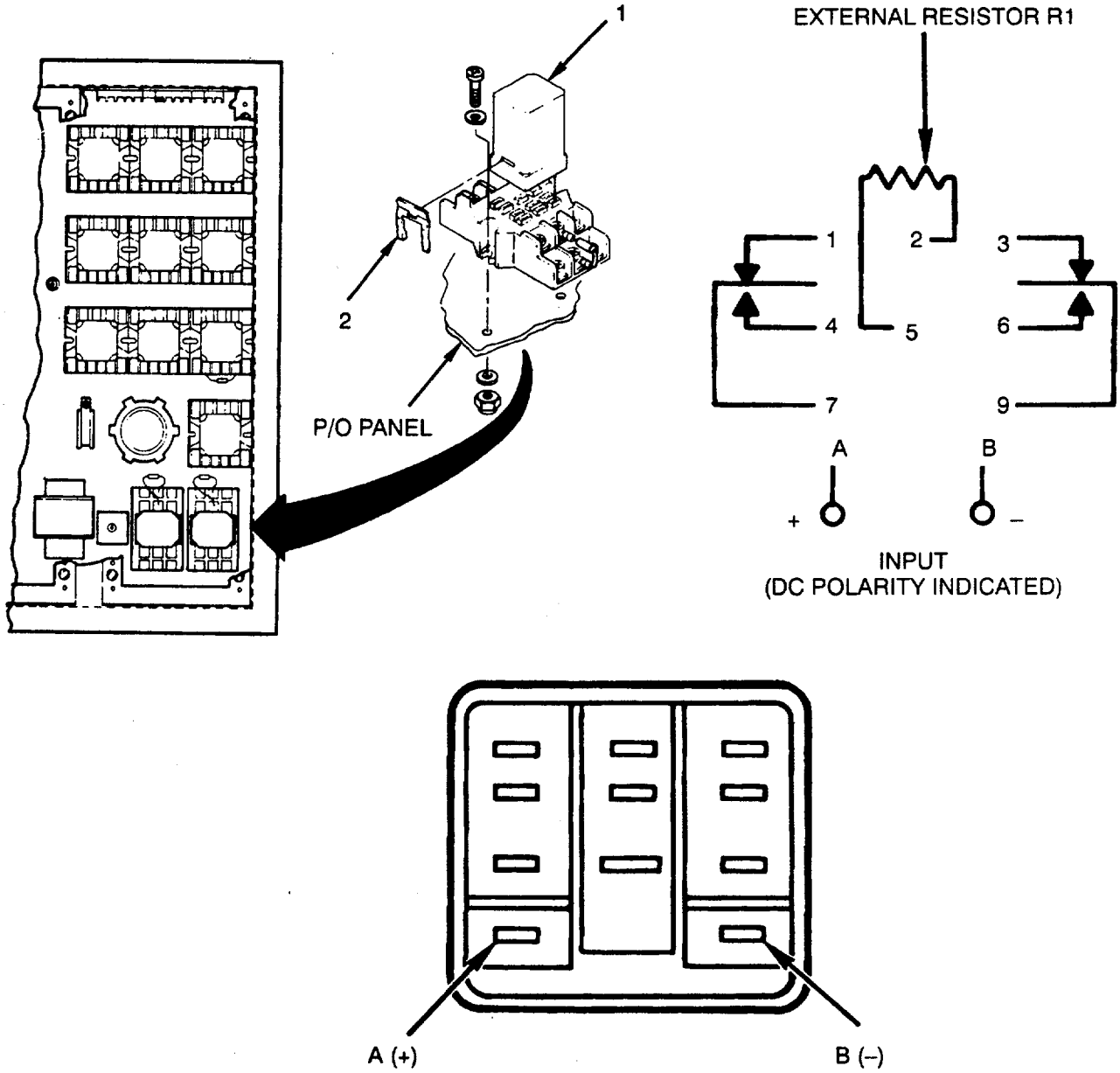


Figure 4-57. Time Delay (10 and 60 sec) Relays (K21 and K22).

4-55. RESISTORS (RI AND R2).

This task covers:

Inspection **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Crimping tool (Item 5, Appendix B)
Heat gun (Item 2, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Open right electric plate (para 4-31).

INSPECTION

1. Check for loose wire connections (see Figure 4-58).
2. Check for cracks, signs of overheating, and other visible damage. Replace resistor, if defective.

REMOVAL

1. Remove two screws (1).
2. Remove resistor (2).

TESTING

1. Using multimeter, measure resistance across R1 (terminals 2 and 5 of K21). If resistance is not 1.2 to 1.4 megohms, replace R1.
2. Using multimeter, measure resistance across R2 (terminals 2 and 5 of K22). If resistance is not 855,000 to 945,000 ohms, replace R2.

INSTALLATION

1. Install wire terminals and shrink tubing to replacement resistor.
2. Place resistor (2) in mounting position.
3. Install two screws (1).

FOLLOW ON PROCEDURE

1. Close right electric plate (para 4-31).
2. Install center front evaporator panel (para 4-22).
3. Connect air conditioner input power at source.

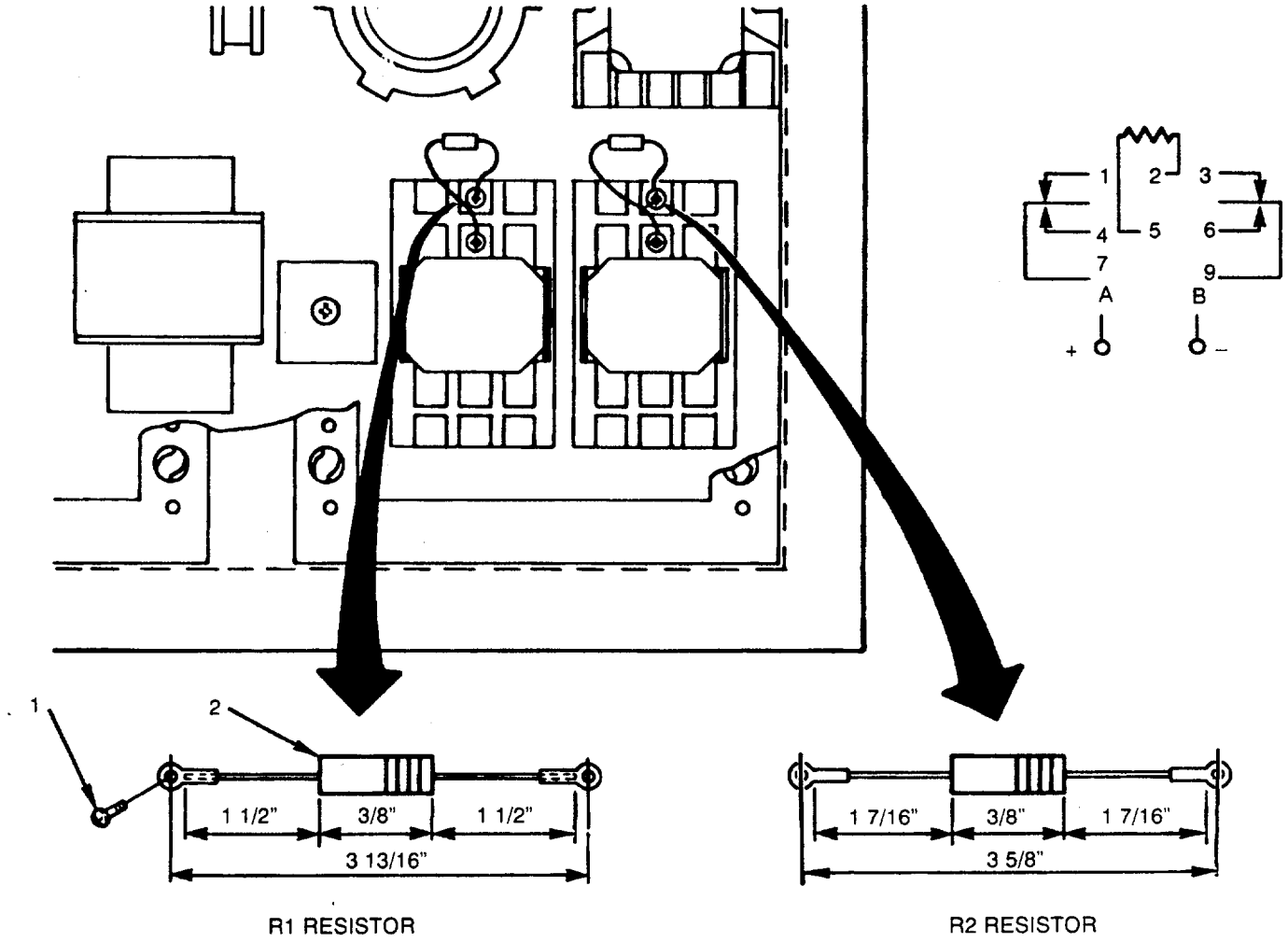


Figure 4-58. Resistors (R1 and R2)

4-56. MODE SELECT SWITCH (S1).

This task covers:
Inspection **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Heat gun (Item 2, Appendix B)
Soldering iron (Item 16, Appendix B)
Screw driver, flat tip (Item 11, Appendix B)
Goggles, industrial (Appendix C)

Personnel: 1

Materials:

Solder, lead-tin alloy (Item 18, Appendix E)
Flux, solder, liquid rosin base (Item 19, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open right electric plate (para 4-31).

INSPECTION

1. Using wiring diagram (see Figure FO-3) check for loose wires or solder connections, and that leads are properly connected (see Figure 4-59).
2. Check switch (1) for smoothness of operation. Replace switch, if defective.
3. Check switch (1) for signs of overheating or other visible damage. If wires are damaged, replace as necessary.

TESTING

NOTE

In this test, switch contacts are identified by the wire number attached to the contact. Each wire is labeled with a wire number. See Figure FO-3 as an aid during testing.

Set switch to each position in turn. Using multimeter, check continuity as listed in Table 4-4. If conditions are abnormal at any switch setting, replace switch.

REMOVAL

1. Unsolder, tag and disconnect leads.
2. Loosen set screw (4) and remove knob (5).
3. Remove nut (3) and star washer (2).
4. Remove switch (1).

Table 4-4. MODE SELECT SWITCH Test

Set SW to:	Check Continuity From	To	Read
OFF	Wire	104 -119	Open
	Wire	104-120	Open
	Wire	104-121	Open
	Wire	1002-1062	Open
	Wire	1002-1063	Open
AUTO	Wire	104 -119	Closed
	Wire	104-120	Closed
	Wire	104-121	Closed
	Wire	1002-1062	Open
	Wire	1002-1063	Open
COOL	Wire	104 -119	Closed
	Wire	104-120	Closed
	Wire	104-121	Closed
	Wire	1002-1062	Open
	Wire	1002-1063	Closed
HEAT	Wire	104 -119	Open
	Wire	104-120	Open
	Wire	104-121	Open
	Wire	1003-1062	Closed
	Wire	1002-1063	Open

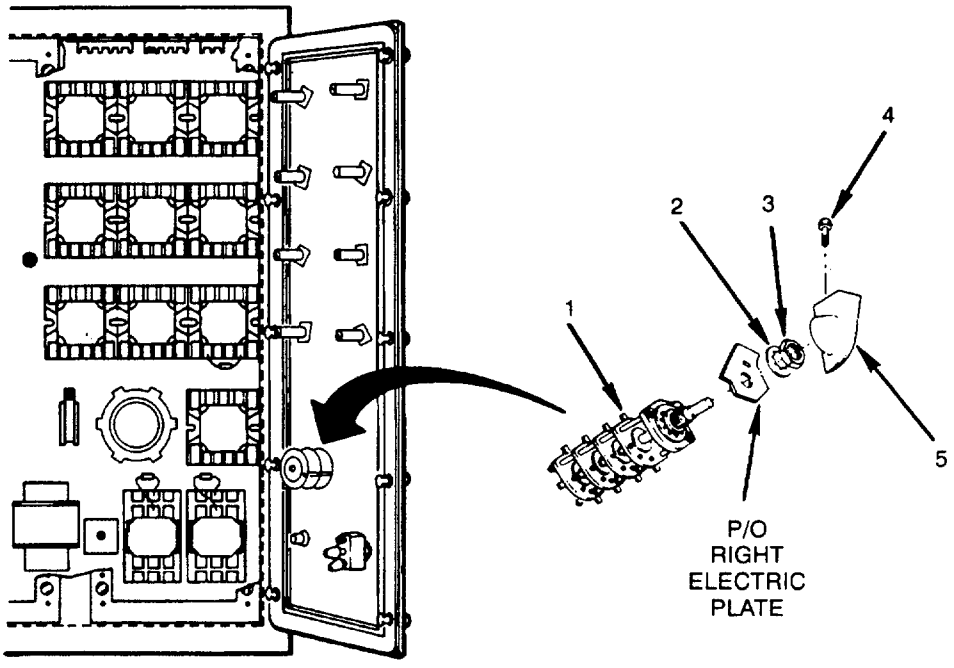


Figure 4-59. Mode Select Switch (S1)

4-56. MODE SELECT SWITCH (S1) - Continued.

INSTALLATION

1. Place switch (1) in mounting position.
2. Install star washer (2) and nut (3).
3. Solder leads as tagged and remove tags.
4. Install knob (5) and tighten set screw (4).

FOLLOW ON PROCEDURE

1. Close right electric plate (para 4-31).
2. Connect air conditioner input power at source.

4-57. KNOB (MODE SELECT SWITCH (S1)).

This task covers:
Inspection **Removal** **Installation**

INITIAL SETUP:

Tools:
Screw driver, flat tip, 1/8" WD (Item 11, Appendix B)
Personnel: 1

INSPECTION

Check knob for cracks, and other visible damage. Replace knob, if defective (see Figure 4-60).

REMOVAL

Loosen set screw (1) and remove knob (2).

INSTALLATION

Position knob (2) in place and tighten set screw (1).

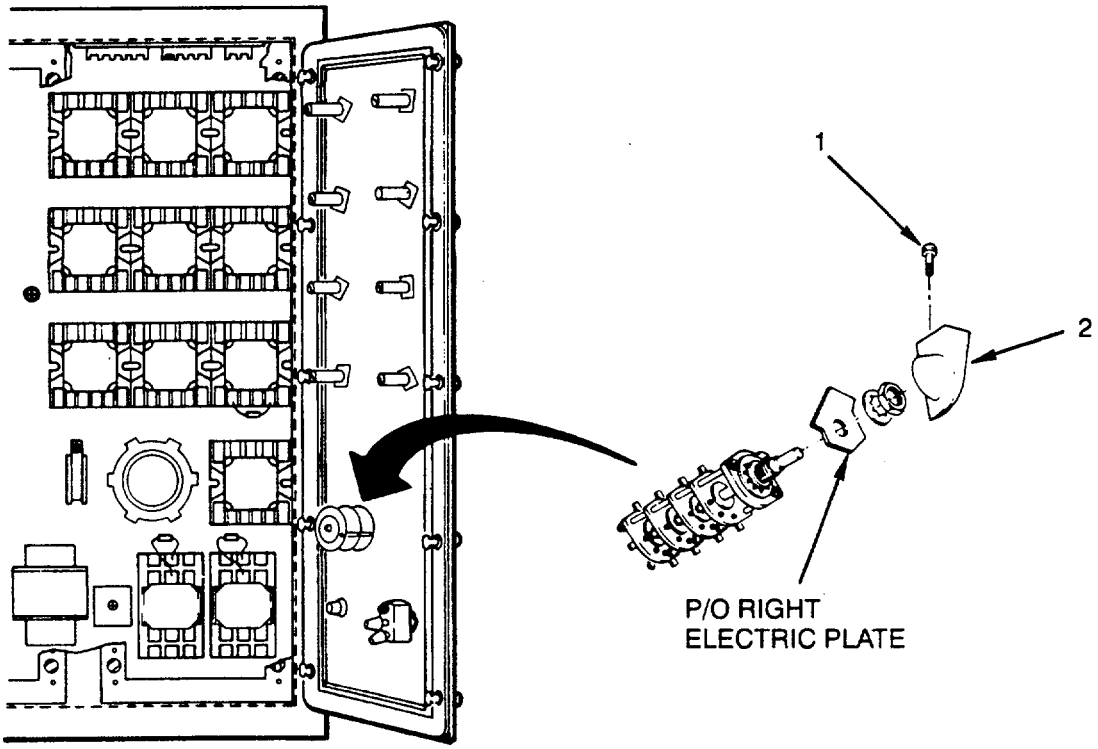


Figure 4-60. Knob (Mode Select Switch (S1))

4-58. SERVICE LIGHT SWITCH (S2).

This task covers:

Inspection **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect Input power to the air conditioner before performing any Internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open right electric plate (para 4-31).

INSPECTION

1. Check switch (1) to see that leads are properly connected (see Figure 4-61 and Figure FO-3).
2. Check that leads are not loose or broken. Tighten loose leads. Ifwiring is damaged, replace as necessary.
3. Check that switch terminals are not loose, broken, or corroded. Replace switch, if defective.
4. Check switch for signs of overheating or other visible damage. Replace switch, if defective.

TESTING

1. Tag and disconnect leads from switch.
2. Using multimeter, check continuity between two switch terminals and set switch to ON, then OFF.
   ON - Continuity.
   OFF - No continuity.
3. If switch fails test, replace switch.
4. If switch not being replaced, connect leadstagged in step 1.

REMOVAL

1. Tag and disconnect leads from switch.
2. Remove nut (3) and star washer (2).
3. Remove switch (1).

INSTALLATION

1. Place switch (1) in mounting position.
2. Install star washer (2) and nut (3).
3. Reconnect leads and remove tags.

FOLLOW ON PROCEDURES

1. Close right electric plate (para 4-31).
2. Connect air conditioner input power at source.

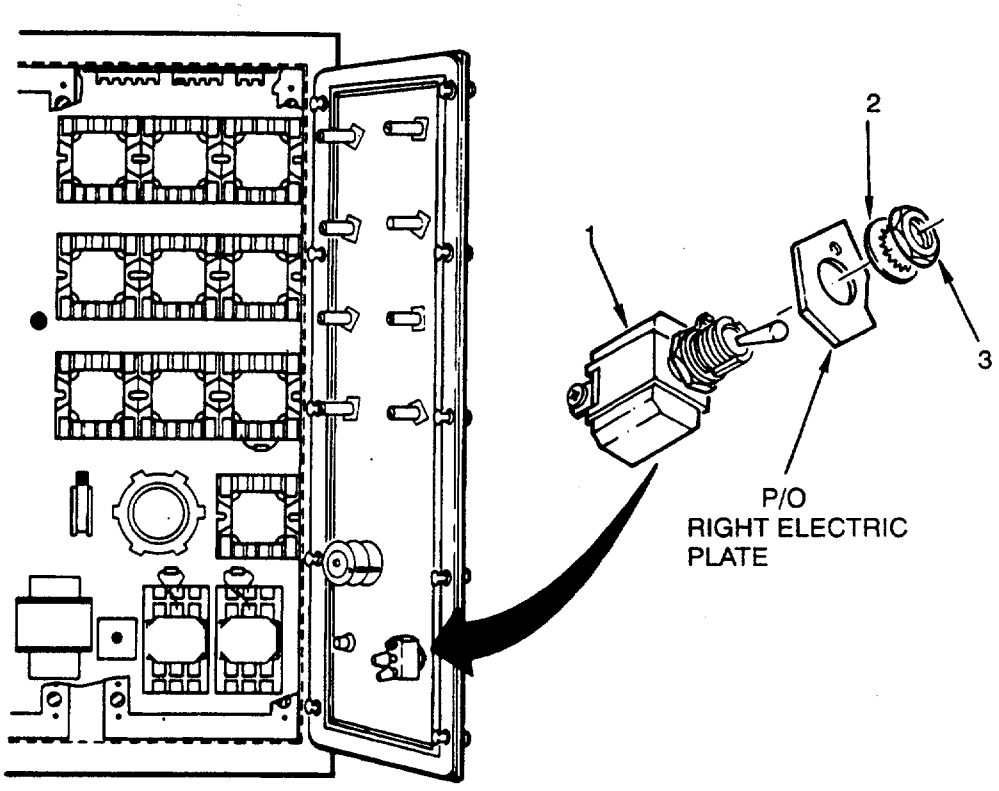


Figure 4-61. Service Light Switch (S2)

4-59. FAULT RESET SWITCH (S12).

This task covers:

Inspection Testing Repair/Replace Removal Installation

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Soldering Iron (Item 16, Appendix B)
Goggles, industrial (Appendix C)

Personnel: 1

Materials:

Solder, lead-tin alloy (Item 18, Appendix E)
Flux, soldering, liquid rosin base (Item 19, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnected unit power.

1. Disconnect air conditioner input power at source.
2. Open right electric plate (para 4-31).

INSPECTION

1. Check switch (4) to see that leads are properly connected (see Figure 4-62 and Figure FO-3).
2. Check that leads are not loose or broken. Tighten loose leads. If wiring is damaged, replace as necessary.
3. Check that switch (4) terminals are not loose, broken, or corroded. Replace switch, if defective.
4. Check switch (4) for signs of overheating or other visible damage. Replace switch, if defective.

TESTING

1. Using multimeter, check continuity between terminals and depress switch.
   OUT - Continuity.
   IN - No Continuity
2. If switch fails test, replace switch.

REPAIR/REPLACE

Repair consists of replacing splash proof seal or fault reset switch.

REMOVAL

1. Unsolder, tag and disconnect leads.
2. Remove splash proof seal (1), nut (2), and star washer (3).
3. Remove switch (4).

INSTALLATION

1. Place switch (4) in mounting position.
2. Install star washer (3), nut (2) and cap (1).
3. Solder leads as tagged and remove tags.

FOLLOW ON PROCEDURES

1. Close right electric plate (para 4-31).
2. Connect air conditioner input power at source.

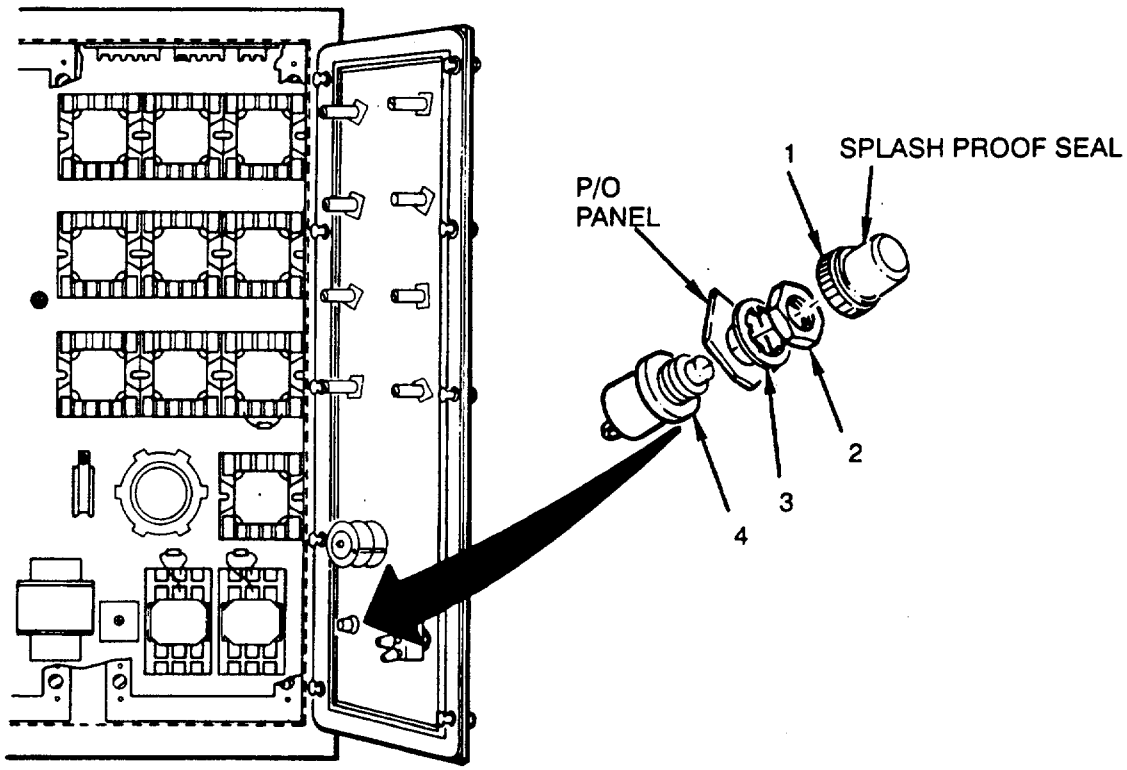


Figure 4-62. Fault Reset Switch (S12)

4-60. TRANSFORMER (T1).

This task covers:

Inspection **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Material:

Varnish, moisture and fungus resistant (Item 16, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Open left electric plate (para 4-30).

INSPECTION

1. Check for loose, corroded, missing or broken connections.
2. Check for damaged wires; repair as necessary.
3. Check transformer (1) for cracks, evidence of overheating, and other visible damage. Replace transformer, if defective.

TESTING

1. Using multimeter, check for continuity between black and white input leads. If open, replace transformer.
2. Using multimeter, check for continuity between R and C output terminals. If open, replace transformer.
3. Using multimeter set on high OHMS scale, measure resistance between black or white input leads and transformer case. If resistance is less than 500,000 ohm, replace transformer.
4. Using multimeter set on high OHMS scale, measure resistance between R or C output terminals and transformer case. If resistance is less than 500,000 ohms, replace transformer.
5. Using multimeter set on high OHMS scale, measure resistance between R or C output terminals and black or white input leads. If resistance is less than 500,000 ohms, replace transformer.

REMOVAL

1. Tag and disconnect leads (see Figure 4-63).
2. Remove four screws (2), locknuts (4), and eight flat washers (3).
3. Remove transformer (1).

INSTALLATION

1. Fungus proof replacement transformer per MIL-V-173.
2. Place transformer (1) in mounting position.
3. Install four screws (2), eight flat washers (3), and four locknuts (4).
4. Reconnect leads and remove tags.

FOLLOW ON PROCTDURES

1. Close left electric plate (para 4-30).
2. Install center front evaporator panel (para 4-22).
3. Connect air conditioner input power at source.

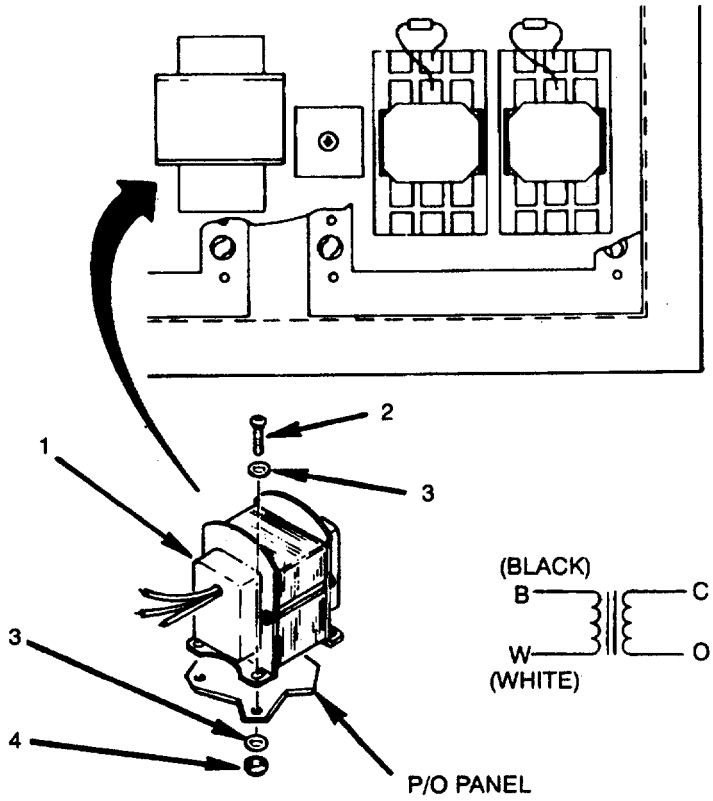


Figure 4-63. Transformer (T1)

4-61 TERMINAL BOARDS (TB1-TB3).

This task covers:
Inspection Removal Installation

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions-

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used, can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Open left electric plate (para 4-30).
4. Open right electric plate (para 4-31).

INSPECTION

1. Check terminal boards for loose or corroded terminals, cracks and obvious damage. Replace terminal board, if cracked or broken (see Figure 4-64).
2. Check that wire leads are secure and properly located (see Figure FO-3).

REMOVAL

1. Tag and disconnect leads.
2. Remove four screws (2), locknuts (1), and flat washers (4).
3. Remove terminal boards (3).

INSTALLATION

1. Place replacement terminal boards (3) in mounting position.
2. Install four screws (2), flat washers (4), and locknuts (1).
3. Reconnect leads and remove tags.

FOLLOW ON PROCEDURES

1. Close left electric plate (para 4-30).
2. Close right electric plate (para 4-31).
3. Install center front evaporator panel (para 4-22).
4. Connect air conditioner input power at source.

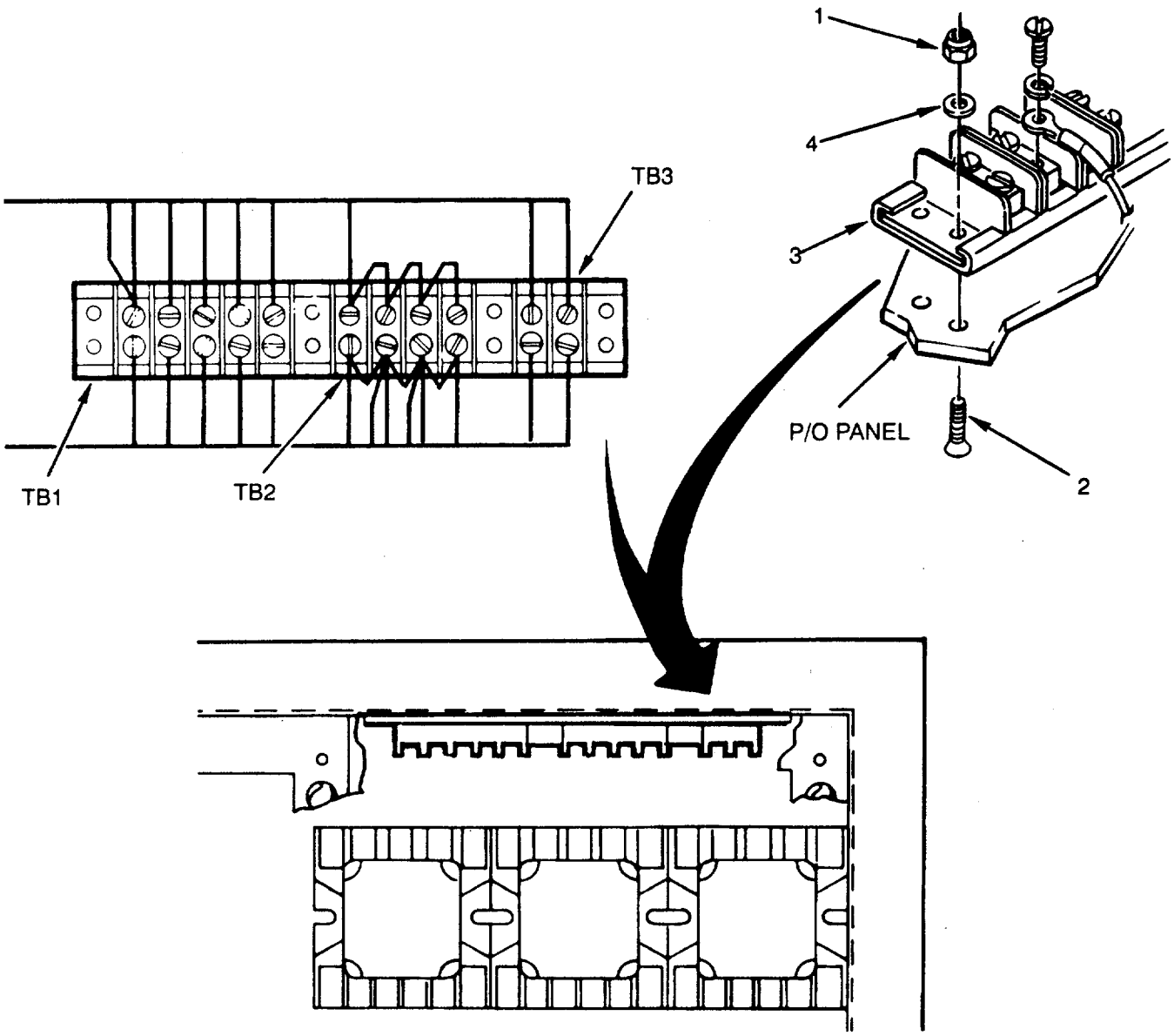


Figure 4-64. Terminal Boards (TB1-TB3).

4-62. CIRCUIT BREAKERS (CB1 AND CB2).

This task covers:

Inspection **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Open left electric plate (para 4-30).

INSPECTION

1. Check that mounting hardware and circuit breakers (3) are in place and secure (see Figure 4-65).
2. Check that wire leads are properly connected to circuit breakers (3) and are not damaged (see Figure FO-3).
3. Check circuit breakers (3) for signs of overheating or other visible damage.

TESTING

Using multimeter, check continuity between circuit breaker (3) terminals. Contacts should be closed. If there is no continuity, replace circuit breaker.

REMOVAL

1. Tag and disconnect leads.
2. Remove two screws (1), locknuts (2), and four flat washers (4).
3. Remove circuit breaker (3).

INSTALLATION

1. Place replacement circuit breaker (3) in mounting position.
2. Install two screws (1), four flat washers (4) and two locknuts (2).
3. Reconnect leads and remove tags.

FOLLOW ON PROCEDURES

1. Close left electric plate (para 4-30).
2. Install center front evaporator panel (para 4-22).
3. Connect air conditioner input power at source.

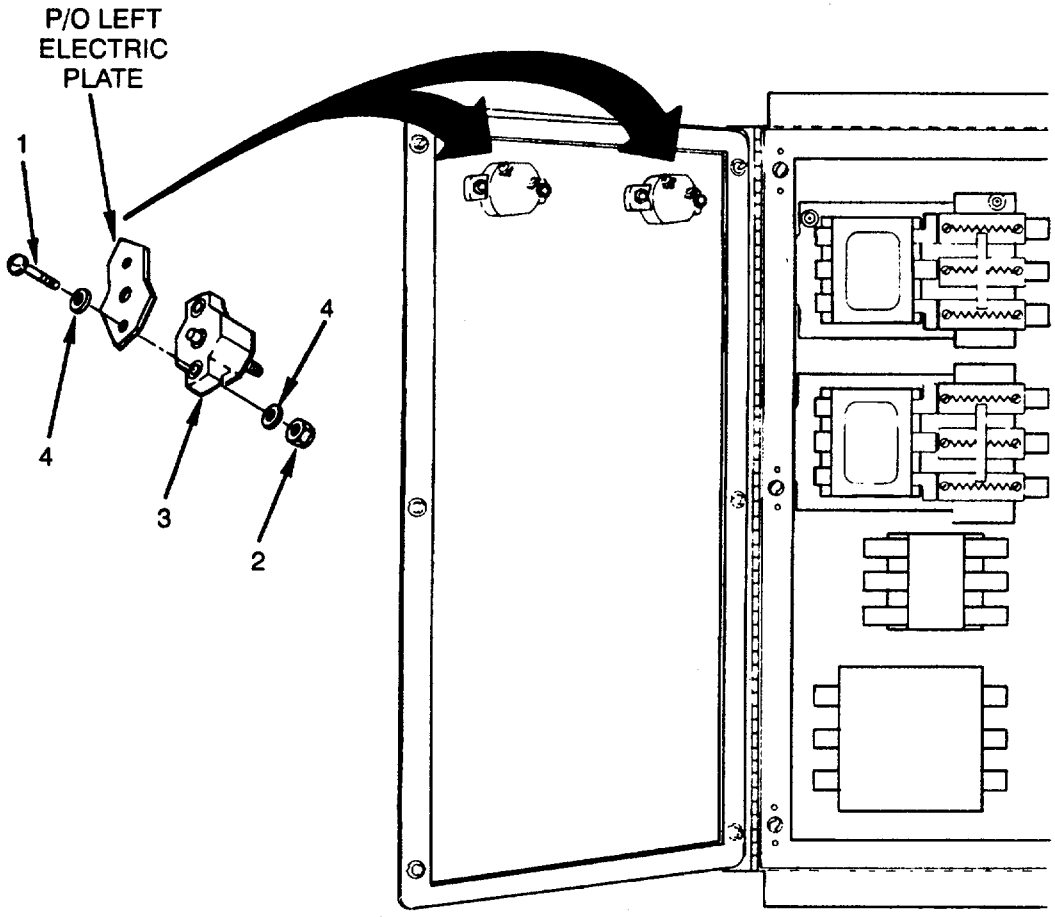


Figure 4-65. Circuit Breakers (CB1-CB3).

4-63. CONTROL BOX.

This task covers:

Inspection **Testing** **Removal** **Repair/Replace** **Installation**

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Drill, electric, portable (Item 6, Appendix B)
Drill set, twist (Item 7, Appendix B)
Riveter, blind (Item 8, Appendix B)
Soldering Iron (Item 16, Appendix B)
Goggles, industrial (Appendix C)

Personnel: 1

Materials:

Solder, lead-tin alloy (Item 18, Appendix E)
Flux, soldering, liquid rosin base (Item 19, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing, any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Open left electric plate (para 4-30).
4. Open right electric plate (para 4-31).
5. Open control box (para 4-45).

INSPECTION

1. Check control box (13) for dents, cracks, punctures, or missing mounting hardware. Replace if damage creates a hazard or interferes with operation (see Figure 4-66).
2. Check that hinge (4), receptacles (10), bushing (14) and locking ring (7) are in place and secure. Repair or replace as needed.

REMOVAL

1. Remove four screws (1), flat washers (2) and locknuts (3).
2. Remove bolt (20), locknut (18) and two flat washers (19).
3. Set control box (13) in evaporator compartment.

REPAIR/REPLACE

NOTE

Repair consists of replacing hinge, receptacle ,bushing and locking ring, brace, or control box.

1. Hinge.

   a. Remove 10 rivets (15) from control box (13).
   b. Remove 13 rivets (17) from frame bracket (16).
   c. Position replacement hinge (4) in mounting position on control box (13).
   d. Install 10 rivets (15) to hinge (4).
   e. Install 13 rivets (17) to frame bracket (16).

2. Receptacle.

   a. Remove two rivets (12) and receptacle (10).
   b. Install replacement receptacle (10) with two rivets (12).

3. Bushing and Locking Ring.

   a. Tag and disconnect wiring harness wires (see Figure FO-3).
   b. Remove locking ring (7).
   c. Remove bushing (14).
   d. Install replacement bushing (14) in mounting position.
   e. Install replacement locking ring (7).
   f. Connect wiring harness wires tagged in step 1.

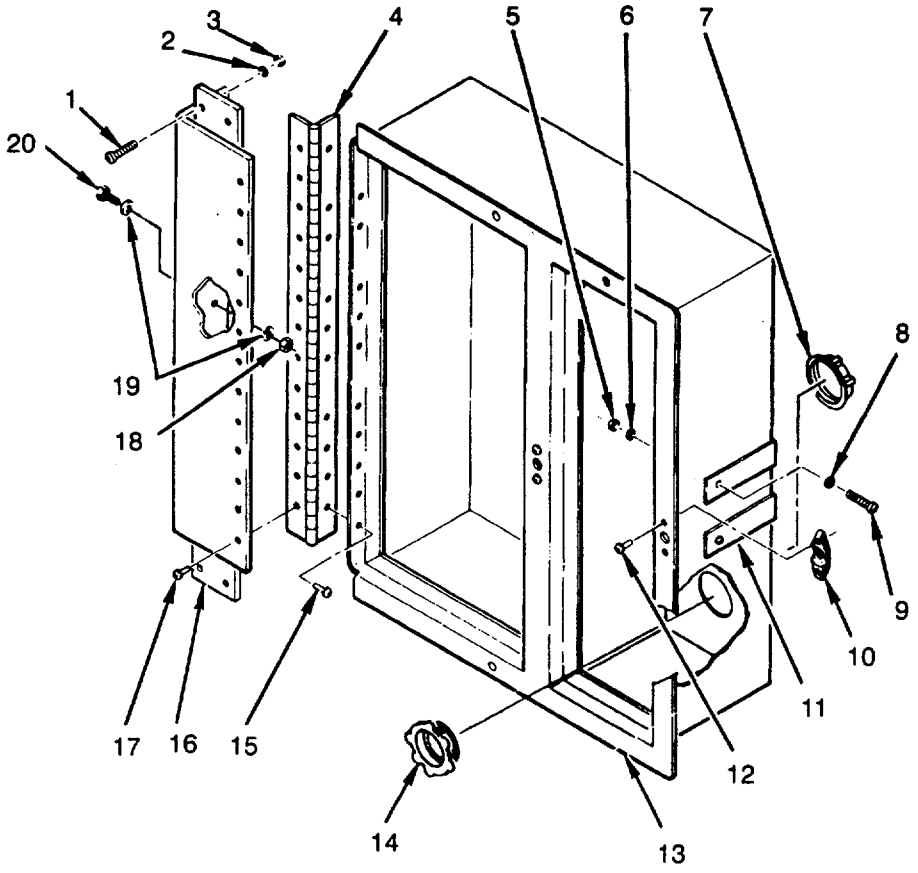


Figure 4-66. Control Box

4-63. CONTROL BOX - Continued.

REPAIR/REPLACE - Continued.

4. Brace.

   a. Remove six screws (9), locknuts (4), and twelve flat washers (5) and (8).
   b. Remove control box brace (11).
   c. Place replacement brace (11) in mounting position.
   d. Install six screws (9), twelve flat washers (5) and (8), and six locknuts (4).

5. Control Box.

   a. Tag and disconnect wiring harness wires (see Figure FO-3).
   b. Remove 10 rivets (15) securing hinge (4) to control box (13).
   c. Remove control box (13).
   d. Remove control box components listed in paragraph 4-45.
   e. Install replacement control box components listed in paragraph 4-45.
   f Install replacement control box (13) to hinge (4) with 10 rivets (15).
   g. Install left and right electric plates (para 4-30 and 4-31).
   h. Connect wiring harness wires tagged in step a (see Figure FO-3).

INSTALLATION

1. Position control box (13) in mounting position.
2. Install four screws (1), flat washers (2), and locknuts (3).
3. Install bolt (20), two flat washers (19), and locknut (18).
4. Close control box (para 4-45).
5. Close left electric plate (para 4-30).
6. Close right electric plate (para 4-31).

FOLLOW ON ,PROCEDURES

1. Install center front evaporator panel (para 4-22).
2. Connect air conditioner input power at source.

4-64. TERMINAL BOARD (TB4).

This task covers:
Inspection **Removal** **Installation**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove center front evaporator panel (para 4-22).
3. Remove left front evaporator panel (para 4-23).
4. Remove control wire J-box cover (para 4-33).

INSPECTION

1. Check terminal board (4) for loose or corroded terminals, cracks and obvious damage. Replace terminal board, if defective (see Figure 4-67).
2. Check that wire leads are secure and properly located (see Figure FO-3).

REMOVAL

1. Tag and disconnect leads.
2. Remove four screws (3), flat washers (1), and lockwashers (2).
3. Remove terminal board (4).

INSTALLATION

1. Position terminal board (4) in mounting position.
2. Install four screws (3), lockwashers (2), and flat washers (1).
3. Reconnect leads and remove tags.

4-64. TERMINAL BOARD (TB4) - Continued.

FOLLOW ON PROCEDURES

1. Install Control wire J-box cover (para 4-33).
2. Install left front evaporator panel (para 4-23).
3. Install center front evaporator panel (para 4-22).
4. Connect air conditioner input power at source.

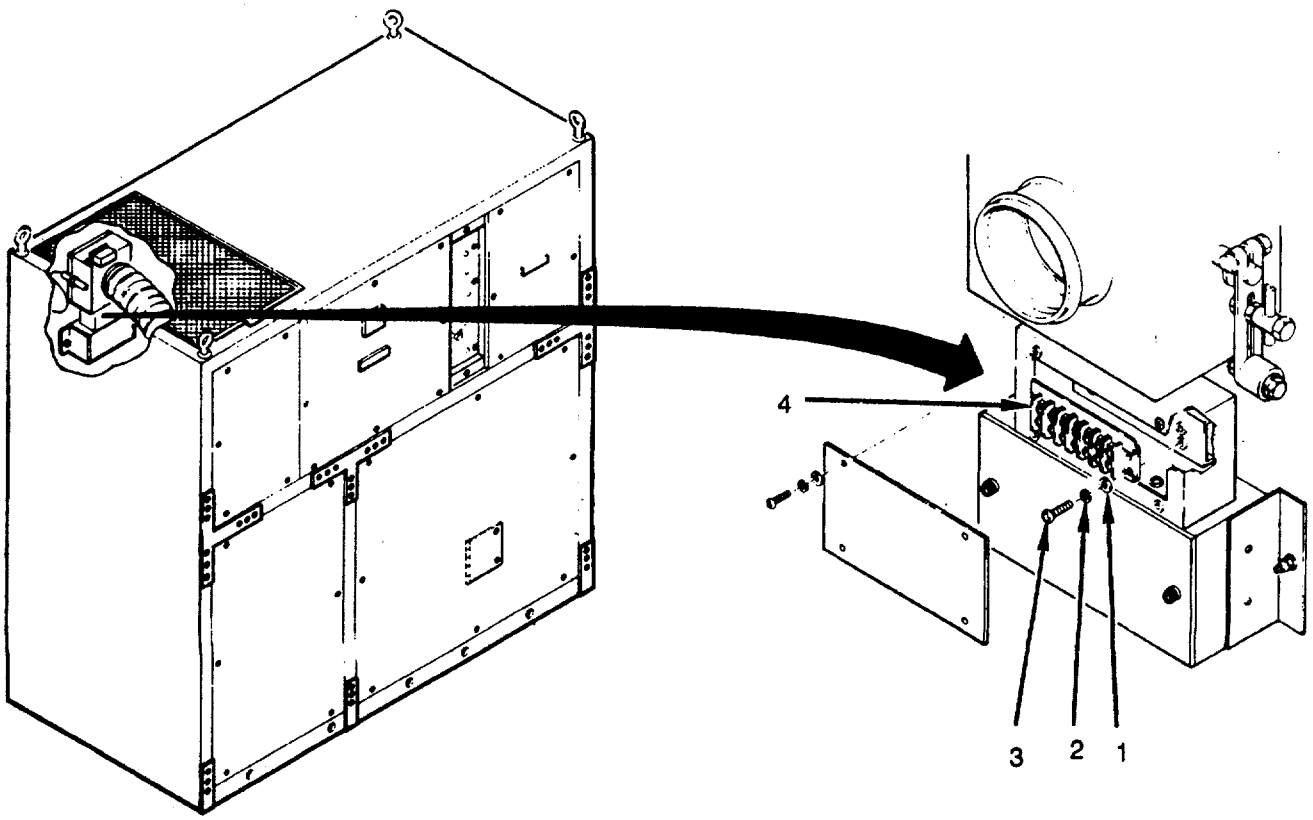


Figure 4-67. Terminal Board (TB4)

4-65. SERVICE LIGHT (DS8).

This task covers:
Inspection Testing Removal Repair/Replace Installation

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input Power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).
3. Remove circulating air out RFI filter access cover (para 4-41).

INSPECTION

1. Check lamp guard (8) for bent or broken prongs (see Figure 4-68).
2. Check for missing or loose mounting hardware.
3. Check light bulb (9) for signs of burnout, cracks, or breaks. Replace light bulb, if defective.

TESTING

NOTE

Power must be applied for testing.

1. If service light switch (S2) fails to turn service bulb (9) on, unscrew service bulb (9) from lamp holder (5).
2. Using multimeter, check that service bulb (9) filaments are not burned out. Replace service bulb, if defective.

REMOVAL

1. Unscrew bulb (9).
2. Loosen two screws and remove lamp guard (8).
3. Remove two screws (7), flat washers (6), and lamp holder (5).
4. Tag and disconnect leads.

NOTE

When mounting hardware for box is removed, the mounting bracket for sensing bulb will come loose also.

5. Remove two screws (1), locknuts (3), four flat washers (4), and box (2).

REPAIR/REPLACE

Repair consists of replacing service bulb (9), lamp guard (8), lamp holder (5), insulator bushing or service light.

4-65. SERVICE LIGHT (DS8) - Continued.

INSTALLATION

1. Install box (2) with two screws (1), four flat washers (4), and two locknuts (3).
2. Reconnect leads and remove tags.
3. Install lamp holder (5) with two screws (7) and flat washers (6).
4. Install lamp guard (8) and tighten two screws.
5. Install bulb (9).

FOLLOW ON PROCEDURES

1. Install circulating air out RFI filter access cover (para 4-41).
2. Install right front condenser panel (para 4-28).
3. Connect air conditioner input power at source.

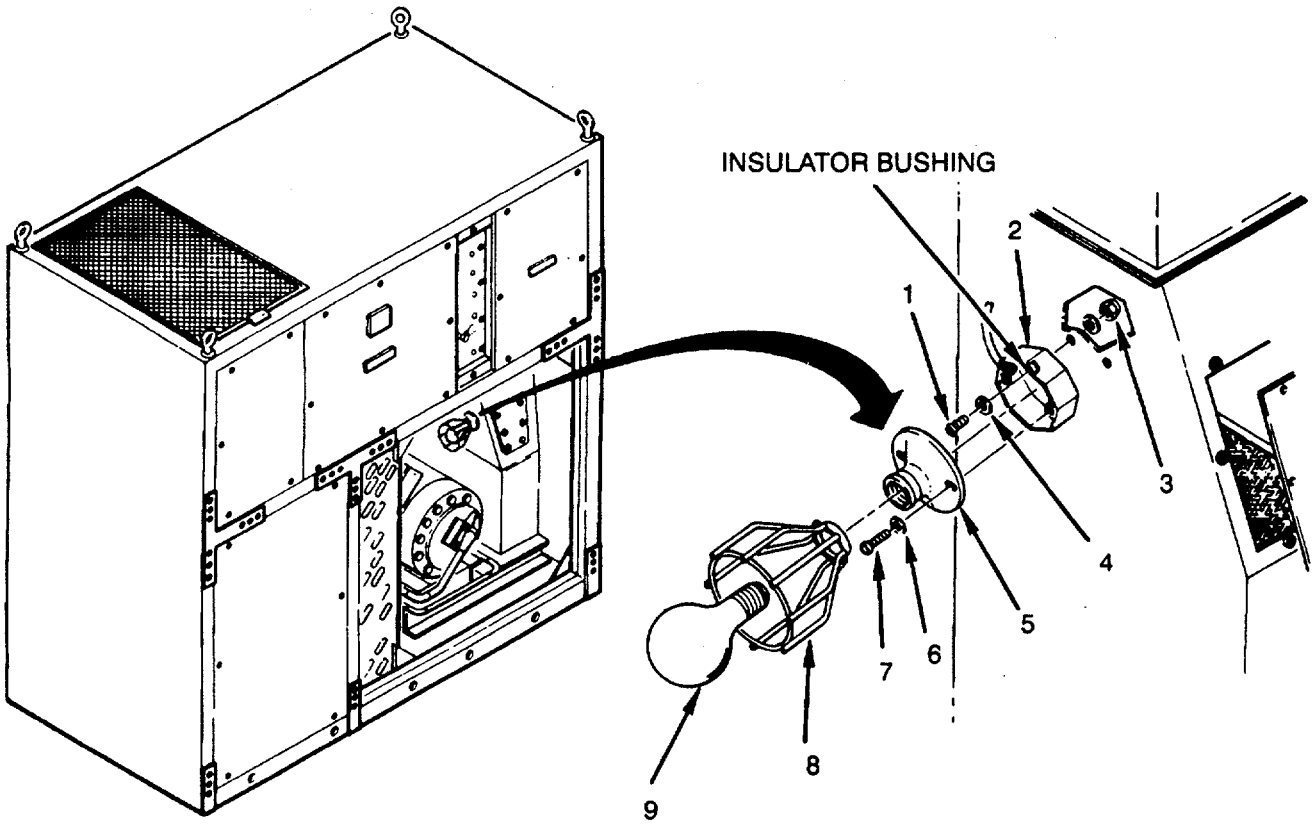


Figure 4-68. Service Light (DS8)

4-66. FRESH AIR DAMPER SOLENOID (L3).

This task covers:
Inspection **Testing** **Removal** **Installation**

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Material:

Varnish, moisture and fungus resistant (Item 16, Appendix B)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open left front evaporator panel (para 4-23).

INSPECTION

1. Check for loose, corroded, missing or broken connections (see Figure 4-69).
2. Check for damaged wires; repair as necessary.
3. Check solenoid (4) for cracks, evidence of overheating, and other visible damage. Replace solenoid, if defective.

TESTING

1. Using wiring diagram (see Figure FO-3), check 120 V ac input power.
2. Using wiring diagram (see Figure FO-3), check for 120 V ac output power. Replace solenoid, If defective.

REMOVAL

1. Tag and disconnect leads.
2. Remove screw (6), locknut (9), two flat washers (5), spacers (7), and control rod (8).
3. Remove four screws (1), lockwashers (2), and flat washers (3).
4. Remove solenoid (4) and shield (10).

INSTALLATON

1. Fungus proof replacement solenoid per M;L-V-173.
2. Place solenoid (4) and shield (10) in mounting position.
3. Install four screws (1), lockwashers (2), and flat washers (3).
4. Install control rod (8) with screw (6), two flat washers (5), spacers (7), and locknut (9).
5. Reconnect leads and remove tags.

4-66. FRESH AIR DAMPER SOLENOID (L3) - Continued.

FOLLOW ON PROCEDURES

1. Close left front evaporator panel (para 4-23).
2. Connect air conditioner input power at source.

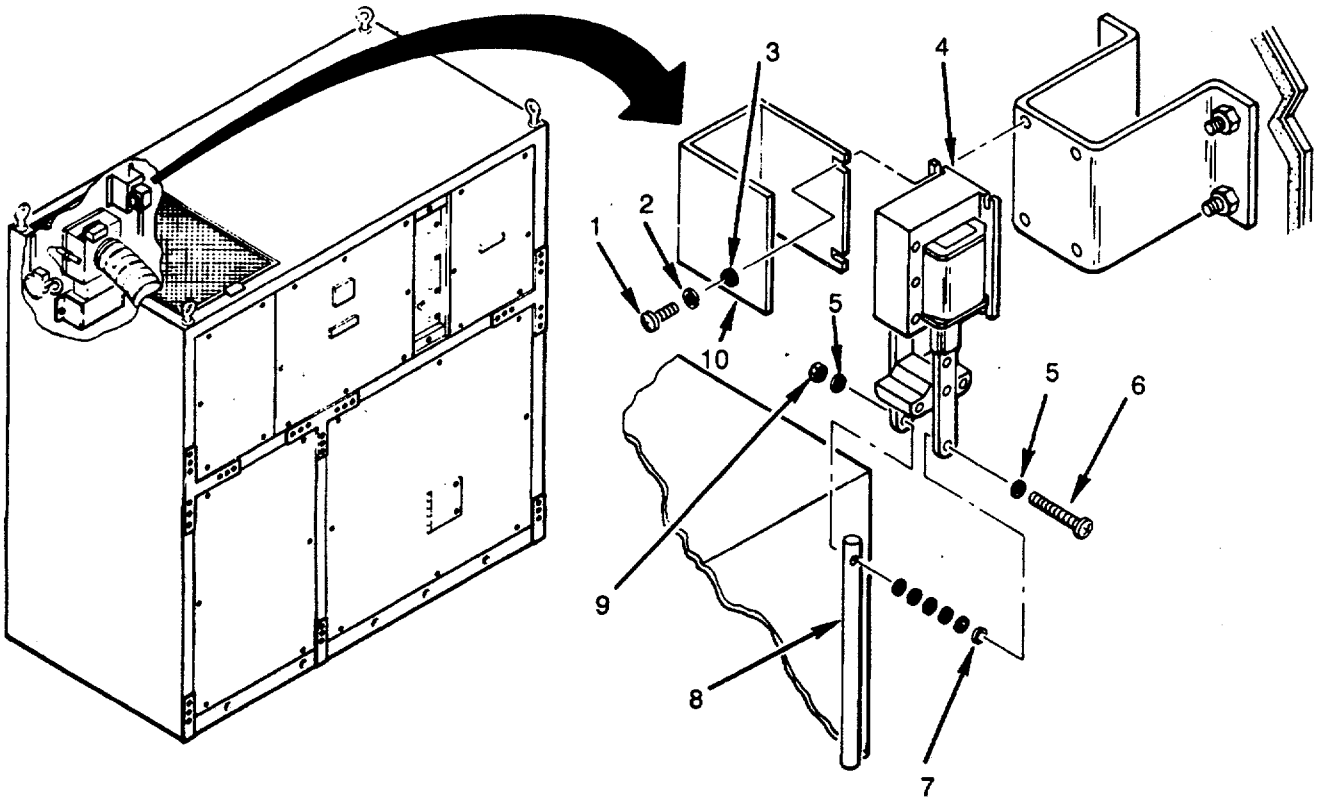


Figure 4-69. Fresh Air Damper Solenoid (L3)

4-67. WIRE HARNESS.

This task covers:

Inspection **Testing** **Repair**

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Heat gun (Item 2, Appendix B)
Crimping tool (Item 5, Appendix B)
Crimping tool (pig tail) (Item 10, Appendix B)
Soldering iron (Item 16, Appendix B)
Goggles, industrial (Appendix C)

Personnel: 2

Materials:

Solder, lead-tin alloy (Item 18, Appendix E)
Flux, solder, liquid rosin base (Item 19, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Open left front evaporator panel (para 4-23).
3. Remove right front evaporator panel (para 4-25).
4. Open left electric plate (para 4-30).
5. Open right electric plate (para 4-31).
6. Open control box (para 4-45).
7. Remove left front condenser panel (para 4-27).
8. Remove right front condenser panel (para 4-28).

INSPECTION

Check wiring, terminals and connections for corrosion, frayed or broken wires, and signs of overheating. Replace wiring or connections as necessary.

TESTING

Using wiring diagram (see Figure FO-3), check continuity on suspected bad wiring.

4-67. WIRE HARNESS - Continued.

REPAIR

1. General. Preferred repair methods consist of replacing wires, terminals, connectors, etc, rather than splicing wires, bending ends to form terminals, and other makeshift procedures, although the latter may be appropriate for emergency field repairs. Determine the proper size and length of wire, or terminal, or connector to be used for replacement.

2. Soldering Connections. Wire connections must be made mechanically sound before they are soldered. Solder alone does not provide sufficient strength to prevent breakage. Joining surfaces of connections to be soldered must be clean and bright. If a separate flux is used, it should conform to Specification MIL-F-14256 rosin base flux, and should be brushed onto the joint before soldering. Wires should always be heated to the point at which the solder will melt completely and flow into all parts of the joint. Excessive build up of solder "gobs" on the joint should be avoided or removed.

3. Insulating Joints. The preferred method of insulating electrical joints is by the use of heat-shrink tubing. To apply, cut a piece of heat-shrink tubing of suitable diameter to a one inch length for covering joints at terminals or connectors, or to a length about 1/2 inch (1. 3cm) longer than the joint to be insulated, and slide the tubing over the wire before making the joint. After the joint is made, slide the tubing so that it covers the joint, and shrink in place with moderate heat.

4. Splicing Wires. To repair broken or cut wires that are otherwise sound, the mating ends can be stripped and spliced. A commercial butt splice can be crimped onto the ends to join them, or a "Western Union" wire splice can be made. The latter is made by stripping 1/4 1/2 inch (0. 6 1. 3cm) of insulation from the wire ends, holding the ends parallel and facing opposite directions, then twisting each end around the other wire at least three turns. Solder and apply insulation as described above.

5. Crimping Terminals. To install a terminal on the end of a wire, strip 1/4 1/2 inch (0. 6 1. 3cm) of insulation from the end of wire, apply a one inch piece of heat-shrink tubing (if the terminals are of the uninsulated type), and insert wire end into the shank of the terminal. Crimp the shank, and install heatshrink tubing, if necessary.

FOLLOW ON PROCEDURES

Install any panels that were removed.

4-68. EVAPORATOR (CIRCULATOR) MOTOR AND HOUSING SUPPLY.

This task covers: Inspection Testing Repair Replacement

INITIAL SET-UP:
Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front evaporator panel (para 4-25).
3. Swing open control box (para 4-45).

INSPECTION, TESTING, REPAIR, AND REPLACEMENT

Inspection, testing, repair, and replacement of the evaporator (circulator) motor and housing assembly components is covered in the following referenced paragraphs.

1. Fan belt (para 4-69).
2. Evaporator motor (para 4-70).
3. Circulator fan (para 4-71).
4. Pulleys 60 Hz (evaporator motor and circulator fan) (para 4-72).
5. Pulleys 50 Hz (evaporator motor and circulator fan) (para 4-73).

FOLLOW ON PROCEDURES

1. Close control box (para 4-45).
2. Close right front evaporator panel (para 4-25).
3. Connect air conditioner input power at source.

4-69. FAN BELT (EVAPORATOR MOTOR AND HOUSING ASSEMBLY).

This task covers: Inspection Adjust Removal Installation

INITIAL SET-UP:
Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box (para 4-45).

INSPECTION
1. Check that belt is not cut, worn, frayed, or cracked. If belt is damaged, replace belt (see Figure 4-70).
2. At a point halfway between the motor pulley and fan pulley, press the belt with hand. Belt should not depress more than 1/2 inch (1.3 cm). If belt is too loose, adjust belt tension.

ADJUST
1. Loosen four locknuts (1).
2. Reposition motor in appropriate direction to obtain proper tension.
3. Tighten four locknuts (1).
4. Check belt tension (INSPECTION step 2), above.
5. Repeat steps 1 thru 4 until proper tension is obtained.

REMOVAL
1. Loosen four locknuts (1).
2. Move motor in proper direction to obtain sufficient slack in fan belt.
3. Remove belt (3) from pulleys (2).

INSTALLATION
1. Slip belt (3) onto pulleys (2).
2. Perform steps 2 thru 5 in ADJUST procedure.

FOLLOW ON PROCEDURES

1. Close control box (para 4-45).
2. Install right front evaporator panel (para 4-25).
3. Install center front evaporator panel (para 4-22).
4. Connect air conditioner input power at source.

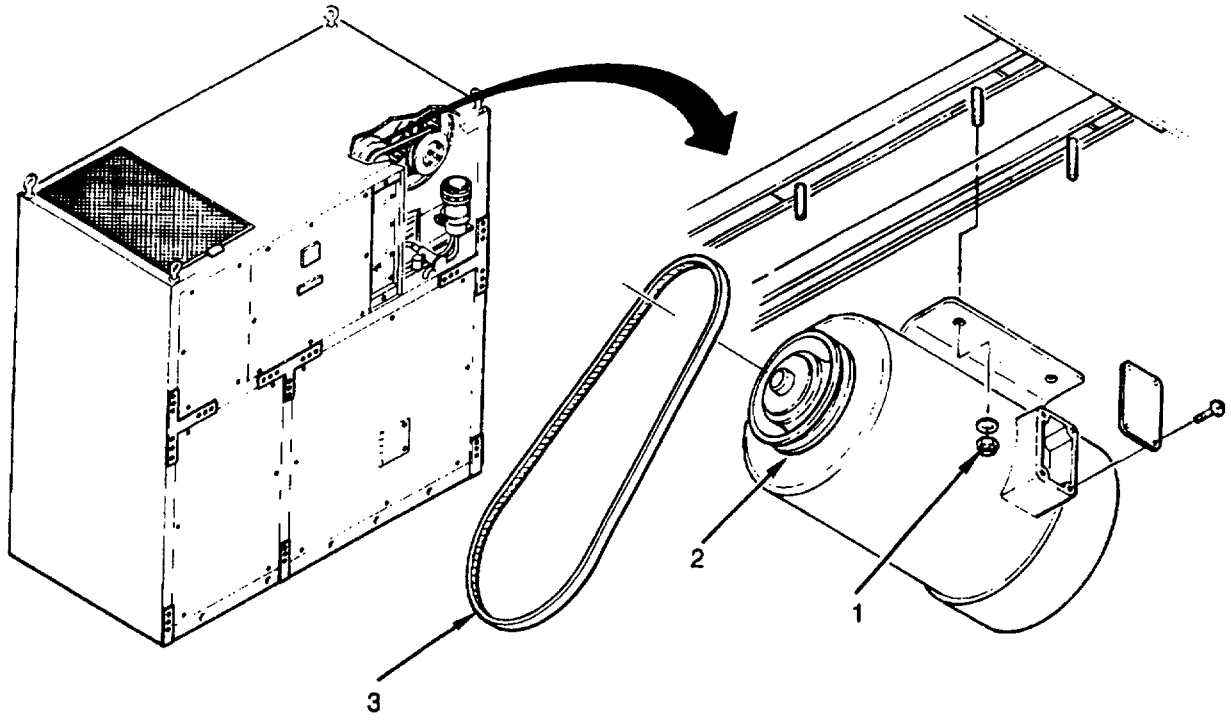


Figure 4-70. Fan Belt (Evaporator Motor And Housing Assembly)

4-70. EVAPORATOR MOTOR (B1).

This task covers: Inspection Service Removal Testing Installation

INITIAL SET-UP:

Tools:
- Tool kit, service, refrigeration unit (Item 1, Appendix B)
- Crimping tool (pigtail) (Item 10, Appendix B)
- Lubricating gun (Item 15, Appendix B)
- Gloves, chemical (Appendix C)

Personnel: 1

Materials:
- Grease aeroshell 22 (Item 2, Appendix E)
- Rags (Item 12, Appendix E)

Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove fan belt (para 4-69).

INSPECTION

1. Check motor (4) for rotational freedom by spinning shaft. If there is any stiffness or binding, contact Direct Support Maintenance (see Figure 4-71).
2. Check motor bearings for shaft end play. If there is excessive end play, contact Direct Support Maintenance.

SERVICE

1. Lubrication. Lubricate motor (para 4-1).
2. Cleaning. Use clean dry cloth to remove dirt and grease from motor (4).

REMOVAL

1. Remove four screws (2) and J-box cover (3).
2. Tag and disconnect leads.
3. Loosen four locknuts (5) until bolt threads are even with nut.

When handling motor, wear gloves to avoid injury to personnel and to reduce fin damage on the coil.

4. Slide motor (4) towards coil and remove.
5. Remove pulley (para 4-68).
6. Remove four locknuts (5), flat washers (6), and two brackets (1).

TESTING

1. Using multimeter, check continuity between wires 1 and 2, 1 and 3, and 2 and 3. Replace motor if there is no continuity between any pair of wires. Motor winding is open.
2. Using multimeter set on high OHMS scale, test stator insulation between each wire (1, 2, and 3) and motor housing.
   A reading of less than 500,000 ohms indicates insulation failure. Replace motor.

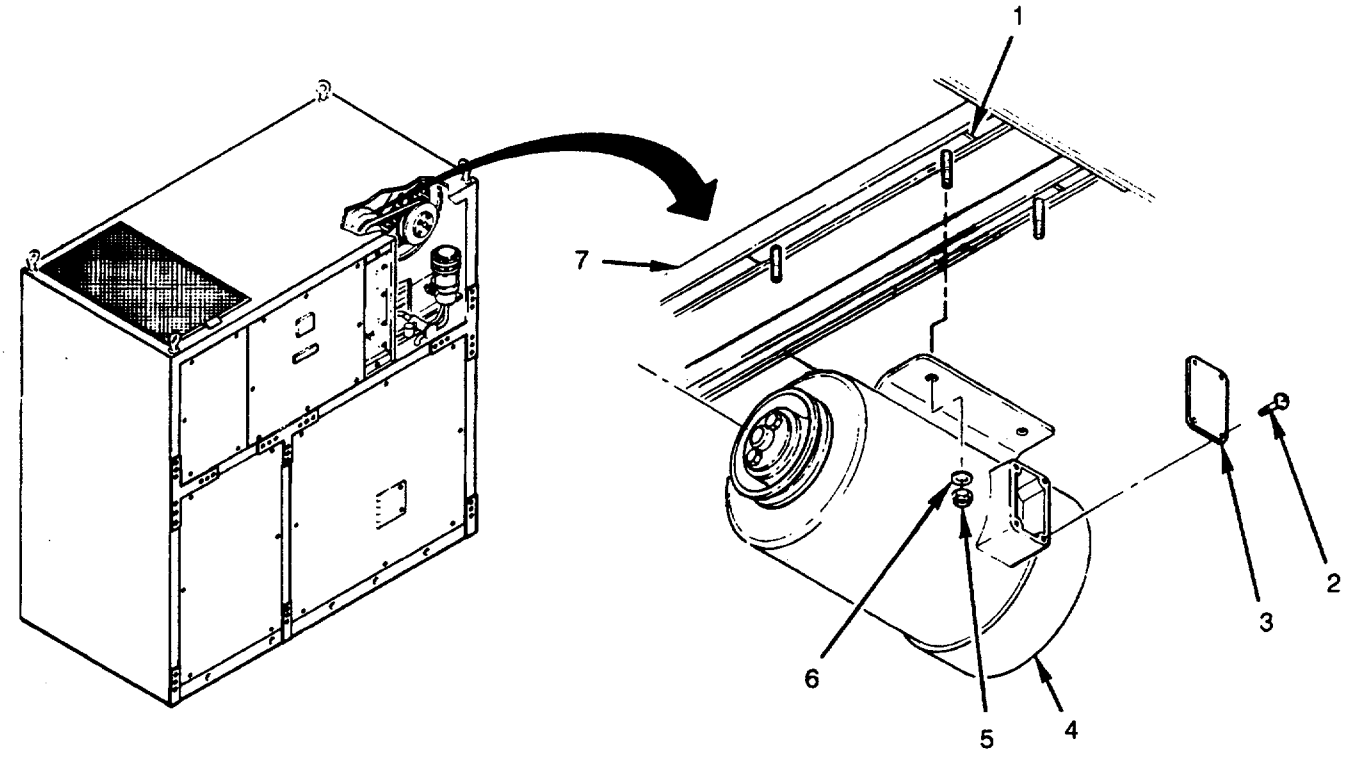


Figure 4-71. Evaporator Motor (B1)

INSTALLATION

1. Install two brackets (1) loosely with four flat washers (6) and locknuts (5).
2. Install pulley (para 4-68).

WARNING

When handling motor, wear gloves to avoid Injury to personnel and to reduce fin damage on the coil.

3. Place motor (4) onto slide rails (7) and slide into mounting position.
4. Reconnect leads and remove tags.
5. Install J-box cover (3) with four screws (2).

FOLLOW ON PROCEDURES

1. Install and adjust fan belt (para 4-69).
2. Connect air conditioner input power at source.

4-71. CIRCULATOR FAN (EVAPORATOR).

This task covers: Inspection Service Removal Repair/Replace Installation

INITIAL SET-UP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:
Corrosion preventative (Item 17, Appendix E)
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (Item 13, Appendix E)

Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove fan belt (para 4-69).
3. Remove evaporator motor (para 4-70).
4. Remove circulator fan pulley (para 4-68).

INSPECTION

1. Inspect for noise or missing mounting hardware (see Figure 4-72).
2. Check fan shaft for rotational freedom by spinning shaft. If there is any stiffness or binding, replace bearings and bearing collar.
3. Check motor for shaft end play and defects. Replace shaft, if defective.

SERVICE

Service consists of applying corrosion preventative compound to shaft before installation.

REMOVAL

1. Remove 10 screws (1), flat washers (3), and lockwashers (2) securing top brackets (4).
2. Remove 6 screws (10), flat washers (12), and lockwashers (11) securing blower (14) to housing (13).
3. Tilt blower (14) towards coil and remove.

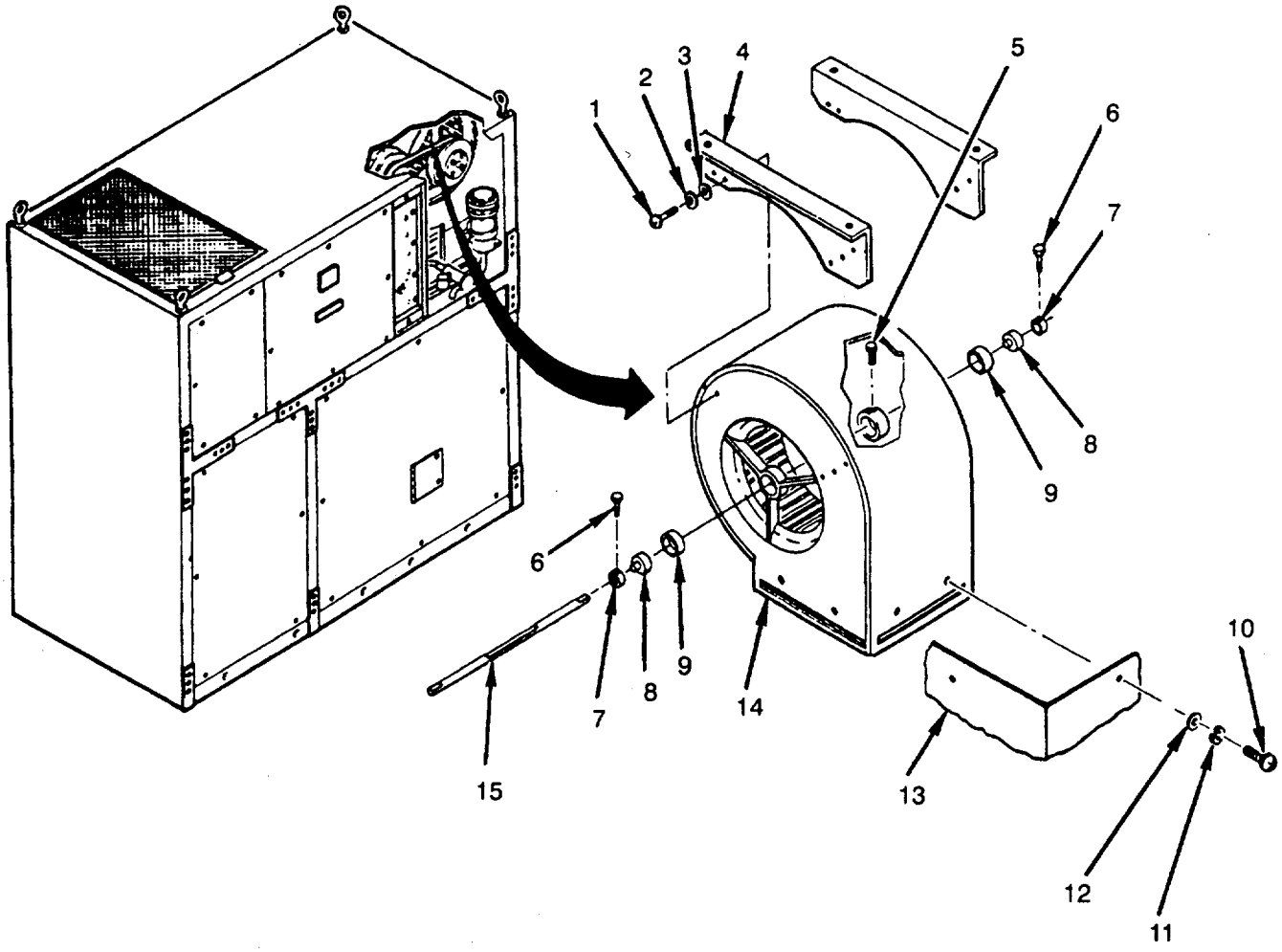


Figure 4-72. Circulator Fan (Evaporator)

REPAIR/REPLACE

NOTE

Repair consists of replacing bearing, bearing cups, bearing collar, shaft or fan assembly. Dress high metal defects in shaft with a file. If shaft is damaged beyond repair, replace shaft. Replacement shaft must be cut to length.

1. Measure length of shaft (15) from bearing (8) on pulley side of shaft.
2. Loosen two set screws (6).
3. Unlock two bearings collars (7) from shaft (15) by turning bearing quarter turn.
4. Loosen two set screws (5) securing squirrel cage to shaft (15).

4-71. CIRCULATOR FAN (EVAPORATOR) - Continued.

REPAIR/REPLACE - Continued.

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or Inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

5. Clean exposed ends of shaft (15).
6. Dress high metal defects on shaft (15) with file.
7. Remove shaft (15).
8. Slide one end of shaft (15) into each bearing (8) and remove both bearings individually.
9. Remove two bearing cups (9).
10. Install shaft (15). Extend shaft on pulley side to length measured in step 1.
11. Install two bearing cups (9) and bearings (8).
12. Install two replacement bearing collars (7) by turning quarter turn, locking bearings in place.
13. Tighten set screw (6).
14. Apply corrosion preventative compound to exposed ends of shaft (15).

INSTALLATION

1. Install blower (14) by tilting away from coil.
2. Secure blower to brackets (4) with 10 screws (1), lockwashers (2), and flat washers (3).
3. Secure blower to housing (13) with 6 screws (10), lockwashers (11), and flat washers (12).

FOLLOW ON PROCEDURES

1. Install circulator fan pulley (para 4-68)
2. Install evaporator motor (para 4-70).
3. Install and adjust fan belt (para 4-69).
4. Close control box (para 4-45).
5. Connect air conditioner input power at source.

4-72. PULLEYS 60 HZ, GREEN (EVAPORATOR MOTOR AND CIRCULATOR FAN).

This task covers Inspection Removal Adjust Installation

INITIAL SET-UP:
Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

Disconnect Input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front evaporator panel (para 4-25).
3. Swing open control box (para 4-45).

INSPECTION

1. Check evaporator motor and circulator fan pulleys diameter measures 4 7/8 inches (12.4 cm). If pulley measurements are not correct, install correct pulley. (See Figure 4-73)
2. Check pulleys for dents, burrs or any damage that would cause interference with fan operation. Replace pulley, if damaged.

REMOVAL

NOTE

To remove pulleys mounted on inside of cabinet, remove nut, lockwasher, small flat washer, large flat washer, and pulley.

1. Circulator Fan Pulley (Evaporator).
   a. Remove fan belt (para 4-69).

   NOTE

   Bolts are used as pulley remover devices.

   b. Match mark position of pulley on shaft (4).
   c. Remove two bolts (6) and screw into two threaded holes (5).
   d. Tighten two bolts (6) and remove pulley (7).
2. Evaporator Motor Pulley.
   a. Match mark position of pulley on shaft (3).
   b. Loosen three set screws (2) (two on front and one on rear).
   c. Remove pulley (1).

4-72. PULLEYS 60 HZ, GREEN (EVAPORATOR MOTOR AND CIRCULATOR FAN) - Continued.

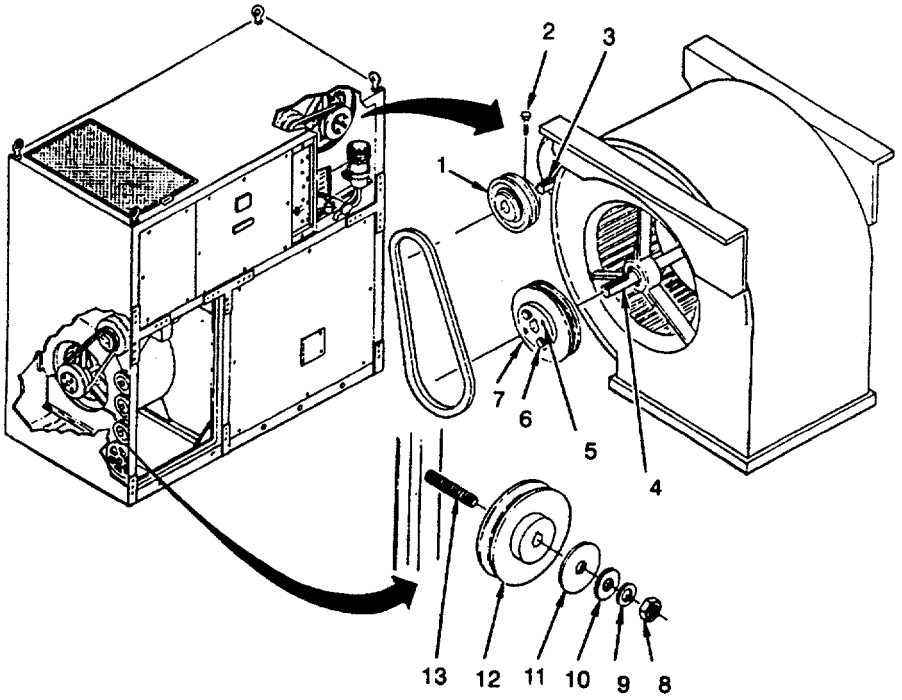


Figure 4-73. Pulleys 60 Hz, Green (Evaporator Motor And Circulator Fan)

ADJUST

1. Close pulley gap.
2. Line up notches.
3. Open pulley gap four 1/2 turns.
4. To adjust 50 Hz pulleys (red) for 60 Hz operation perform steps 1, 2 , and 5
5. Open pulley gap four turns.

INSTALLATION

NOTE

To install pulley inside of cabinet, place pulley on mounting screw and secure with large flat washer, small flat washer, lockwasher, and nut.

1. Circulator Fan Pulley (Evaporator).
   a. Install pulley (7) and align with match mark on shaft (4).
   b. Tighten two bolts (6) in unthreaded holes.
2. Evaporator Motor Pulley.
   a. Install pulley (1) and align with match mark on shaft (3).
   b. Tighten three set screws (2) (two on front and one on rear).

FOLLOW ON PROCEDURES

Install and adjust fan belt (para 4-69).

4-73. PULLEYS 50 HZ, RED (EVAPORATOR MOTOR AND CIRCULATOR FAN).

This task covers: Inspection Removal Adjust Installation

INITIAL SET-UP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front evaporator panel (para 4-25).
3. Swing open control box (para 4-45).

INSPECTION

1. Check evaporator motor and circulator fan pulleys diameter measures 4 3/4 inches (12.1 cm). If pulleys measurement are not correct, install correct pulley. (See Figure 4-74)
2. Check pulleys for dents, burrs or any damage that would cause interference with fan operation. Replace pulley, if damaged.

REMOVAL

NOTE

To remove pulleys mounted on inside of cabinet, remove nut, lockwasher, small flat washer, large flat washer, and pulley.

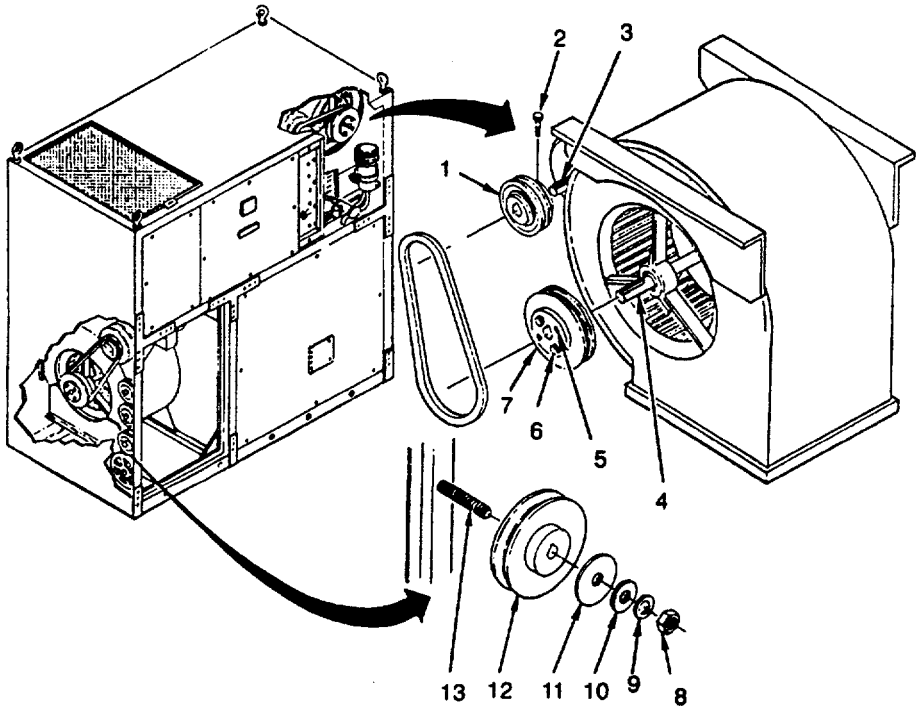
1. Circulator Fan Pulley (Evaporator)
   a. Remove fan belt (para 4-69).

   NOTE

   Bolts are used as pulley remover devices.

   b. Match mark position of pulley on shaft (4).
   c. Remove two bolts (6) and screw into threaded holes (5).
   d. Tighten two bolts (6) and remove pulley (7).
2. Evaporator Motor Pulley.
   a. Match mark position of pulley on shaft (3).
   b. Loosen three set screws (2) (two on front and one on rear).
   c. Remove pulley (1).

4-73. PULLEYS 50 HZ, RED (EVAPORATOR MOTOR AND CIRCULATOR FAN) - Continued



4-73. PULLEYS 50 HZ, RED (EVAPORATOR MOTOR AND CIRCULATOR FAN) - Continued.

ADJUST

1. Close pulley gap.
2. Line up notches.
3. Open pulley gap two turns.
4. To adjust 60 Hz pulleys (green) for 50 Hz operation perform steps 1, 2, and 5.
5. Open pulley gap five turns.

INSTALLATION

NOTE

To install pulley inside of cabinet, place pulley on mounting screw and secure with large flat washer, small flat washer, lockwasher, and nut.

1. Circulator Fan Pulley (Evaporator).
   a. Install pulley (7) and align with match mark on shaft (4).
   b. Install two bolts (6) in unthreaded holes.
2. Evaporator Motor Pulley.
   a. Install pulley (1) and align with mark on shaft (3).
   b. Tighten three set screws (2) (two on front and one on rear).

FOLLOW ON PROCEDURES

Install and adjust fan belt (para 4-69).

4-74. CONDENSER MOTOR AND HOUSING ASSEMBLY.

This task covers: Inspection Testing Repair Replacement

INITIAL SET-UP:
Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser panel (para 4-27).

INSPECITON, TESTING, REPAIR, AND REPLACEMENT

NOTE
Applicable inspection, testing, repair, and replacement of the condenser motor and housing assembly components is covered in the following referenced paragraphs.

1. Fan belt (para 4-75).
2. Condenser motor (para 4-76).
3. Circulator fan (para 4-77).
4. Pulleys 60 Hz (condenser motor and circulator fan) (para 4-78).
5. Pulleys 50 Hz (condenser motor and circulator fan) (para 4-79).

FOLLOW ON PROCEDURES
1. Install left front condenser panel (para 4-27).
2. Connect air conditioner input power at source.

4-75. FAN BELT (CONDENSER MOTOR AND HOUSING ASSEMBLY).

This task covers: Inspection Adjust Removal Installation

INITIAL SET-UP:
Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

Disconnect input power to the air conditioner before performing any Internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser panel (para 4-27).

INSPECTION

1. Check that belt is not cut, worn, frayed, or cracked. If belt is damaged, replace belt (see Figure 4-75).
2. At a point halfway between the motor pulley and fan pulley, press the belt with hand. Belt should not depress more than 1/2 inch (1.3 cm). If belt is too loose, adjust belt tension. ADJUST
1. Loosen four locknuts (1).
2. Reposition motor in appropriate direction to obtain proper tension (see INSPECTION).
3. Tighten four locknuts (1).
4. Check belt tension (inspection step 2), above.
5. Repeat steps 1 thru 4 until proper tension is obtained.

REMOVAL

1. Loosen four locknuts (1).
2. Move motor in proper direction to obtain sufficient slack in fan belt.
3. Remove belt (3) from pulleys (2).

INSTALLATION

1. Slip belt (3) onto pulleys (2).
2. Perform steps 2 thru 4 in ADJUST procedure.

FOLLOW ON PROCEDURES

1. Install left front condenser panel (para 4-27).
2. Connect air conditioner input power at source.

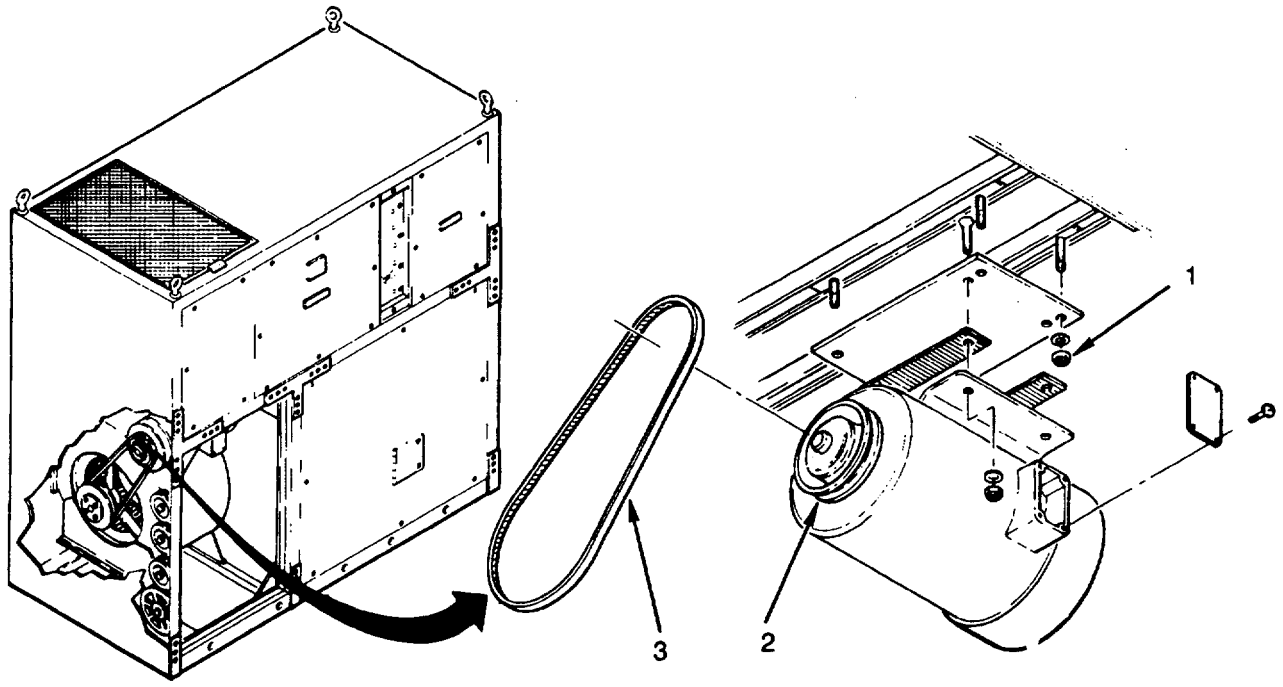


Figure 4-75. Fan Belt (Condenser Motor And Housing Assembly)

4-76. CONDENSER MOTOR (B3).

This task covers: Inspection Service Removal Testing Installation

INITIAL SET-UP:

Tools:
- Tool kit, service, refrigeration unit (Item 1, Appendix B)
- Crimping tool (pigtail) (Item 10, Appendix B)
- Lubricating gun (Item 15, Appendix B)

Personnel: 1

Materials:
- Grease aeroshell 22 (Item 2, Appendix E)
- Rags (Item 12, Appendix E)

Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove fan belt (para 4-75).

INSPECTION

1. Check motor (5) for rotational freedom by spinning shaft. If there is any stiffness or binding, contact Direct Support Maintenance (see Figure 4-76).
2. Check motor bearings for shaft end play. If there is excessive end play, contact Direct Support Maintenance.

SERVICE

1. Lubrication. Lubricate motor (para 4-1).
2. Cleaning. Use clean dry cloth to remove dirt and grease from motor (5).

REMOVAL

1. Remove four screws (3) and J-box cover (4).
2. Tag and disconnect leads.
3. Support motor (5) and remove four locknuts (2) and flat washers (1).
4. Remove motor (5).
5. Remove pulley (para 4-78 or 4-79).

TESTING

1. Using multimeter, check continuity between wires 1 and 2, 1 and 3, and 2 and 3. Replace motor if there is no continuity between any pair of wires.
   2.Using multimeter set on high OHMS scale, test stator insulation between each wire (1, 2, and 3) and motor housing. A reading of less than 500,000 ohms indicates insulation failure. Replace motor.

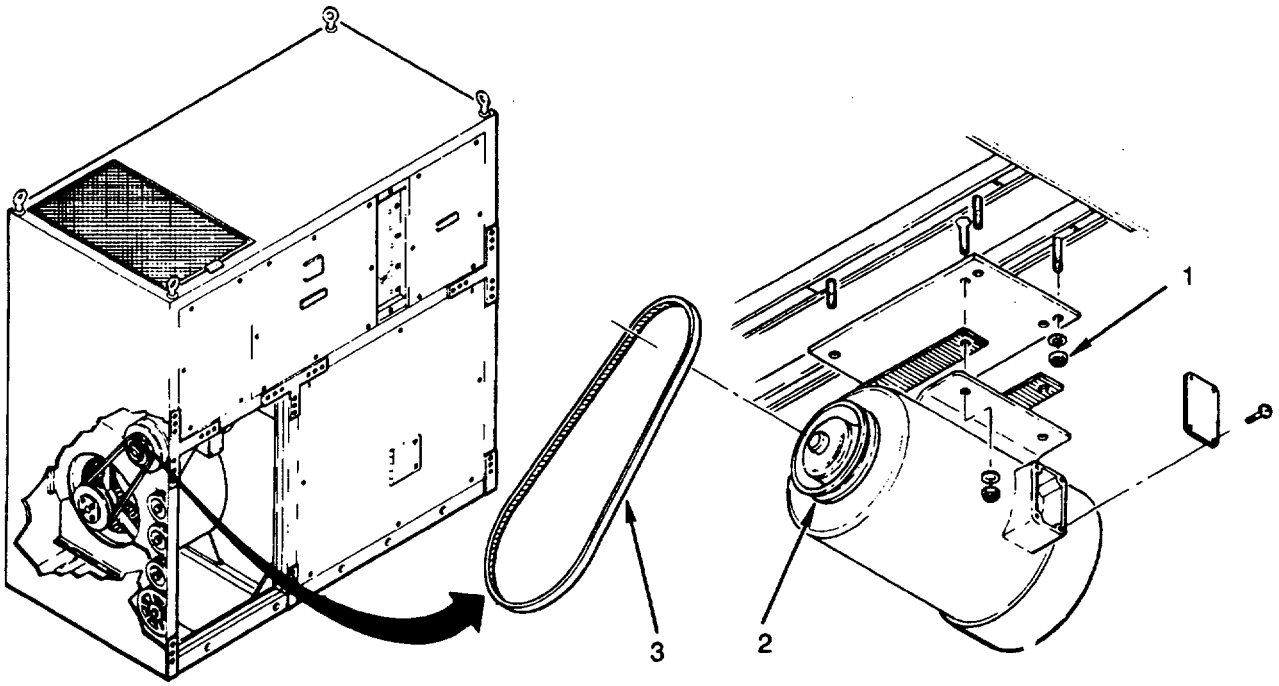


Figure 4-76. Condenser Motor (B3)

INSTALLATION

1. Install pulley (60 Hz para 4-78 or 50 Hz para 4-79).
2. Place motor (5) in mounting position.
3. Install four flat washers (1) and locknuts (2).
4. Reconnect leads and remove tags.
5. Install J-box cover (4) with four screws (3).

FOLLOW ON PROCEDURES

Install and adjust fan belt (para 4-75).

4-77. CIRCULATOR FAN (CONDENSER).

This task covers: Inspection Service Removal Repair/Replace Installation

INITIAL SET-UP:

Tools:
- Tool kit, service, refrigeration unit (Item 1, Appendix B)
- Gloves, chemical (Appendix C)
- Goggles, industrial (Appendix C)

Personnel: 1

Materials:
- Corrosion preventative (Item 17, Appendix E)
- Rags (Item 12, Appendix E)
- Methyl-Ethyl Ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove condenser motor (para 4-76).

INSPECTION

1. Inspect for noise or missing mounting hardware (see Figure 4-77).
2. Check fan shaft for rotational freedom by spinning shaft. If there is any stiffness or binding, replace bearings and bearing collar.
3. Check motor for shaft end play and defects. Replace shaft, if defective.

SERVICE

Service consists of applying corrosion preventative compound to shaft before installation.

REMOVAL

Use great care to avoid contact with 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.

1. Front seat (clockwise) actuator service valve (see Figure 5-20).
2. Slowly loosen flare nut (9) on actuator to release gas.
3. Remove two bolts (7), lockwashers (6), and flat washers (5). (1/2 inch socket top rear bracket)
4. Remove three screws (3), lockwashers (2), flat washers (1), and top bracket (4).
5. Remove screw (15), lockwasher (16), flat washer (17), and clamp (18).

6. Position flare nut (9) and tubing out of way.

NOTE

Rubber grommets will fly in different directions when removing circulator fan housing from bracket.

7. Remove four bolts (22), locknuts (19), eight grommets (21) and flat washers (20).
8. Remove circulator fan housing (23).
9. If fan housing is being replaced, remove condenser fan connecting link assembly (para 4-89) and contact Direct Support Maintenance to remove actuator.

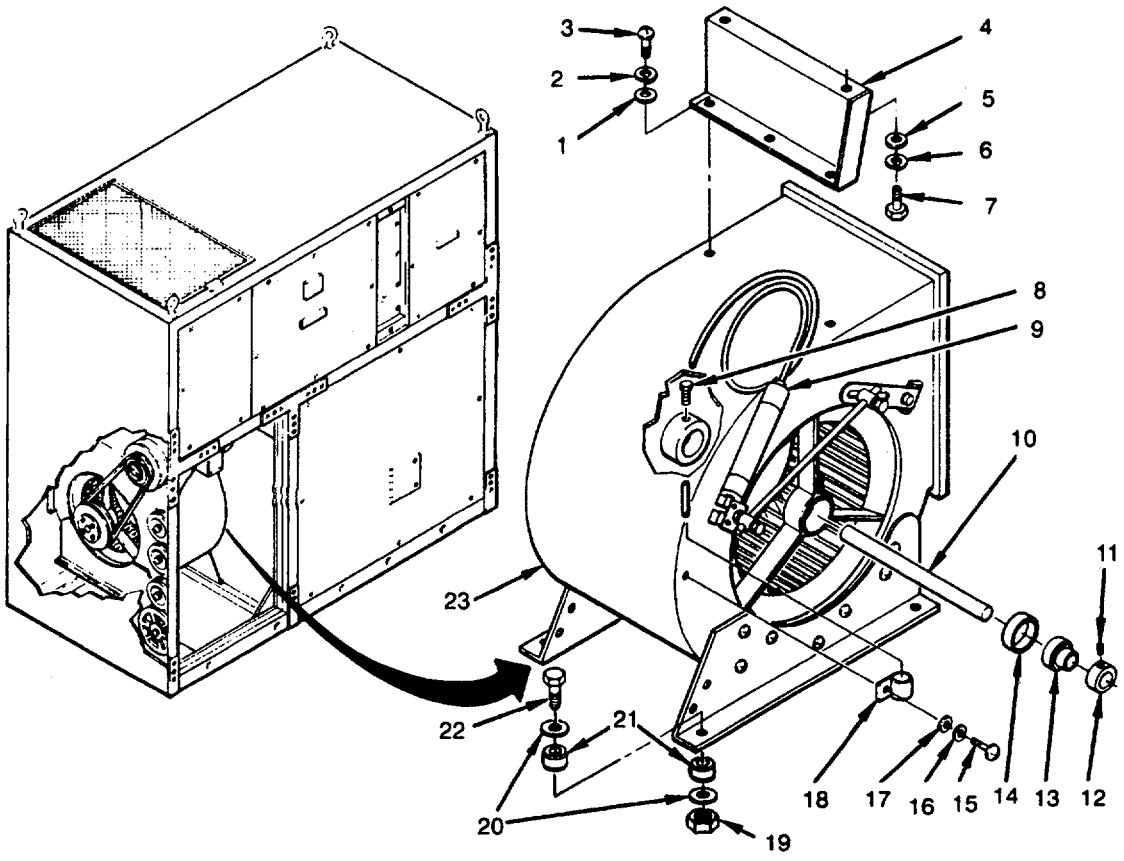


Figure 4-77. Circulator Fan (Condenser)

REPAIR/REPLACE

NOTE

Repair consists of replacing bearing, bearing collar, bearing cups, shaft, or fan assembly. Dress high metal defects in shaft with a file. If shaft is damaged beyond repair, replace shaft. Replacement shaft must be cut to length.

1. Measure length of shaft from bearing (13) on pulley side of shaft.
2. Loosen two set screws (11).
3. Unlock two bearing collars (12) from shaft (10) by turning collars quarter turn.

4-77. CIRCULATOR FAN (CONDENSER) - Continued.

4. Loosen two set screws (8) secure squirrel cage to shaft (10)

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

5. Clean exposed ends of shaft (10).
6. Dress high metal defects on shaft (10) with file.
7. Remove shaft (10).
8. Slide one end of shaft (10) into each bearing (13) and remove both bearings (13) individually.
9. Remove two bearing cups (14).
10. Install shaft (10). Extend shaft on pulley side to length measured in step 1.
11. Install two bearings cups (14) and replacement bearings (13).
12. Install two replacement bearing collars (12) by turning quarter turn, locking bearings in place, then tighten two set screws (11) in bearing collars (12).
13. Apply corrosion preventative compound to exposed ends of shaft (10).

INSTALLATION

1. If fan housing was replaced, install condenser fan connecting link assembly (para 4-89) and contact Direct Support Maintenance to install actuator.
2. Position circulator fan (23) in mounting position.
3. Install four bolts (22), grommets (21), eight flat washers (20), and four locknuts (19) .
4. Install top brackets (4) with three screws (3), lockwashers (2) and flat washers (1).
5. Install two bolts (7), lockwashers (6), and flat washers (5).
6. Install clamp (18) with screw (15), lockwasher (16), and flat washer (17).
7. Install actuator line with flare nut (9) loose, but do not tighten at this time.
8. To back seat (counterclockwise) actuator service valve contact Direct Support Maintenance. Let gas escape for three seconds and tighten flare nut (9).
9. Leak test all newly connected joints and those in the repair area (contact Direct Support Maintenance).

FOLLOW ON PROCEDURES

Install condenser motor (para 4-76).

4-78. PULLEYS 60 HZ, GREEN (CONDENSER MOTOR AND CIRCULATOR FAN).

This task covers: Inspection Removal Adjust Installation

INITIAL SET-UP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

Disconnect Input power to the air conditioner before performing any internal maintenance. Voltages used can KILL Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser panel (para 4-27).

INSPECTION

1. Check condenser motor pulley diameter measures 4 1/2 inches (11.4 cm) and circulator fan pulley diameter measures 6 3/4 inches (17.1 cm). If measurements are not correct, install correct pulley (see Figure 4-78).
2. Check pulleys for dents, burrs or any damage that would cause interference with fan operation. Replace pulley, if damaged.

REMOVAL

NOTE

To remove pulleys mounted on inside of cabinet, remove nut, lockwasher, small flat washer, large flat washer, and pulley.

1. Circulator Fan Pulley (Condenser).
   a. Remove fan belt (para 4-75).

NOTE

Bolts are used as pulley remover device.

   b. Match mark position of pulley on shaft (4).
   c. Remove two bolts (6) and screw into threaded holes (7).
   d. Tighten two bolts (6) and remove pulley (5).

2. Condenser Motor Pulley.
   a. Match mark position of pulley on shaft (3).
   b. Loosen three set screws (1) (two in front one in rear).
   c. Remove pulley (2).

4-78. PULLEYS 60 HZ, GREEN (CONDENSER MOTOR AND CIRCULATOR FAN) - Continued.

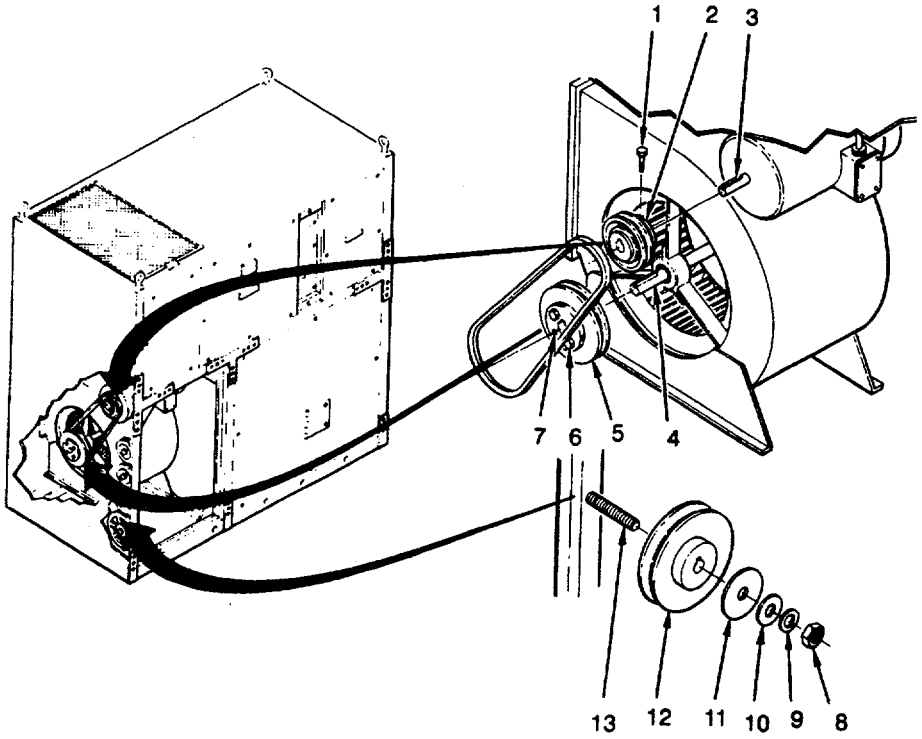


Figure 4-78. Pulleys 60 Hz, Green (Condenser Motor and Circulator Fan)

ADJUST

1. Close pulley gap.
2. Line up notches.
3. Open pulley gap 3 turns.
4. To adjust 50 Hz pulleys (red) for 60 Hz operation perform steps 1, 2, and 5.
5. Open pulley gap 4 turns.

INSTALLATION

NOTE

To install pulley inside of cabinet, place pulley on mounting screw and secure with large flat washer, small flat washer, lockwasher, and nut.

1. Circulator Fan Pulley (Condenser).
   a. Install pulley (5) and align with match mark on shaft (4).
   b. Install two bolts (6) in unthreaded holes.
2. Condenser Motor Pulley.
   a. Install pulley (2) and align with match mark on shaft (3).
   b. Tighten three set screws (1) (two in front and one in rear).

FOLLOW ON PROCEDURES

Install and adjust fan belt (para 4-75).

4-79. PULLEYS 50 HZ, RED (CONDENSER MOTOR AND CIRCULATOR FAN).

This task covers: Inspection Removal Adjust Installation

INITIAL SET-UP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

Disconnect input power to the air conditioner before performing any Internal maintenance. Voltages used can KILL Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser motor (para 4-27).

INSPECTION

1. Check condenser fan pulley diameter measures 5 1/4 inches (13.3 cm) and circulator fan pulley diameter measures 6 1/2 inches (16.5 cm). If pulley measurement are not correct, install correct pulley (see Figure 4-79).
2. Check pulleys for dents, burrs or any damage that would cause interference with fan operation. Replace pulley, if damaged.

REMOVAL

NOTE

To remove pulleys mounted on inside of cabinet, remove nut, lockwasher, small flat washer, large flat washer, and pulley.

1. Circulator Fan Pulley (Condenser).
   a. Remove fan belt (para 4-75).

NOTE

Bolts are used as pulley remover devices.

   b. Match mark position of pulley on shaft (4).
   c. Remove two bolts (6) and screw into threaded holes (7).
   d. Tighten two bolts (6) and remove pulley (5).
2. Condenser Motor Pulley.
   a. Match mark position of pulley on shaft (3).
   b. Loosen three set screws (1) (two in front and one in rear).
   c. Remove pulley (2).

4-79. PULLEYS 50 HZ, RED (CONDENSER MOTOR AND CIRCULATOR FAN) - Continued.

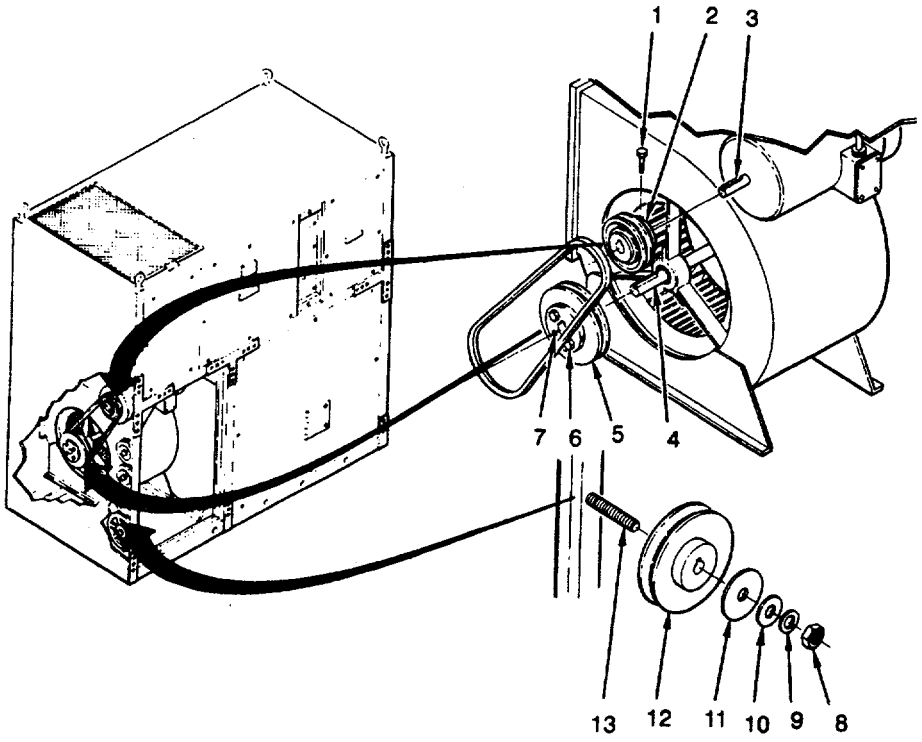


Figure 4-79. Pulleys 50 Hz, Red (Condenser Motor and Circulator Fan)

ADJUST

1. Close pulley gap.
2. Line up notches.
3. Open pulley gap three 1/2 turns.
4. To adjust 60 Hz pulleys (green) for 50 Hz operation perform steps 1, 2, and 5.
5. Open pulley gap five turns.

INSTALLATION

NOTE

To install pulley inside of cabinet, place pulley on mounting screw and secure with large flat washer, small flat washer, lockwasher, and nut.

1. Circulator Fan Pulley (Condenser).
   a. Install pulley (5) and align with match mark on shaft (4).
   b. Install two bolts (6) in unthreaded holes.
2. Condenser Motor Pulley.
   a. Install pulley (2) and align with match mark on shaft (3).
   b. Tighten three set screws (1) (two in front and one in rear).

FOLLOW ON PROCEDURES

Install and adjust fan belt (para 4-75).

4-80. ELECTRIC HEATER (EH).

This task covers: Inspection Removal Adjust Installation

INITIAL SET-UP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel; 1

Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

INSPECTION

Check heater elements for deformation, damaged terminals, threads, cracked or broken parts. Replace if damaged.

TESTING

1. Tag and disconnect leads on heater element under test.
2. Using multimeter, check for continuity between two terminal studs of each element. If no continuity is indicated, replace element.

REMOVAL

CAUTION

Use two wrenches to ensure that terminal stud does not turn, preventing ceramic breakage.

1. Remove three screws (3), flat washers (1), and lockwashers (2) (see Figure 4-80).
2. Remove plastic cover (4).
3. Remove two locknuts (5), lockwashers (6), and four flat washers (7).
4. Tag and disconnect leads.
5. Remove two nuts (8).
6. Remove screw (14), flat washer (12), and lockwasher (13).
7. Remove element (10) and clamp (11).

4-80. ELECTRIC HEATER (EH) - Continued.

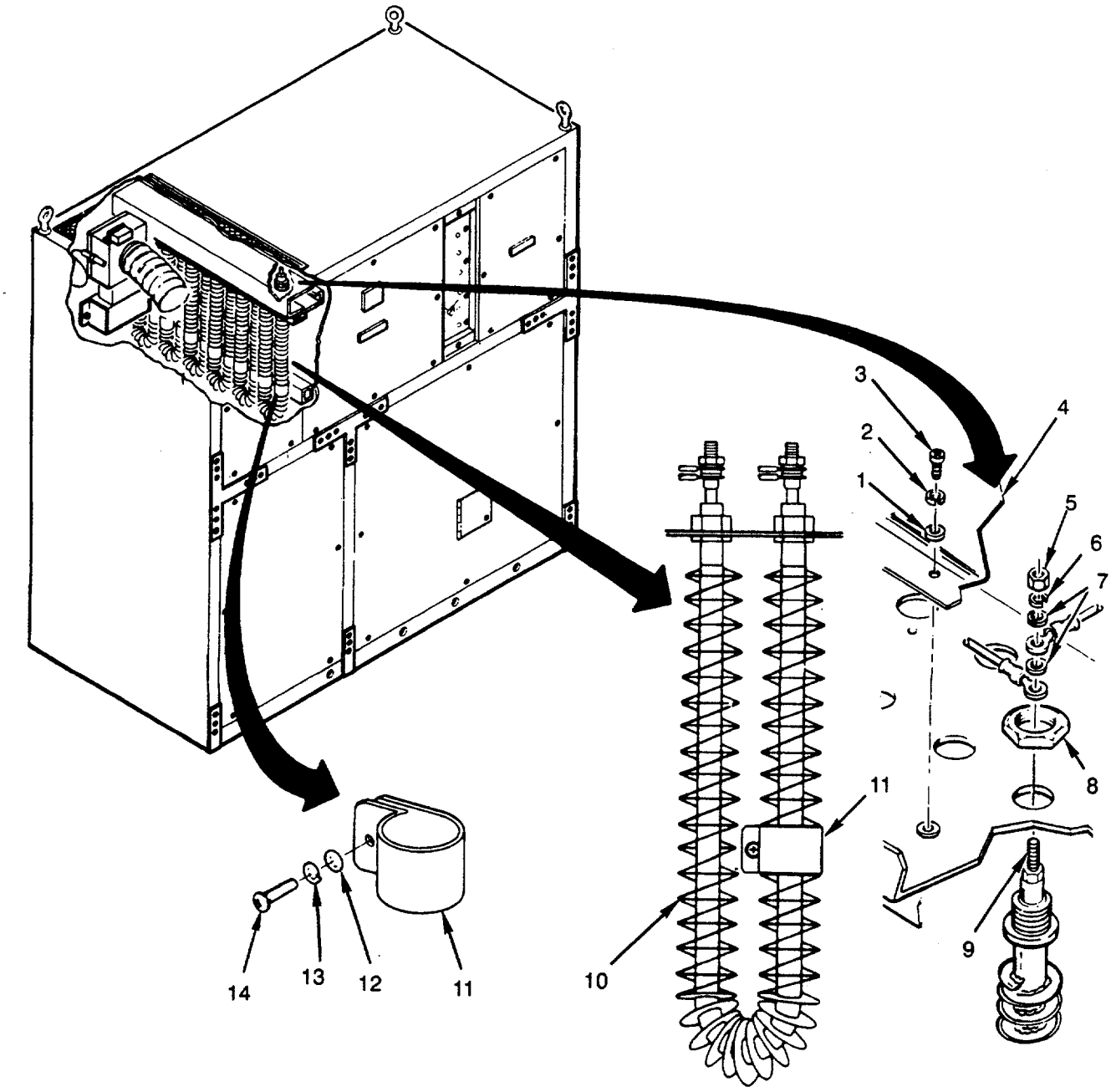


Figure 4-80. Electric Heater

INSTALLATION

1. Place clamp (11) on heater element (10).
2. Place element (10) and clamp (11) in mounting position.
3. Install screw (14), lockwasher (13), and flat washer (12).

CAUTION

Use two wrenches to ensure that terminal stud does not turn, preventing ceramic breakage.

4. Install two nuts (8).
5. Reconnect wire leads tagged in removal onto terminal stud (9)
6. Install four flat washers (7), lockwashers (6), and locknut (5).
7. Place plastic cover (4) in mounting position.
8. Install three screws (3), lockwashers (2), and flat washers (1).

FOLLOW ON PROCEDURES

1. Install left front evaporator panel (para 4-23).
2. Connect air conditioner power at source.

4-81. COMPRESSOR CRANKCASE HEATER (CCH).

This task covers: Inspection Removal Adjust Installation

INITIAL SET-UP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel:1

Equipment Conditions:

Disconnect input power to the air conditioner before performing any Internal maintenance. Voltages used can KILL Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

INSPECTION

1. Remove two screws (2) and J-box cover (3) (see Figure 4-81).
2. Check crankcase heater wires in J-box for corrosion or loose electrical connections.
3. Check for signs of overheating or other visible damage. Replace heater, if defective.

TESTING

The following testing procedure Is performed with power on. Proceed with extreme caution. Death or serious Injury can result.

1. Connect air conditioner input power and verify CB2 is dosed.
2. Using a clamp-on ammeter, verify current flow through compressor crankcase heater wires (red) located in J-box is less than 10 amps.
3. If no current flow is indicated or current is greater than 10 amps, replace crankcase heater.

REMOVAL

1. Disconnect air conditioner input power at source.
2. Tag and disconnect red wire leads.
3. Loosen two screws (1) and remove flex conduit (4).

Allow crankcase heater to cool before touching crankcase heater. Surfaces are extremely hot. Serious Injury can result.

4. Allow heater to cool.
5. Remove crankcase heater (5).

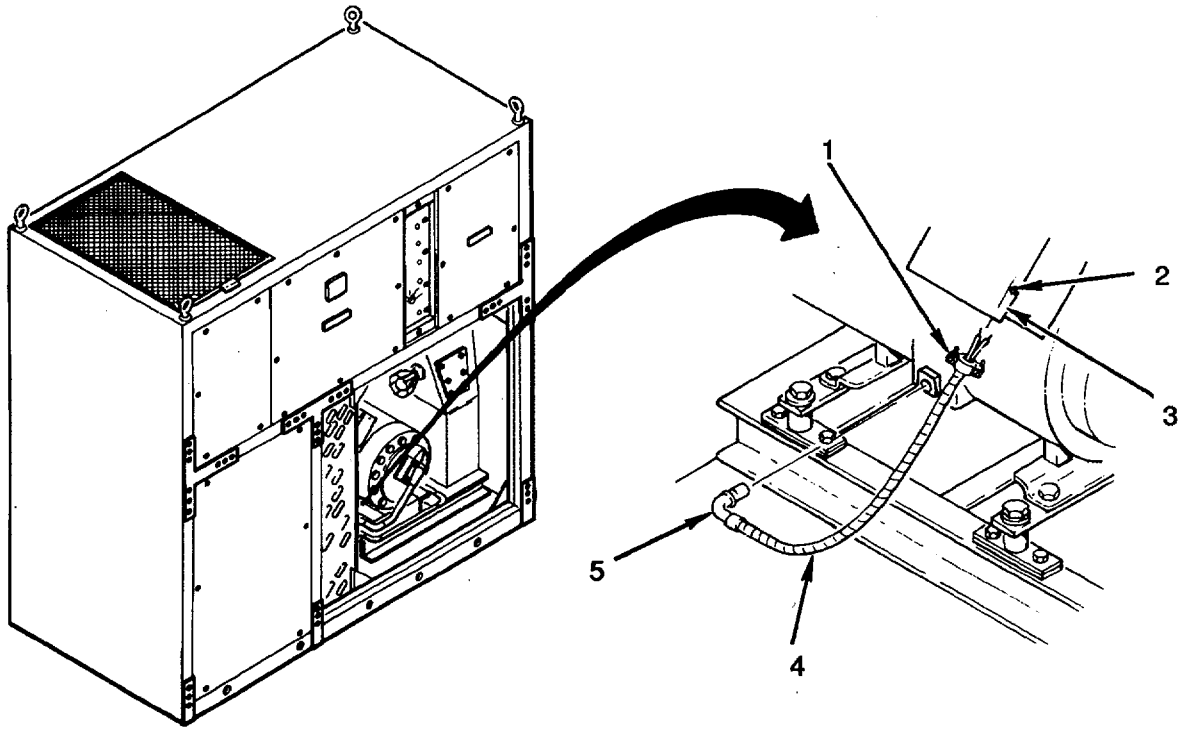


Figure 4-81. Compressor Crankcase Heater

INSTALLATION

NOTE

When replacing crankcase heater, cut conduit to 10 1/2 inches, cut wires to 18 inches, and strip wire ends to 1/2 inch maximum.

1. Install crankcase heater (5).
2. Install flex conduit (4) and tighten two screws (1) .
3. Connect red wire leads and remove tags.
4. Install J-box cover (3) with two screws (2).

FOLLOW ON PROCEDURES

1. Install right front condenser panel (para 4-28).
2. Connect air conditioner input power at source.

4-82. DIRTY FILTER SWITCH (S3).

This task covers: Inspection Removal Adjust Installation

INITIAL SET-UP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Manometer (Item 3, Appendix B)
Riveter, blind (Item 8, Appendix B)

Personnel: 1

Material:

Varnish, moisture and fungus resistant (Item 16, Appendix E)

Equipment Conditions:

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

INSPECTION

Check dirty filter switch for corrosion, loose electrical connections or missing mounting hardware. If damaged, replace switch (see Figure 4-82).

TESTING

1. Remove screw (6) and cover (4).
2. Using multimeter, check continuity between common and open electrical terminals.
3. Turn adjustment screw back and forth slightly and check that switch contacts open and close.
4. If dirty filter switch fails above tests, replace switch.

ADJUST

1. Attach tube (1) from manometer to switch (3).
2. Connect multimeter to common and normally open terminals of switch.
3. While blowing into tube, gently adjust switch to close when indication reaches 1.15 ± 0.05 inches wc on manometer.

REMOVAL

1. Tag and disconnect leads.
2. Remove two rivets (2).
3. Remove dirty filter switch (3).
4. Remove tubing (5) and (7).

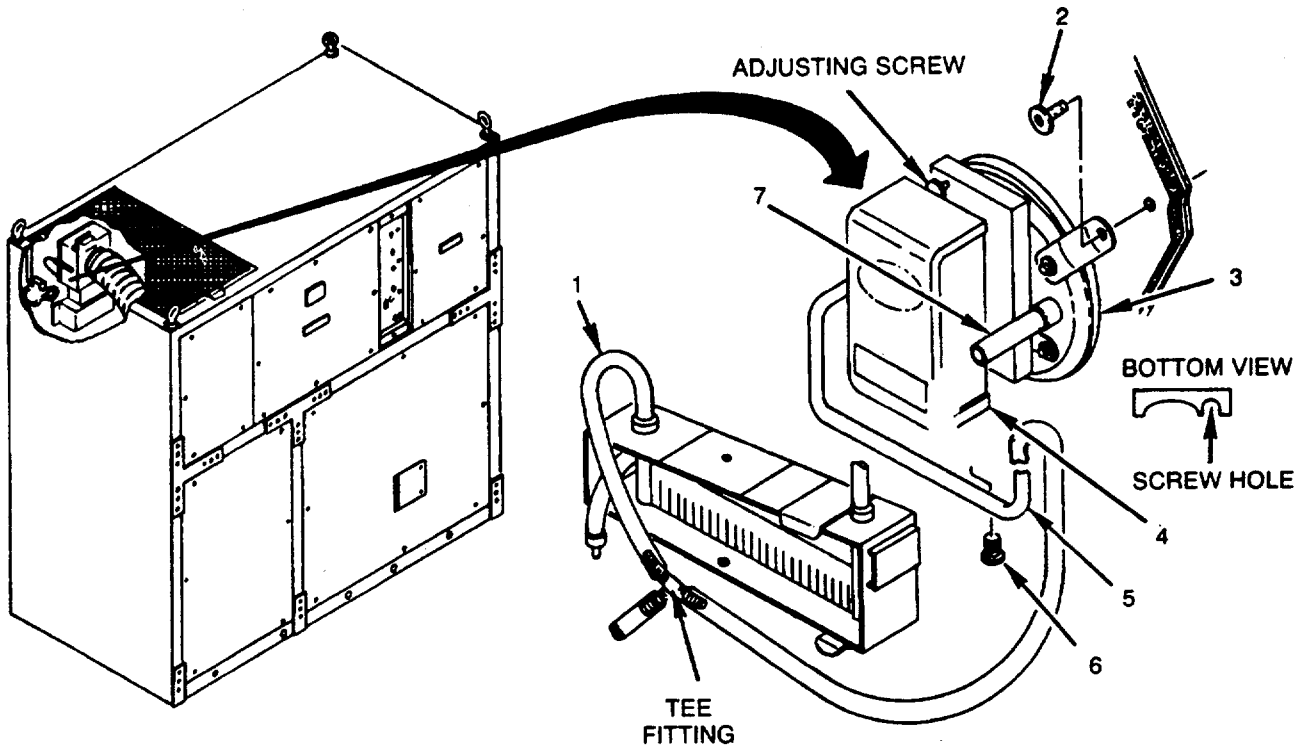


Figure 4-82. Dirty Filter Switch (S3)

INSTALLATION

1 Fungus proof replacement dirty filter switch per MIL-V-173.
2 Place dirty filter switch (3) in mounting position.
3 Install two rivets (2).
4 Install tubing (5) and (7).
5 Reconnect leads and remove tags.
6 Install cover (4) with screw (6).

FOLLOW ON PROCEDURES

1 Install left front evaporator panel (para 4-23).
2 Connect air conditioner input power at source.

4-83. HIGH TEMPERATURE SWITCH (S6).

This task covers:

a. Inspection **b. Removal** **c. Testing**
d. Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1

Material:
Heat gun (Item 2, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.

2. Remove left front evaporator panel (para 4-23).

INSPECTION
Check high temperature switch (3) for corrosion, loose electrical connections or missing mounting hardware. If damaged, replace switch (see Figure 4-83).

REMOVAL

1 Tag and disconnect leads.
2 Remove two screws (4), locknuts (2), and four flat washers (1).
3 Remove switch (3).

TESTING

NOTE

For full operational test of switch, an external heat source is required. Switch should open (no continuity across contacts) at 130 degrees F (54.4°C).

With switch at room temperature, using multimeter, check for continuity between switch terminals. If continuity is not indicated, replace switch.

INSTALLATION
1. Place switch (3) in mounting position.
2. Install two screws (4), four flat washers (1), and two locknuts (2).
3. Reconnect leads and remove tags.

FOLLOW ON PROCEDURES

1 Install left front evaporator panel (para 4-23).
2 Connect air conditioner input power at source.

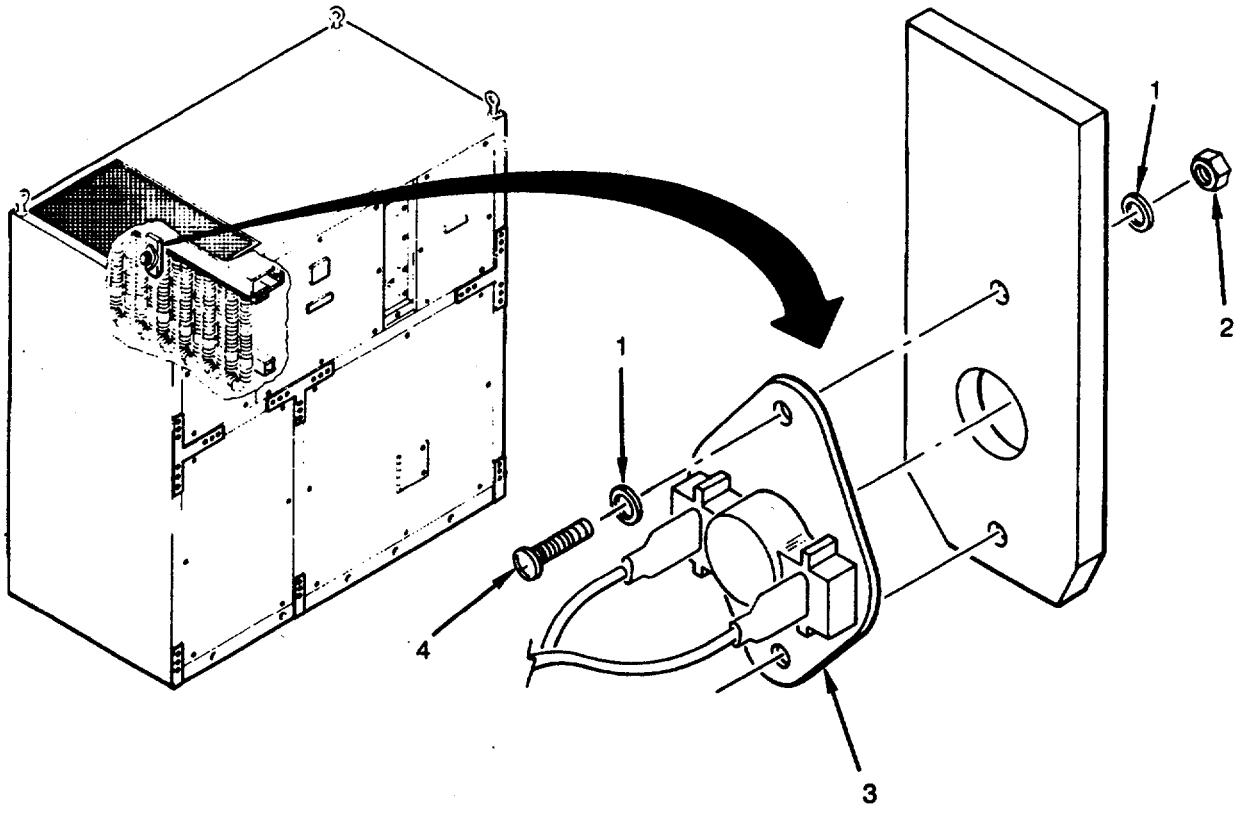


Figure 4-83. High Temperature Switch (S6)

4-84. AIR FLOW SWITCH (S8).

This task covers:

a. Inspection **b. Testing** **c. Removal**
d. Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Goggles, industrial (Appendix C)
Personnel: 1
Material:
Solder, lead-tin alloy (Item 18, Appendix E)
Flux, solder, liquid rosin base (item 19, Appendix E)
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front evaporator panel (para 4-25).

INSPECTION

1. Check for missing mounting hardware (see Figure 4-84).
2. Check that leads are properly connected to terminals.

TESTING

1. Slide cover (1) off air flow switch (5).
2. Using multimeter, check continuity between two wired terminal.
   - Move flow sensor down - no continuity.
   - Move flow sensor up - continuity.
3. If air flow switch fails test, replace switch.

REMOVAL

1. Tag, unsolder and disconnect leads.
2. Remove screw (2), lockwasher (3), and flat washer (4).
3. Remove air flow switch (5).
4. Check that air flow sensor arm (6) is not bent or broken.

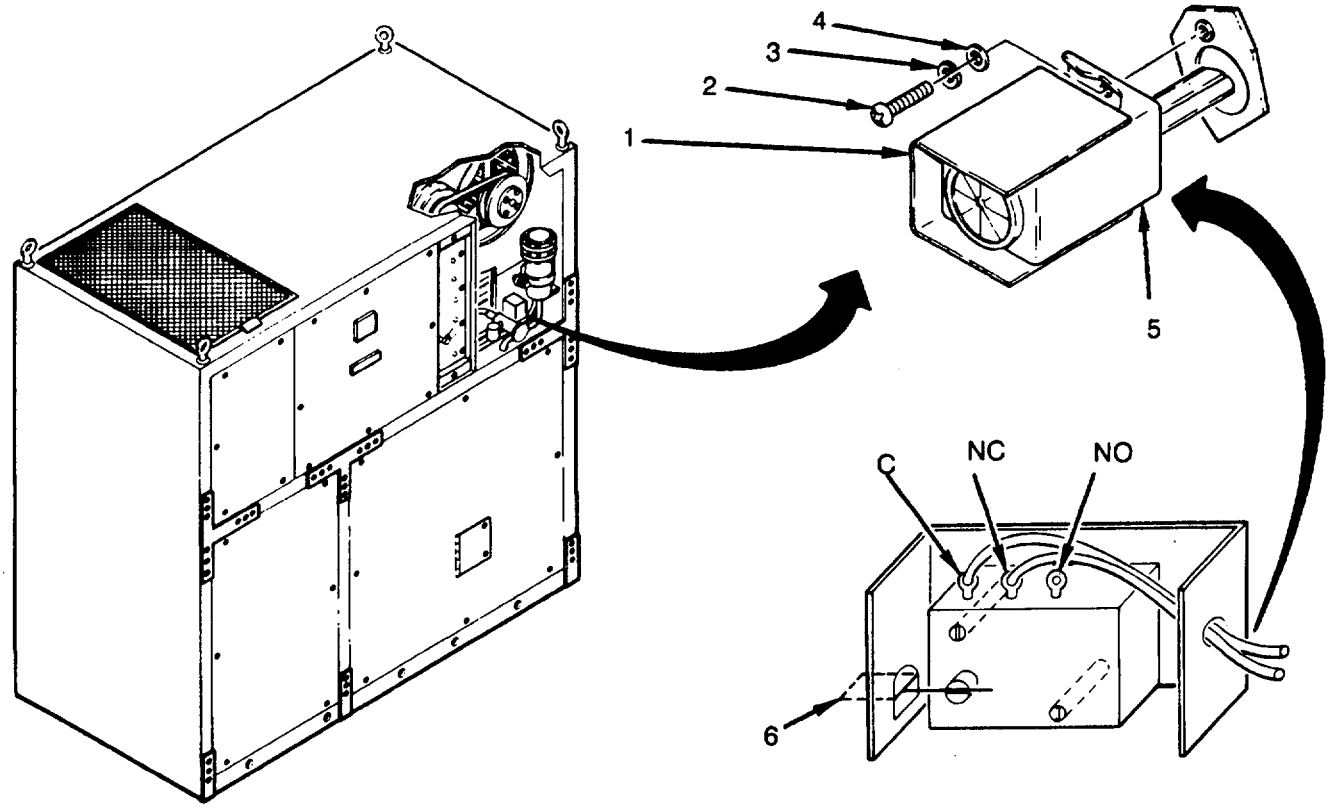


Figure 4-84. Air Flow Switch (S8)

INSTALLATION

1. Fungus proof replacement air flow switch per MIL-V-173.
2. Place air flow switch (5) in mounting position.
3. Install screw (2), lockwasher (3), and flat washer (4).
4. Solder leads and remove tags.
5. Slide cover (1) on switch (5).

FOLLOW ON PROCEDURES

1. Install right front evaporator panel (para 4-25).
2. Connect air conditioner input power at source.

4-85. HEAT CONTROL THERMOSTAT (S9).

This task covers:

a. Inspection **b. Testing** **c. Adjust**
d. Removal **e. Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Material:
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

INSPECTION

1. Check that leads are properly connected (see Figure 4-85 and Figure FO-3).
2. Check that capillary line is not damaged.
3. Check thermostat (5) for signs of overheating or other obvious damage. Replace if damaged.

TESTING

1. Using multimeter, check continuity. Place probes on red and blue terminals.
2. Slowly turn dial counterclockwise until continuity is indicated. Turn dial back and forth slightly to check that switch contacts open and close on a very narrow band.
3. If thermostat fails test, replace thermostat.

ADJUST

Set thermostat to 72°F (22°C).

REMOVAL

1. Remove screw (6) and cover (7).
2. Remove four screws (1), lockwashers (2), and flat washers (3).
3. Gently pull thermostat (5) away from bracket (4) as far as harness will allow.
4. Tag and disconnect leads.
5. Remove thermostat (5).

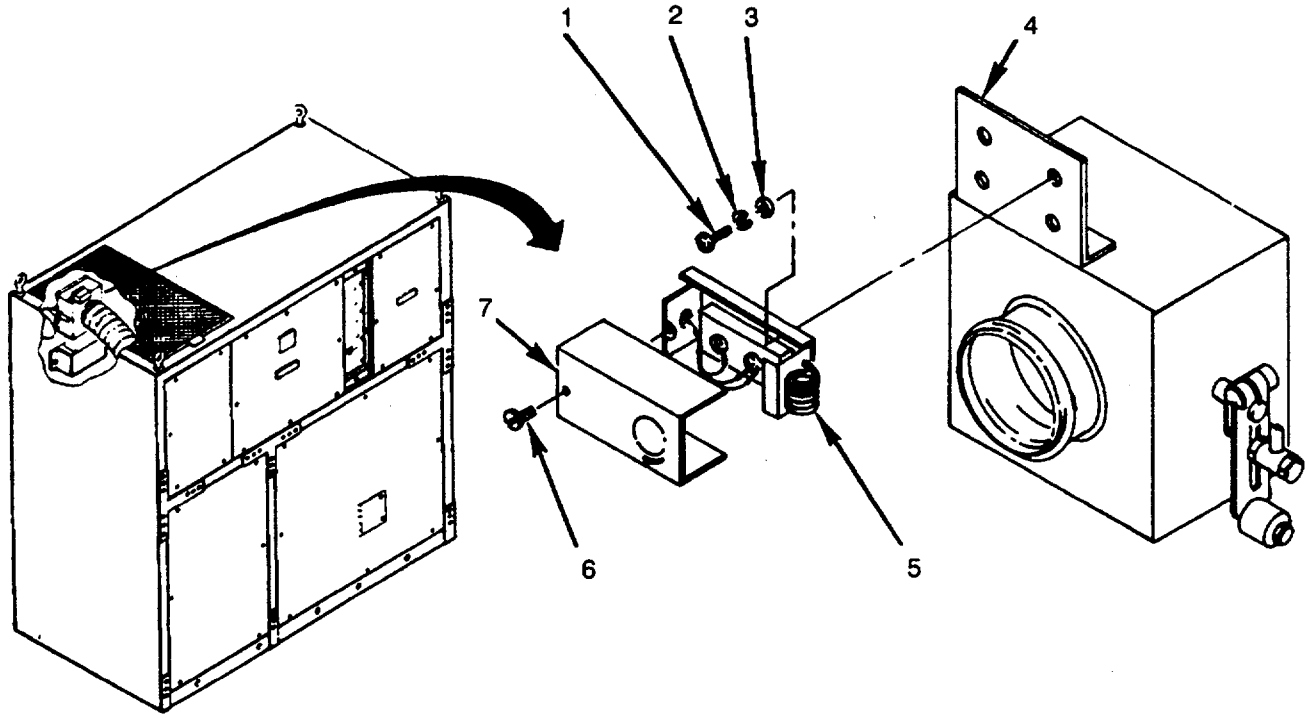


Figure 4-85. Heat Control Thermostat (S9)

INSTALLATION

NOTE

On replacement thermostat install insulator bushing.

1. Fungus proof replacement thermostat per MIL-V-173.
2. Reconnect leads and remove tags.
3. Place thermostat (5) in mounting position.
4. Install four screws (1) lockwashers (2), and flat washers (3).
5. Install cover (7) with screw (6).
6. Adjust thermostat (see ADJUST).

FOLLOW ON PROCEDURES

1. Install left front evaporator panel (para 4-23).
2. Connect air conditioner input power at source.

4-86. LOW AMBIENT TEMPERATURE THERMOSTAT (S13).

This task covers:

a. Inspection **b. Testing** **c. Adjust**
d. Removal **e. Removal** **f. Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Material:
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

INSPECTION

1. Check that leads are properly connected before (see Figure 4-86 and Figure FO-3).
2. Check that capillary line and sensing bulb are not damaged.
3. Check thermostat (10) for signs of overheating or other obvious damage. Replace if damaged.

TESTING

1. Using multimeter, check continuity. Place probes on red and blue terminals.
2. Slowly turn dial counterclockwise until continuity is indicated. Turn dial back and forth slightly to check that switch contacts open and close on a very narrow band.
3. If thermostat fails test, replace thermostat.

ADJUST

Set thermostat to 0°F (-18°C).

REMOVAL

1. Remove screw (9) and cover (8).
2. Tag and disconnect leads.
3. Remove screw (2), locknut (4), two flat washers (1), and clamp (3).
4. Remove four locknuts (6), eight flat washers (5), and four screws (7).
5. Remove thermostat (10).
6. Install cover (8) and screw (9)

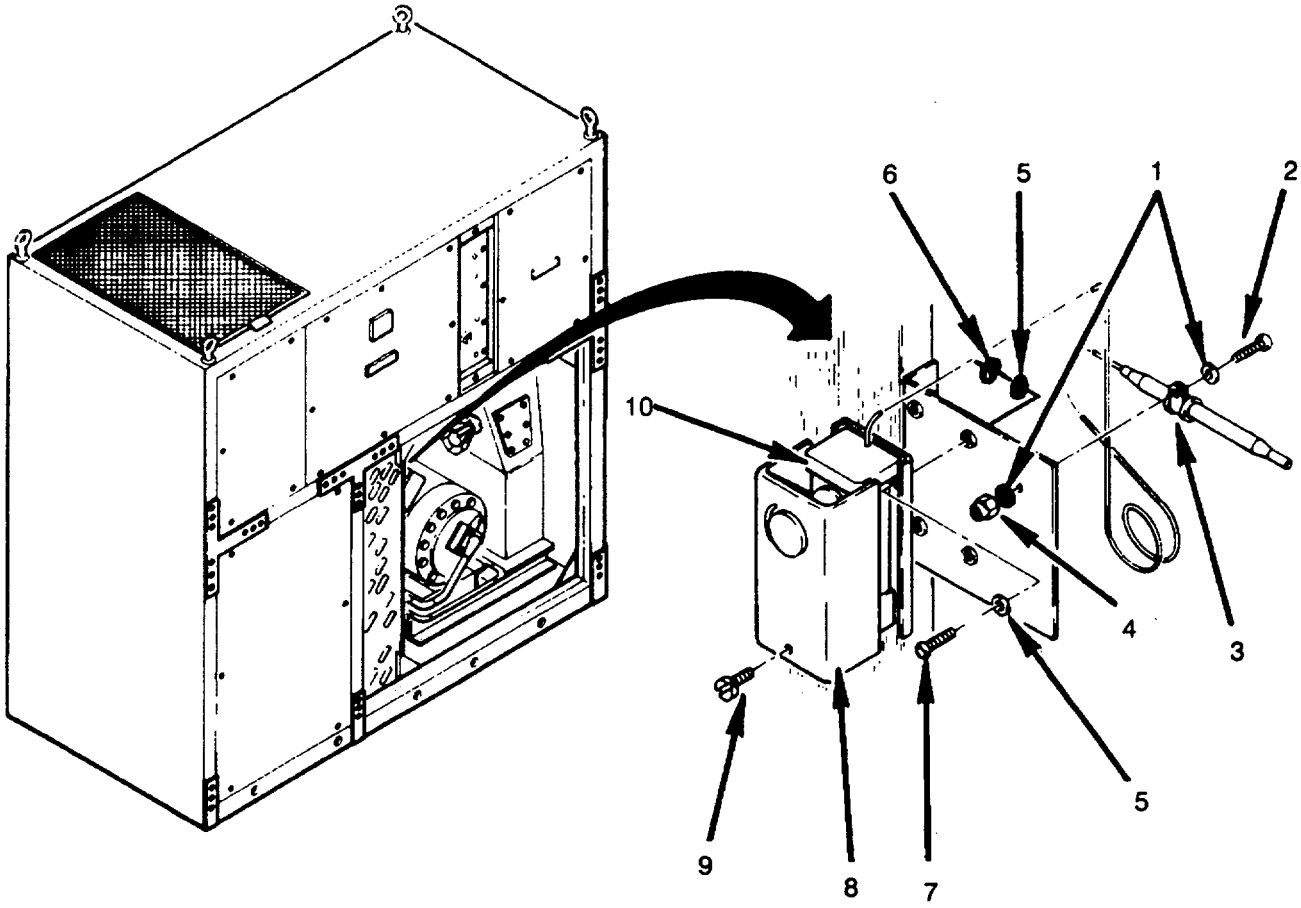


Figure 4-86. Low Ambient Temperature Thermostat (S13)

INSPECTION

1. Fungus proof replacement thermostat per MIL-V-173.
2. Place thermostat (10) in mounting position.
3. Install four screws (7), eight flat washers (5), and four locknuts (6).
4. Install sensing bulb with clamp (3), screw (2), two flat washers (1), and locknut (4).
5. Reconnect leads and remove tags.

FOLLOW ON PROCEDURES

1. Install right front condenser panel (para 4-28).
2. Connect air conditioner input power at source.

4-87. COOL CONTROL THERMOSTAT (S14).

This task covers:

a. Inspection **b. Testing** **c. Adjust**
d. Removal **e. Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Material:
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).

INSPECTION

1. Remove two screws (9), flat washers (7), lockwashers (8), and cover (6). (See Figure 4-87).
2. Check that leads are properly connected (see Figure FO-3).
3. Check that capillary line (18) and sensing bulb (5) are not damaged.
4. Check thermostat for signs of overheating or other obvious damage. Replace if damaged.

TESTING

1. Using multimeter, check continuity. Place probes on each set of red and blue terminals, in turn.
2. At each set, slowly turn dial back and forth slightly to check that switch opens and closes on a very narrow range.
3. Place probes on each set of red and yellow terminals in turn. Repeat step 2.
4. Replace thermostat if it fails any of above tests.

ADJUST

NOTE

This temperature adjustment is for single mode of operation.

Set temperature to desired room temperature between 68° and 95°F (20° and 35°C).

REMOVAL

1. Remove screw (1), flat washer (3), lockwasher (2), and sensing bulb (5).
2. Remove sensing bulb clamp (4).
3. Remove screw (16), flat washer (15), lockwasher (17), and clamp (14).
4. Tag and disconnect leads.

5. Remove thermostat housing grommet (13).
6. Remove six screws (10).
7. Remove thermostat (11) and sensing bulb (5).

INSTALLATION

1. Fungus proof thermostat per MIL-V-173.
2. Position thermostat (11) and sensing bulb (5) in mounting position.
3. Install thermostat (11) with six screws (10) to housing (12).
4. Install sensing bulb (5), and grommet (13).
5. Install clamp (14) with screw (16), lockwasher (17), and flat washer (15).
6. Install sensing bulb (5) with clamp (4), screw (1), lockwasher (2), and flat washer (3).
7. Reconnect leads and remove tags.
8. Set thermostat to appropriate operating temperature (see ADJUST).

FOLLOW ON PROCEDURES

1. Install cover (6) with two screws (9), lockwashers (8), and flat washers (7).
2. Install left front evaporator panel (para 4-23).
3. Connect air conditioner input power at source.

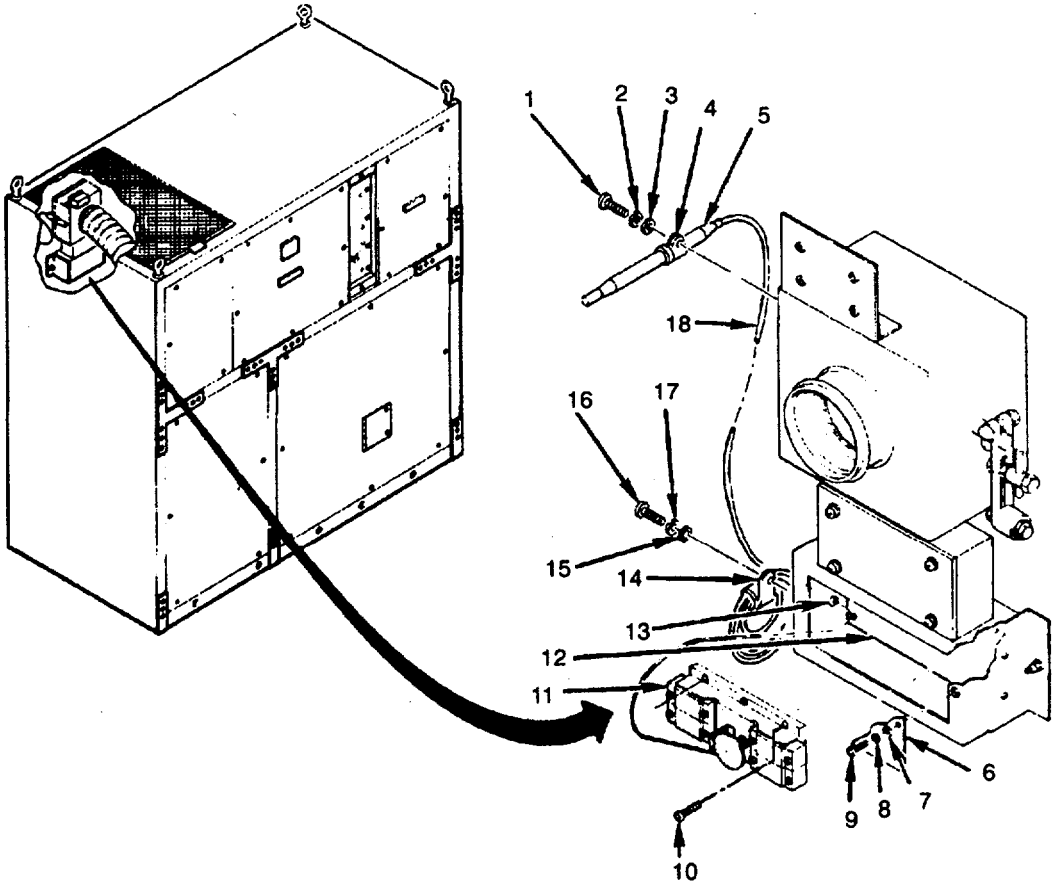


Figure 4-87. Cool Control Thermostat (S14)

4-88. SOLENOID VALVES (L1 AND L2) COIL REMOVAL.

This task covers:

a. Inspection **b. Testing** **c. Replace**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Crimping tool (pigtail) (Item 10, Appendix B)
Personnel: 1
Material:
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front evaporator panel (para 4-25).

INSPECTION

1. Check that leads are properly connected (see Figure 4-88 and Figure FO-3).
2. Check coil for signs of overheating or other obvious damage. Replace coil, if damaged.

TESTING

1. Check to be sure power has been disconnected.
2. Tag and disconnect wires from coil.
3. Use multimeter set on lowest OHMS scale to check for continuity between the coil wires. If continuity is not found, coil is open and not be replaced.
4. Use multimeter to check for continuity between each wire and coil casing. If continuity is found between either wire and case, the coil is grounded and should be replaced.
5. If continuity checks are satisfactory, apply 120 V ac from an external power supply across coil wires, 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. Contact Direct Support Maintenance for further action.

REPLACE

NOTE

Replacement consists of replacing defective coil. Refer all other solenoid repair replacement to Direct Support Maintenance.

1. Remove screw (6) and coil cover (5).
2. Tag and disconnect leads.
3. Remove coil retainer (2) and nameplate (1).
4. Remove coil (3).

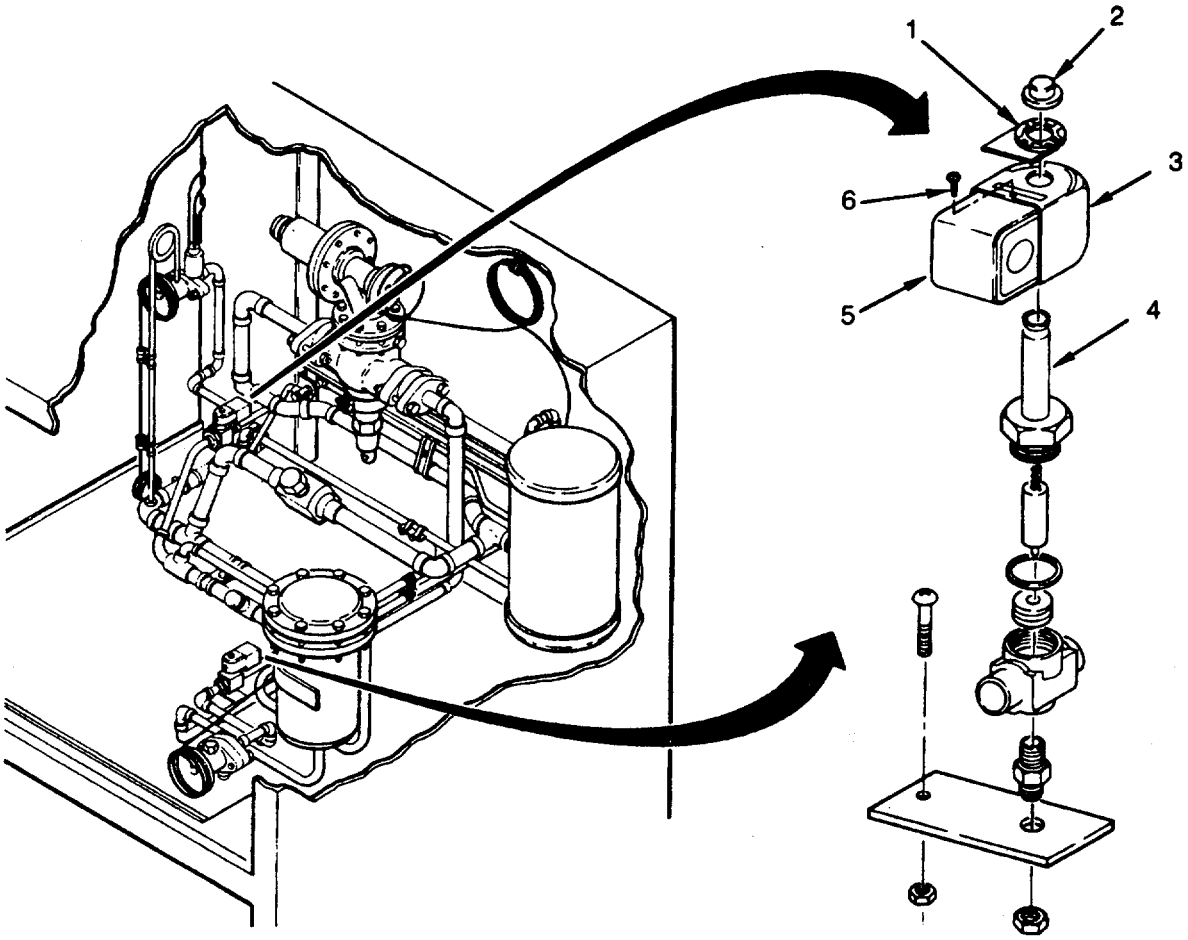


Figure 4-88. Solenoid Valve (L1 and L2) Coil Removal

5. Fungus proof replacement coil per MIL-V-173.

NOTE

On replacement coil, remove one knockout, install bushing, strip and dead end wires, and install crimp pigtails to wires.

6. Install coil (3) on valve plunger (4).
7. Connect wire leads tagged in step 2.
8. Install coil cover (5) with screw (6).
9. Install nameplate (1) and coil retainer (2).

FOLLOW ON PROCEDURES

1. Install right front evaporator panel (para 4-25).
2. Connect air conditioner input power at source.

4-89. CONDENSER FAN CONNECTING LINK ASSEMBLY.

This task covers:

a. Inspection **b. Adjust** **c. Removal**
d. Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser panel (para 4-27).

INSPECTION

1. Check that control rod (7) is not bent or damaged. Replace if damaged (see Figure 4-89).
2. Check that connector swivels (5) and (9) are not damaged. Replace if damaged.
3. Check for damaged, loose, or missing mounting hardware.

ADJUST

1. Loosen screw (8) on actuator connector swivel (9) and close damper.
2. Match mark control rod (7) next to connector swivel (9).
3. Open damper with 1/2 inch (1.3 cm) clearance and match mark control rod (7).
4. Measure damper rod marks for one inch (2.54 cm) between steps 2 and 3.
5. If measurement between steps 2 and 3 is less than one inch (2.54 cm), repeat steps 1 thru 4.
6. To test linkage operation contact Direct Support Maintenance.

REMOVAL

1. Loosen screw (8) on actuator connector swivel (9).
2. Loosen screw (6) on control lever connector swivel (5).
3. Remove control rod (7).
4. Remove locknut (10) and actuator connector swivel (9).
5. Remove locknut (1) and control lever connector swivel (5).
6. Remove bolt (3), locknut (4), and control lever (2).

INSPECTION

1. If control rod is replaced, cut replacement control rod (7) to 13 inches (33 cm).
2. Install control lever (2) with bolt (3) and locknut (4).
3. Install control lever connector swivel (5) with locknut (1).
4. Install actuator connector swivel (9) with locknut (10).
5. Install control rod (7).
6. Tighten screw (6) on control lever connector swivel (5).
7. Tighten screw (8) on actuator connector swivel (9)
8. Adjust linkage.

FOLLOW ON PROCEDURES

1. Install left front condenser panel (para 4-27).
2. Connect conditioner input power at source.

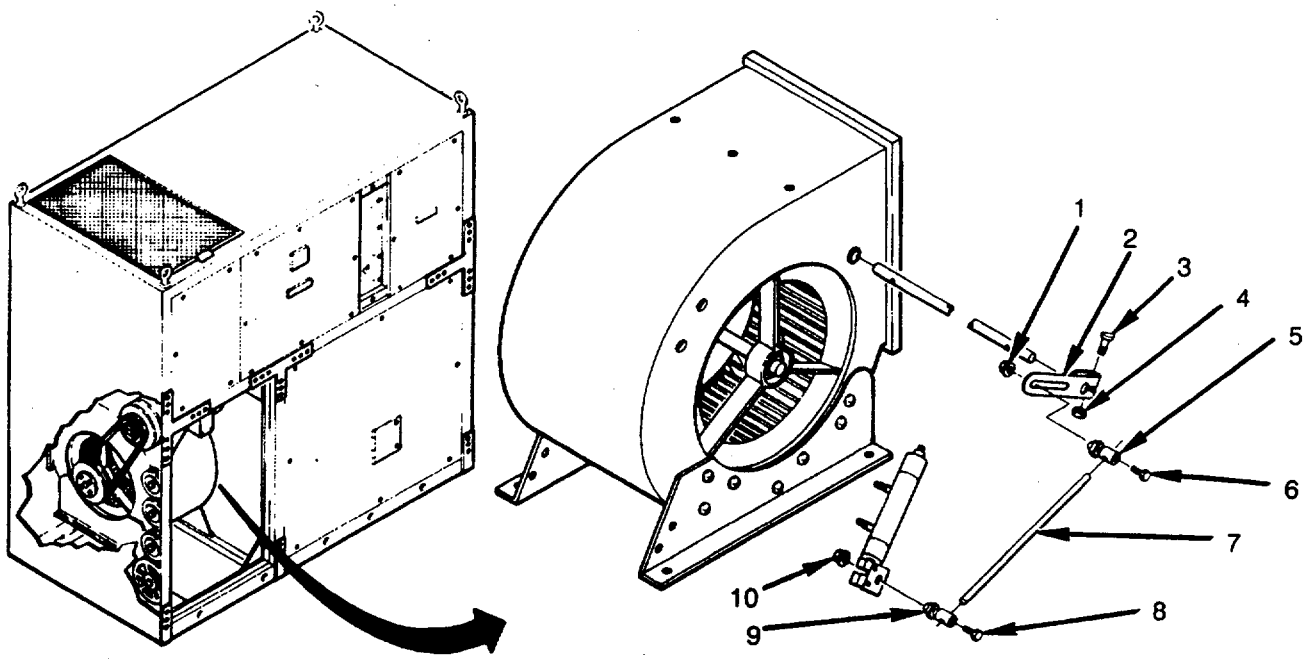


Figure 4-89. Condenser Fan Connecting Link Assembly

4-90. CONDENSER COIL.

This task covers:
a. Inspection **b. Service**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Fin comb (Item 12, Appendix B)
Vacuum cleaner (item 13, Appendix B)
Goggles, industrial (Appendix C)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser panel (para 4-27).
3. Remove right front condenser panel (para 4-28).

INSPECTION

1. Check for accumulated dirt. Clean if dirt is evident (see Figure 4-90).
2. 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. If a leak or major damage is evident, refer to Direct Support Maintenance.

SERVICE

WARNING

Compressed air used for cleaning purposes shall not exceed 30 psi (2.1 kg/cm2). Do not direct compressed air against the skin. When using compressed air, wear safety glasses or goggles to prevent dirt from being blown into your eyes.

CAUTION

Do not use steam to clean coil. Pressure can build up in system causing damage to components.

Clean coil with a soft bristle brush, vacuum cleaner and brush attachment, or use compressed air at 30 psi (2.1 kg/cm2) or less from inside of unit to blow the dirt out. Take care to avoid fin damage. When using compressed air, wear safety glasses or goggles to prevent dirt from being blown into your eyes.

FOLLOW ON PROCEDURES

1. Install left front condenser panel (para 4-27).
2. Install right front condenser panel (para 4-28).
3. Connect air conditioner input power at source.

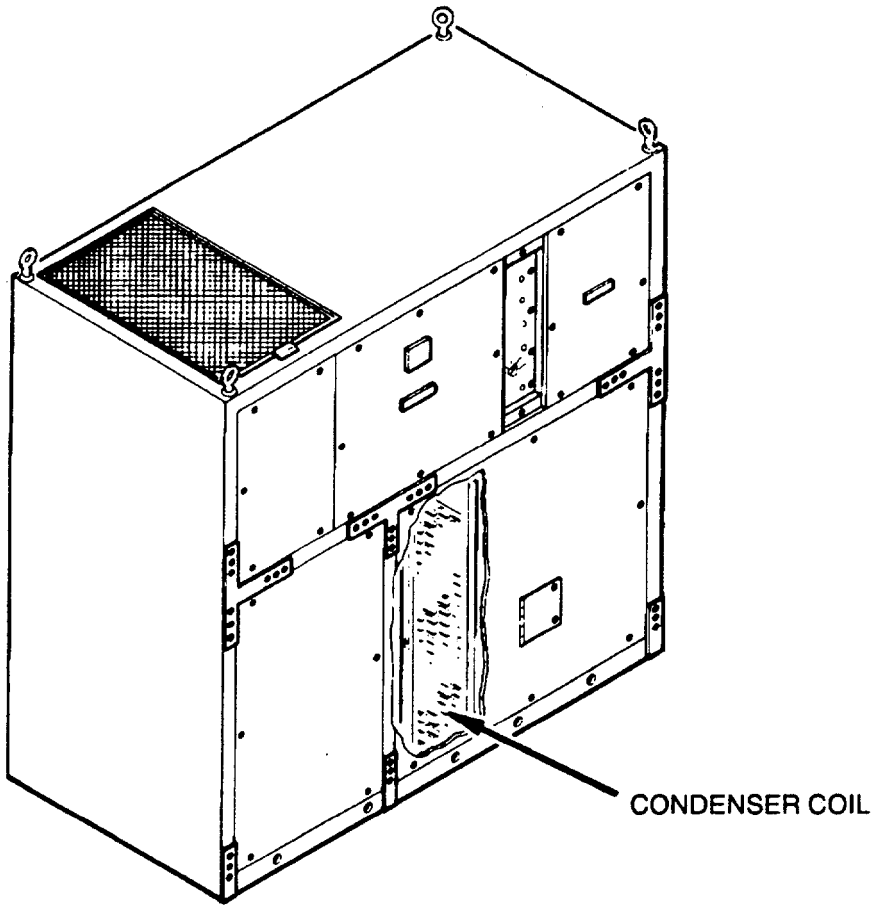


Figure 4-90. Condenser Coil Cleaning

4-91. EVAPORATOR COIL.

This task covers:
a. Inspection **b. Service**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Fin comb (Item 12, Appendix B)
Vacuum cleaner (item 13, Appendix B)
Goggles, industrial (Appendix C)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).
3. Remove right front evaporator panel (para 4-25).
4. Open control box (para 4-45).

INSPECTION

1. Check for accumulated dirt. Clean if dirt is evident (see Figure 4-91).
2. 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. If a leak or major damage is evident, refer to Direct Support Maintenance.

SERVICE

WARNING

Compressed air used for cleaning purposes shall not exceed 30 psi (2.1 kg/cm2). Do not direct compressed air against the skin. When using compressed air, wear safety glasses or goggles to prevent dirt from being blown into your eyes.

CAUTION

Do not use steam to clean coil. Pressure can build up in system causing damage to components.

Clean coil with a soft bristle brush, vacuum cleaner and brush attachment, or use compressed air at 30 psi (2.1 kg/cm2) or less from inside of 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.

FOLLOW ON PROCEDURES

1. Install left front evaporator panel (para 4-23).
2. Install right front evaporator panel (para 4-25).
3. Close control box (para 4-45).
4. Connect air conditioner input power at source.

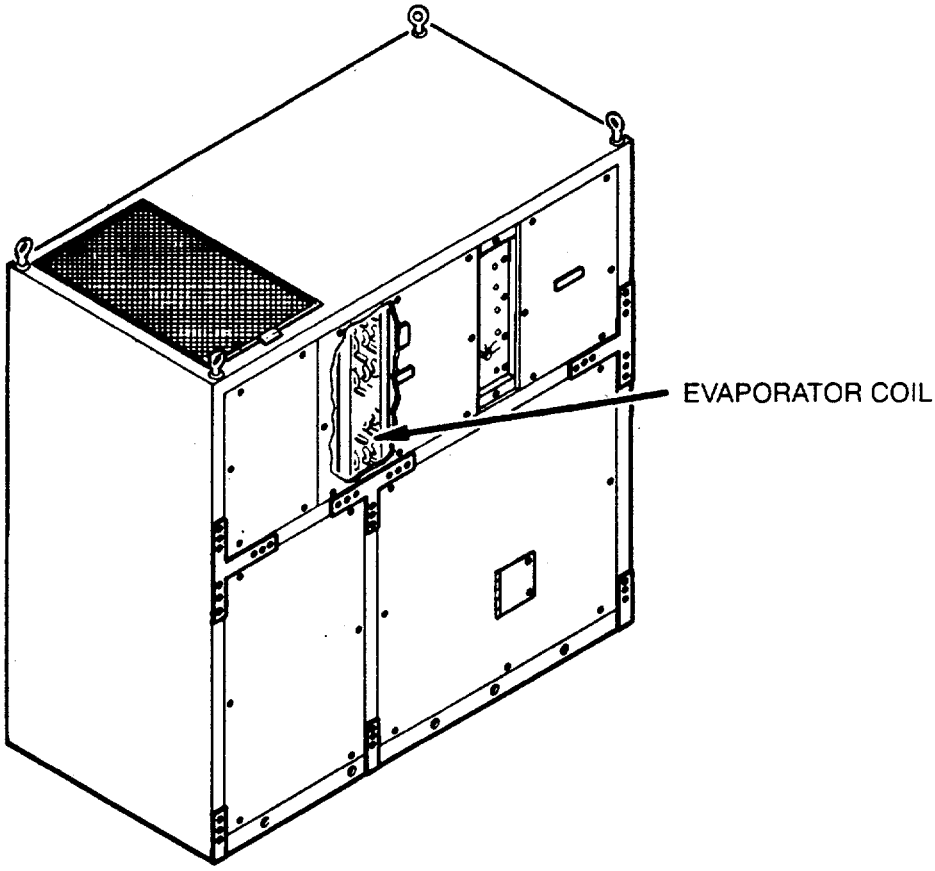


Figure 4-91. Evaporator Coil Cleaning

4-92. DRAIN AREAS.

This task covers:
a. Inspection **b. Service**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Materials:
Corrosion preventative (Item 5, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air. conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).
3. Remove right front evaporator panel (para 4-25).
4. Remove left front condenser panel (para 4-27).
5. Remove right front condenser panel (para 4-28).

INSPECTION

1. Check that drain areas are clean (see Figure 4-92).
2. Check that drain areas do not contain water.
3. Check drain pan for rust and corrosion. Apply corrosion preventative as required.

SERVICE

1. Pour some clean fresh water into drain areas.
2. If water does not freely flow out of drain tubes or has muddy appearance, insert flexible wire in drain tube. Agitate until clog and accumulated debris are loose.
3. Pour additional water in drain area until unrestricted flow of water pours from drain tubes.
4. If water does not freely flow out of drain tube area, disconnect drain tubes from tee fitting, insert flexible wire in drain line. Agitate until clog and accumulated debris are loose.
5. Pour some clean fresh water into drain tube at tee fitting until unrestricted flow of clean water pours from drain tube.
6. Connect drain tubes.

FOLLOW ON PROCEDURES

1. Install left front evaporator panel (para 4-23).
2. Install right front evaporator panel (para 4-25).
3. Install left front condenser panel (para 4-27).
4. Install right front condenser panel (para 4-28).
5. Connect air conditioner input power at source.

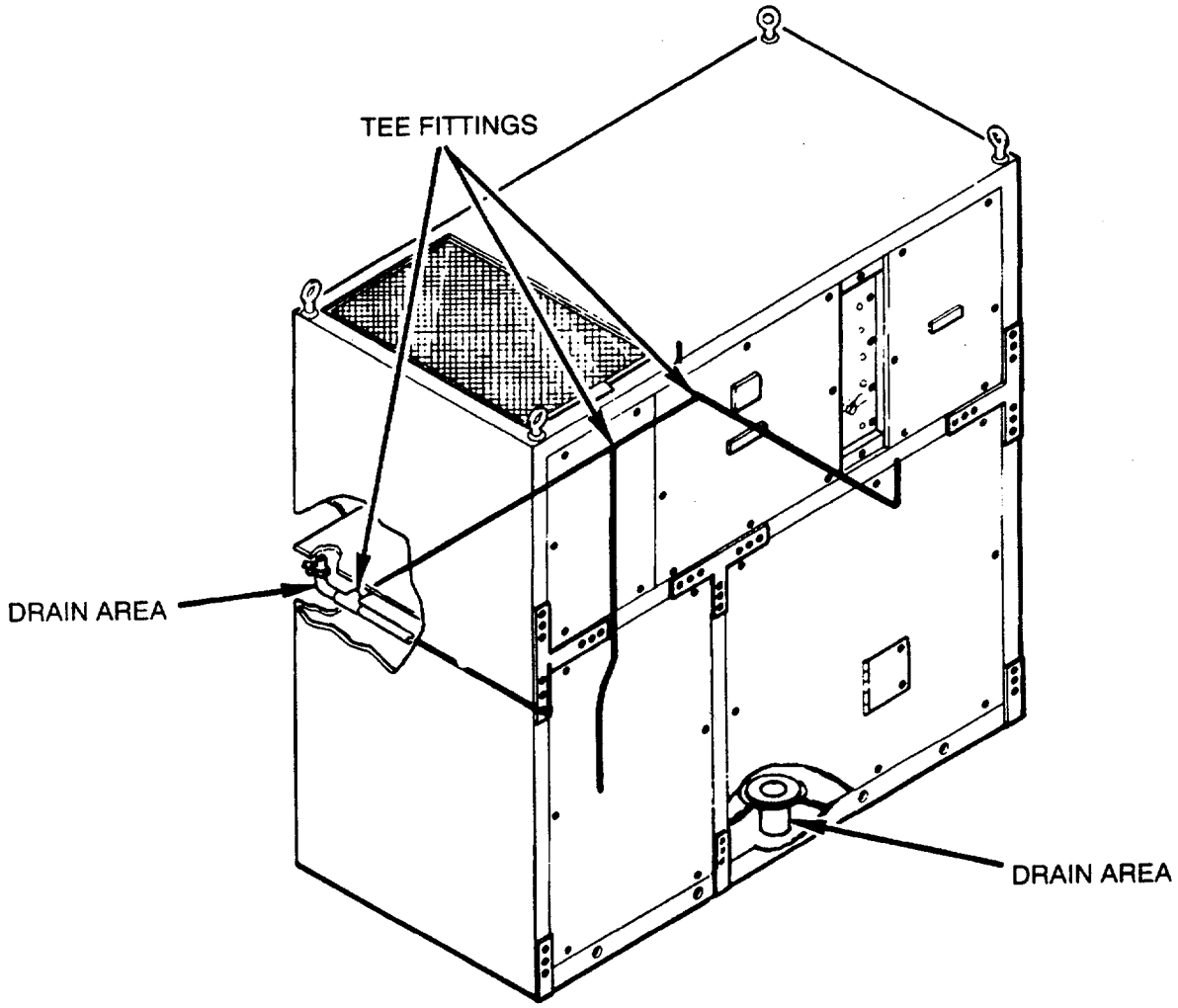


Figure 4-92. Drain Areas

Section VII. PREPARATION FOR STORAGE OR SHIPMENT

4-93. PREPARATION FOR STORAGE OR SHIPMENT.

a. Administrative storage of equipment.

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

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

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

b. Intermediate storage - 46 to 180 days. Repeat administrative storage procedures. No additional special handling is required other than protection from damage and the elements. Place the air conditioner in a dry, covered area.

c. Long term or flyable storage - over 180 days. Repeat administrative storage procedures and the following:

(1) Bolt the unit to a skid base; preferably the original used to ship the unit if it has been preserved.
(2) Wrap the unit with two layers of heavy plastic sheet or barrier paper.
(3) Tape and strap the wrapping in place.
(4) Mark the air conditioner per standard Army, Navy, or Air Force procedures.

CHAPTER 5
DIRECT SUPPORT MAINTENANCE
Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

5-1. COMMON TOOLS AND EQUIPMENT. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. No special tools are required for Direct Support Maintenance of the air conditioner.

5-3. REPAIR PARTS. Repair parts are listed and illustrated in the Repair and Special Tools List (RPSTL), TM 9-4120-381-24P, covering Unit, Direct Support, and General Support Maintenance for this equipment.

Section II. DIRECT SUPPORT TROUBLESHOOTING

5-4. GENERAL. This section contains direct support troubleshooting information for locating and correcting most of the operating troubles which may develop in the air conditioner.

NOTE

Before you use the table, be sure you have performed all applicable PMCS (Table 4-1).

5-5. TROUBLESHOOTING. Each malfunction for the compressor is listed in Table 5-1. The malfunction is followed by a list of tests or inspections which help to determine probable causes and corrective actions to take. All malfunctions that may occur and all tests or inspections and corrective actions may not be listed. If a malfunction is not listed or is not corrected by corrective action, notify your supervisor.

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.
- Whenever possible, the Input power supply to equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.
- Be careful not to contact high-voltage connections of 208 V ac input when installing or operating this equipment.
- Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

- Do not operate the equipment without all panels and covers In place and tightly secured.
- Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

Table 5-1. Direct Support Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. COMPRESSOR WILL NOT START.

Step 1. Power off.

a. Check to see if circuit breaker CB1 is tripped (para 4-62) and reset circuit breaker.
b. Check main fuses and wiring (para.4-42), repair or replace as necessary.

Step 2. Current overload open.

a. Check K23 and K24 current overloads (para 5-52) in compressor (B2) electrical box for open (see Figure FO-3.)
b. Replace current overload if K23 or K24 are open (para 5-52).

Step 3. Oil safety switch open.

Reset low oil pressure switch (S7) manually (para 5-25).

Step 4. Check for loose electrical connections or faulty wiring (para 5-50)..
Tighten connections. Check wiring and rewire if necessary.

Step 5. Compressor motor burned out.

Check and replace compressor if defective (para 5-46).

2. LOW COMPRESSOR CAPACITY OR INABILITY TO PULL DOWN SYSTEM.

Step 1. Blown valve plate or cylinder head gasket.
See malfunction 3.

Step 2. Leaky valve plates or worn valve seats.
Replace valve plate assembly (para 5-47).

Step 3. Leaky suction valves.
Replace suction valves (para 5-47).

Step 4. Broken connecting rods or pistons.

a. Replace connecting rods and pistons (para 5-49), replace if necessary.
b. Check rods, pistons, and cylinder tolerances (para 5-49).
c. Replace compressor (para 5-46) if any cylinder bore is out of tolerance.

Table 5-1. Direct Support Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. BLOWN VALVE PLATE OR CYLINDER HEAD GASKETS.

Step 1. Cylinder head bolts not properly torqued.

a. Replace cylinder head gasket (para 5-47).
b. Retorque cylinder head bolts to 30-35 lb-ft.

Step 2. Liquid refrigerant floodback or flooded start. See malfunction 7.

4. COMPRESSOR CYCLES ON LOW-PRESSURE CONTROL.

Step 1. Low refrigerant pressure switch erratic in operation.

a. Check tubing to switch to see if clogged or crimped (para 5-24).
b. Check switch setting (para 5-24).

Step 2. Insufficient refrigerant in system.
Add refrigerant (para 5-17).

Step 3. Suction service valve closed.
Backseat (counterclockwise) suction service valve (para 5-34).

Step 4. Restricted air flow through condenser.
Clean condenser (para 4-90).

Step 5. Discharge service valve not fully open.
Backseat (counterclockwise) discharge service valve (para 5-33).

Step 6. Air in system.
Purge refrigerant system (para 5-13).

5. COMPRESSOR CONTINUALLY CYCLES.

Step 1. Faulty high refrigerant pressure switch.
Adjust or replace switch (para 5-23).

Step 2. Faulty low refrigerant pressure switch.
Adjust or replace switch (para 5-24).

Step 3. Faulty low oil pressure switch.
Adjust or replace switch (para 5-25).

Step 4. Condenser capacity reduced by refrigerant overcharge accompanied by high discharge pressure.
Remove overcharge (para 5-17).

Step 5. Plugged drier filter.
Replace drier filter (para 5-26).

Table 5-1. Direct Support Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
6. LOW DISCHARGE PRESSURE.
Step 1. Suction service valve partially closed. Backseat (counterclockwise) suction service valve (para 5-34).
Step 2. Leaky compressor suction valves. Remove cylinder head, examine valves and valve seats (para 5-47), replace if necessary.
Step 3. Worn piston rings. a. Check connecting rods pistons, and rings (para 5-49), replace if necessary. b. Check rods, pistons, and cylinder tolerances (para 5-49). c. If any cylinder bore is out of tolerance (para 5-49), replace compressor (para 5-46).
7. FLOODING.
Step 1. Improperly set primary expansion valve. Adjust primary expansion valve (para 5-38).
Step 2. Improperly set liquid quench expansion valve. Adjust liquid quench expansion valve (para 5-36).
Step 3. Improperly set hot gas bypass valve Adjust hot gas bypass valve (para 5-37).
Step 4. Evaporator circulator fan failure. a. Check fan belt tension (para 4-69). b. Check evaporator motor (para 4-70). c. Check evaporator motor fan pulleys (para 4-72 and 4-73). d. Check evaporator circulator fan (para 4-71).
8. LOW SUCTION PRESSURE.
Step 1. Insufficient refrigerant in system. Add refrigerant (para 5-17).
Step 2. Evaporator circulator fan failure. a. Check fan belt tension (para 4-69). b. Check evaporator motor (para 4-70). c. Check evaporator motor and fan pulleys (para 4-72 and 4-73). d. Check evaporator circulator fan (para 4-71).

Table 5-1. Direct Support Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

8. LOW SUCTION PRESSURE - Continued.

Step 3. Plugged drier filter.
Replace drier filter (para 5-26).

9. COMPRESSOR NOISY.

Step 1. Slugging due to floodback of refrigerant.
See malfunction 6.

Step 2. Hydraulic knock due to excess oil in circulation.
a. Remove excess compressor oil (para 5-46).
b. Recheck oil level (para 5-46).

Step 3. Bearings wiped because of loss of oil.
a. Add compressor oil (para 5-46).
b. Recheck oil level (para 5-46).
c. Check pipes for rattles and vibration (see malfunction 10).

Step 4. Compressor not firmly mounted.
Check for loose mounting hardware (para 5-46).

Step 5. Broken connecting rods or pistons.
a. Check connecting rods pistons, and rings (para 5-49), replace if necessary.
b. Check rods, pistons, and cylinder tolerances (para 5-49).
c. If any cylinder bore is out of tolerance (para 5-49), replace compressor (para 5-46).

Step 6. Broken discharge or suction valves.
Check discharge and suction valves (para 5-33 and 5-34), replace if necessary.

10. PIPE RATTLE.

Inadequately supported piping or loose pipe connections.

Support pipes or check pipe connections.

11. OIL PRESSURE LOWER THAN NORMAL OR NO OIL PRESSURE.

Step 1. Low oil charge.
a. Check compressor oil level (para 5-46).
b. Add compressor oil and recheck compressor oil level (para 5-46).

Step 2. Faulty oil pump end bearing assembly.
Replace oil pump end bearing assembly (para 5-48).

Table 5-1. Direct Support Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

11. OIL PRESSURE LOWER THAN NORMAL OR NO OIL PRESSURE - Continued.

Step 3. Worn oil pump.
Replace oil pump assembly (para 5-48).

12. COMPRESSOR MOTOR PROTECTORS TRIPPING OR CYCLING

Step 1. High discharge pressure.
Check operation of condenser fan (para 4-77) and clogged condenser coil, contact General Support Maintenance.

Step 2. Defective overload K23 or K24 relay.
Replace defective relay (para 5-52).

Step 3. High suction temperature.
Improperly set liquid quench valve (para 5-36) or hot gas bypass valve (para 5-37), adjust valves.

Step 4. Loose power or control circuit wiring connections.
Check all power and control circuit connections (Figure FO-3).

Step 5. Defective compressor motor.
Check motor windings for short to ground (see malfunction 14).

13. COMPRESSOR CYCLES ON LOCKED ROTOR.

Step 1. Low line voltage.
Check line voltage and determine location of voltage drop (para 4-13).

Step 2. Seized compressor. Remove pump end bearing assembly and attempt to rotate eccentric shaft (para 5-48).
Replace compressor (para 5-46) if eccentric shaft does not turn.

Step 3. Defective compressor motor.
Check motor windings for short to ground. (See malfunction 14.)

Step 4. Single phasing.
a. Check voltage across all three legs at compressor contactor K10 (para 4-51 and Figure FO-3). If incorrect, correct source of problem.
b. Check input voltage to RFI box (para 4-42).

Step 5. Liquid refrigerant condensing in cylinder.
Check and replace valve plates (para 5-47).

Table 5-1. Direct Support Troubleshooting - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

14. MOTOR BURNOUT.

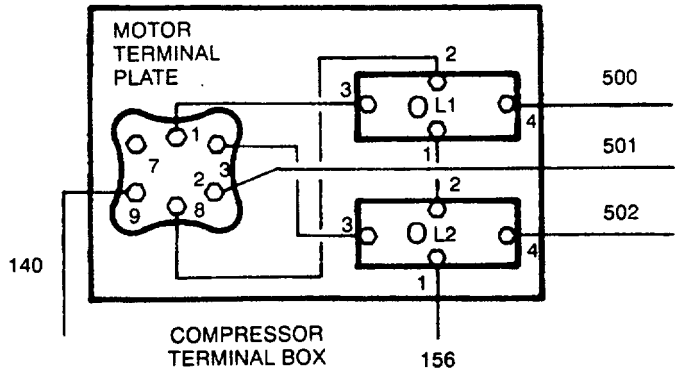
Check control box for welded starter contacts, welded overload contacts or burned out heater elements.

a. Replace crankcase heater (para 4-81), if defective.
b. Replace terminal plate (para 5-51), if defective.
c. Replace current overloads K23 and K24 (para 5-52), if defective.

NOTE

For steps d, e, and f, tag and remove all wires from terminal plate.

d. Check thermal overload (S15) for continuity. Using multimeter, measure across terminals 8 and 9 for continuity. Replace compressor (para 5-46) if continuity is not indicated.
e. Check motor windings for short to ground. Using multimeter, measure from each terminal (1, 2, and 3) on terminal plate (para 5-51) to ground. Replace compressor (para 5-46) if any measurement has continuity.
f. Check motor windings resistance. Using multimeter, measure across terminalsl-2, 2-3, and 1-3 (para 5-51) for less than 10 ohms. If any measurement is greater than 10 ohms, replace compressor (para 5-46).



15. COMPRESSOR RUNNING HOT.

Step 1. Blown valve plate head gasket.
Replace gasket (para 5-47), if defective.

Step 2. Broken suction or discharge valve.
Replace valves and valve plate (para 5-47), if defective.

Step 3. Compression ratio too high.
a. Check setting of high (para 5-23) and low (para 5-24) pressure switches.
b. Clean condenser coil (para 4-90).
c. Check that evaporator motor (para 4-70) and condenser motor (para 4-76) are operating properly.

Section III. DIRECT SUPPORT MAINTENANCE PROCEDURES

5-6. GENERAL. This section contains maintenance procedures which are authorized to Direct Support Maintenance (F) by the Maintenance Allocation Chart (MAC) Appendix B and Source, Maintenance and Recoverability (SMR) coded items. Each paragraph covers a complete maintenance procedure but may require other tasks to be included (i.e. initial setups, references and follow on procedures). Perform procedures/tasks in designated order.

5-7. PANELS AND INFORMATION PLATES. For removal, inspection, cleaning, and installation, refer to the following paragraphs:

a. Center Front Evaporator Panel. Refer to paragraph 4-22.

b. Left Front Evaporator Panel. Refer to paragraph 4-23.

c. Right Front Evaporator Panel. Refer to paragraph 4-25.

d. Information Plates. Refer to paragraph 4-26.

e. Left Front Condenser Panel. Refer to paragraph 4-27.

f. Right Front Condenser Panel. Refer to paragraph 4-28.

g. Front Service Valve Panel. Refer to paragraph 4-29.

h. Left Electric Plate. Refer to paragraph 4-30.

i. Right Electric Plate. Refer to paragraph 4-31.

j. Repair. Repairs are limited to straightening of minor dents, rewelding of broken welds, installation of loose or missing rivets and rivnuts, replacement of quarter turn receptacles, replacement of loose or missing bushing, grommets, gaskets and insulation, paint touch up, and replacement of damaged or missing information plates.

(1) Minor Dents. Repair minor dents using standard sheet metal repair practices.

(2) Broken Welds. Repair broken welds using standard weld repair practices.

(3) Rivets. To replace loose or missing rivets, drill old rivet out using a drill bit slightly smaller than the diameter of old rivet body, and install replacement rivet.

(4) Rivnuts. To replace loose or missing rivnuts, drill old rivnut out using a drill bit slightly smaller than the diameter of the old rivnut body, and install replacement rivnut.

(5) Quarter Turn Receptacles. To replace or repair quarter turn receptacles, drill old rivet out using a drill bit slightly smaller than the diameter of old rivet body, and install replacement receptacle.

(6) Bushing arid Grommets. Replace or repair damaged bushings or grommets using standard electricians repair practices.

(7) Gasket/Insulation. To replace or repair gasket or insulation:

(a) Remove as much old gasket or insulation material as possible by pulling or scraping it away from the metal surface.

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

(b) Soften and remove old adhesive, gasket and insulation residue, using acetone or MEK and a stiff brush.

(c) Starting with an end, carefully attach the gasket to the metal. Press into firm contact all over.

(8) Touch Up. Should touch up or refinishing be necessary, refer to TM 43-0139, Painting Instructions for Field Use.

(9) Information Plates. To replace damaged or missing information plates, drill rivets out using a drill bit slightly smaller than the diameter of the rivet body, and secure new information plate with replacement rivets.

5-8. EVAPORATOR MOTOR (B1).

This task covers: Disassembly Repair Reassembly

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
File, hand (Item 22, Appendix B)
Personnel: 1

Materials:
Grease aeroshell 22 (Item 2, Appendix E)
Rags (Item 12, Appendix E)

Equipment Conditions:
Remove evaporator motor (para 4-70).

DISASSEMBLY

1. Remove three screws (17) (see Figure 5-1).
2. Remove fan shield (1) from end cap (5).
3. Loosen fan clamp screw (16).

CAUTION

Plastic fan is very fragile. Be careful not to break fan when prying clamp open and prying fan off the shaft.

4. Pry open clamp (3).
5. Remove plastic fan (2) by prying off shaft.
6. Match-mark motor frame (8) and end caps (5) and (13).
7. Remove four end cap nuts (12) and through bolts (4).

CAUTION

When removing end caps, rotor will be freed. Damage to rotor could occur if rotor is dropped while removing end caps from motor.

8. Remove end caps (5) and (13).
9. Carefully pull rotor (15) from the motor frame (8).
10. Identify location of two wavy spring washers (7) and bearing spacer washer (6).
11. Carefully remove small bearing (10) from fan end of shaft (9).
12. Carefully remove large bearing (11) from shaft end (14).
13. Examine rotor (15), stator and housing (8), and shafts for nicks, gouges, deformations, or evidence of overheating.

REPAIR

Dress high metal defects in shaft with a file. If rotor or stator are beyond repair, replace motor.

5-8. EVAPORATOR MOTOR (B1) - Continued.

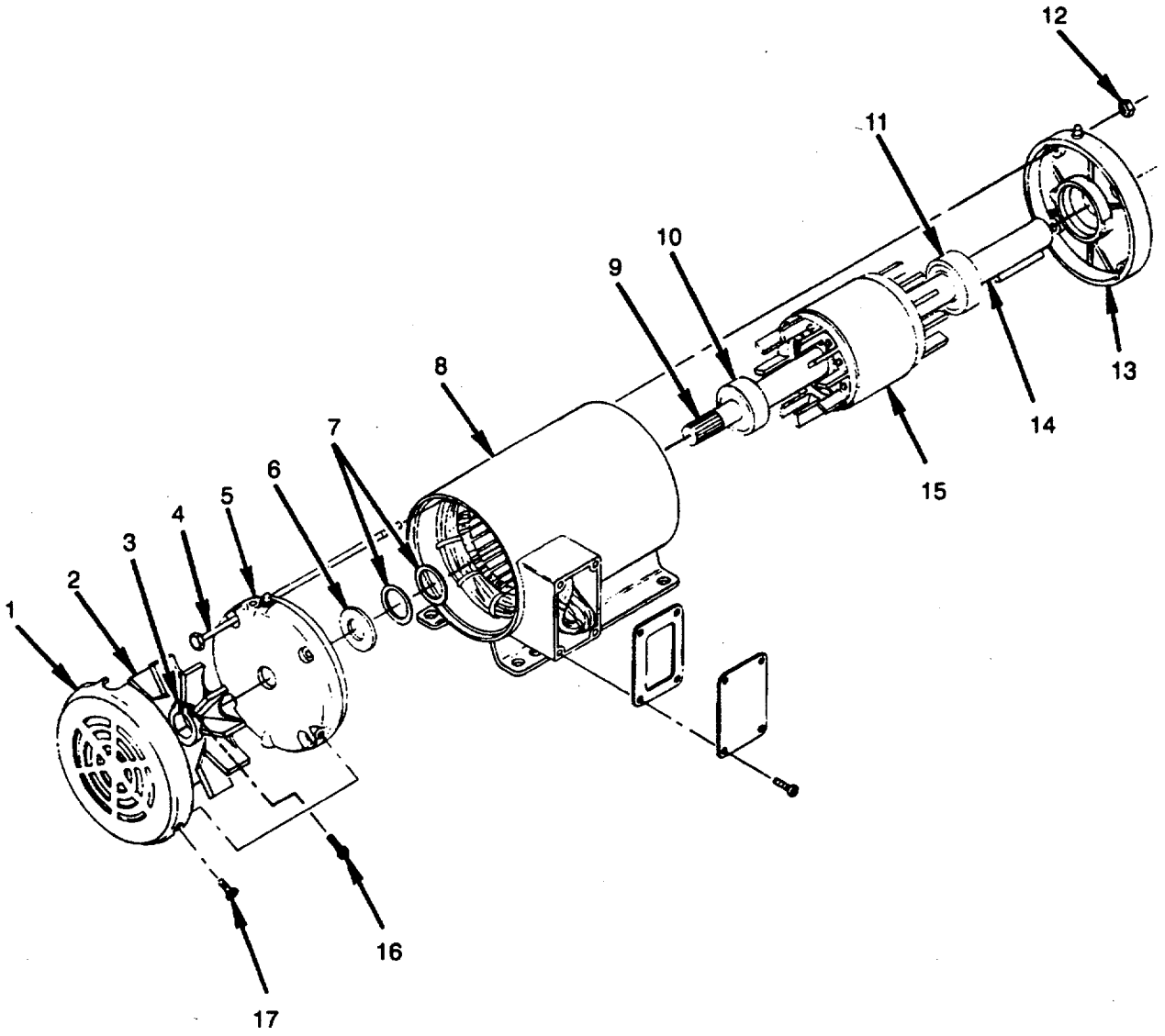


Figure 5-1. Evaporator Motor (B1)

REASSEMBLY

1. Coat the bearing cavity of end caps (5) and (13) with grease.
2. Install small bearing (10) to fan end of shaft (9).
3. Install large bearing (11) to shaft end (14).
4. Insert bearing washer (6) and two wavy spring washers (7).

CAUTION

Damage to rotor could occur if rotor is dropped.

5. Carefully insert rotor (15) with small bearing (10) and large bearing (11) into motor frame (8).
6. Carefully work end caps (5) and (13) onto shaft ends keeping the match-marks in alignment.
7. Install four through bolts (4) through end caps (5) and (13).
8. Partially tighten four through bolts (4) with end cap nuts (12).
9. Before final tightening, check freedom of rotation by turning shaft by hand. There should be no drag or binding.
10. Alternately tighten nuts (12) and adjust as necessary.
11. Check for binding and drag.

CAUTION

Plastic fan is very fragile. Be careful not to break fan when installing fan onto shaft.

12. Install plastic fan (2) onto shaft.
13. Tighten clamping screw (16).

NOTE

Align the large hole on fan shield with grease fitting.

14. Install fan shield (1) and secure with three screws (17).

FOLLOW ON PROCEDURE

Install evaporator motor (para 4-70).

5-9. CONDENSER MOTOR (B3).

This task covers: Disassembly Repair Reassembly

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
File, hand (Item 22, Appendix B)
Personnel: 1
Materials:
Grease aeroshell 22 (Item 2, Appendix E)
Rags (item 12, Appendix E)
Equipment Conditions:
Remove condenser motor (para 4-76).

DISASSEMBLY

1. Remove three screws (16) (see Figure 5-2).
2. Remove fan shield (1) from end cap (5).
3. Loosen clamping screw (15) .

CAUTION

Plastic fan is very fragile. Be careful not to break fan when prying clamp open and prying fan off the shaft.

4. Pry open clamp (3)
5. Remove plastic fan (2) by prying off shaft.
6. Match-mark motor frame (7) and end caps (5) and (12).
7. Remove four end cap nuts (11) and through bolts (4).

CAUTION

When removing end caps, rotor will be freed. Damage to rotor could occur if rotor is dropped while removing end caps from motor.

8. Remove end caps (5) and (12).
9. Carefully pull rotor (14) from the motor frame (7).
10. Identify location of two wavy spring washers (6).
11. Carefully remove small bearing (9) from fan end of shaft (8).
12. Carefully remove large bearing (10) from shaft end (13).
13. Examine rotor (14), stator and housing assembly (7), and shafts for nicks, gouges, deformations, or evidence of overheating.

REPAIR

Dress high metal defects in shaft with a file. If rotor or stator are beyond repair, replace motor.

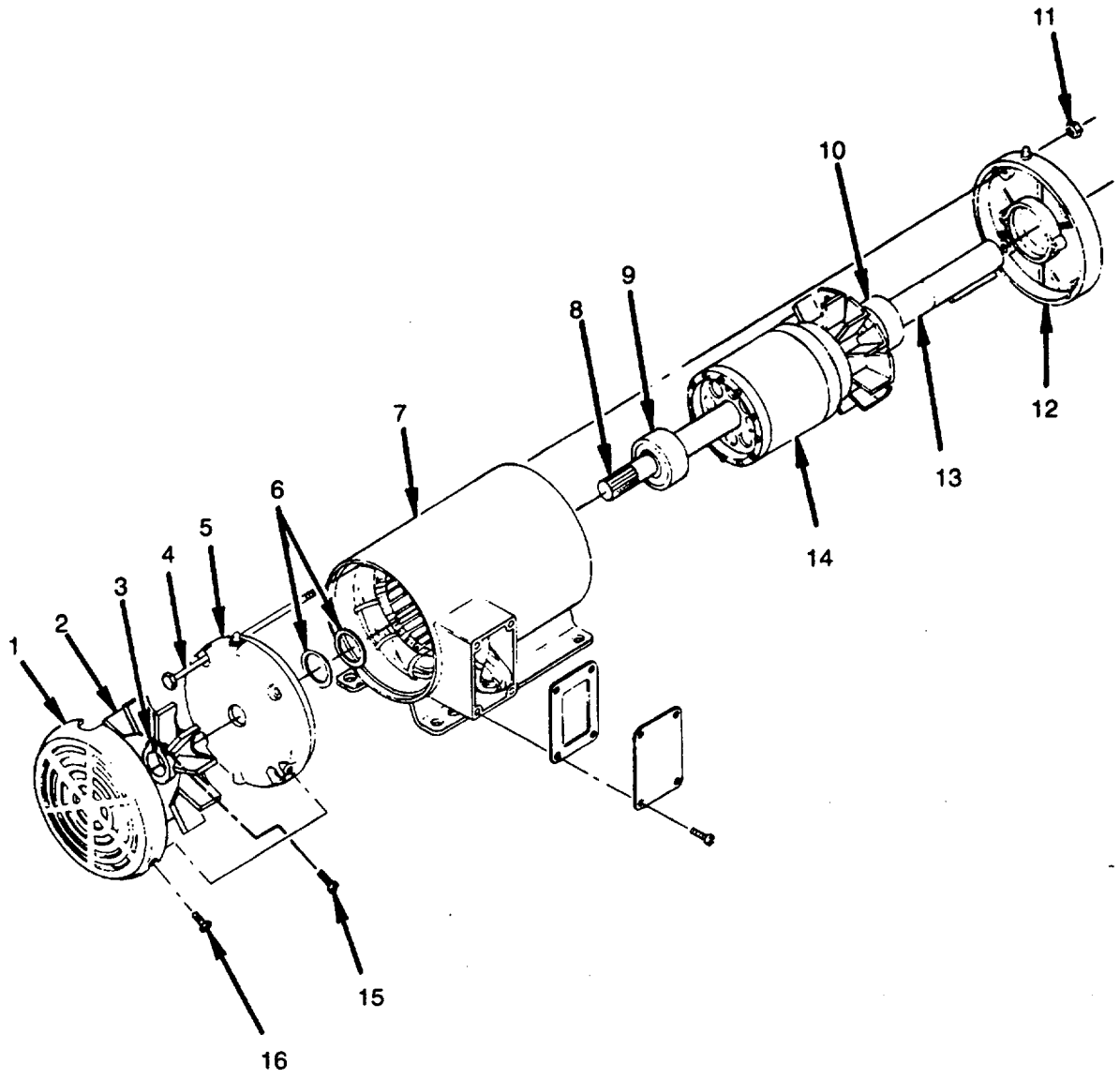


Figure 5-2. Condenser Motor (B3)

5-9. CONDENSER MOTOR (B3)-Continued.

REASSEMBLY

1. Coat the bearing cavity of end caps (5) and (12) with grease.
2. Install small bearing (9) on fan end of shaft (8).
3. Install large bearing (10) on shaft end (13).
4. Insert two wavy spring washers (6) into end cap (5).

CAUTION

Damage to rotor could occur if rotor is dropped.

5. Carefully insert rotor (14) with small bearing (9) and large bearing (10) into motor frame (7).
6. Carefully work end caps (5) and (12) onto shaft ends keeping the match-marks in alignment.
7. Install four through bolts (4) through end caps (5) and (12).
8. Partially tighten four through bolts (4) with end cap nuts (11).
9. Before final tightening, check freedom of rotation by turning shaft by hand. There should be no drag or binding.
10. Alternately tighten nuts (11) and adjust as necessary.
11. Check for binding and drag.

CAUTION

Plastic fan is very fragile. Be careful not to break fan when installing fan onto shaft.

12. Install plastic fan (2) onto shaft.
13. Tighten fan clamping screw (15).

NOTE
Align the large hole on fan shield with grease fitting.

14. Install fan shield (1) and secure with three screws (16).

FOLLOW ON PROCEDURE

Install condenser motor (para 4-76).

5-10. EVAPORATOR MOTOR (B1).

This task covers: Service

INITIAL SETUP

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)

Personnel: 1

WARNING

DANGEROUS CHEMICAL (R-22) is used in this equipment.

DEATH
or severe damage 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.

REFRIGERANT UNDER PRESSURE

is used in the operation of this equipment.

DEATH
or severe Injury may result if you fall to observe safety precautions. Never use a heating torch on any part that contains R-22 refrigerant. Do not let liquid refrigerant touch you, and do not Inhale refrigerant gas.

REPAIR

1. The refrigeration system must be totally discharged before performing any maintenance action that requires opening of the pressurized system (para 5-12).

2. The drier filter replacement and leak testing are required after any system component has been removed and replaced (para 5-26 and para 5-15).

3. The system must be evacuated before it is charged (para 5-16).

4. The system must be properly charged to function properly (para 5-17).

5-11. SERVICE MANIFOLD INSTALLATION

This task covers: Service

INITIAL SETUP

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

SERVICE

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.

1. Remove protective caps (Figure 5-3) from high and low pressure service valve stems.
2. Insure service valves for manifold are closed, then remove caps from service ports.
3. Remove blue and red hoses from service manifold hose rack.
4. Connect blue hose to low pressure service valve and red hose to high pressure service valve.
5. Open high and low pressure service valves.
6. Loosen blue hose at compound gauge port and allow refrigerant to purge for 3-5 seconds, then tighten.
7. Loosen red hose at pressuregauge port and allow refrigerant to purge for 3-5 seconds, then tighten.
8. The service manifold is now installed, purged and ready for test or maintenance operations.

FOLLOW ON PROCEDURE

1. When all testing is complete, install right front condenser panel (para 4-28).
2. Connect air conditioner input power at source.

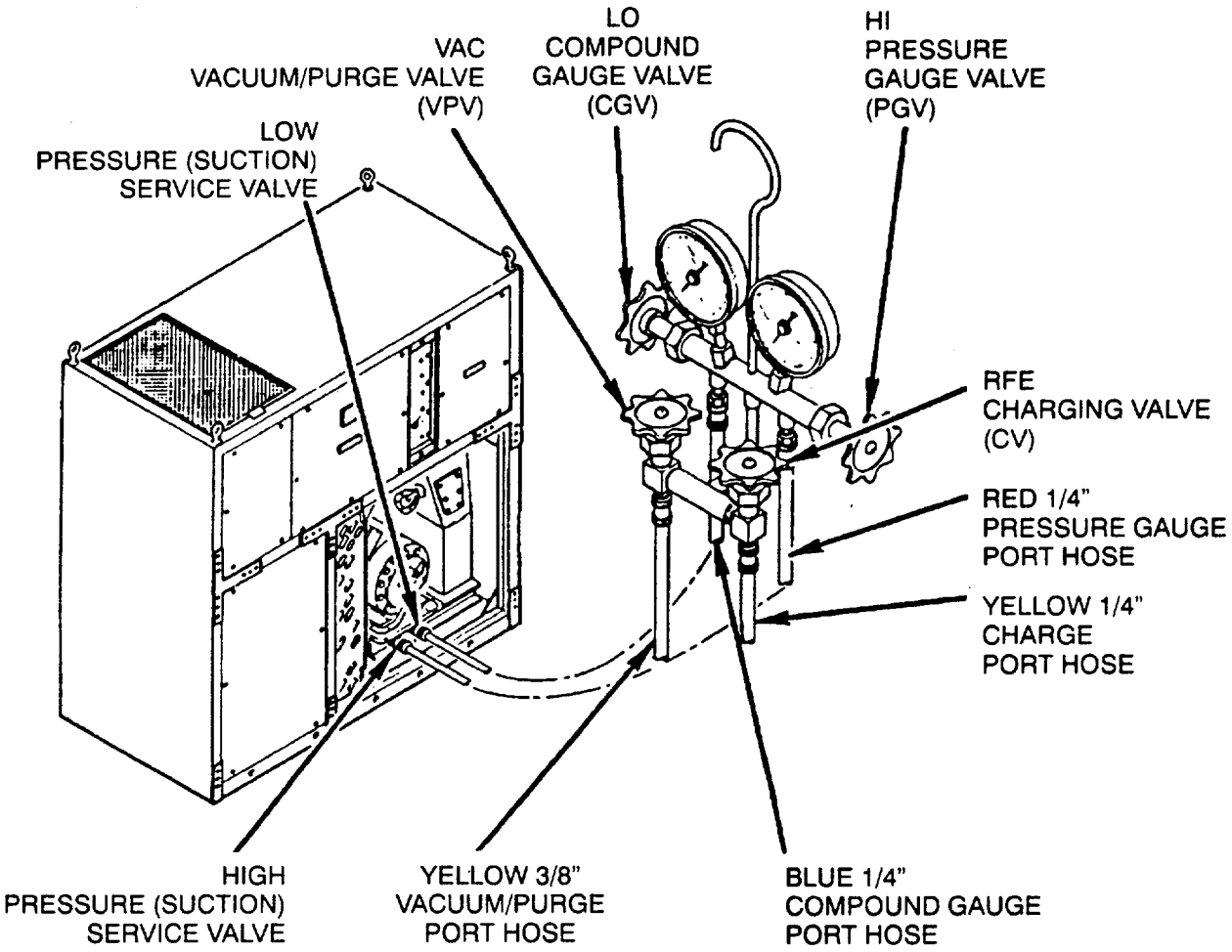


Figure 5-3. Service Manifold Installation

5-12. DISCHARGING REFRIGERATION SYSTEM.

This task covers: Service

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)
Recovery and Recycling Unit, Refrigeration (Item 26, Appendix B)
Pail, utility (Appendix C)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)

Equipment Condition:
Service manifold installed (para 5-11)

NOTE

In accordance with Environmental Protection Agency regulations, refrigerants cannot be discharged into the atmosphere. A refrigerant recovery and recycling unit must be used whenever discharging the refrigerant system. Operation of the recovery/recycling unit must be by AUTHORIZED PERSONNEL ONLY.

SERVICE

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.

CAUTION

- **Do not permit the oil to escape from the unit. If oil is escaping, close the valve(s) slightly to prevent possible oil loss.**
- **Do not permit the refrigerant to escape fast enough to form ice or frost on either the lines or the valve(s) to prevent possible damage to system.**

Connect and operate recovery/recycling unit in accordance with the manufacturer's instructions.

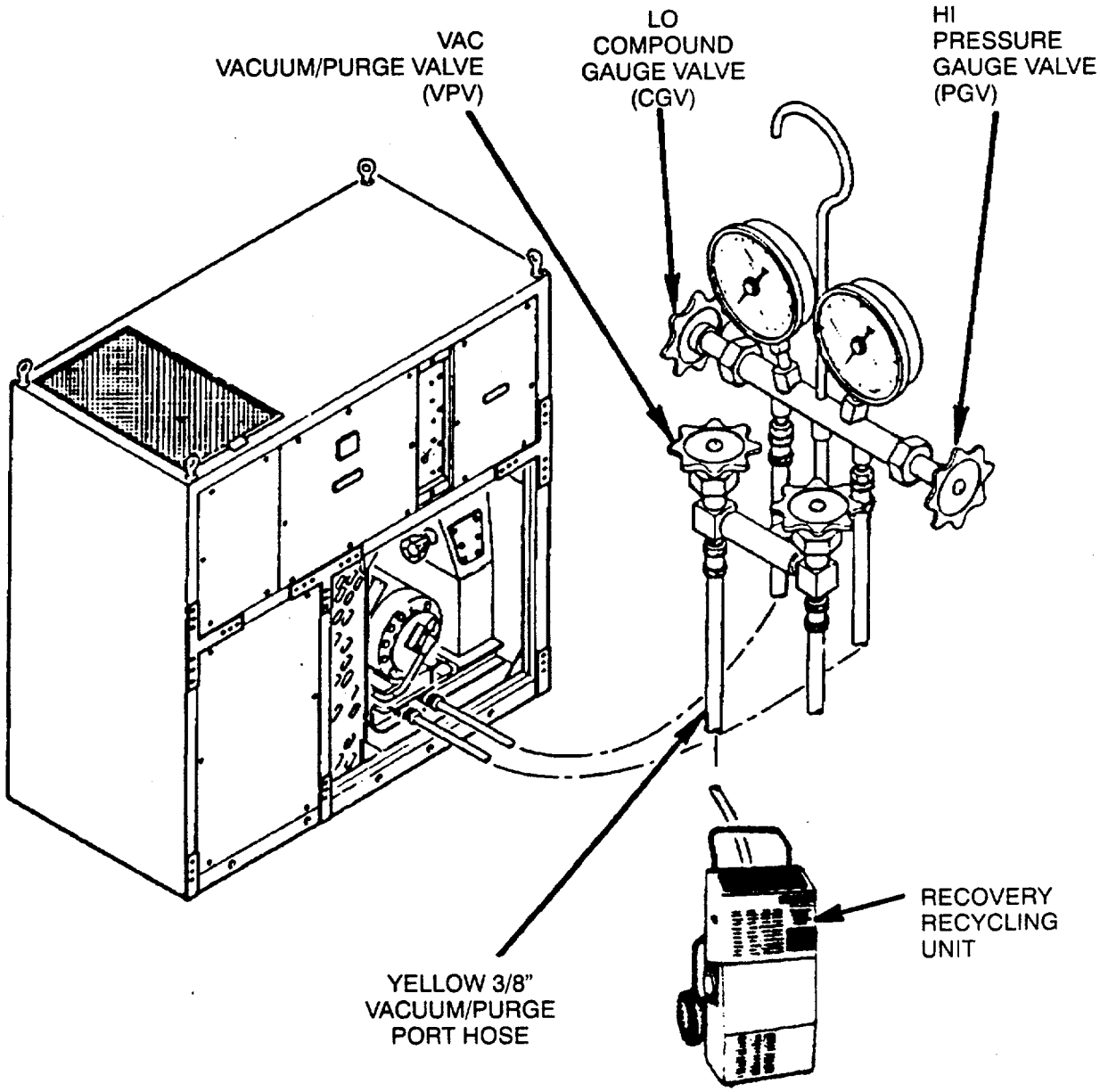


Figure 5-4. Discharging Refrigeration System

5-13. PURGING REFRIGERANT SYSTEM.

This task covers: Service

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Goggles, industrial (Appendix C)
Nitrogen regulator (Item 25, Appendix B)
Gloves, chemical (Appendix C)
Personnel: 1
Material:
Nitrogen (Item 14, Appendix E)
Equipment Conditions:
1. Install service manifold (para 5-11 steps 1 thru 5.)
2. Discharge system (para 5-12).

SERVICE

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.

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. Do not allow nitrogen pressure regulator setting to exceed 200 psig during purging. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must also be discharged in a ventilated location.

NOTE

The refrigeration system must be purged with dry nitrogen before any brazing or debrazing is performed on any component.

1. If system was pumped down, connect manifold red hose to expansion service valve (para 5-30).
2. Connect yellow 1/4 inch (0.64 cm) charging hose (Figure 5-5) from charge port to nitrogen regulator and dry nitrogen cylinder.
3. Loosen low pressure hose (blue) at compound gauge port of service manifold.
4. Open pressure gauge valve (PGV) on service manifold.
5. Open charging valve (CV) on service manifold.
6. Open the nitrogen cylinder valve and adjust the regulator so that less than 1-2 cfm (0.028-0.057 m3/minute) of nitrogen flow rate is established.
7. Check to insure that nitrogen is flowing from loosened hose at compound gauge port of service manifold.
8. Allow nitrogen to sweep through the system for a minimum of 5 minutes before brazing or debrazing operations are started; continue sweep during the operation and for 5 minutes after completion.
9. Close nitrogen cylinder valve, service manifold valves and high and low pressure service valves on the unit.
10. Disconnect hose from nitrogen regulator and return it to hose rack.
11. Assuming that all repairs are completed, go to Leak Testing the Refrigerant System (para 5-15).

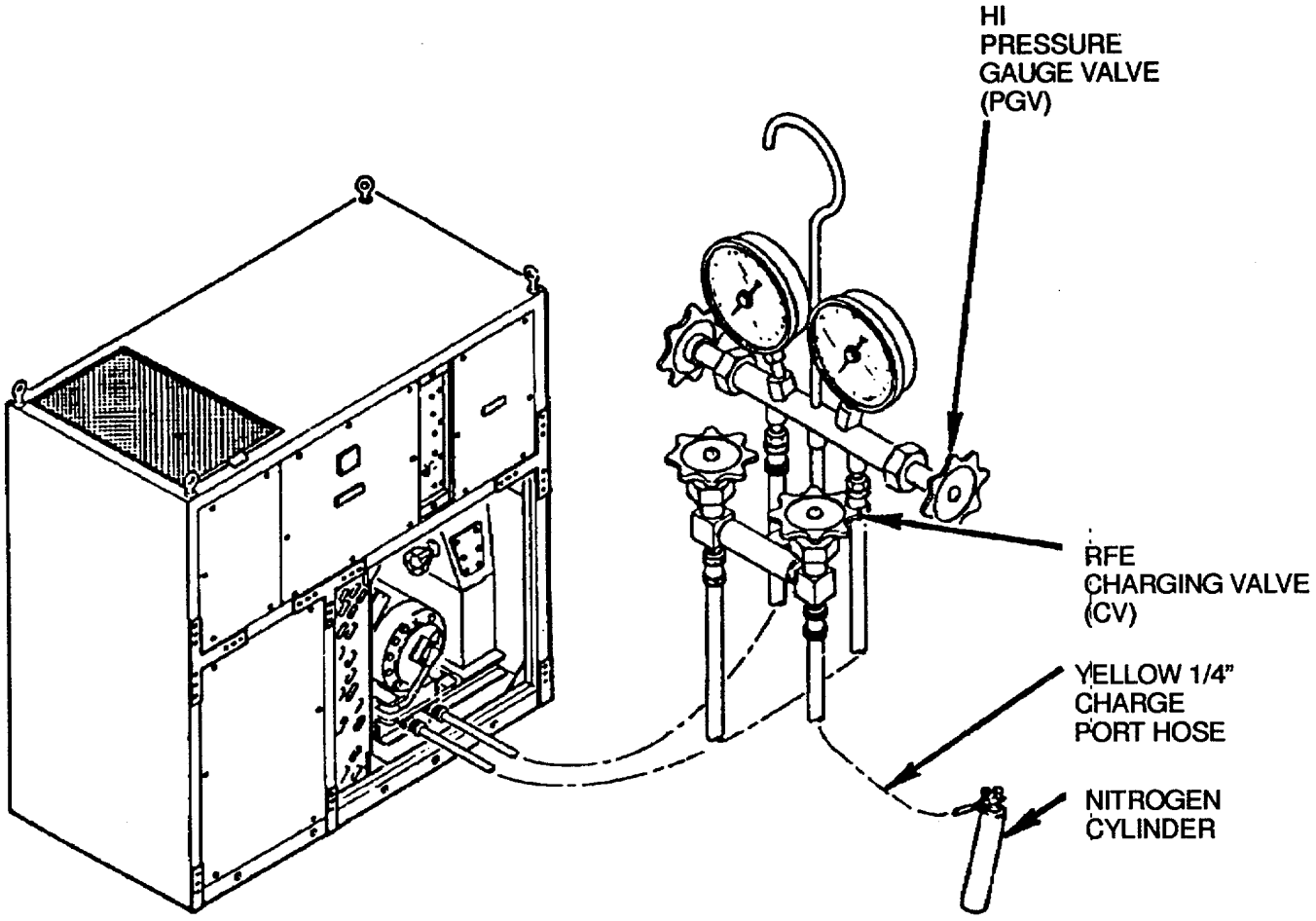


Figure 5-5. Purging Refrigerant System

5-14. BRAZING, DEBRAZING PROCEDURES.

This task covers: Service

INITIAL SETUP

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Goggles, industrial (Appendix C)
Nitrogen regulator (Item 25, Appendix B)
Personnel: 1
Materials:
Rags (Item 12, Appendix E)
Nitrogen (Item 14, Appendix E)
Brazing alloy, silver (Item 21, Appendix E)
Brazing flux (Item 19, Appendix E)
Abrasive cloth (part of Item 1, Appendix B)
Equipment Conditions:
1. Discharge refrigerant system (para 5-12).
2. Purge system with nitrogen (para 5-13).

SERVICE

WARNING

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

NOTE

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.

All tubing in the refrigeration system is seamless copper with a bright internal finish that permits thorough cleaning and prevents entrapment of moisture and other impurities. Rigid grade copper is used for straight sections and soft grade for sections that must be bent. 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.

1. Debrazing. Debraze joints for removal of refrigeration system components as follows:
   a. Determine which joints are to be debrazed. Due to the limited work space inside the air condtioner, it may be more convenient to remove a part of the interconnecting tubing with the component rather than debrazing the joint on the component itself.

   b. 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.

   c. Protect insulation, wiring harnesses, cabinet, and other surrounding components with appropriate shields.

   d. 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 m3/minute) (para 5-13).

   e. 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.

2. 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 damp cloth. Be sure no filler alloy or other debris is left inside any tubing, fitting, or component.

3. 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.
4. Brazing. Braze joints within the air conditioner as follows:

   a. Position the component to be installed.

   b. 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.
   c. Protect insulation, wiring harnesses, and surrounding comments with appropriate shields.
   d. 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 m3/minute).
   e. Apply sufficient heat uniformly around the joint to quickly raise it to a temperature that will melt the filler alloy. Remove the heat as soon as brazing is completed.
   f. Allow to cool. Reassemble the valve.

5. Leak test the repair and surrounding area (para 5-15).

5-15. LEAK TESTING REFRIGERANT SYSTEM.

This task covers: Service

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)
Personnel: 1
Materials:
Nitrogen, technical (Item 14, Appendix E)
Rags (Item 12, Appendix E)
Refrigerant-22 (Item 11, Appendix E)
Equipment Conditions:
1. Install service manifold (para 5-11 steps 1 thru 5).
2. Purge refrigerant system (para 5-13).

SERVICE

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 heat surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly poisonous and corrosive gas.

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. Do not allow nitrogen pressure regulator setting to exceed 200 psig during purging. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must also be discharged in a ventilated location.

NOTE

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.

1. Open compound and pressure gauges. If system pressure is 50 psig or higher, proceed to step 6; if not, continue with step 2.
2. Disconnect nitrogen cylinder and connect yellow hose to R-22 cylinder.
3. Open R-22 cylinder valve and let purge for 3-5 seconds.
4. Open CV and PGV and allow refrigerant to enter system until compound and pressure gauges indicate a minimum pressure of 50 psig, then close CV.
5. Close R-22 refrigerant cylinder valve and remove yellow manifold hose.
6. Install yellow hose to nitrogen cylinder (para 5-13).
7. Open nitrogen cylinder valve and adjust regulator to a pressure 10 psi greater than system pressure.
8. Loosen 1/4 inch (0.64 cm) yellow hose at charge port and purge for 3-5 seconds, then tighten.
9. Open charge valve and adjust nitrogen regulator to slowly raise command and pressure gauge reading to 300 psig.
10. Using a halon leak detector, check all fittings, connections and components in surrounding area for leaks. Insure pressure remains at 300 psig by adding more nitrogen if necessary.
11. Close CV and nitrogen cylinder valve.
12. Open VPV and bleed pressure out of lines.
13. Remove yellow hose from nitrogen regulator and connect to service manifold hose rack.
14. Always perform a final leak test before the air conditioner is reassembled and the refrigeration system is evacuated and charged.

5-16. EVACUATING REFRIGERANT SYSTEM.

This task covers: Service

INITIAL SETUP:

Tools:
Tool, kit, service, refrigeration unit (Item 1, Appendix B)
Pump, vacuum (part of Item 1, Appendix B)
Gloves, chemical (Appendix C) Goggles, industrial (Appendix C)
Personnel: 1
Materials:
R-22 Refrigerant cylinder (Item 11, Appendix E)
Rags (Item 12, Appendix E)
Equipment Conditions :

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltage used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Install service manifold (para 5-11).

SERVICE

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.

CAUTION

Do not evacuate a leaking system. The vacuum created can cause air, moisture, and dirt to enter system.

NOTE

- **The refrigeration system must be evacuated to remove all moisture before it is charged with R-22 refrigerant.**
- **Check that system was leak tested and has no leaks (para 5-15).**
- **If compressor was replaced as result of a burn out, check that compressor burn out procedures were followed (para 5-46).**

5-16. EVACUATING REFRIGERANT SYSTEM.

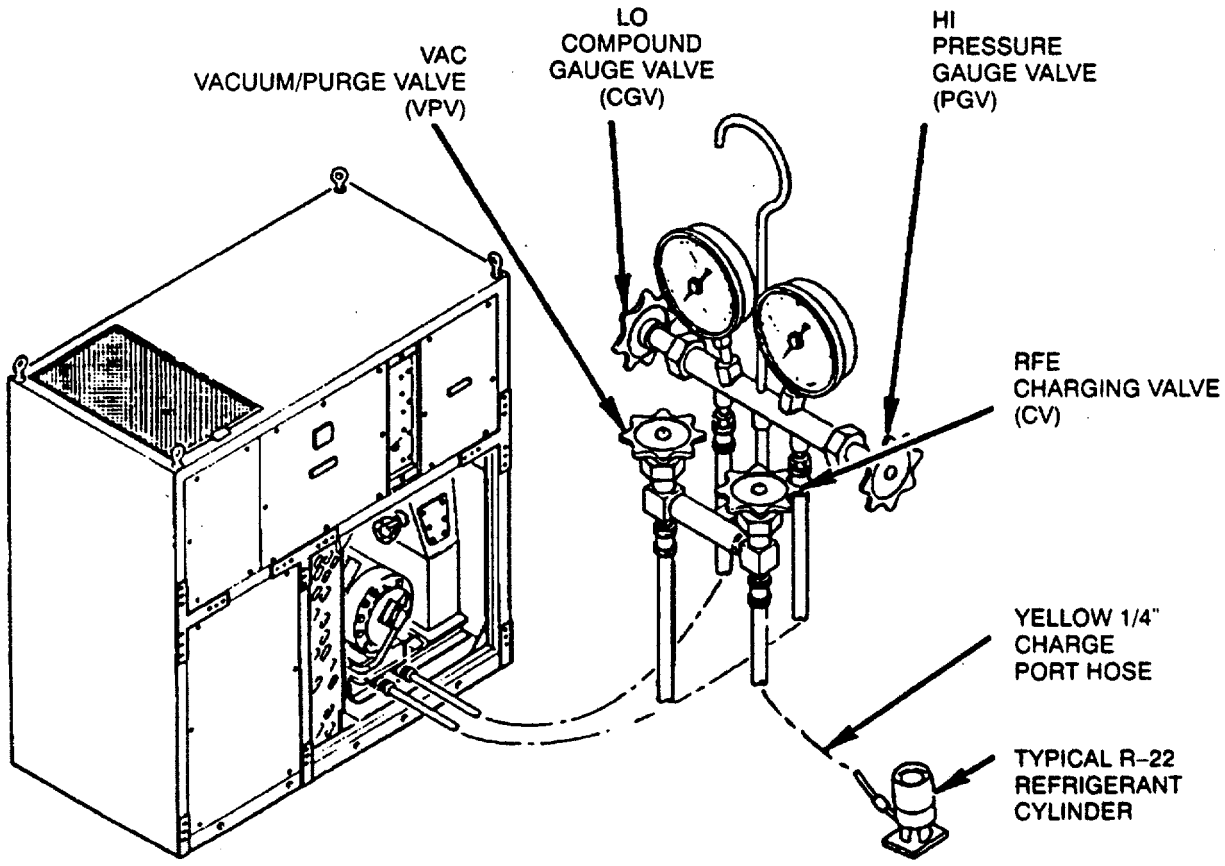


Figure 5-6. Evacuating Refrigerant System

1. Check that new drier filter was installed. If not, install one (para 5-26).
2. Check that both charging manifold valves are closed.
3. Remove yellow 3/8 inch (0.95 cm) hose from hose rack and connect to vacuum pump.
4. Remove 1/4 inch (0.64 cm) yellow hose from hose rack and connect to R-22 refrigerant cylinder positioned for dispensing gas.
5. Open R-22 refrigerant cylinder and loosen 1/4 inch (0.64 cm) yellow hose at charge port and purge for 3-5 seconds, then tighten.
6. Open VPV, CGV, and PGV.
7. Start vacuum pump and open ballast valve (on vacuum pump) one turn.
8. Observe gauge reading on vacuum pump for reading of 29-30 Hg vacuum.
9. Close VPV and open CV and add refrigerant until compound and pressure gauges read approximately 2 psig (4.41 kg), then close CV.
10. Stop vacuum pump and close ballast valve.
11. Allow refrigerant to remain in system for one hour.

NOTE

Refrigerant will act as a blotter for moisture. One hour is recommended time for maximum moisture removal. Shorter blotting period could be used if it is known that system is relatively dry.

12. Open VPV.
13. Repeat steps 7 thru 11.
14. Open VPV.
15. Repeat steps7 thru 11.
16. Close VPV and OGV.
17. Stop vacuum pump and close ballast valve.
18. Disconnect hose from vacuum pump and return it to rack.
19. Charge refrigeration system (para 5-17).

5-17. CHARGING REFRIGERANTSYSTEM.

This task covers: Service

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Recovery and Recycling Unit, Refrigeration (Item 26, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)
Personnel: 1
Materials:
R-22 Refrigerant cylinder (Item 11, Appendix E)
Rags (Item 12, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltage used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front evaporator panel (para 4-25).

SERVICE

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.

1. After system has been satisfactorily evacuated, it must be fully charged with R22 refrigerant.

CAUTION

Never introduce liquid refrigerant Into the low pressure (suction, service) valve. Compressor damage may result.

NOTE

The system must be evacuated before charging. Use only R-22 refrigerant to charge unit. Whenever available, use recycled refrigerant for charging the refrigeration system.

2. Check that service manifold is connected (para 5-11).
3. Check that 1/4 (0.64 cm) inch yellow hose is connected to R-22 refrigerant cylinder.

5-17. CHARGING REFRIGERANT SYSTEM-Continued.

SERVICE-Continued.

4. Position R-22 refrigerant cylinder so that liquid will be dispensed.
5. Place cylinder on accurate scale, measure and record weight of cylinder.
6. Open CV, VPV, and OGV. Allow liquid refrigerant to enter system until the drum weight has decreased by 22 pounds (9.99 kg) or until system pressure has equalized with cylinder pressure.
7. Close CGV. NOTE If system pressure equalized prior to admitting a complete charge, proceed to step 8.

NOTE

If system pressure equalized prior to admitting a complete charge proceed to step 8.

8. Position refrigerant cylinder so that gas only will be dispensed.
9. If air conditioner is set up for single mode of operation, proceed to steps 10 and 11. If air conditioner is set up for remote operation proceed to step 13.
10. Set cool control thermostat (para 4-87) to lowest temperature setting.
11. Connect air conditioner input power at source.
12. Turn MODE SELECT SWITCH to COOL mode.

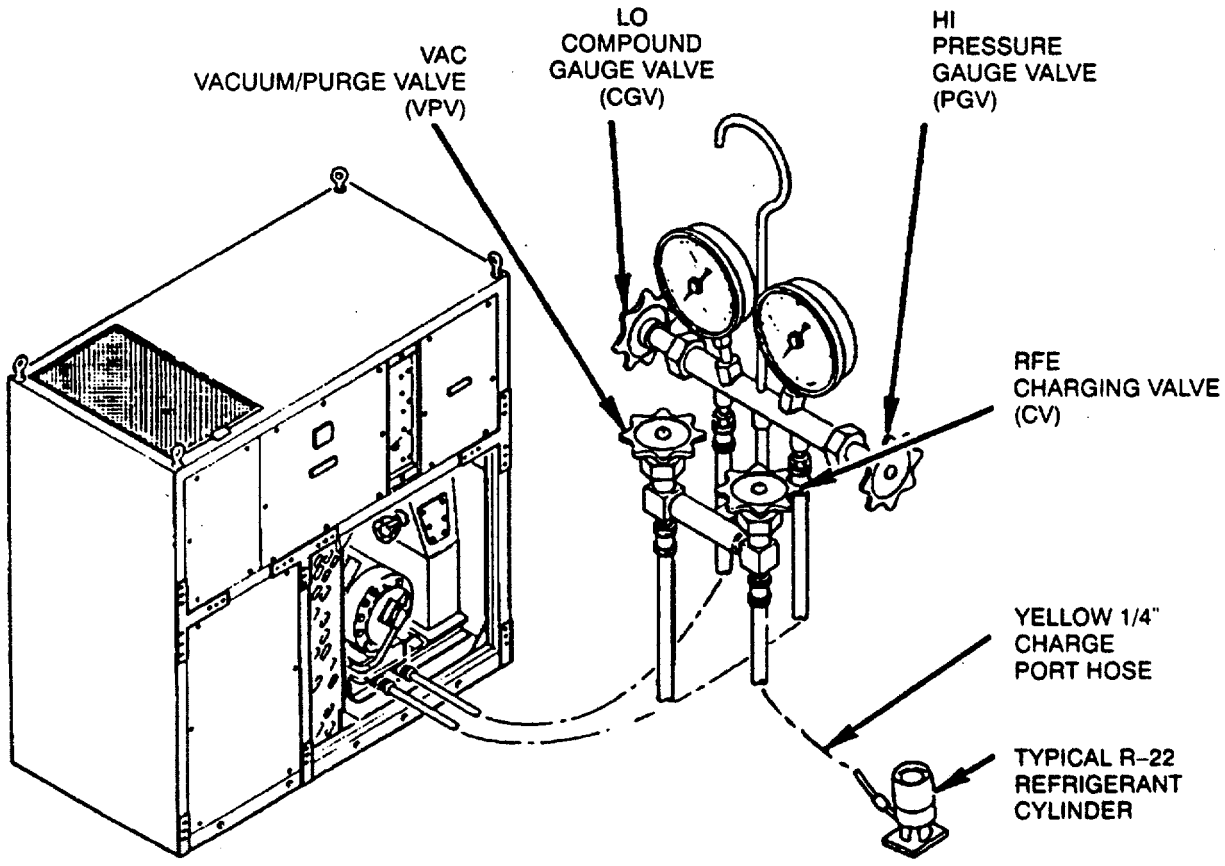


Figure 5-7. Charging Refrigerant System

13. Open CGV and monitor weight of refrigerant cylinder as compressor draws additional refrigerant into system.
14. Close CGV when complete charge weight has been admitted.
15. Perform pressure check and repeat steps 14 and 15, if necessary (para 5-18)
16. After 15 minutes, observe sight glass (para 5-28).
    a. Milky white or bubbly liquid means system has a low charge.

NOTE

Bubbles may be visible at temperatures less than 70°F (21°C) or greater than 100°F (38°C).

    b. Clear bubble-free liquid means system is fully charged.
17. If charge is low add gas refrigerant.
    a. Be sure that drum is switched to gas position.
    b. Open CGV
    c. Continue to charge until sight glass is clear and bubble free.
    d. Close CGV.
18. Check air conditioner for proper cooling. There should be at least a 15° temperature difference between evaporator discharge air and inlet air.
19. Disconnect air conditioner input power at source.
20. Turn mode selector switch to OFF.
21. Close all manifold valves.
22. Disconnect manifold hoses from service valves, R-22 cylinder, and attach them to hose rack.

FOLLOW ON PROCEDURE

1. Install right front condenser panel (para 4-28).
2. Install right front evaporator panel (para 4-25).
3. Connect air conditioner input power at source.
4. Set MODE SELECT SWITCH to system configuration. (AUTO or REMOTE).

5-18. REFRIGERANT PRESSURE CHECK..

This task covers: Service

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Goggle, industrial (Appendix C)
Personnel: 1

SERVICE

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.

1. Except in cases where it is obvious that the refrigerant charge has been lost, the first step in troubleshooting problems in the refrigeration system should be to check discharge and suction pressures under operating conditions.

2. Check pressures as follows:

   a. Turn mode selector switch to OFF.

   b. Connect service manifold (para 5-11).

   c. Both gauges should read the same. Check the reading with the appropriate column in Table 5-2. If the system is even partially charged, the pressure should be approximately equal to that shown in the table for the appropriate ambient temperature. If the pressure is considerably less than shown in the table, the system does not contain enough refrigerant to continue the pressure check; go to leak testing (para 5-15).

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance or adjusting thermostat. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

   d. Disconnect air conditioner input power at source.

   e. Open left electric plate (para 4-30).

NOTE

If air conditioner is configured for dual operation, jumper wires need to be installed for single mode operation refrigerant testing.

   f. Install jumper wires to TB2 (para 4-61) for single mode operation. (See Figure FO-3)

Table 5-2. Pressure-Temperature Relationship of Saturated R-22 Refrigerant

Temperature		Pressure		Temperature		Pressure	
Deg F	Deg C	Psig	kg/cm^2	Deg F	Deg C	Psig	kg/cm^2
10	–12.3	32.93	2.315	66	18.9	114.2	8.029
12	–11.1	34.68	2.439	68	20.0	118.3	8.318
14	–10.0	36.89	2.593				
16	–8.9	38.96	2.739	70	21.1	122.5	8.612
18	–7.6	41.09	2.889	72	22.2	126.8	8.915
				74	23.3	131.2	9.225
20	–6.6	43.28	3.043	76	24.4	135.7	9.541
22	–5.5	45.23	3.180	78	25.6	140.3	9.864
24	–4.3	47.85	3.364				
26	–3.4	50.24	3.532	80	26.7	145.0	10.195
28	–2.2	52.70	3.705	82	27.8	149.8	10.522
				84	28.9	154.7	10.877
30	–1.1	55.23	3.883	86	30.0	159.8	11.236
32	0.0	57.83	4.066	88	31.1	164.9	11.594
34	1.1	60.51	4.254				
36	2.2	63.27	4.448	90	32.2	170.1	11.960
38	3.3	66.11	4.648	92	33.3	175.4	12.332
				94	34.5	180.9	12.719
40	4.4	69.02	4.853	96	35.6	186.5	13.113
42	5.5	71.99	5.062	98	36.7	192.1	13.506
44	6.6	75.04	5.276				
46	7.7	78.18	5.497	100	37.8	197.9	13.914
48	8.8	81.40	5.723	102	38.9	203.8	14.329
				104	40.0	209.9	14.758
50	10.0	84.70	5.955	106	41.1	216.0	15.187
52	11.1	88.10	6.257	108	42.2	222.3	15.630
54	12.2	91.50	6.443				
56	13.3	95.10	6.686	110	43.3	228.7	16.080
58	14.5	98.80	6.947	112	44.4	235.2	16.537
				114	45.6	241.9	17.008
60	15.6	102.5	7.206	116	46.7	248.7	17.486
62	16.7	106.3	7.474	118	47.8	255.6	17.971
64	17.8	110.2	7.748				

5-18. REFRIGERANT PRESSURE CHECK-Continued.

SERVICE-Continued

g. Open manual service valve (para 5-39).
h. Adjust cool control thermostat (para 4-87) to lowest temperature setting.
i. Connect air conditioner input power at source.
j. Turn MODE SELECT SWITCH to COOL mode.
k. With unit operating, allow gauges to stabilize. Take readings of the two gauges.

(1) If discharge and suction pressures are at, or near, same value, a pressure equalizer solenoid valve malfunction or an internal compressor failure is indicated.

(2) If discharge pressure is low and suction pressure is normal, (refer to Table 5-3), a low refrigerant charge is indicated.

(3) If discharge pressure is normal and suction pressure is either high or low, failure or maladjustment of the pressure regulator valve or expansion valve is indicated.

(4) If discharge pressure is high and suction pressure is normal, a malfunction of the condenser fan, refrigerant overcharge, or clogged filter drier is indicated.

l. When pressure tests are completed, proceed with maintenance action indicated.
m. Turn mode switch to OFF.
n. Disconnect air conditioner input power at source.
o. Remove jumper wires installed in step f.

FOLLOW ON PROCEDURE

1. Reset cool control thermostat (para 4-87).
2. Close left electric plate (para 4-30).
3. Remove service manifold hoses from service valves.
4. Install protective caps (para 5-11) to high and low pressure service valve stems.
5. Connect air conditioner input power at source.

Table 5-3. Normal Operating Pressures (In Full Cooling Mode)

Temperature	Pressure Range (psig)			
Outdoor ambient	50°F (10°C)	75°F (24°C)	100°F (38°C)	120°F (49°C)
90°F (32°C) Return Air to Unit (Dry Bulb)	52–62 Suction 175–195 Discharge	57–67 Suction 235–255 Discharge	66–76 Suction 300–320 Discharge	74–84 Suction 370–390 Discharge
80°F (27°C) Return Air to Unit (Dry Bulb)	47–57 Suction 165–185 Discharge	53–63 Suction 215–235 Discharge	60–70 Suction 290–310 Discharge	70–80 Suction 360–380 Discharge

5-19. DISCHARGING COMPRESSOR.

This task covers: Service

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)
Personnel: 1

Equipment Conditions :

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

SERVICE

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.

1. Remove discharge and suction gauge caps.
2. Connect service manifold high pressure hose (red) to compressor discharge valve.
3. Connect service manifold low pressure hose (blue) to compressor suction valve.
4. Frontseat (clockwise) compressor suction service valve.
5. Frontseat (clockwise) compressor discharge service valve.
6. Discharge compressor (para 5-20, steps 2-6).
7. Remove service manifold hoses from compressor.

5-19. DISCHARGING COMPRESSOR - Continued.

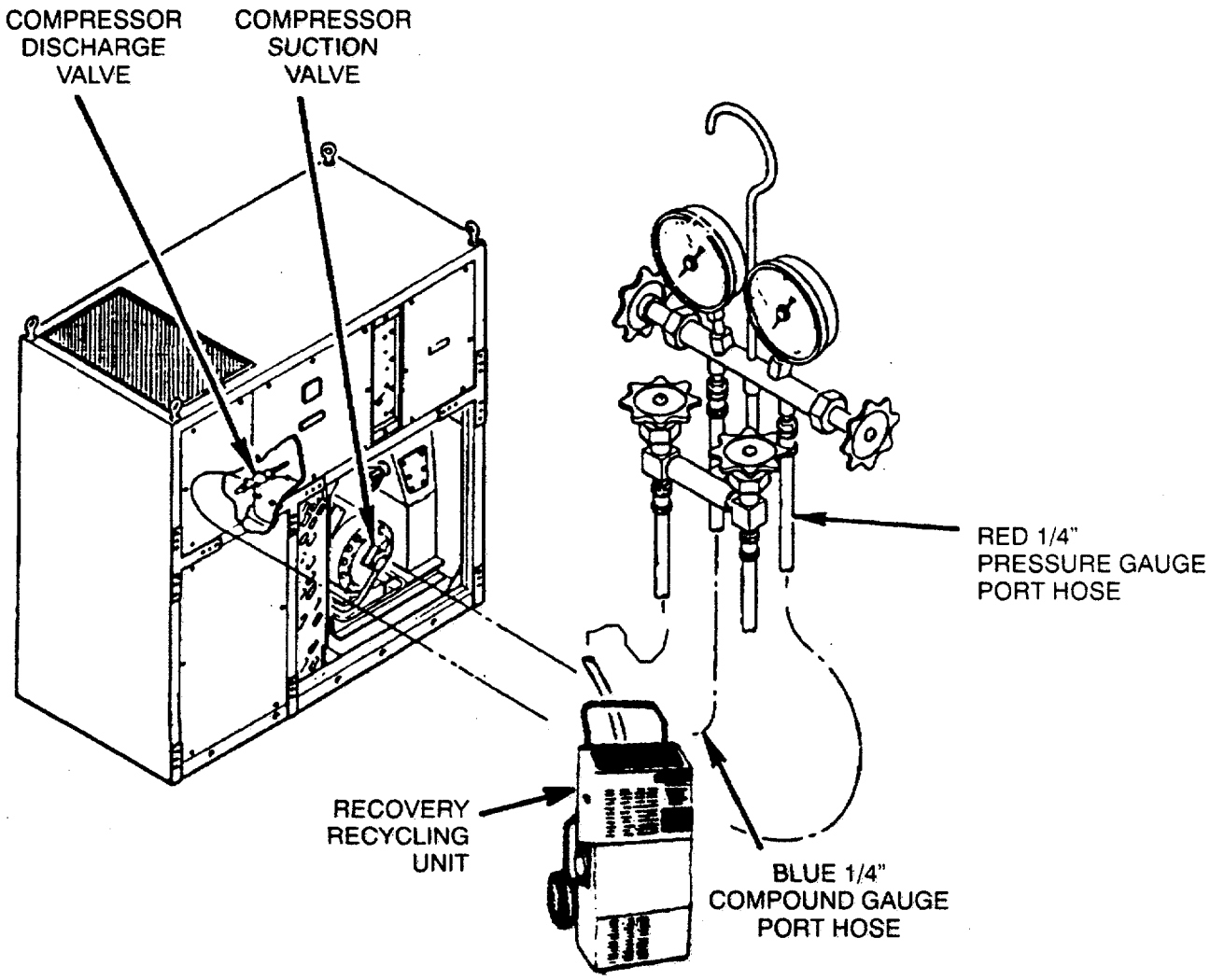


Figure 5-8. Discharging Compressor

5-20. PURGING COMPRESSOR.

This task covers: Service

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

SERVICE

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.

1. Check that discharge and suction valves are frontseated (clockwise).
2. Remove discharge and suction gauge port caps.
3. Connect service manifold low pressure hose (blue) to compressor suction valve gauge port.
4. Connect service manifold high pressure hose (red) to compressor discharge valve gauge port.
5. Connect yellow 1/4 inch (0.64 cm) hose to R-22 refrigerant cylinder.
6. Open CV, CGV, and VPV. Let refrigerant flow out into container port for 30 seconds.
7. Turn CV slowly to reduce pressure of escaping refrigerant.
8. Close CGV while refrigerant is escaping.
9. Backseat (counterclockwise) suction and discharge service valves.
10. Close R-22 refrigerant valve.
11. Remove all service manifold hoses and return to manifold rack.
12. Install discharge and suction valve protective caps.

5-20. PURGING COMPRESSOR - Continued.

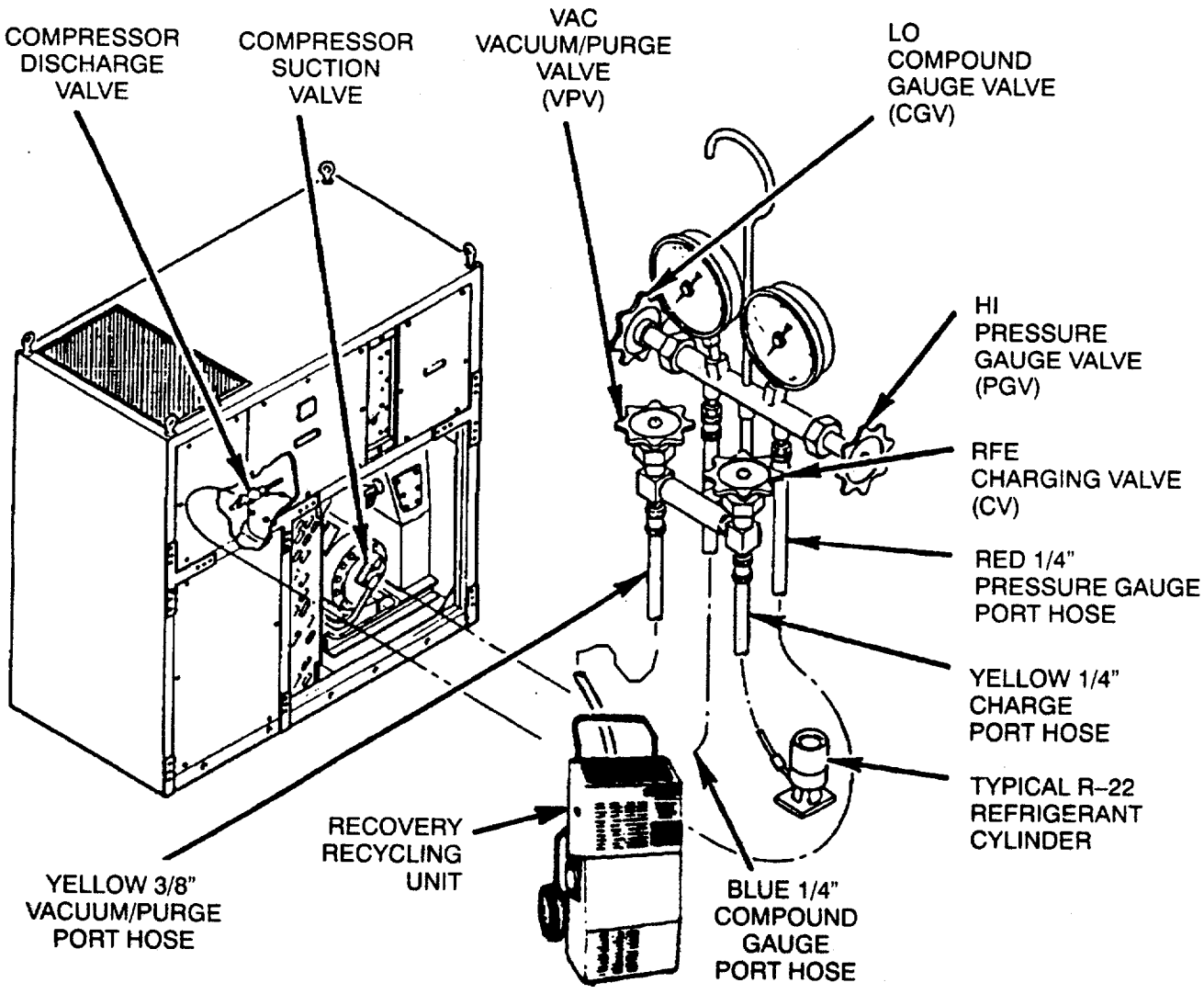


Figure 5-9. Purging Compressor

5-21. PUMP DOWN.

This task covers: Service

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Goggles, industrial (Appendix C)
Gloves, chemical (Appendix C)
Personnel: 1
Equipment Condition:
Remove right front condenser panel (para 4-28).

SERVICE

1. Turn mode switch to OFF.
2. Remove suction, discharge, head, and hot gas bypass protective caps.
3. Backseat (counterclockwise) suction and discharge valves (paras 5-33 and 5-34).

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.

4. Connect service manifold to compressor suction and discharge valve (para 5-19, steps 3 and 4).
5. Crack suction valve so gauge will function .(see Figure 5-10).
6. Frontseat (clockwise) head and hot gas bypass service valves (see Figure 5-18).

CAUTION

Never pump the system down below 1 to 2 lbs gauge pressure. A slight positive pressure should always be left in the system. This prevents air and system damaging moisture from being drawn in thru very small leaks.

Never pump the system down to a vacuum and then open to atmosphere. A vacuum in the lines, when opened, would fill the system with air carrying undesirable amounts of moisture into the system.

WARNING

High voltage Is used In operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions.

7. Connect air conditioner input power at source.
8. Turn mode switch to COOL mode.
9. The compressor will operate until the low pressure cutout shuts off the compressor.
10. The compressor will stand idle for a few minutes. During this time, pressure may build up again in the system due to refrigerant remaining in the crankcase oil. If the pressure builds up, let the compressor run to low pressure cutout. Allow the compressor to pump down until the pressure no longer builds up.

5-21. PUMP DOWN - Continued.

11. Frontseat (clockwise) compressor discharge valve.
12. Turn mode switch to OFF.

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance or adjusting thermostat. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

13. Disconnect air conditioner input power at source.
14. Open manifold VPV and let remaining refrigerant escape.
15. Purge low side of system (para 5-13).

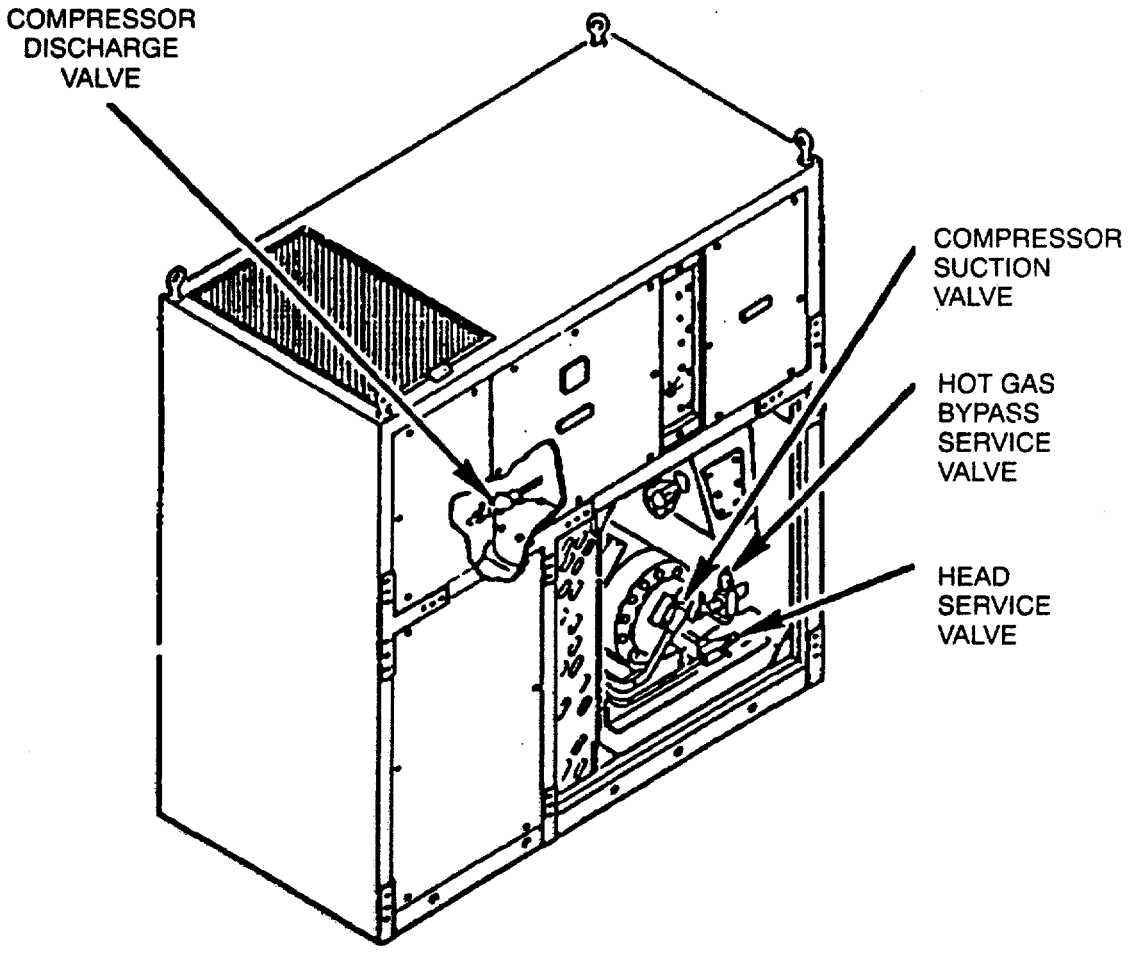


Figure 5-10. Pump Down

INSERT SUBTITLE HERE!

This task covers: Service

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)
Personnel: 1
Equipment Conditions:
1. Replacement part has been leak tested per paragraph 5-15.
2. Remove right front evaporator panel (para 4-25).
3. Replace drier filter if required (para 5-26).

SERVICE

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.

1. Remove discharge and suction gauge caps.
2. Connect high pressure hose (red) to compressor discharge valve.
3. Connect low pressure hose (blue) to compressor suction valve.
4. Remove yellow 3/8 inch hose end from hose rack and place in container.
5. Open CGV and PGV.
6. Check compressor discharge service valve is frontseated (clockwise).
7. Backseat (counterclockwise) compressor suction valve.
8. Open head service valve slowly to allow liquid refrigerant to enter system.
9. Slowly open CV and allow refrigerant to flow out into container (30 seconds to one minute) until system is purged.
10. Backseat (counterclockwise) hot gas bypass service valve (see Figure 5-18).
11. Backseat (counterclockwise) compressor discharge valve.
12. Close CGV, PGV and CV service manifold valves.
13. Remove all service manifold hoses and return to manifold rack.
14. Install discharge, suction, head, and hot gas bypass protective caps.

5-22. START UP AFTER REPAIRS - Continued.

FOLLOW ON PROCEDURE

WARNING

Personnel injury and/or equipment damage may result if compressor is started when service valves are not in a backseated (counterclockwise) position.

1. Connect air conditioner input power at source.
2. Check supply of refrigerant in system (para 5-17).
3. Install right front evaporator panel (para 4-25).
4. Install right front condenser panel (para 4-28).
5. Return air conditioner to normal operation.

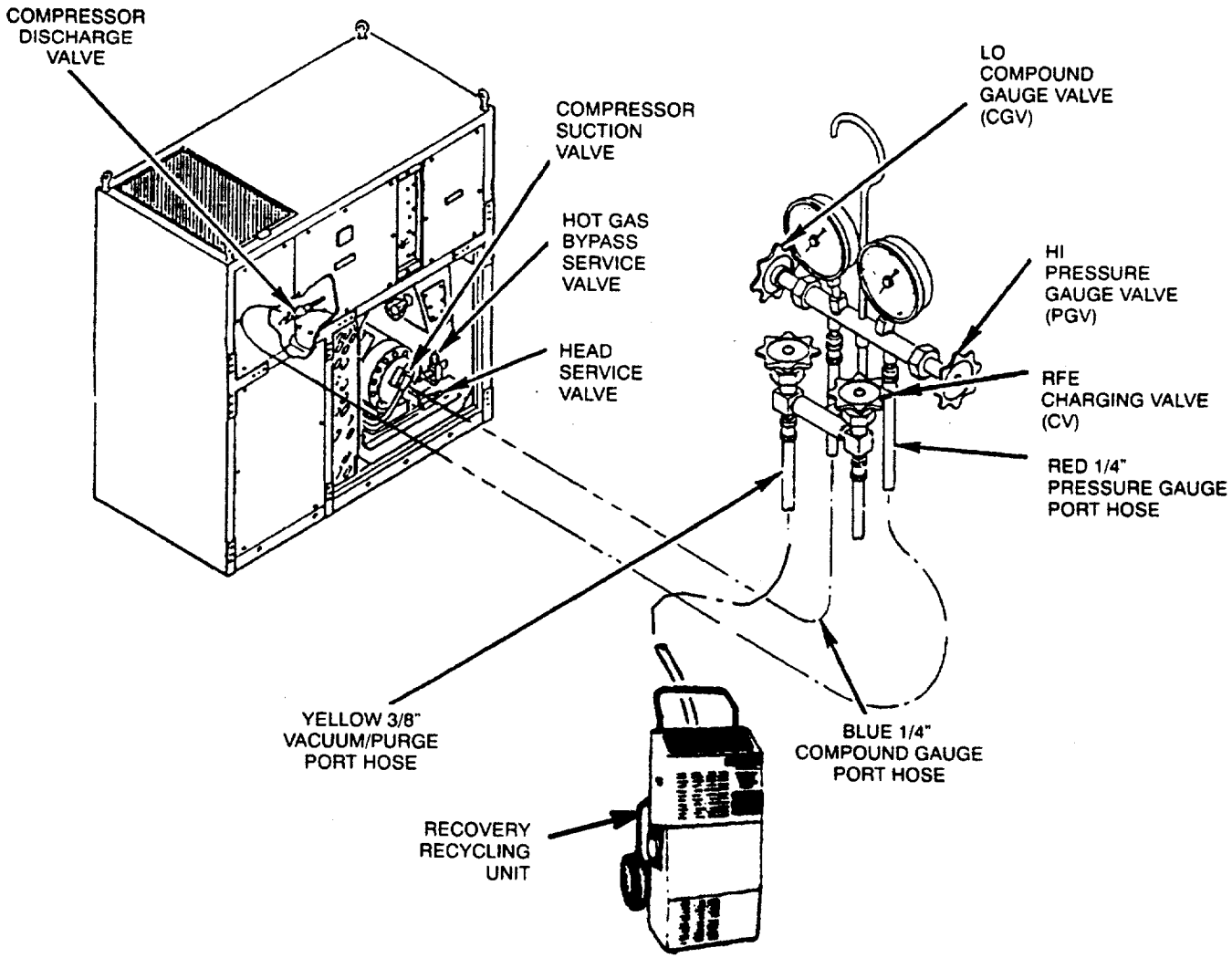


Figure 5-11. Start Up After Repairs

5-23 HIGH REFRIGERANT PRESSURE SWITCH (S4).

This task covers: **Inspection** **Removal** **Testing/Adjustment** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Materials:
Rags (Item 12, Appendix E)
Nitrogen, technical (Item 14, Appendix E)
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).
3. Purge compressor (para 5-20).

INSPECTION

1. Check that switch and cover are not dented, broken or cracked, replace switch and cover, if defective (see Figure 5-12).
2. Check bracket is not dented, broken or cracked. Replace bracket, if defective.
3. Check that wire leads are properly connected (see Figure FO-3).

REMOVAL

1. Remove cover (2).
2. Tag and disconnect leads.
3. Remove pressure line (6) from valve head of compressor (5/8" wrench).
4. Remove two screws (4), four flat washers (5) and (7), two locknuts (8), and clamps (9).
5. Remove screw and clamp from compressor electric box.
6. Remove two screws (12), flat washers (10), and lockwashers (11).
7. Remove switch (3).

TESTING/ADJUSTMENT

1. Using multimeter, check continuity between two lead terminals. If continuity is indicated (switch closed), switch is defective. Replace switch.
2. Connect manifold blue hose to nitrogen cylinder.
3. Connect yellow 1/4 inch (0.64 cm) hose to pressure line (6).
4. Using multimeter, switch should close at 425 to 475 psig (30 to 33 kg/cm^2) and open at 335 to 385 psig (24 to 27 kg/cm^2).
5. If switch can not be adjusted to ranges in step 4, replace switch.

5-23. HIGH REFRIGERANT PRESSURE SWITCH (S4) - Continued

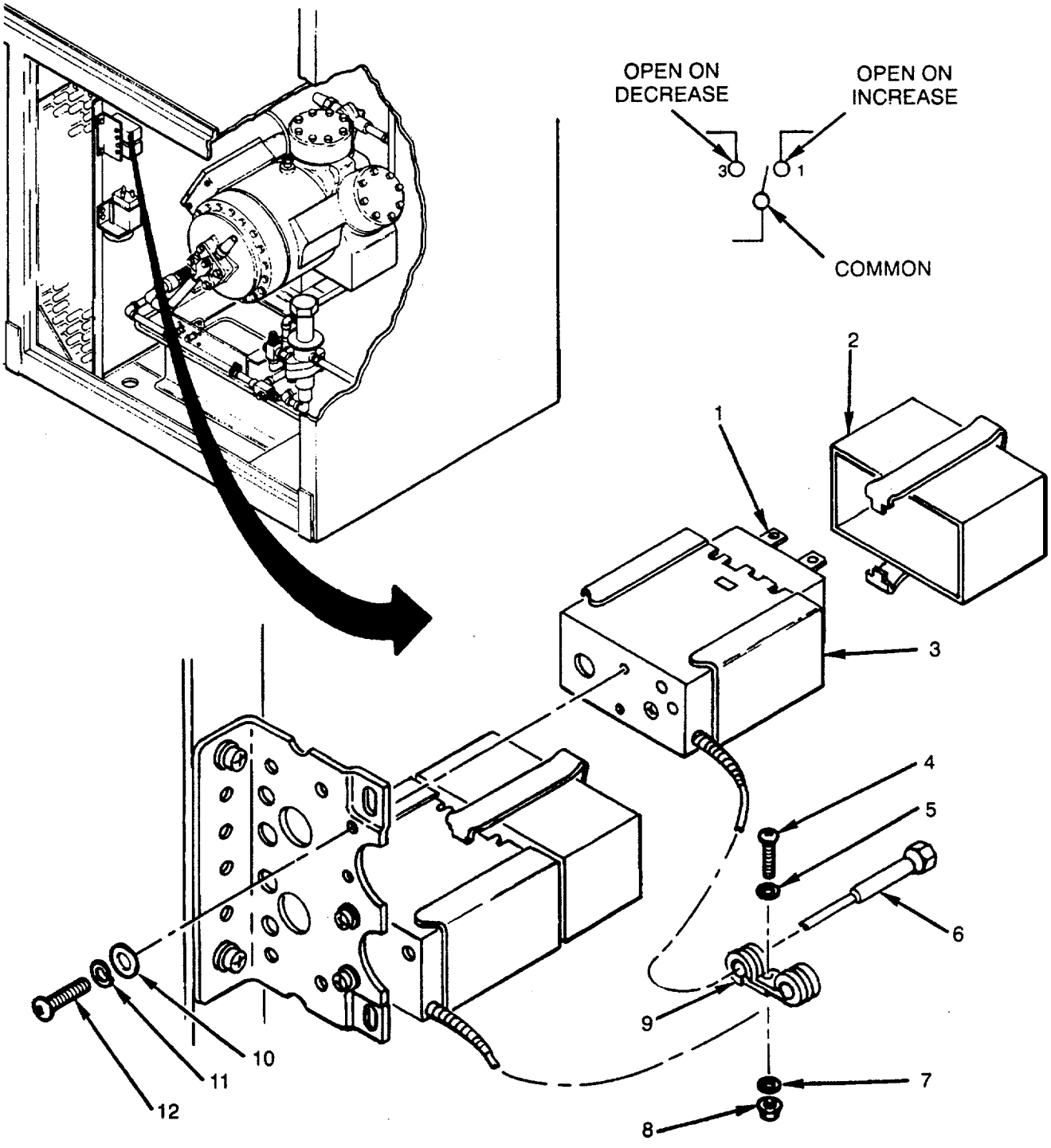


Figure 5-12. High Refrigerant Pressure Switch (S4)

INSTALLATION

1. Drill 5/32 inch holes through three terminals (1) on replacement switch.
2. Fungus proof replacement switch per MIL-V-173.
3. Place switch (3) in mounting position.
4. Install two screws (12), lockwashers (11), and flat washers (10).
5. Install two clamps (9) with two screws (4), four flat washers (5) and (7), and two locknuts (8).
6. Install clamp to compressor electric box with screw.
7. Install high refrigerant pressure line (6) to valve head of compressor (5/8" wrench).
8. Reconnect leads tagged in removal and remove tags.
9. Install cover (2).
10. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Replace drier filter (para 5-26).
2. Connect air conditioner input power at source.
3. Check refrigerant level (para 5-17) and charge if necessary.
4. Install right front condenser panel (para 4-28).

5-24 LOW REFRIGERANT PRESSURE SWITCH (S5).

This task covers: **Inspection** **Removal** **Testing/Adjustment** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Materials:
Rags (Item 12, Appendix E)
Nitrogen (Item 14, Appendix E)
Varnish, moisture and fungus resistant (Item 16, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).
3. Purge compressor (para 5-20).

INSPECTION

1. Check that switch and cover are not dented, broken or cracked. Replace switch and cover, if defective (see Figure 5-13).
2. Check bracket is not broken or cracked or dented. Replace bracket, if defective.
3. Check that wire leads are properly connected (see Figure FO-3).

REMOVAL

1. Remove cover (2).
2. Tag and disconnect leads.
3. Remove pressure line (6) from top of compressor (5/8" wrench).
4. Remove two screws (4), four flat washers (5) and (9), two locknuts and clamp (7).
5. Remove screw and clamp from compressor electric box.
6. Remove two screws (12), flat washers (10), and lockwashers (11).
7. Remove switch (3).

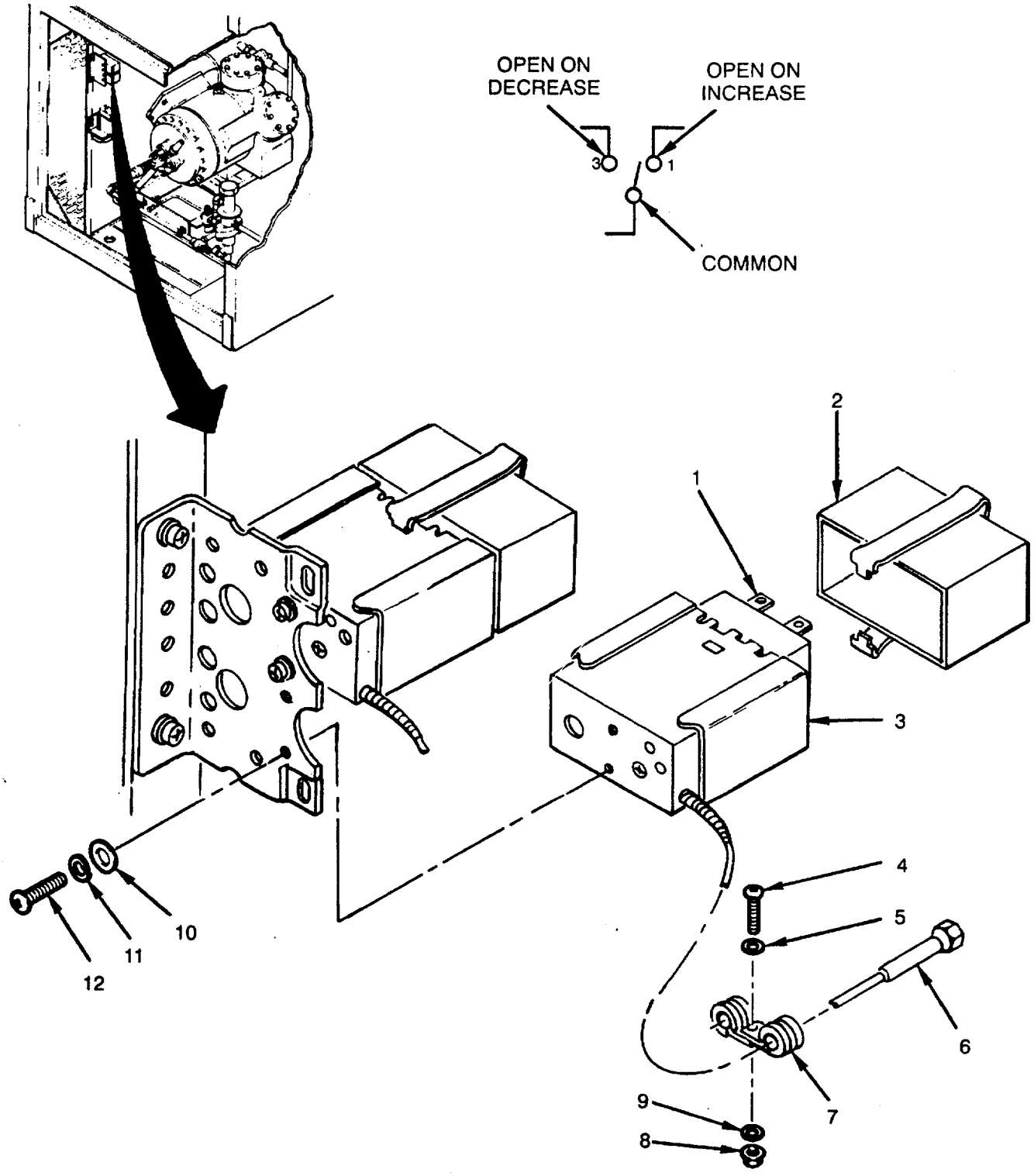


Figure 5-13. Low Refrigerant Pressure Switch (S5)

5-24. LOW REFRIGERANT PRESSURE SWITCH (S5) - Continued.

TESTING/ADJUSTMENT

1. Using multimeter, check continuity between two lead terminals. If continuity is indicated (switch closed), switch is defective. Replace switch.
2. Connect manifold blue hose to nitrogen cylinder.
3. Connect yellow 1/4 inch (0.64 cm) hose to pressure line (6).
4. Using multimeter, switch should close at 1 5 to 25 psig (1 to 1.8 kg/cm^2) and open at 35 to 45 psig (2.5 to 3.2 kg/cm^2).
5. If switch can not be adjusted to ranges in step 4, replace switch.

INSTALLATION

1. Drill 5/32 inch holes through three terminals (1) on replacement switch.
2. Fungus proof replacement switch per MIL-V-173.
3. Place switch (3) in mounting position.
4. Install two screws (12), lockwashers (11), and flat washers (10).
5. Install two clamps (7) with two screws (4), four flat washers (5) and (9), and two locknuts (8).
6. install clamp to compressor electric box with screw.
7. Install high refrigerant pressure line (6) to top of compressor (use 5/8" wrench).
8. Reconnect leads-tagged in removal and remove tags.
9. Install cover (2).
10. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Replace drier filter (para 5-26).
2. Connect air conditioner input power at source.
3. Check refrigerant level (para 5-17) and charge if necessary.
4. Install right front condenser panel (para 4-28).

5-25 LOW OIL PRESSURE SWITCH (S7).

This task covers: **Inspection** **Removal** **Testing/Adjustment** **Installation**

INITIAL SETUP:
Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Materials:
Rags (Item 12, Appendix E)
Nitrogen, technical (Item 14, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).
3. Purge compressor (para 5-20).

INSPECTION
1. Check that switch and cover are not dented, broken or cracked. Replace switch or cover, if defective (see Figure 5-14).
2. Check bracket is not broken or cracked or dented. Replace bracket, if defective.
3. Check that wire leads are properly connected. (see Figure FO-3).

REMOVAL
1. Remove cover (1).
2. Tag and disconnect leads.
3. Remove pressure lines (4) from rear of compressor (5/8" wrench).
4. Remove five screws (2), ten flat washers (3) and (6), five locknuts (7) and clamps (5).
5. Remove two screws (8), four flat washers (9) and (11), and two locknuts (12).
6. Remove switch (10).

5-25. LOW OIL PRESSURE SWITCH (S7) - Continued.

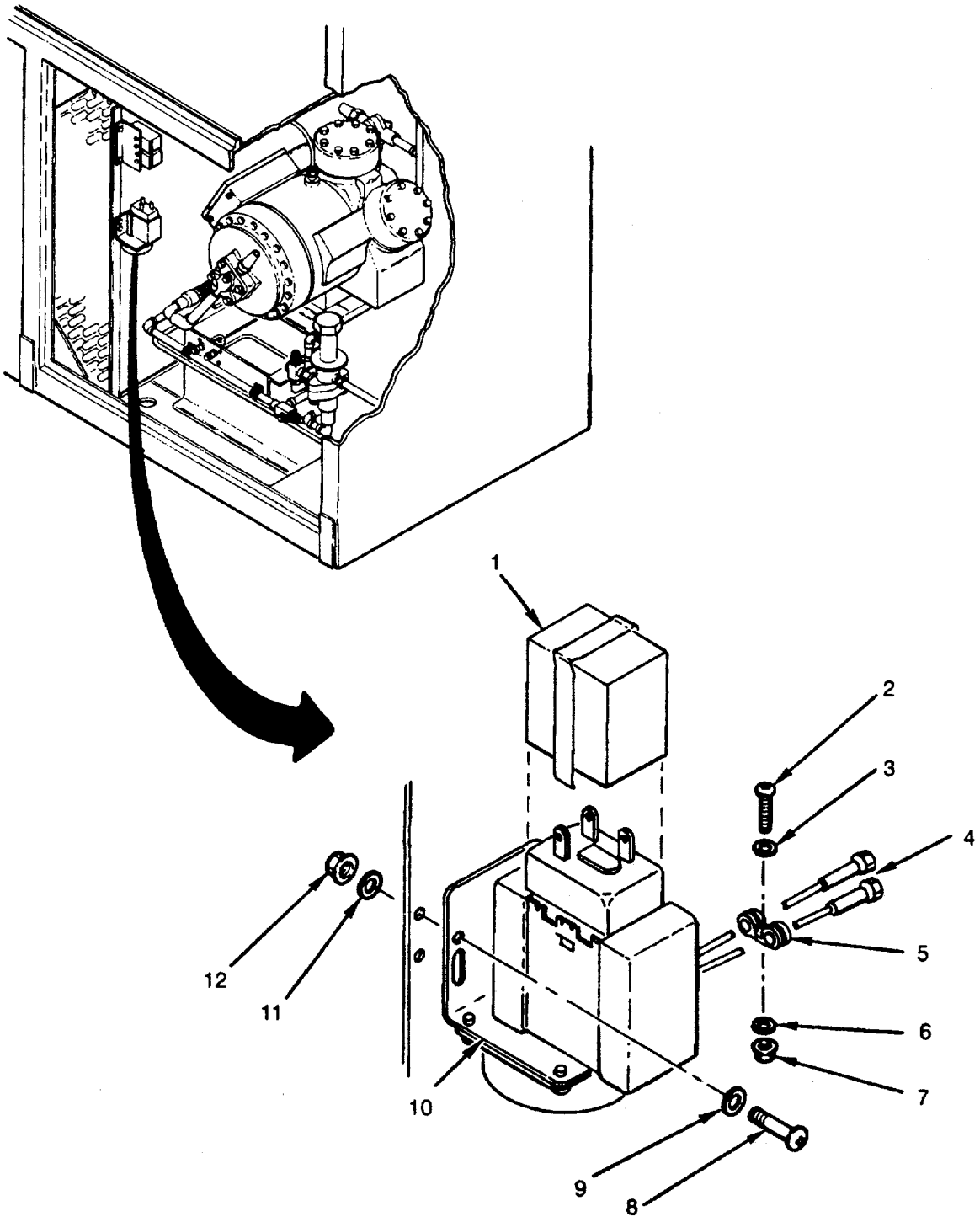


Figure 5-14. Low Oil Pressure Switch (S7)

TESTING/ADJUSTMENT

1. Using multimeter, check continuity between two lead terminals. If continuity is indicated (switch closed), switch is defective. Replace switch.
2. Connect manifold blue hose to nitrogen cylinder.
3. Connect yellow 1/4 inch (0.64 cm) hose to pressure line (4).
4. Using multimeter, switch should close at 4 to 6 psig (0.29 to 0.43 kg/cm^2) and open at 9 to 12 psig (0.65 to 0.86 kg/cm^2)
5. If switch can not be adjusted to ranges in step4, replace switch.

INSTALLATION

1. Place switch (10) in mounting position.
2. Install two screws (8), four flat washers (9) and (11), and two locknuts (12).
3. Install five clamp (5) with five screws (2), ten flat washers (3) and (6), and five locknuts (7).
4. Install pressure lines (4) to rear of compressor (5/8" wrench).
5. Reconnect leads tagged in removal and remove tags.
6. Install cover (1).
7. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Connect air conditioner input power at source.
2. Check refrigerant level (para 5-17) and charge if necessary.
3. Install right front condenser panel (para 4-28).

5-26. DRIER FILTER (DEHYDRATOR).

This task covers:	Inspection	Removal	Service	Disassembly	Repair/Replace
	Reassembly	Installation			

INITIAL SETUP:

Tools;
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:
1. Pump down refrigerant system (para 5-21).

WARNING

Disconnect Input to the air conditioner before performing any internal maintenance. Voltages used can KILL Shutting the unit off at the control panel does not disconnect unit power.

2. Disconnect air conditioner input power at source.
3. Remove right front evaporator panel (para 4-25).

INSPECTION
1. Inspect for evidence of leaks, damaged lines, and loose or missing mounting hardware (see Figure 5-15).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL
1. If drier body (8) is to be removed, disassemble drier before debrazing. (Perform disassembly).
2. If drier body (8) is to be removed, debraze tubing (7) and (9) at joints (para 5-14).
3. Remove screw (10), nut (12), and bracket (11).

SERVICE
1. Replace drier filter cartridge (5) upon compressor burn-out or whenever refrigerant system is opened for purging or evacuation.
2. Clean filter strainer (6) upon compressor bum-out or when refrigerant system is opened fo purging or evacuation.

DISASSEMBLY
1. Remove eight bolts (1) and backplate (2).
2. Remove gasket (15).
3. Remove wingnut (3), end cap (4), filter cartridge (5), and strainer (6).
4. Remove filter/strainer end cap (14) and felt gasket (13).

REPAIR/REPLACE
Repair consists of replacing backplate (2), gasket (15), wingnut (3), end cap (4), filter cartridge (5), filter strainer (6), filter/strainer end cap (14), felt gasket (13), or drier body (8).

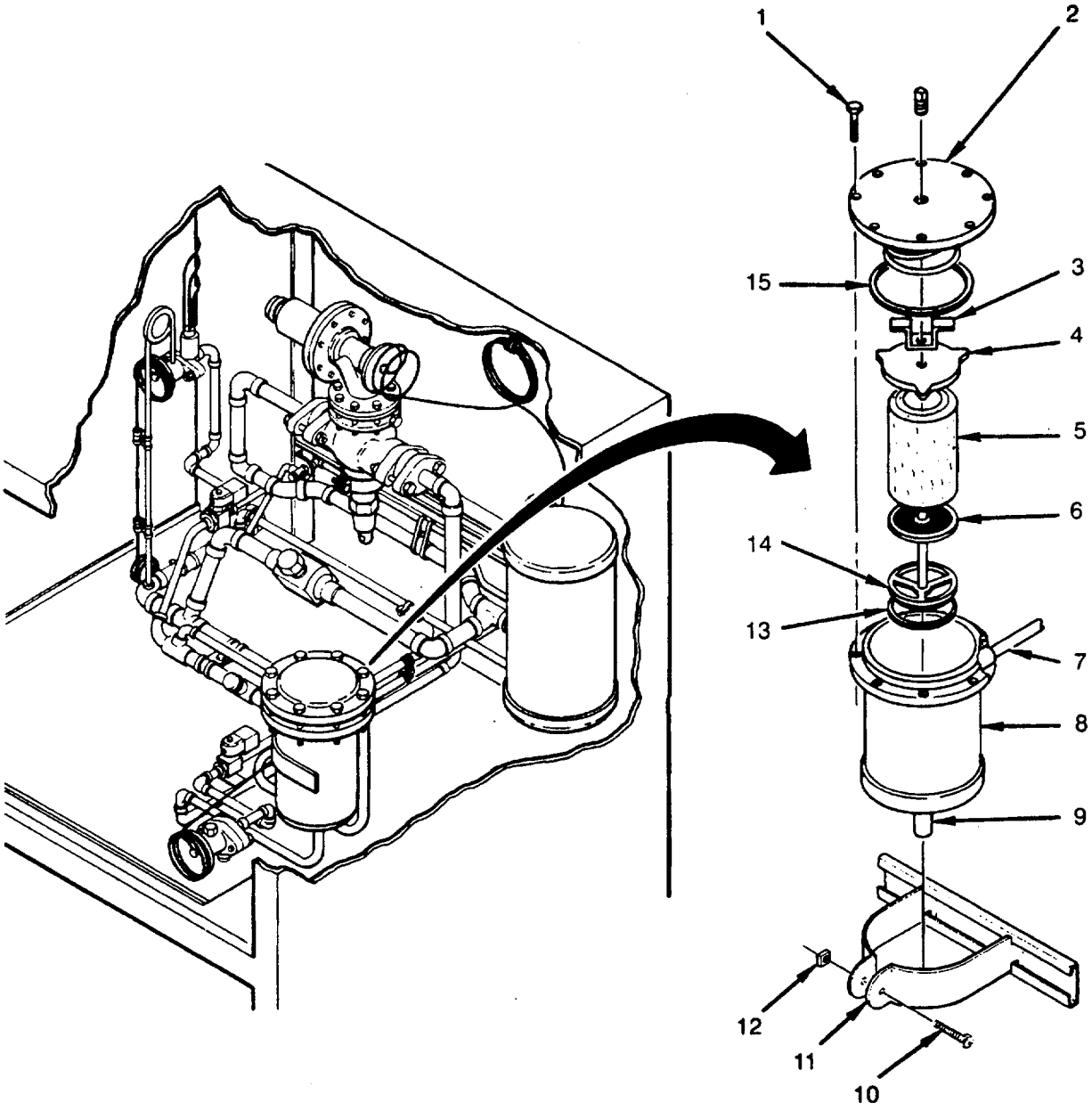


Figure 5-15. Drier Filter

5-26. DRIER FILTER (DEHYDRATOR) - Continued.

REASSEMBLY

1. Install felt gasket (13) and filter/strainer end cap (14).
2. Install filter strainer (6), filter cartridge (5), and end cap (4) with wingnut (3).
3. Install gasket (15).
4. Install backplate (2) with eight bolts (1).

INSTALLATION

1. If drier body (8) was removed, disassemble replacement drier filter before brazing.
2. Install replacement drier body (8) with bracket (11), screw (10), and nut (12).
3. Braze tubing (7) and (9) at joints (para 5-14).
4. Reassemble drier.
5. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Perform start up after repairs (para 5-22).
2. Install right front evaporator panel (para 4-25).
3. Connect air conditioner input power at source.

5-27. REFRIGERANT STRAINER.

This task covers:	Inspection	Removal	Service	Disassembly	Repair/Replace
	Reassembly	Installation			

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:
1. Pump down refrigerant system (para 5-21).

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

2. Disconnect air conditioner input power at source.

INSPECTION
1. Inspect for evidence of leaks, damaged lines, and loose or missing mounting hardware (see Figure 5-16).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL
1. If strainer body (4) is to be removed, disassemble strainer.
2. If strainer body (4) is to be removed, debraze tubing at coupling joints (5) (para 5-14).

SERVICE
Service consists of replacing the strainer cartridge (3).

DISASSEMBLY
1. Remove eight bolts (6) (six on replacement item) and end cap (1). (A 17 inch extension is required for removing bolts.)
2. Remove gasket (2).
3. Remove strainer cartridge (3).

REPAIR/REPLACE
Repair consists of replacing strainer cartridge (3), gasket (2), end cap (1), strainer body (4) or refrigerant strainer.

REASSEMBLY
1. Install replacement strainer cartridge (3).
2. Install gasket (2).
3. Install end cap (1) with eight bolts (6) (six bolts on replacement item).

5-27. REFRIGERANT STRAINER - Continued.

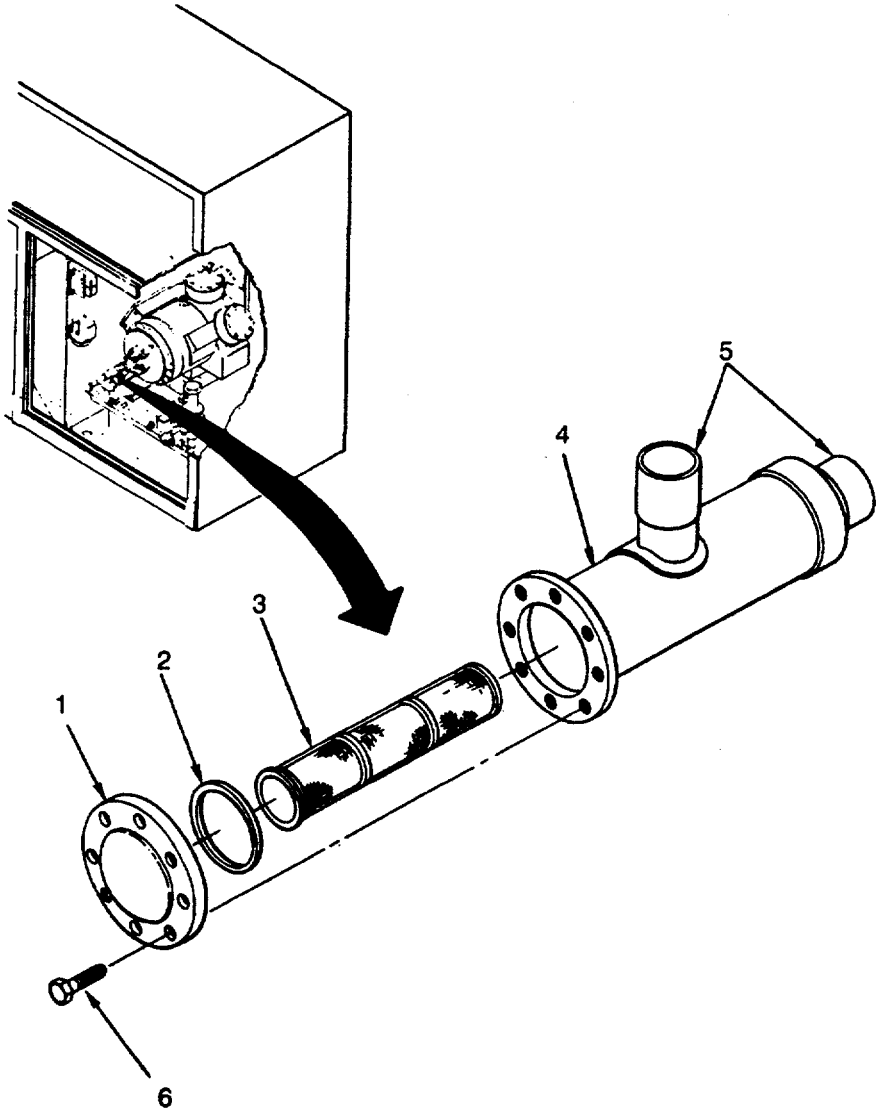


Figure 5-16. Refrigerant Strainer

INSTALLATION

1. If strainer body was removed, disassemble replacement strainer.
2. If strainer body (4) was removed braze tubing at joints (5) (para 5-14).
3. Reassemble strainer.
4. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Perform start up after repairs (para 5-22).
2. Connect air conditioner input power at source.

5-28. SIGHT REFRIGERANT GLASS.

This task covers: **Inspection** **Repair** **Removal** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front evaporator panel (para 4-25).
3. Swing control box out (para 4-45).

INSPECTION

1. Inspect for evidence of leaks, damaged lines, and loose or missing mounting hardware (see Figure 5-17).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REPAIR

Repair of the sight refrigerant glass consists of tightening the sight glass.

REMOVAL

1. Pump down refrigerant system (para 5-21).
2. Remove plastic cover (3).
3. Remove clamps in work area.
4. Debraze tubing (1) at joints (para 5-14).
5. Remove sight refrigerant glass (2).

INSTALLATION

1. Remove plastic cover (3).
2. Position sight refrigerant glass (2) in unit.
3. Braze tubing (1) at joints (para 5-14).
4. Leak test all newly connect joints and those in the repair area (para 5-15).
5. Install clamps that were removed in work area.
6. Install plastic cover (3).

5-28. SIGHT REFRIGERANT GLASS - Continued.

FOLLOW ON PROCEDURE

1. Swing control box in and secure in place (para 4-45).
2. Perform start up after repairs (para 5-22).

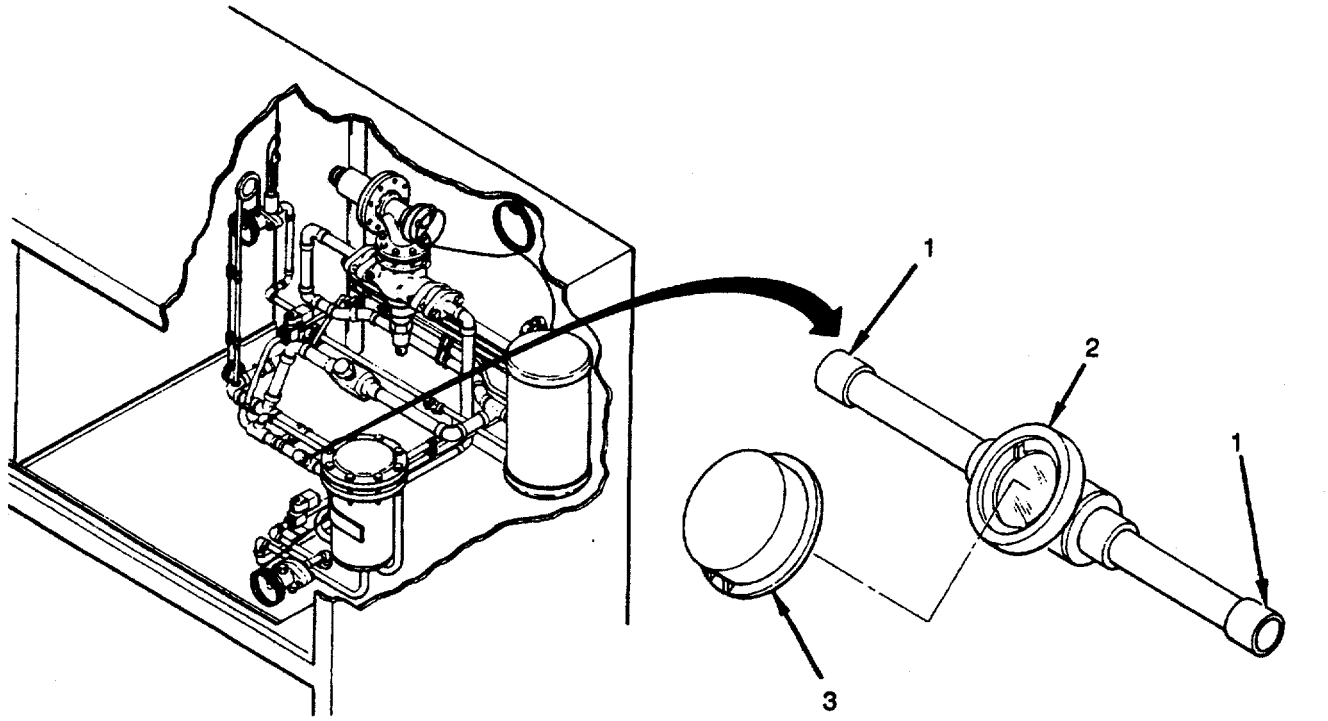


Figure 5-17. Sight Glass

5-29. SERVICE VALVES (HEAD AND HOT GAS BYPASS).

This task covers: **Inspection** **Removal** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

INSPECTION

1. Check that caps are in place and that threaded connection ends are not damaged. Replace if missing or damaged (see Figure 5-18).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Discharge refrigerant-system (para 5-12).
2. Receive protective caps (3).
3. Debraze tubing (1) at joints (para 5-14).
4. Remove valve (2).

INSTALLATION

1. Place valve (2) into mounting position.
2. Braze tubing (1) at joints (para 5-14).
3. Install protective caps (3).
4. Leak test all newly connected joints and those in the repair area (para 5-15).
5. Backseat (counterclockwise) both service valves (head and hotgass bypass).

5-29. SERVICE VALVES (HEAD AND HOT GAS BYPASS) - Continued.

FOLLOW ON PROCEDURE

1. Replace drier filter (para 5-26).
2. Charge refrigerant system (para 5-17).

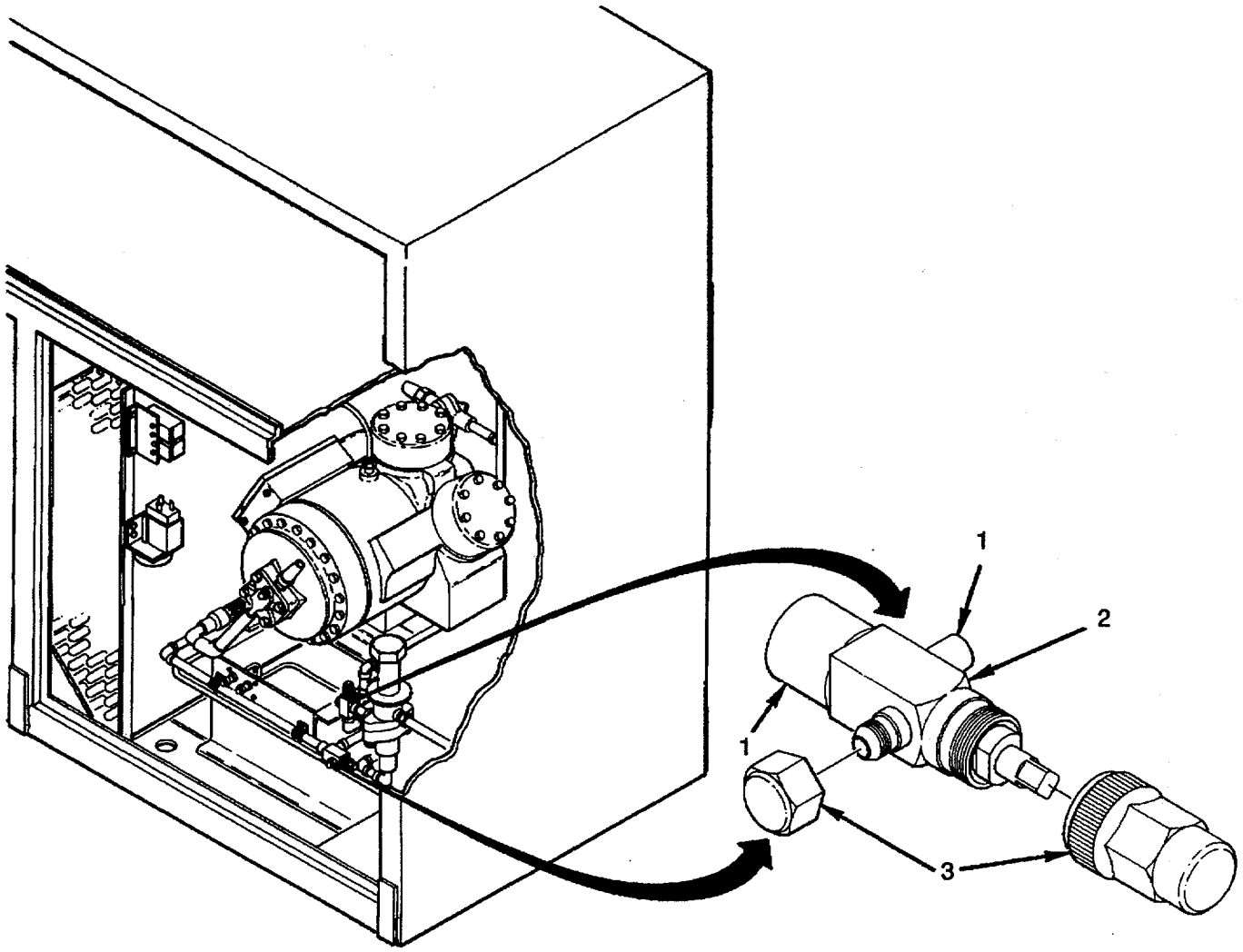


Figure 5-18. Service Valves (Head and Hot Gas Bypass)

5-30. SERVICE VALVE (EXPANSION).

This task covers: **Inspection** **Removal** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front evaporator panel (para 4-25).
3. Swing control box out (para 4-45).

INSPECTION

1. Check that caps are in place and that threaded connection ends are not damaged. Replace if missing or damaged (see Figure 5-19).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Pump down refrigerant system (para 5-21).
2. Remove two screws (4), locknuts (1), and four washers (2) and (3).
3. Remove valve caps (5).
4. Debraze tubing at joints (7) (para 5-14).
5. Debraze valve (6) from bracket (8) (para 5-14).

INSTALLATION

NOTE

Check to see if valve caps have been removed before brazing.

1. Braze valve (6) onto bracket (8) (para 5-14).
2. Place valve (6) into mounting position.
3. Install two screws (4), four washers (2) and (3), and two locknuts (1).
4. Braze tubing (7) at joints (para 5-14).
5. Install valve caps (5).
6. Leak test all newly connected joints and those in the repair area (para 5-15).

5-30. SERVICE VALVE (EXPANSION) - Continued.

FOLLOW ON PROCEDURE

1. Replace drier filter (para 5-26).
2. Close control box (para 4-45).
3. Start up after repairs (para 5-22).

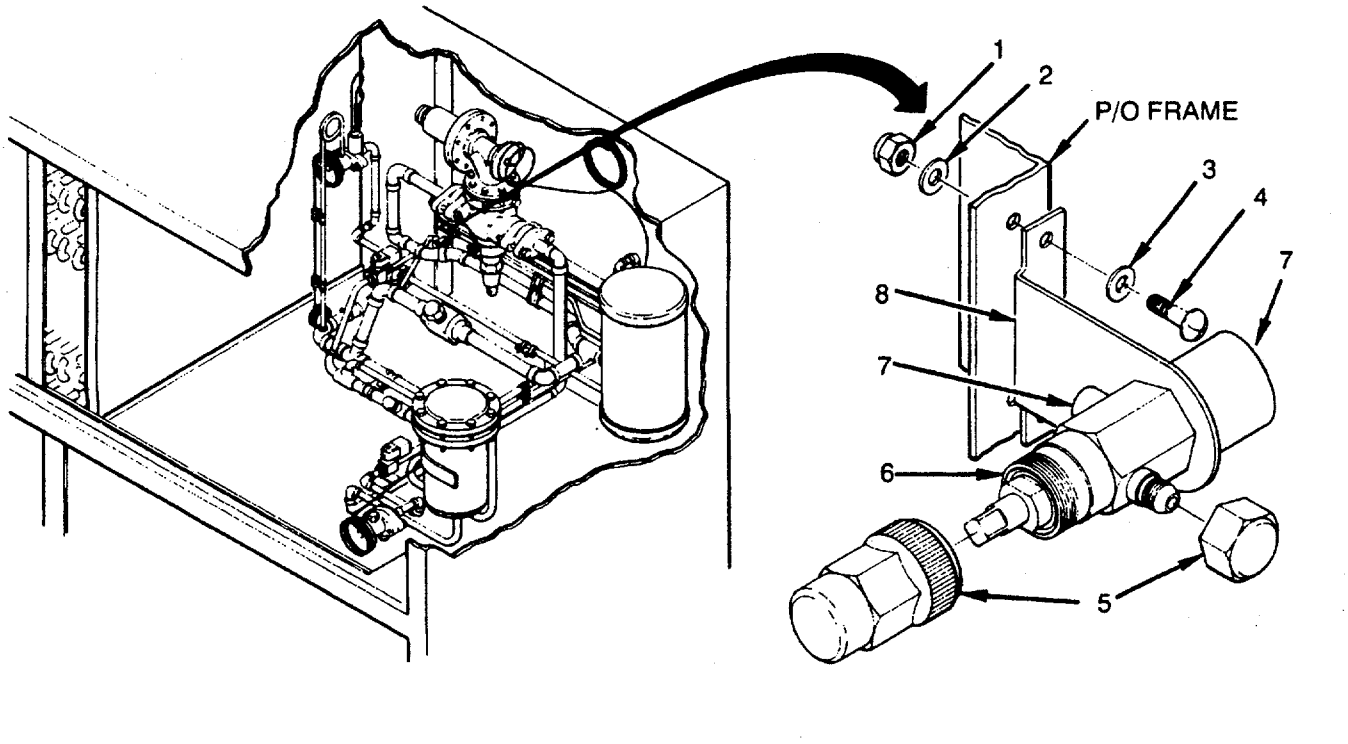


Figure 5-19. Service Valve (Expansion)

5-31. SERVICE VALVE (ACTUATOR).

This task covers: **Inspection** **Removal** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser panel (para 4-27).

INSPECTION

1. Check that caps are in place and that threaded connection ends are not damaged. Replace if missing or damaged (see Figure 5-20).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Discharge refrigerant system (para 5-12).
2. Disconnect air conditioner input power at source.
3. Remove valve caps (2).
4. Debraze tubing at joints (3) and (5) (para 5-14).
5. Remove screw (1), flat washer (6), and valve (4).

INSTALLATION

1. Install valve (4) with screw (1) and flat washer (6).

NOTE

Check to see if valve caps have been removed before brazing.

2. Braze tubing at joints (3) and (5) (para 5-14).
3. Install valve caps (2).
4. Leak test all newly connected joints and those in the repair area (para 5-15).

5-31. SERVICE VALVE (ACTUATOR) - Continued.

FOLLOW ON PROCEDURE

1. Install drier filter (para 5-26).
2. Install left front condenser panel (para 4-27).
3. Charge refrigerant system (para 5-17).

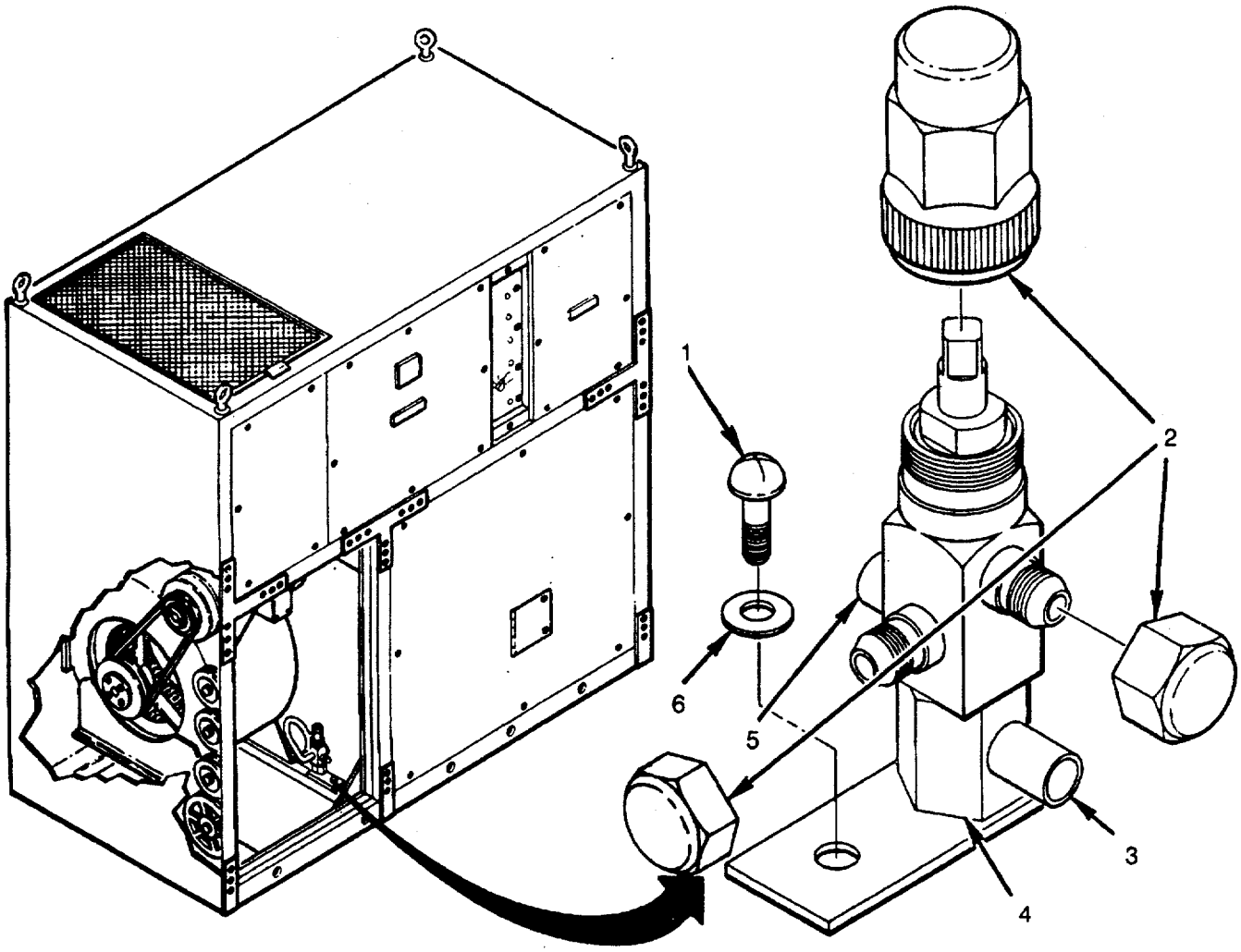


Figure 5-20. Service Valve (Actuator)

5-32. SERVICE VALVES (SCHRADER).

This task covers: **Inspection** **Removal** **Installation**

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

INSPECTION

1. Check that caps are in place and that threaded connection ends are not damaged. Replace if missing or damaged (see Figure 5-21).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Discharge refrigerant system (para 5-12).
2. Remove valve cap (1) .
3. Debraze tubing (8) at joints (2) (para 5-14).
4. Remove screw (7), flat washer (6), locknut (4), and valve plate (5).
5. Debraze valve (3) from valve plate (5) (para 5-14).

INSTALLATION

NOTE

Check to see if valve caps have been removed before brazing.

1. Remove schrader valve stem on replacement valve.
2. Braze valve (3) onto valve plate (5) (para 5-14).
3. Install valve plate (5) with screw (7), flat washer (6), and locknut (4).
4. Braze tubing (8) at joints (2) (para 5-14).
5. Install schrader valve stem.
6. Install valve cap (1).
7. Leak test all newly connected joints and those in the repaired area (para 5-15).

5-32. SERVICE VALVES (SCHRADER) - Continued.

FOLLOW ON PROCEDURE

1. Install right front condenser panel (para 4-28).
2. Charge refrigerant system (para 5-17).

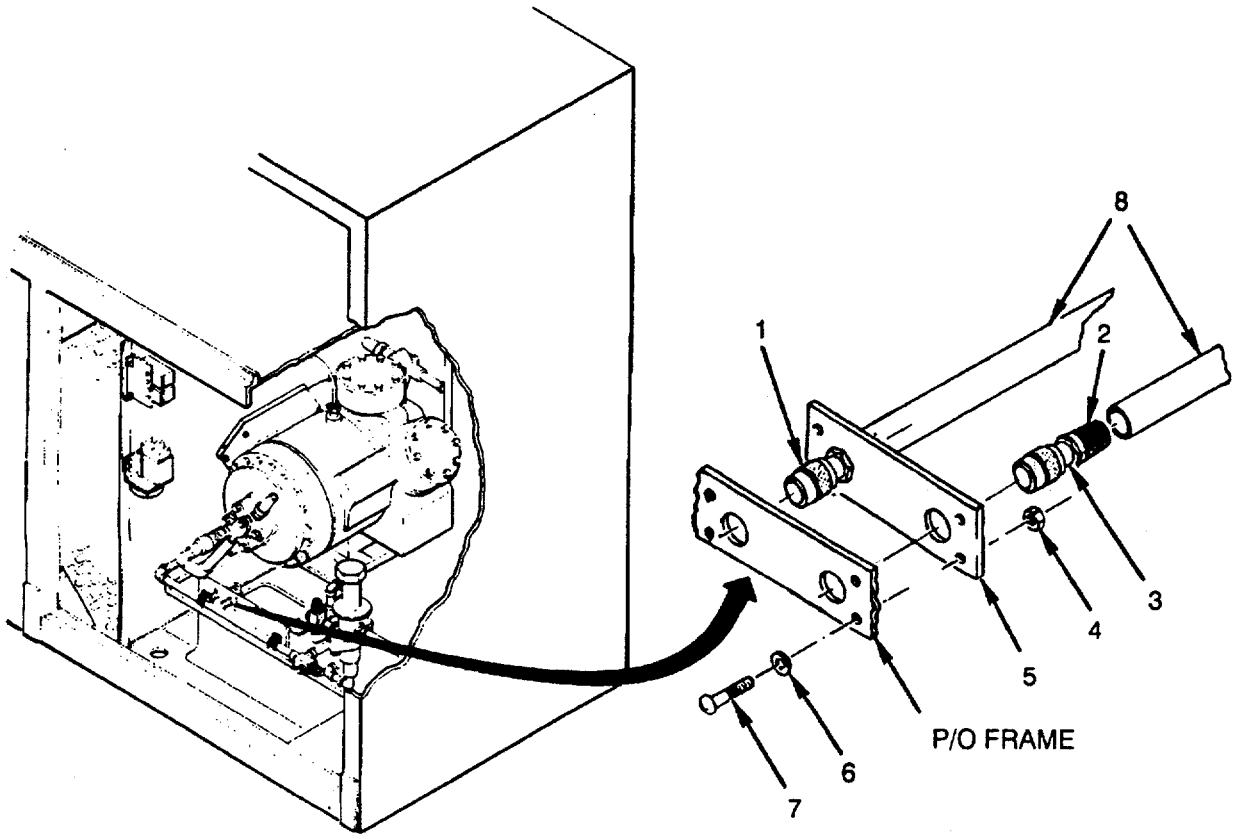


Figure 5-21. Service Valves (Schrader)

5-33. DISCHARGE VALVE (COMPRESSOR).

This task covers: Inspection Removal Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Material:
Lubricating oil #Zerol 150 (Item 9, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).
3. Discharge compressor (para 5-19).

INSPECTION

1. Check that caps are in place and that threaded connection ends are not damaged. Replace if missing or damaged (see Figure 5-22).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Remove valve caps (2).
2. Remove two bolts (3) and move valve (1) away from compressor. (1/2 inch wrench.)
3. If valve is to be replaced, debraze tubing (4) at joint (para 5-14).
4. If valve is good, remove gasket (5) and clean gasket material from valve (1).

INSTALLATION

1. If valve was replaced, braze tubing (4) at joint (para 5-14).
2. Coat replacement gasket (5) with lubricating oil.
3. Install replacement gasket (5) onto valve (1).
4. Install valve (1) with two bolts (3).
5. Install valve caps (2).

5-33. DISCHARGE VALVE (COMPRESSOR) Continued.

FOLLOW ON PROCEDURE

1. Purge compressor (para 5-20).
2. Backseat (counterclockwise) suction and discharge valves.
3. Leak test all newly connected joints and those in the repair area (para 5-15).
4. Connect air conditioner input power at source.
5. Charge refrigerant system (para 5-17).

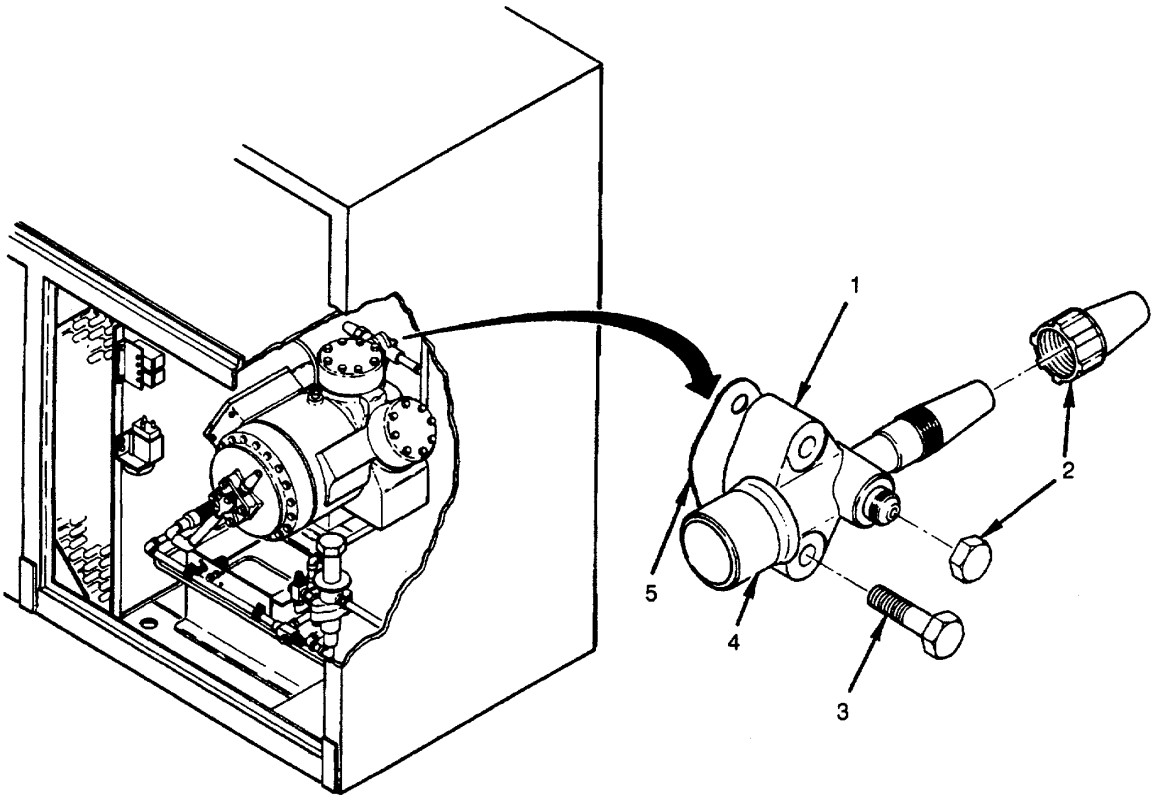


Figure 5-22. Discharge Valve (Compressor)

5-34. SUCTION VALVE (COMPRESSOR).

This task covers: Inspection Removal Installation

INITIAL SETUP:

Tools:

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Material:

Lubricating oil #Zerol 150 (Item 9, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).
3. Discharge compressor (para 5-19).

INSPECTION

1. Check that caps are in place and that threaded connection ends are not damaged. Replace if missing or damaged (see Figure 5-23).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Remove valve caps (3).
2. Remove four bolts (4) and valve (2).
3. If valve is to be replaced, debraze tubing (5) at joint (para 5-14).
4. If valve is good, remove gasket (1) and clean gasket material from valve (2).

INSTALLATION

1. If valve was replaced, braze tubing (5) at joint (para 5-14).
2. Coat replacement gasket (1) with lubricating oil.
3. Install replacement gasket (1) onto valve (2).
4. Install valve (2) with four bolts (4).
5. Install valve caps (3).

5-34. SUCTION VALVE (COMPRESSOR) - Continued.

FOLLOW ON PROCEDURE

1. Purge compressor (para 5-20).
2. Backseat (counterclockwise) suction and discharge valves.
3. Leak test all newly connected joints and those in the repair area (para 5-15).
4. Connect air conditioner input power at source.
5. Charge refrigerant system (para 5-17).

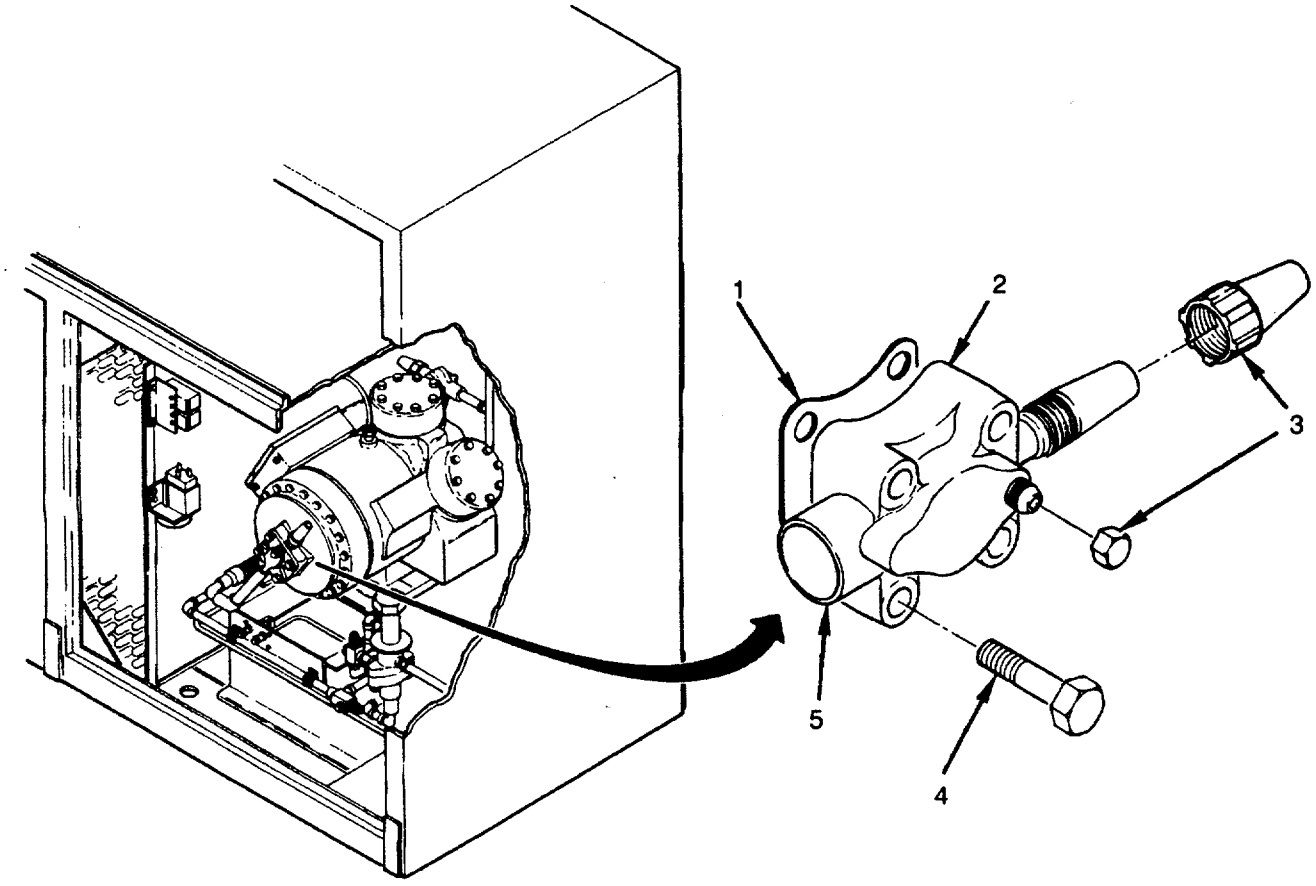


Figure 5-23. Suction Valve (Compressor)

5-34. SOLENOID VALVES (L1 AND L2).

This task covers: Inspection Removal Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box (para 4-45).

INSPECTION

1. Check for leaks or frayed wires (see Figure 5-24).
2. if a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Pump down refrigerant system (para 5-21).
2. Remove retainer (2), nameplate (1), and coil (3).
3. Unscrew tube assembly (4).
4. Remove plunger assembly (9).
5. Check valve body (6) for visible damage. Normally valve body replacement is unnecessary. If valve body is not replaced, skip steps 9 and 10.
6. If L1 is being removed, skip step 7.
7. Remove two clamps and move wiring harness away from work area.
8. Remove nut (7) at bottom of bracket (8).
9. Debraze tubing (5) at joints (para 5-14).
10. Remove valve body (6).

5-35. SOLENOID VALVES (L1 AND L2) - Continued.

INSTALLATIION

1. Place valve body (6) in mounting position.
2. Braze tubing (5) at joints (para 5-14).
3. Install nut (7) at bottom of bracket (8).
4. Install plunger assembly (9) into tube assembly (4).
5. Install tube assembly (4).
6. Install coil (3) with nameplate (1) and retainer (2).
7. If L2 was replaced, install wiring harness with two clamps.
8. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Perform start up after repairs (para 5-22).
2. Close control box (para 4-45).

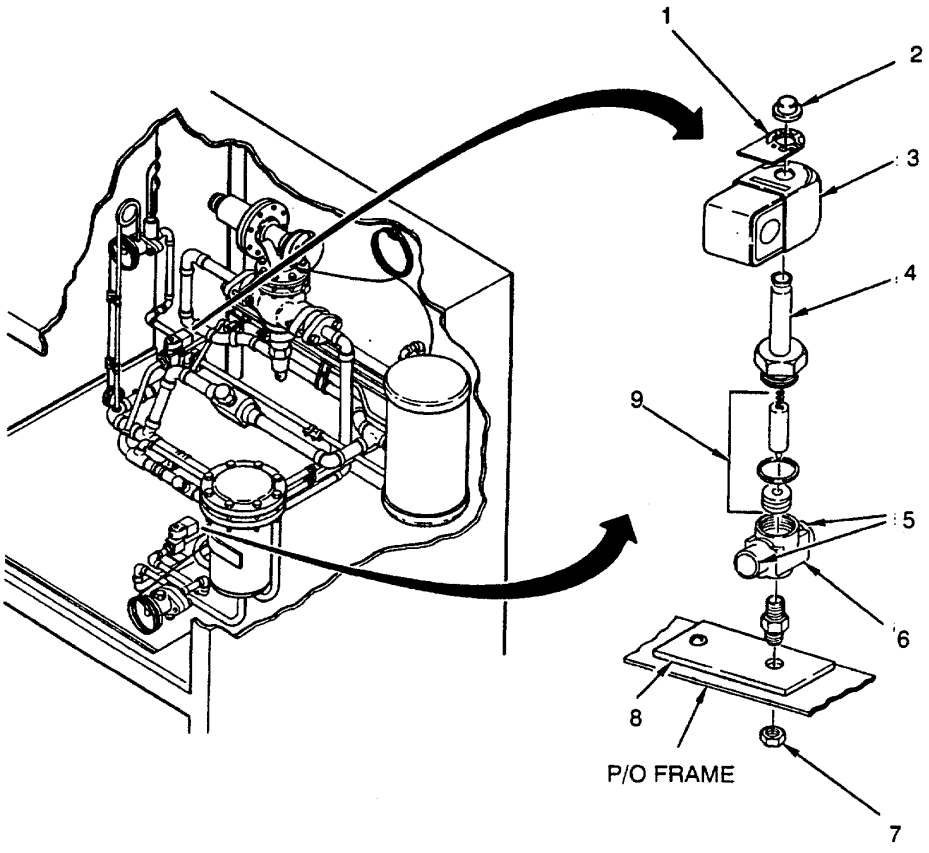


Figure 5-24. Solenoid Valve (L1 And L2)

5-36. THERMOSTATIC EXPANSION VALVE (LIQUID QUENCH).

This task cover:	Inspection	Adjust	Removal	Disassembly	Repair/Replace
	Reassembly	Installation			

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix)B
Thermometer,. digital (Item 17, Appendix B)
Thermocouple (Item 18, Appendix B)

Personnel: 1

Material: Sealant tape (Item 15, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box (para 4-45).

INSPECTION

1. Inspect for evidence of leaks, kinked or damaged capillary line, and loose or missing mounting hardware (see Figure 5-25).
2. Check thermal bulb to see that it is securely clamped to the suction line.
3. If a leak is suspected or indicated, test per paragraph 5-15.

ADJUST

1. Open manual valve (para 5-39).
2. Install jumper wires to TB2 (para 4-61 and Figure FO-1) for single mode operation.
3. Perform a refrigerant pressure check in accordance with para 5-18. Leave gauges attached.
4. Attach first thermocouple to an exposed surface of suction return line adjacent to sensing bulb.
5. Attach second thermocouple to suction line at compressor.
6. Install right front evaporator panel (para 4-25).
7. Install center front evaporator panel (para 4-22).
8. Note pressure indicated on gauge and temperature indicated for sensing bulb.
9. Set air conditioner temperature control thermostat to highest temperature setting.

WARNING

High voltage is used in operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions.

10. Connect air conditioner input power at source.

5-36. THERMOSTATIC EXPANSION VALVE (LIQUID QUENCH) - Continued.

ADJUST - Continued

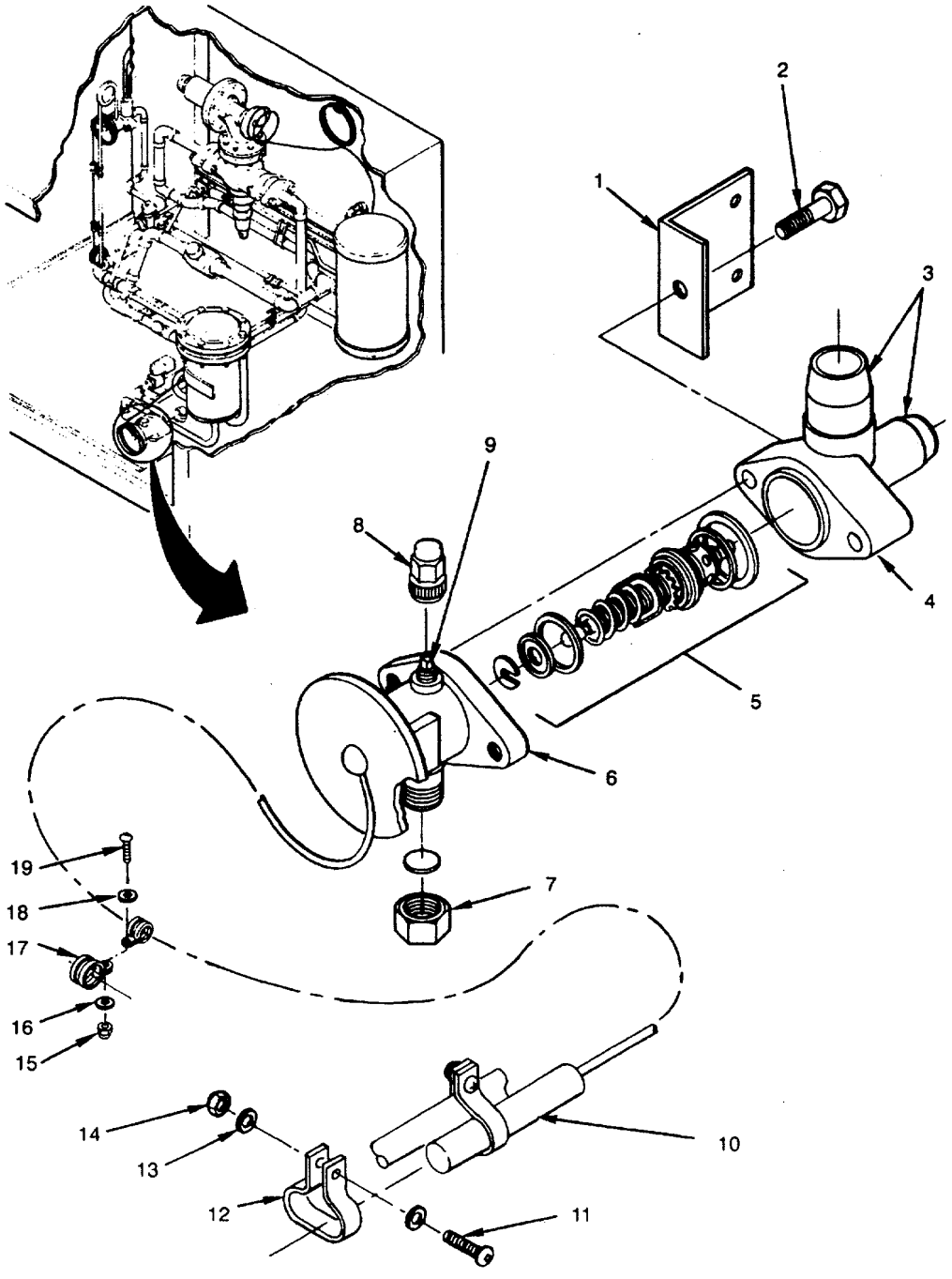


Figure 5-25. Thermostatic Expansion Valve (Liquid Quench)

11. Start the air conditioner in COOL mode. Note that suction pressure drops to 58 ± 2 psig (4. 0 ± 0. 14 kg/cm^2). Allow the compressor to run for at least 30 minutes. If the pressure is not within the above limits, ensure proper operation of the pressure regulator valve (para 5-44) before proceeding with quench valve test.

12. Observe that thermocouple meter temperature indicated for sensing bulb remains stable for a minimum of two minutes, then find saturation temperature for pressure indicated on gauge, using Table 5-2. For example, the saturation temperature for a refrigerant pressure of 69 psig (4. 85 kg/cm^2) is 40°F (4.40°C).

13. Compare the saturation temperature with indicated temperature at the sensing bulb. The indicated temperature should be 20 to 30°F (-6.7 to -1.1 °C) higher than the saturation temperature. The temperature indicated at compressor should be 65 to 85°F (18.3 to 29.4°C).

14. If indicated temperature is not within limits shown in step 11, adjust the quench valve as follows:

    a. Turn adjustment screw (9) clockwise to increase suction line pressure.

    b. Turn adjustment screw (9) counterclockwise to decrease suction line pressure.

15. If indicated temperature shown in step 11 can not be stabilized by adjustment, replace quench valve.

16. Tum unit OFF.

17. Remove both thermocouples.

18. Remove service manifold from high and low service valves.

19. Install service valve protective caps.

REMOVAL

1. Pump down refrigerant system (para 5-21).

WARNING

Disconnect Input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

2. Disconnect air conditioner input power at source.
3. Remove locknut (15), screw (19), and two flat washers (16) and (18).
4. Remove two clamps (17).
5. Remove two flatwashers (13), screw (11) and nut (14) on sensing bulb retaining clamp (12).
6. Remove sensing bulb (10) from retaining clamp (12).

NOTE

- If expansion valve body is to be replaced, disassemble before debrazing.
- If expansion valve body is not damaged and will not be removed, proceed to the disassembly procedure.

7. Remove expansion valve body (4) by debrazing tubing (3) (para 5-14).
8. Remove bolt (2) holding valve to bracket (1).
9. Remove valve (4) from bracket (1).

5-36. THERMOSTATIC EXPANSION VALVE (LIQUID QUENCH) - Continued.

DISASSEMBLY

1. Remove two bolts (2), or second bolt (2) as applicable.
2. Remove powerhead (6) from valve body (4).
3. Remove cage assembly (5).
4. Examine cage assembly for damage or defects.

REPAIR/REPLACE

NOTE

Repair consists of replacing power head, cage assembly, or valve body.

REASSEMBLY

1. Examine replacement cage assembly (5) for defects or damage before reassembly.
2. Install cage assembly (5).
3. Install powerhead (6) on valve body (4).
4. Install two bolts (2), or just one bolt (2) if valve will immediately be installed in unit.

INSTALLATION

NOTE

- If expansion valve body is not being installed, proceed to step 3.
- If expansion valve body is being installed, proceed to disassembly before brazing valve body.

1. Position valve (4) in mounting position.
2. Install valve (4) to bracket (1) with one bolt (2).
3. Install sensing valve body (4) by brazing tubing (3) (para 5-14).
4. Install sensing bulb (10) in retaining damps (12).
5. Tighten two flatwashers (13), screw (11) and nut (14).
6. Install two clamp halves (17) to refrigerant lines.
7. Install two flat washers (16) and (18), one screw (19), and locknut (15).
8. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Perform start up after repairs (para 5-22).
2. Close control box assembly (para 4-45).

5-37. HOT GAS BYPASS VALVE.

This task cover:	Inspection	Adjust	Removal	Disassembly	Repair/Replace
	Reassembly	Installation			

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any Internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).
3. Remove right front evaporator panels (para 4-25).

INSPECTION

1. Inspect for evidence of leaks, damaged lines, and loose or missing mounting hardware (see Figure 5-26).
2. If a leak is suspected or indicated, test per paragraph 5-15.
3. Check that mounting damp is secure.

ADJUST

1. Connect compound gauge to low service valve (para 5-11).
2. Open manual valve (para 5-39).
3. Open left electrical plate (para 4-30).
4. Install jumper wires to TB2 (para 4-61) for single mode operation (see FO-3).
5. Set cool control thermostat (para 4-87) to lowest temperature setting.

WARNING

High voltage is used in operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions.

6. Connect air conditioner input power at source.
7. Start unit in COOL mode.

NOTE

- The hot gas bypass valve is set at the factory to maintain the suction pressure above 55 to 58 psig (3.9 to 4.1 kg/cm^2) at the compressor.
- Allow air conditioner to run until pressure remains constant.

5-37. HOT GAS BYPASS VALVE - Continued.

ADJUST - Continued

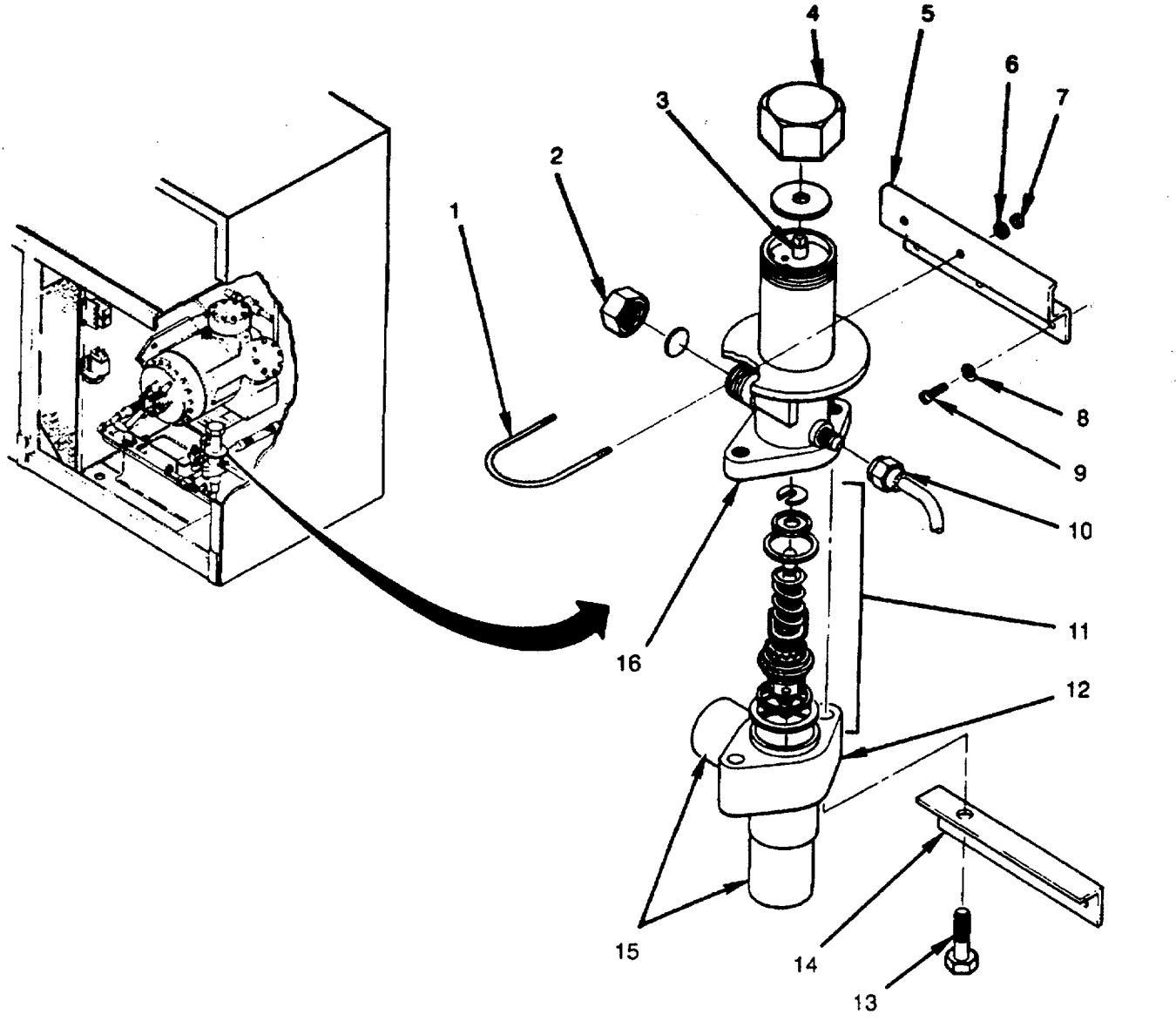


Figure 5-26. Hot Gas Bypass Valve

8. If suction line pressure of 55 to 58 psig (3.9 to 4.1 kg/cm^2) is not present, adjust valve.
9. Turn the adjusting stem (3) one turn to change suction by 4 psig (.28 kg/cm^2). Turn the stem clockwise to increase suction pressure or counterclockwise to decrease suction pressure.
10. If valve can not be adjusted to maintain 55 to 58 psig (3.9 to 4.1 kg/cm^2) suction pressure, replace valve and repeat steps 1 thru 4.

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltage used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

11. Disconnect air conditioner input power at source.
12. After proper setting is obtained:

    a. Turn unit OFF.
    b. Remove service manifold from low service valve.
    c. Install service valve protective cap (2) and (4).
    d. Remove wires installed to TB-2 in step 4.
    e. Close left electric plate (para 4-30).
    f. Close manual valve (para 5-39).

REMOVAL

1. Pump down refrigerant system (para 5-21).

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

2. Disconnect air conditioner input power at source.
3. Loosen flare nut (10) and let gas escape.
4. Disconnect flare nut (10).

NOTE

- If hot gas bypass valve body is to be replaced, disassemble before debrazing.
- If hot gas bypass valve body is not damaged and will not be removed, proceed to the disassembly procedure.

5. If valve body (12) is to be removed, debraze tubing at joints (15) (para 5-14).

5-37. HOT GAS BYPASS VALVE - Continued.

DISASSEMBLY

1. Remove three screws (9) and lockwashers (8) from bracket (5).
2. Remove two bolts (13).
3. Remove upper body assembly (16).
4. Remove two washers (6), locknuts (7), and u-bolt (1) from bracket (5).
5. Remove cage assembly (11).

REPAIR/REPLACE

Repair consists of replacing the upper body (16), cage assembly (11) or valve body (12).

REASSEMBLY

1. Install cage assembly (11).
2. Install upper body assembly (16).
3. Install two bolts (13).

INSTALLATION

1. Install u-bolt (1), two flat washers (6), and two locknuts (7) to bracket (5).
2. Install three screws (9) and lockwashers (8).

NOTE

- If hot gas bypass valve body is not being installed, proceed to step 2.
- If hot gas bypass valve body is being installed, proceed to disassembly before brazing valve body.

3. If valve body (12) was removed, braze tubing (15) at joints (para 5-14).
4. Connect flarenut (10).
5. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Perform start up after repairs (para 5-22).
2. Install right front evaporator panel (para 4-25).

5-38. THERMOSTATIC EXPANSION VALVE (PRIMARY).

This task covers: Inspection Adjust

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Thermometer, digital (Item 17, Appendix B)
Thermocouple (Item 18, Appendix B)
Personnel: 1
Material:
Sealant tape (Item 15, Appendix E)
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box assembly (para 4-45).
3. Remove right front condenser panel (para 4-28).

INSPECTION

1. Inspect for evidence of leaks, kinked or damaged capillary line, and loose or missing mounting hardware (see Figure 5-27).
2. Check thermal bulb to see that it is securely clamped to the suction line.
3. If a leak is suspected or indicated, test per paragraph 5-15.

ADJUST

NOTE

The expansion valve as supplied with unit is preset at the factory. This valve should not be adjusted unnecessarily.

1. Open manual valve (para 5-39).
2. Open left electric plate (para 4-30).
3. Install jumper wires to TB2 (para 4-61) for single mode operation (see FO-3).
4. Attach thermocouple to an exposed surface of suction return line adjacent to sensing bulb.
5. Connect pressure gauge to expansion service valve port (para 5-30).
6. Set cool control thermostat (para 4-87) to lowest temperature setting.

5-38. THERMOSTATIC EXPANSION VALVE (PRIMARY) - Continued.

ADJUST - Continued

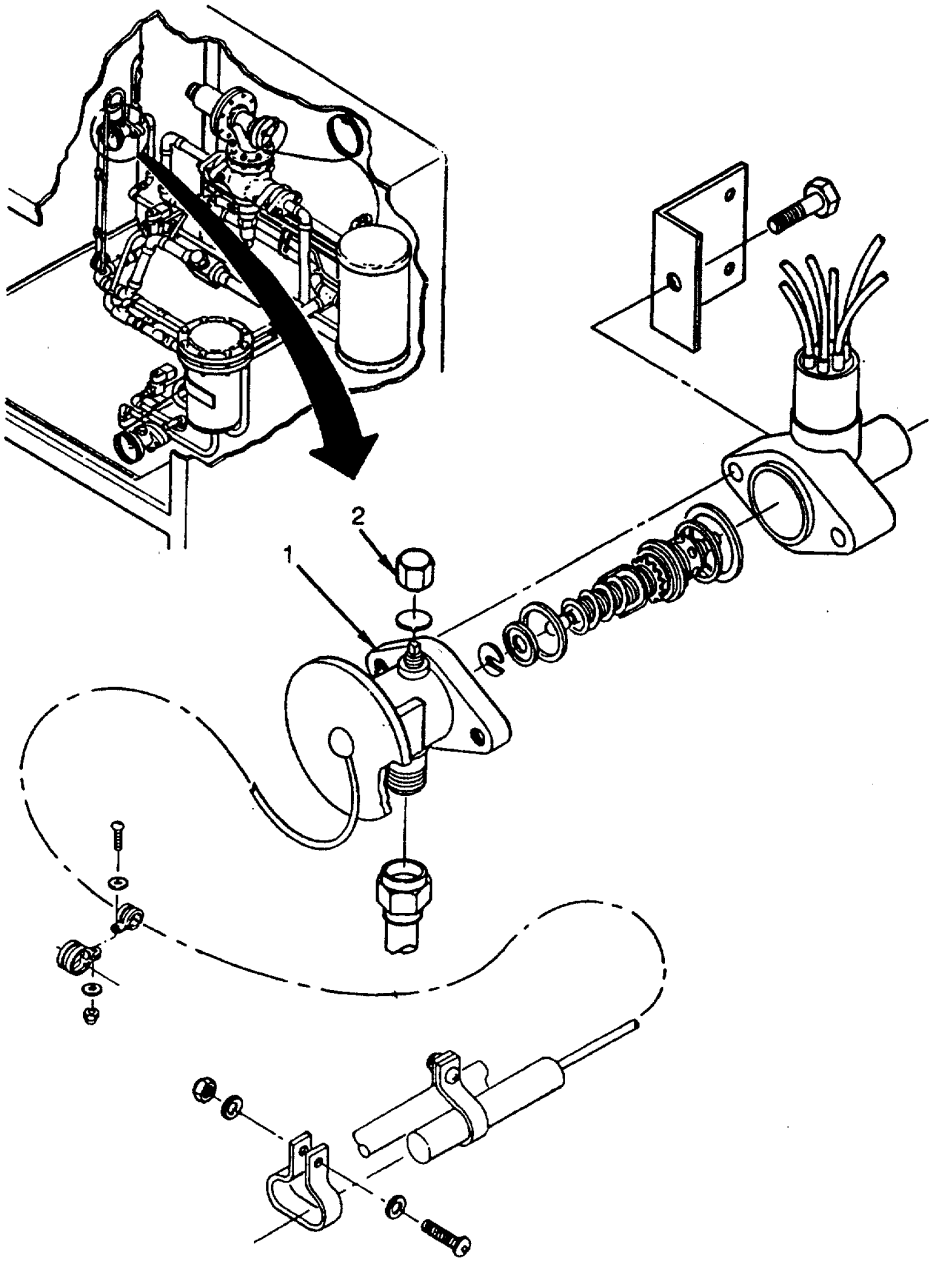


Figure 5-27. Thermostatic Expansion Valve (Primary)

WARNING

High voltage is used in operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions.

7. Connect air conditioner input power at source.
8. Start air conditioner in COOL mode.
9. Allow air conditioner to run about 30 minutes.
10. Check to be sure temperature in suction line has stabilized and thermocouple meter reading remains unchanged for at least two minutes.
11. Note pressure on manifold gauge connected to low pressure expansion (primary) service valve. Identify saturation temperature for pressure gauge reading (see Table 5-2) and compare with thermocouple meter reading. The thermocouple meter temperature should be 8 to 15°F (4.48 to 8.4°C) higher than saturation temperature found in Table 5-2.
12. If the superheat setting is not within limits shown in step 11, adjust expansion valve as follows:

    a. Remove service valve cap (2) from side of power assembly (1).

NOTE

Do not change more than two full turns at one time, then wait five to ten minutes for temperature to stabilize and recheck pressure and temperature before further adjustment.

    b. Turn adjusting stem two complete turns to change superheat setting by 1 °F. Turn clockwise to increase superheat span or counterclockwise to decrease superheat span.
    c. If expansion valve can not be adjusted to within limits shown in step 11, contact General Support Maintenance.

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

13. Disconnect air conditioner input power at source.
14. After proper setting is obtained:

    a. Turn unit OFF.
    b. Install service valve cap (2)
    c. Remove thermocouple.
    d. Remove service manifold from service expansion (primary) valve.
    e. Remove wires installed to TB-2 in step 3.
    f. Close left electric plate (para 4-30).
    g. Close manual valve (para 5-39).

FOLLOW ON PROCEDURE

1. Perform start up after repairs (para 5-22).
2. Close control box (para 4-45).
3. Install right front condenser panel (para 4-28).

5-39. MANUAL VALVE (BYPASS).

This task covers: Inspection Removal Installation

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box assembly (para 4-45).

INSPECTION

1. Inspect for evidence of leaks, damaged lines, and loose or missing mounting hardware. Replace if inspection fails (see Figure 5-28).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Pump down refrigerant system (para 5-21).
2. Remove valve protective cap (1).
3. Debraze tubing (3) at joints (para 5-14).
4. Remove valve (2).

INSTALLATION

1. Position valve (2) in unit.
2. Braze tubing (3) at joints (para 5-14).
3. Open valve for single unit configuration or close valve for dual unit configuration.
4. Install valve protective cap (1).
5. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Close control box (para 4-45).
2. Perform start up after repairs (para 5-22).

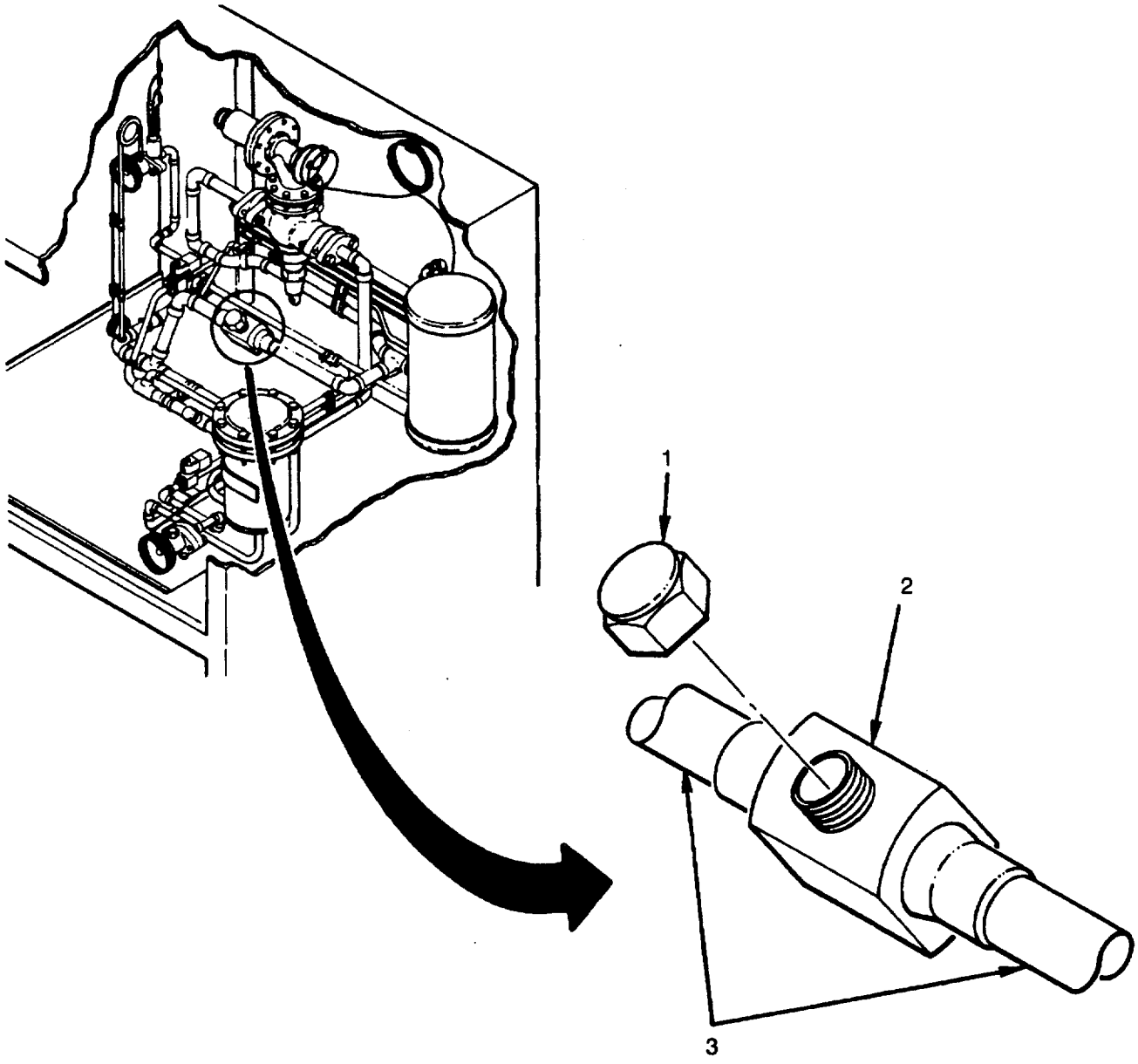


Figure 5-28. Manual Valve (Bypass)

5-40. VIBRATION ELIMINATORS.

This task covers: Inspection Removal Installation

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

INSPECTION

1. Inspect for evidence of leaks or damaged lines (see Figure 5-29).
2. If a leak is suspected or indicated, test per paragraph 5-15.

REMOVAL

1. Pump down refrigerant system (para 5-21).
2. Remove screw (2), locknut (6), two flat washers (3) and (5), and clamp (4).
3. Debraze tubing (7) at joints (para 5-14).
4. Remove vibration eliminator (1).

INSTALLATION

1. Position vibration eliminator (1) in frame.
2. Braze tubing (7) at joints (para 5-14).
3. Install clamp (4) with screw (2), two flat washers (3) and (5), and locknut (6).
4. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

Perform start up after repairs (para 5-22).

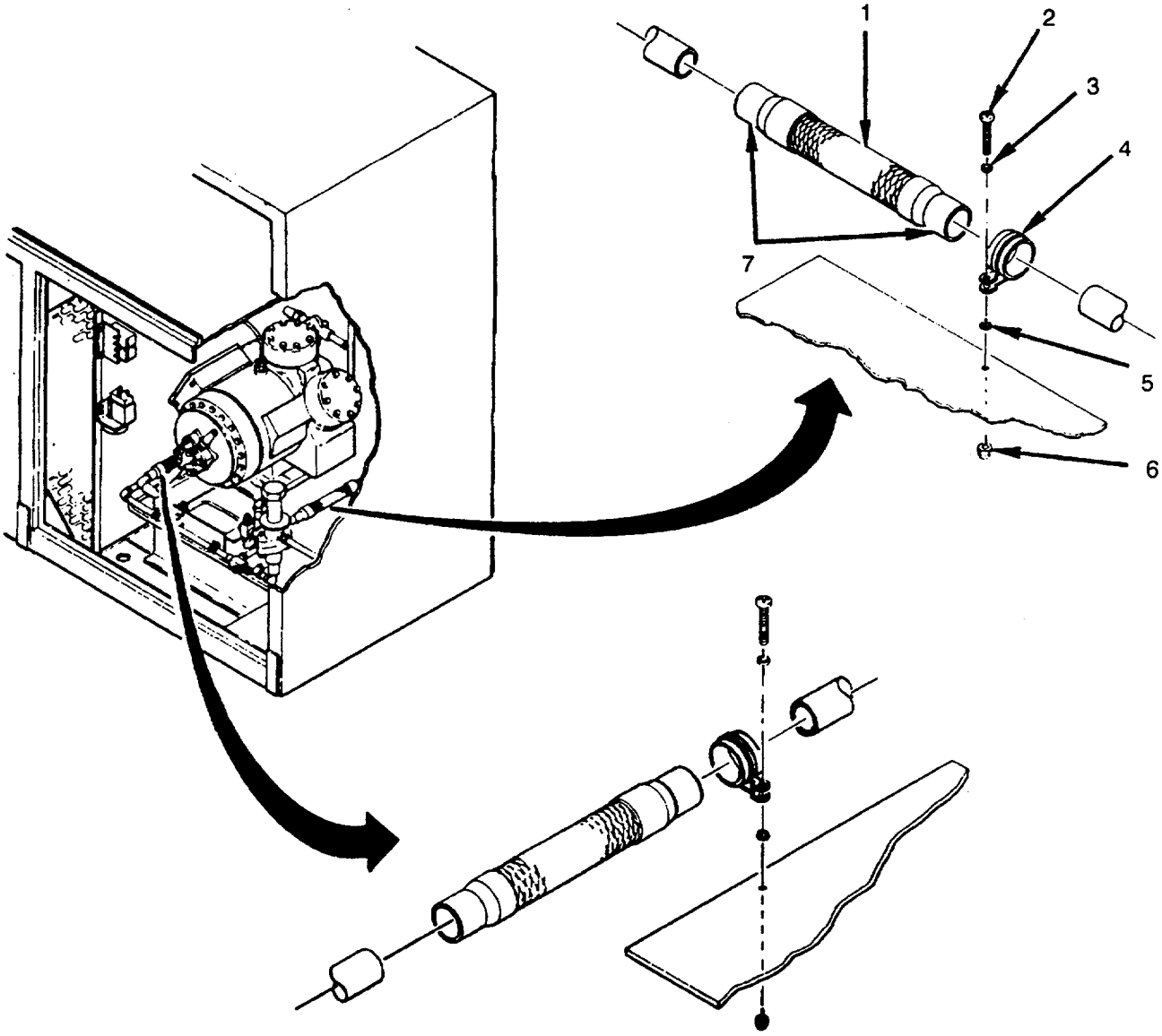


Figure 5-29. Vibration Eliminators

5-41. CONDENSER FAN DAMPER ACTUATOR.

This task covers: Inspection Testing Removal Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)
Personnel: 1
Material:
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (Item 13, Appendix E)
Nitrogen, technical (Item 14, Appendix E)
Corrosion preventative (Item 17, Appendix E)
Equipment Conditions:

1. Remove condenser circulator fan (para 4-77).
2. Remove condenser fan connecting link assembly (para 4-89).

INSPECTION

1. Check for damaged or missing parts (see Figure 5-30).
2. Check for signs of leakage. Leak test if leak is suspected (para 5-15).

TESTING

1. Frontseat (clockwise) actuator service valve (para 5-31).

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.

2. Slowly loosen flare nut (4) on actuator (5) to release gas.
3. Remove screw (10), lockwasher (11), flat washer (12), and clamp (13).
4. Remove flare nut and tubing (4).
5. Install nitrogen cylinder to manifold gauge, high side.
6. install charging valve yellow 1/4 inch (0.64 cm) line to actuator (para 5-11).
7. Open high pressure gauge valve on service manifold.
8. Raise pressure to 200-300 psig (90.8 to 136.2 kg/cm^2).
9. Actuator closes with 1/2 inch (1.27 cm) clearance between damper and squirrel cage.
10. If damper does not close, replace actuator.

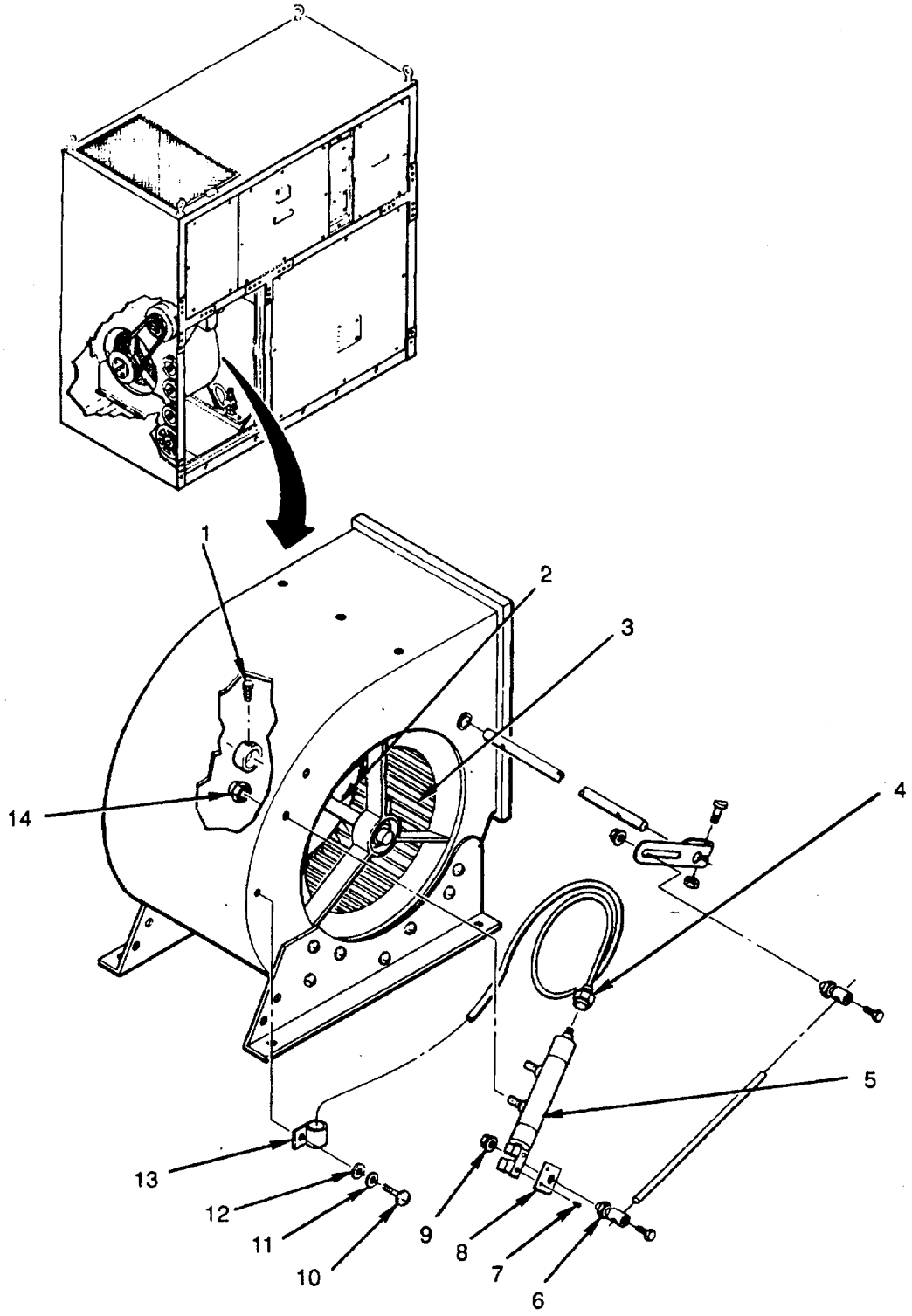


Figure 5-30. Condenser Fan Damper Actuator

5-41. CONDENSER FAN DAMPER ACTUATOR - Continued.

TESTING - Continued.

11. Remove service manifold from actuator.
12. Hand tighten flarenut (4) to actuator (5).
13. Backseat (counterclockwise) actuator service valve (see Figure 5-20).
14. Let gas escape from flarenut for 1 to 3 seconds and tighten flarenut (4).

REMOVAL

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

1. Clean both sides of shaft (2) on squirrel cage with MEK.
2. Loosen set screws (1) on both sides of squirrel cage.
3. Move squirrel cage (3) to side.
4. Remove nut (9) and control rod swivel (6).
5. Remove two locknuts (14) and actuator (5).
6. Remove two rivets (7) and bracket (8).

INSTALLATION

1. Install actuator bracket (8) with two rivets (7).
2. Install actuator (5) with two locknuts (14).
3. Center squirrel cage (3) in housing and tighten two set screws (1).
4. Apply corrosion preventative to both sides of shaft (2).
5. Install control rod swivel (6) with nut (9).
6. Install and adjust actuator linkage (para 4-89).
7. Install flarenut and tubing (4).
8. Backseat (counterclockwise) actuator service valve (see Figure 5-20).
9. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

Install condenser circulator fan (para 4-77).

5-42. RECEIVER.

This task covers: Inspection Removal Installation

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box assembly (para 4-45).
3. Remove evaporator circulator fan (para 4-71).
4. Discharge refrigerant system (para 5-12).

INSPECTION

1. Inspect for evidence of leaks, damaged lines, and loose or missing mounting hardware (see Figure 5-31).
2. If a leak is suspected or indicated, test per paragraph 5-15.
3. Inspect fusible plug (13) for evidence of leaks or damage. Replace fusible plug if defective.

REMOVAL

1. Remove two screws (1), locknuts (7), four flat washers (2) and (8), and clamp (9).
2. Frontseat (clockwise) receiver service valve (6).
3. Debraze tubing (3) and (4) at joints (para 5-14).
4. Remove bolt (10), nut (12), and bracket (11).
5. Remove receiver (5).

INSTALLATION

1. Position receiver (5) in frame.
2. Install bracket (11) with bolt (10) and nut (12).
3. Crimp and braze top of tubing (4) (para 5-14).
4. Braze tubing (3) and (4) at joints (para 5-14).
5. Install clamp (9) with two screws (1), four flat washers (2) and (8), and two locknuts (7).
6. Backseat (counterclockwise) receiver service valve (6).
7. Leak test all newly connected and surrounding area joints (para 5-15).

5-42. RECEIVER - Continued.

FOLLOW ON PHOCEDURE

1. Install circulator fan (para 4-71).
2. Charge refrigerant system (para 5-17).
3. Close control box (para 4-45).

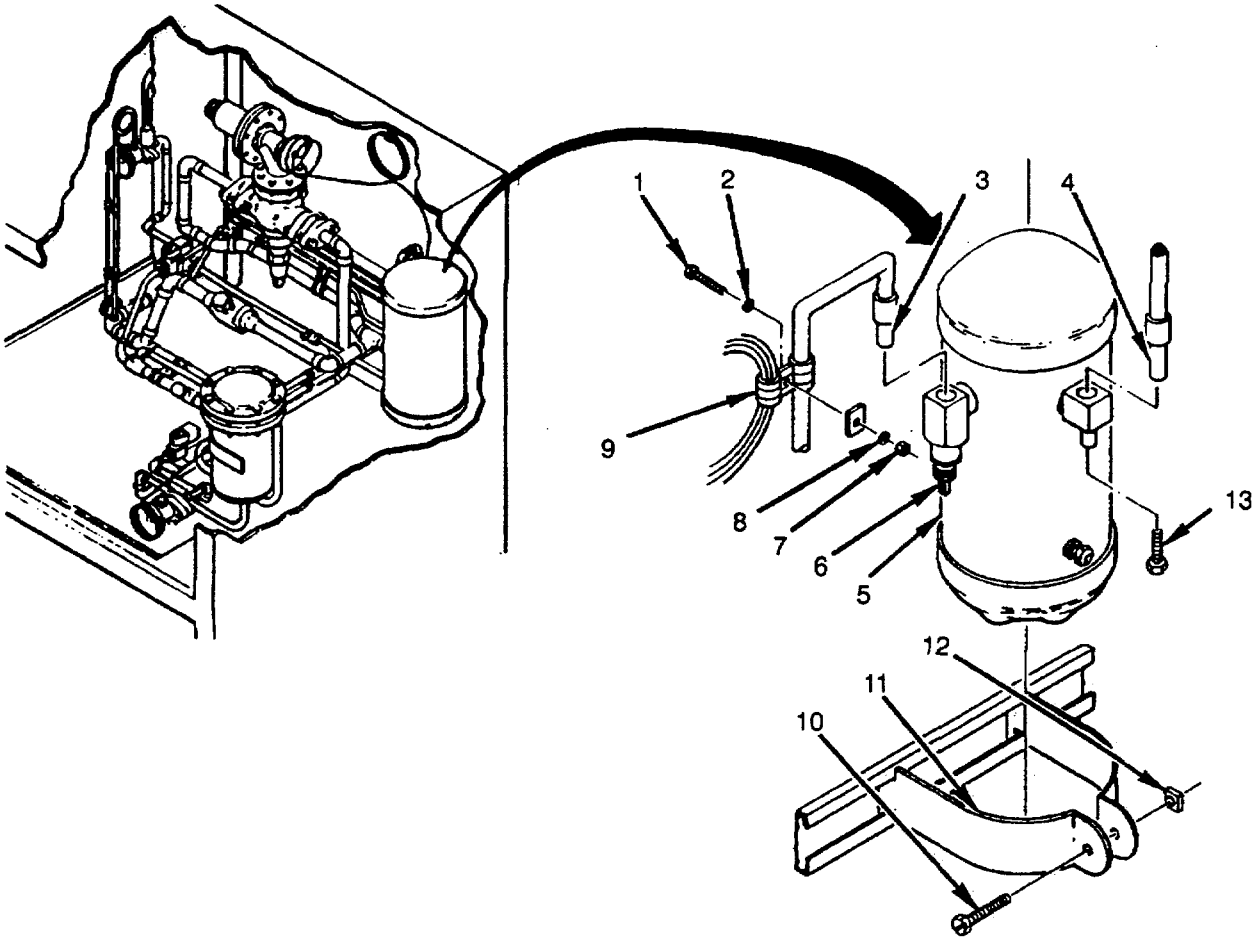


Figure 5-31. Receiver

5-43. DISTRIBUTOR.

This task covers: Inspection

INITIAL SETUP:

Tools

Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Material:

Brazing alloy, silver, QQ-B-654, Grade III (Item 21, Appendix E)

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box assembly (para 4-45).

INSPECTION

1. Check for signs of leakage (see Figure 5-32). Leak test if leak is suspected (para 5-15).
2. If a leak is detected at distributor joint, braze joint (para 5-14).
3. If a capillary line leak is detected, contact General Support Maintenance.

FOLLOW ON PROCEDURE

1. Close control box (para 4-45).
2. Connect air conditioner input power at source.

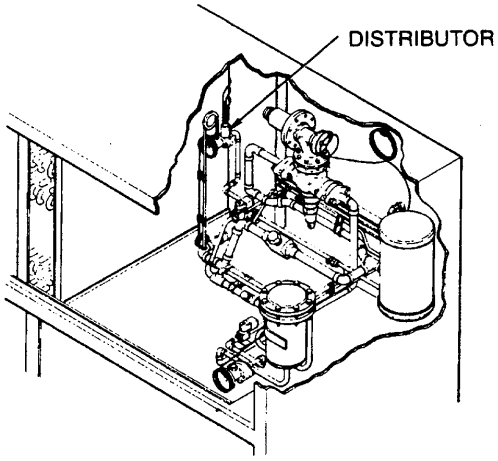


Figure 5-32. Distributor

5-44. PRESSURE REGULATOR VALVE.

This task cover: Inspection Adjust Repair/Replace Disassembly Reassembly

INITIAL SETUP:

Tools
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Thermometer, digital (Item 17, Appendix B)

Material:

Sealant tape (Item 15, Appendix E)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Swing open control box assembly (para 4-45).
3. Remove clamp securing valve to frame.

INSPECTION

1. Inspect for evidence of leaks, kinked or damaged capillary lines, and loose or missing mounting hardware (see Figure 5-33).
2. Check thermal bulb (13) to see that it is securely clamped in the return air compartment (para 4-41).
3. If a leak is suspected or indicated, test per paragraph 5-15.

ADJUST

1. Close manual valve (para 5-39).
2. Attach a thermocouple and thermometer to an exposed surface of capillary line adjacent to sensing bulb in supply air compartment.
3. Set thermostat to lowest temperature setting.

WARNING

High voltage is used in operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions.

4. Connect air conditioner input power at source.
5. Start air conditioner in COOL mode.
6. Allow air conditioner to run about 30 minutes.

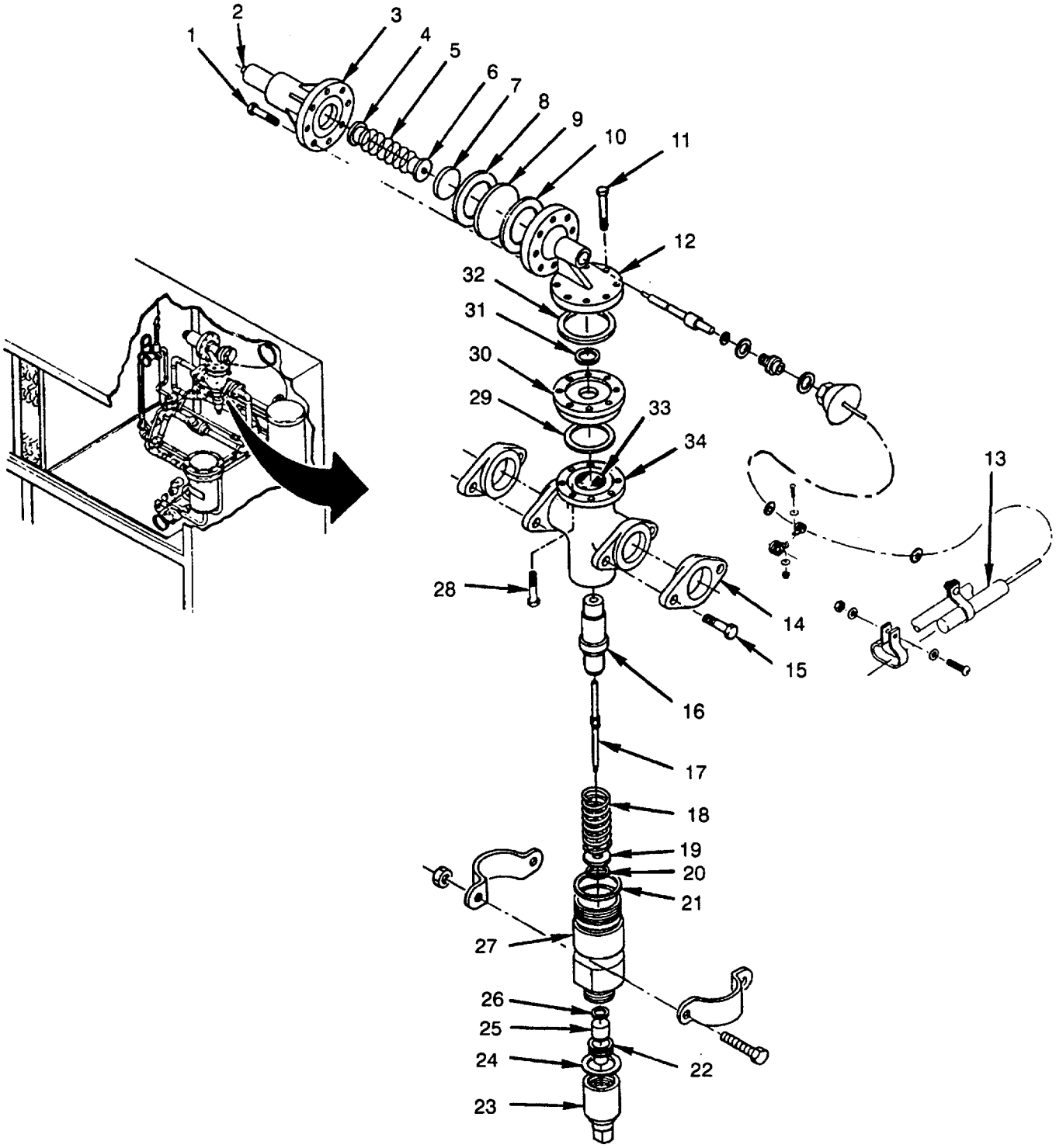


Figure 5-33. Pressure Regulator Valve

5-44. PRESSURE REGULATOR VALVE - Continued.

ADJUST - Continued.

7. Check to be sure temperature reading remains unchanged for two minutes.

NOTE

For this adjustment,. the return air has to be less than 88°F (31.1 °C).

8. If indicated temperature is not 52-58°F (11.1-14.4°C), adjust pressure regulator valve.
9. Turn the stem clockwise to increase temperature; counterclockwise to decrease temperature. Run air conditioner about 30 minutes, then check thermometer and normal temperature indication above. Make additional adjustments to temperature as necessary.
10. If temperature can not be stabilized, repair/replace pressure regulator valve.
11. Turn off air conditioner.
12. Disconnect air conditioner input power at source.
13. Remove thermocouple.
14. Reset thermostat for desired temperature.

REPAIR/REPLACE

Repair consists of replacing bonnet assembly, adapter body, caps or pressure regulator.

DISASSEMBLY

1. Backout temperature adjust screw (2).
2. Remove eight bolts (1) and bonnet body (3).
3. Remove two spring guides (4) and (6), spring.(5) and disk (7).
4. Remove diaphragm (9) and two gaskets (8) and (10).
5. Remove eight bolts (11) and pilot body (12).
6. Remove gasket (32) and O-ring (31).
7. Remove eight bolts (28), adapter body (30), and gasket (29).
8. Remove cap (23) and gasket (24).
9. Remove stuffing box nut (22).
10. Remove packing ring (25).
11. Remove packing washer (26).
12. Remove bottom cap (27).
13. Remove bottom cap seal (21).
14. Remove dirty wiper (20).
15. Remove dirty wiper retainer (19).
16. Remove closing spring (18).
17. Remove manual operating stem (17).
18. Remove throttling plug (16).
19. Remove piston (33) through top of valve body (34).

REASSEMBLY

1. Install piston (33) through top of valve body (34).
2. Install throttling plug (16).
3. Install manual operating stem (17).
4. Install closing spring (18).
5. Install dirty wiper retainer (19).
6. Install dirty wiper (20).
7. Install bottom cap seal (21).
8. Install bottom cap (27).
9. Install packing washer (26).
10. Install packing ring (25).
11. Install stuffing box nut (22).
12. Install gasket (24) and cap (23).
13. Install gasket (29) and adapter body (30) with eight bolts (28).
14. Install gasket (32) and O-ring (31).
15. Install pilot body (12) with eight bolts (11).
16. Install diaphragm (9) and two gaskets (8) and (10).
17. Install two spring guides (4) and (6), spring (5) and disk (7).
18. Install bonnet body (3) with eight bolts (1).

FOLLOW ON PROCEDURE

1. Close control box (para 4-45).
2. Connect air conditioner power at source.

5-45. TUBING AND FITTINGS.

This task covers:

Inspection **Removal** **Installation**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove covers and panels as necessary to have access to repair area.

NOTE

The refrigeration system contains a number of pieces of copper tubing in a variety of material grades, sizes, lengths, and shapes, and a number of elbows, tees, and adapters in several sizes.

INSPECTION

Check tubing and fitting for signs of leakage. Leak test if leak is suspected (para 5-15).

REMOVAL

1. Discharge refrigerant system (para 5-12).
2. Purge refrigerant system (para 5-13).
3. Debraze the tube connections (para 5-14).
4. Remove part.

INSTALLATION

1. Place replacement part on tube end.
2. Braze replacement part (para 5-14).
3. Purge refrigerant system (para 5-13).
4. Replace drier filter (para 5-26).
5. Leak test all newly connected joints and those in the repair area (para 5-15).
6. Evacuate refrigerant system (para 5-16).
7. Charge refrigerant system (para 5-17).

FOLLOW ON PROCEDURE

1. Install all covers and panels that were removed.
2. Connect air conditioner input power at source.

5-46. COMPRESSOR.

This task covers:
Service Testing Removal Repair/Replace Installation
Bum Out Procedure

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Nitrogen regulator (Item 25, Appendix B)
Wrecking bar (Item 4, Appendix B)
Kit, compressor removal (Item 14, Appendix B)
Gauge set, telescopic (Item 24, Appendix B)
Gloves, chemical (Appendix C)
Goggles, industrial (Appendix C)
Materials:
Rags (item 12, Appendix E)
Lubricating oil #Zerol 150 (Item 9, Appendix E)
Lubricating oil SS-291 (Item 10, Appendix E)
R-11 refrigerant (Item 22, Appendix E)

Personnel: 2

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove right front condenser panel (para 4-28).

SERVICE

1. Check sight glass. Refrigerant oil should be between 1/4 min and 1/2 max (see Figure 5-34).
2. Add or remove refrigerant oil as necessary (see step 3 for oil removal and step 4 for adding oil).
3. Oil Removal.
   a. Pump down system (para 5-21).
   b. Discharge compressor (para 5-19).
   c. Remove drain plug and drain excess oil into container.
   d. Install drain plug.
   e. Check sight glass, refrigerant oil should be between 1/4 min and 1/2 max.
   f. Add refrigerant oil (step 4) as necessary.
   g. If oil is not added, perform startup after repairs (para 5-22).

5-46. COMPRESSOR - Continued.

SERVICE - Continued.

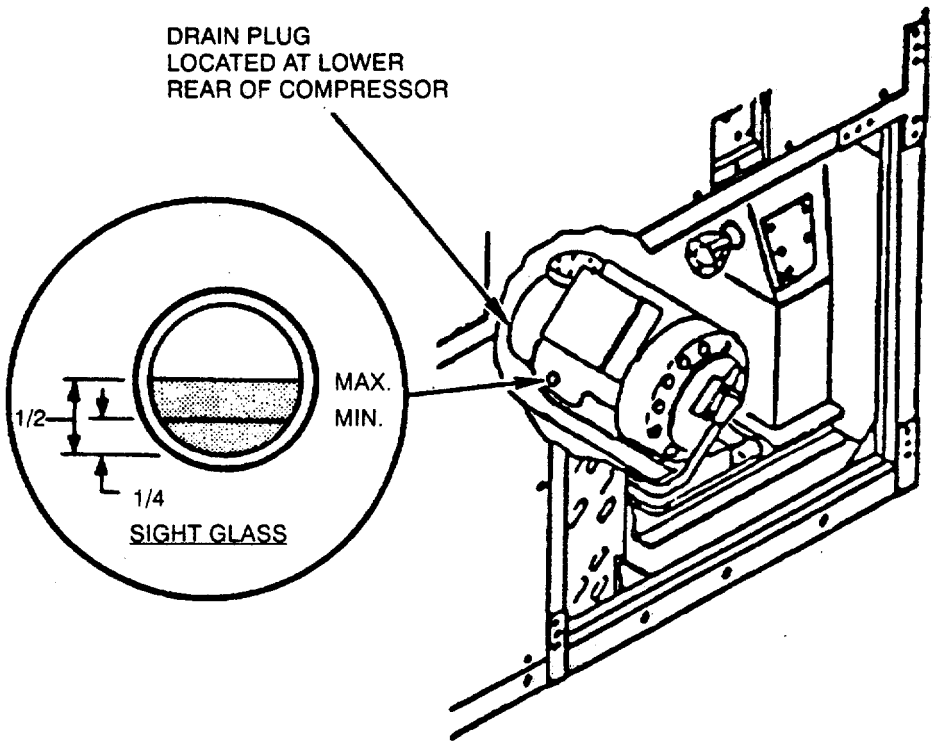


Figure 5-34. Compressor Oil Removal

4. Adding Compressor Oil (see Figure 5-35).

   a. Pump down system (para 5-21).

   b. Discharge compressor (para 5-19).

   c. Close all manifold valves.

   d. Remove yellow 3/8 inch (0.35 cm) hose from hose rack and connect to vacuum pump.

   e. Remove yellow 1/4 inch (0.64 cm) hose from hose rack and connect to R-22 refrigerant cylinder positionec for purging.

   f. Open VPV, CGV, and PGV.

   g. Start vacuum pump and open ballast valve (on vacuum pump) one turn.

   h. Observe gauge reading on vacuum pump for reading of 29-30 Hg.

   i. Stop pump and close ballast valve.

   j. Close VPV, CGV, and PGV.

   k. Remove hose from vacuum pump.

   l. Open VPV and CV and purge air out of yellow 3/8 inch (0.35 cm) line.

   m. Close VPV and CV and place yellow 3/8 inch (0.35 cm) line in oil container.

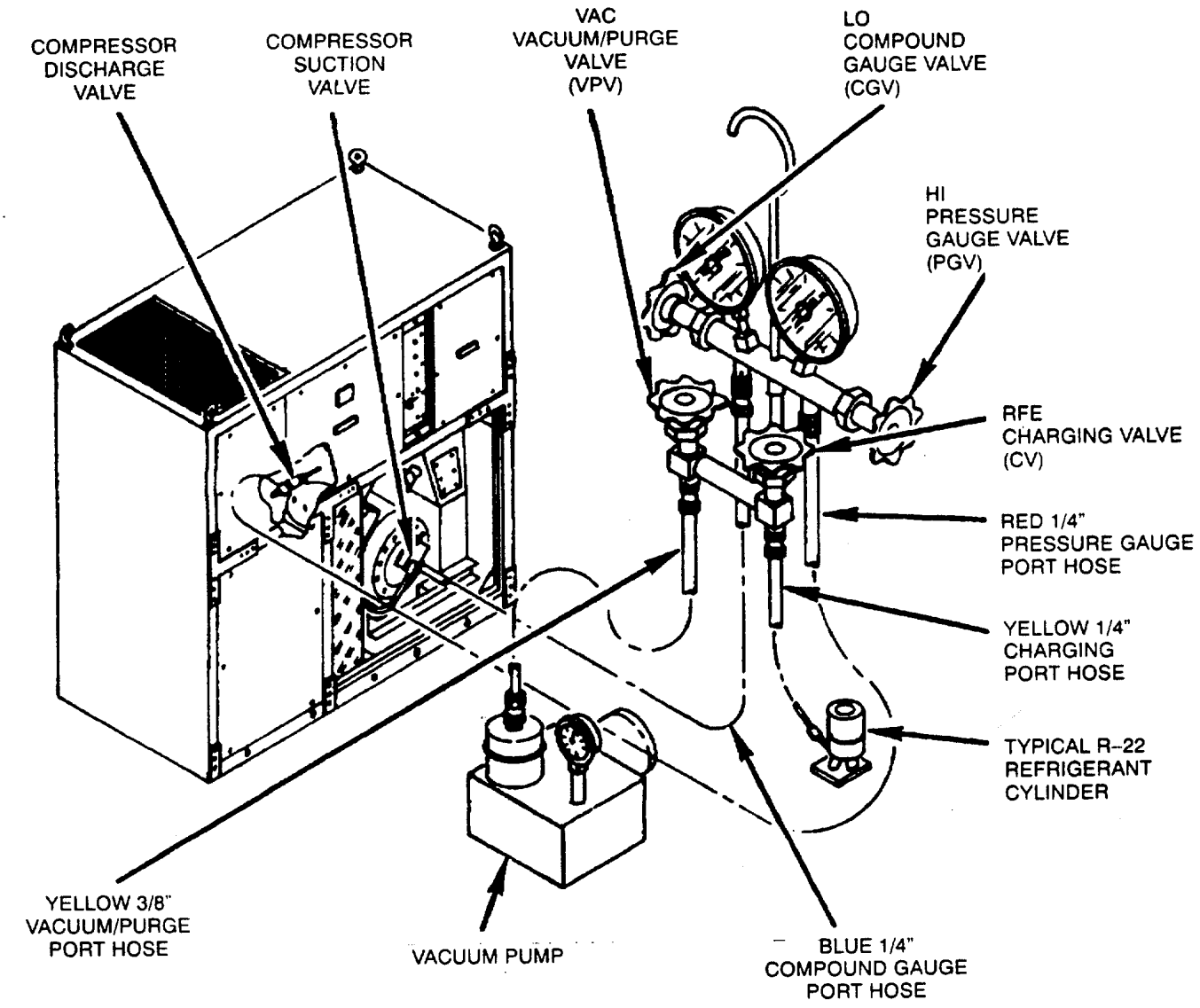


Figure 5-35. Adding Compressor Oil

n. Open VPV and CGV to allow oil to flow into compressor until oil level shows 1/2 full on sight glass.

o. Close VPV and CGV.

p. Purge compressor (para 5-20).

q. Perform startup after repairs (para 5-22).

TESTING

Refer to Table 5-1 for compressor testing and troubleshooting.

5-46. COMPRESSOR - Continued.

REMOVAL

1. Remove crankcase heater (para 4-81).
2. Discharge compressor (para 5-19).
3. Remove high refrigerant pressure switch and lines (para 5-23).
4. Remove low refrigerant pressure switch and lines (para 5-24).
5. Remove low oil pressure switch and lines (para 5-25) and support to piping at bottom of compressor compartment.
6. Remove service light and lamp guard (para 4-65).
7. Remove compressor discharge valve (para 5-33).
8. Remove compressor suction valve (para 5-34).
9. Remove two rear mounting bolts (5), lockwasher (6), and flat washer (7) (see Figure 5-36).
10. Loosen two front mounting bolts (5).

WARNING

Compressor weighs approximately 300 lbs. Personnel injury and/or internal components can be damaged if compressor falls off mounting bracket and shims.

11. Raise rear of compressor (4).
12. Between compressor and mounting frame, place 3/4 inch shims (8) on both sides.
13. Remove two front mounting bolts (5), lockwashers (6), and flat washers (7).
14. Carefully raise front of compressor (4).
15. Between compressor and mounting frame, place 3/4 inch shims (8) on both sides.
16. Insert slide track (3) beneath compressor (4). Lip on sides of slide track point up, while lip at one end of slide track points down at rear of compressor.
17. Insert compressor slide (2) on slide track (3).
18. Raise compressor and remove four shims (8) allowing compressor (4) to set on compressor slide (3).
19. Line up dolly (1) with slide track (3) and lock wheels (9).
20. Slide compressor (4) out on dolly (1).
21. Tag and remove remaining wires.
22. Drain refrigerant oil from crankcase (see SERVICE).
23. Remove compressor.

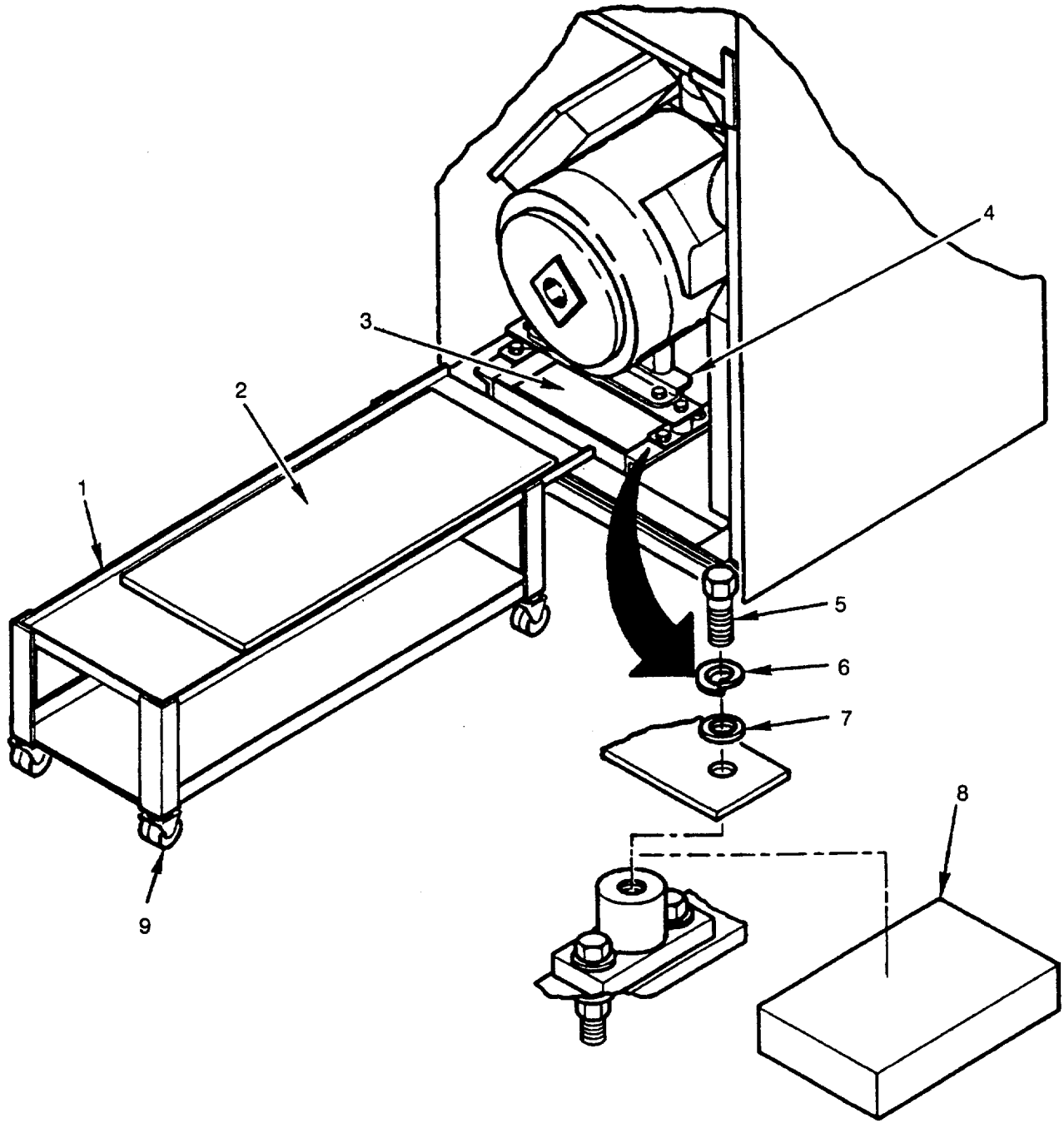


Figure. 5-36. Compressor

5-46. COMPRESSOR - Continued.

REPAIR/REPLACE

Repair and replacement of the compressor components are covered in the following referenced paragraphs or replace compressor.

1. Valve plate assembly (para 5-47).
2. Pump end bearing assembly (para 5-48).
3. Crankshaft, pistons and rods (para 5-49).
4. Electrical box assembly (para 5-50).

INSTALLATION

1. Position compressor on dolly (1).
2. Line up dolly (1) with slide track (3) and lock wheels (9).
3. Connect wires tagged in REMOVAL step 21 and remove tags.
4. Slide compressor (4) into frame.
5. Carefully raise front of compressor.
6. Between compressor and mounting frame, place 3/4 inch shims (8) on both sides.
7. Raise rear of compressor.
8. Between compressor and mounting frame, place 3/4 inch shims (8) on both sides.
9. Remove compressor slide (2).
10. Remove slide track (3).
11. Raise rear of compressor.
12. Remove shims (8) on both sides and lower compressor onto mounting frame.
13. Loosely install two rear mounting bolts (5); lockwashers (6), and flat washers (7).
14. Raise front of compressor.
15. Remove shims (8) on both sides and lower compressor onto mounting frame.
16. Install two front mounting bolts (5), lockwashers (6), and flat washers (7).
17. Tighten rear mounting bolts (5).
18. Install compressor suction valve (para 5-34).
19. Install compressor discharge valve (para 5-33).
20. Install service light and lamp guard (para 4-65).
21. Install low oil pressure switch and lines (para 5-25).
22. Install low refrigerant pressure switch and lines (para 5-24).
23. Install high refrigerant pressure switch and lines (para 5-23).
24. Install crankcase heater (para 4-81).
25. Purge compressor (para 5-20).

BURN OUT PROCEDURE

WARNING

Avoid skin contact or inhaling fumes 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.

1. After removal of a bad compressor from the refrigerant system, drain a sample of oil into a clear glass container.
2. 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 burnout is no, indicated, proceed to INSTALLATION of compressor.
3. If the oil is black, contains sludge, and has burnt acid odor, the compressor failed because of motor burn out.
4. You must clean the entire refrigeration system after 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.
5. Install new drier filter (para 5-26) and clean refrigerant strainer cartridge (para 5-27).
6. Install replacement compressor (see INSTALLATION).
7. Frontseat (clockwise) compressor discharge valve (para 5-33) and suction valve (para 5-34).
8. Open manual valve (para 5-39) to bypass pressure regulator.
9. Tag and disconnect solenoid L1 and L2 coil wires (para 4-88).

WARNING

External input power is used for this procedure. Voltages used can be deadly.

10. Connect an external 120 V ac power source to L1 and L2 and apply power to coils to open solenoid valves.
11. Purge refrigerant system (para 5-13) for at least 30 seconds at 50 psig (3.5 kg/cm2) pressure.
12. Clean system by back flushing with liquid refrigerant, R-1 1, from pressurized cylinder or circulating pump and reservoir with pressure of at least 100 psig (7 kg/cm2).
13. If pump is used, connect the discharge line of the refrigerant system to the discharge side of the pump.
14. 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.

15. The other end of the temporary suction line should be connected to a small drum or suitable reservoir.
16. A line should be run from the bottom of the reservoir to the inlet of the pump.

WARNING

Avoid skin contact or inhaling fumes 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.

17. 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 a least 15 minutes.

18. Remove the pump, reservoir and filter. Purge refrigerant system (para 5-13). Blow dry nitrogen through the system at 50 psig (3.5 kg/cm2) for at least 30 seconds.

5-46. COMPRESSOR - Continued.

BURN OUT PROCEDURE - Continued.

19. Install new drier filter (para 5-26) and clean refrigerant strainer cartridge (para 5-27).
20. Backseat (counterclockwise) compressor discharge valve (para 5-33) and suction valve (para 5-34).
21. Disconnect external power source from L1 and L2 coils (para 4-88) and reconnect wire leads.
22. Close manual valve (para 5-39).
23. Evacuate refrigerant system (para 5-' 6).
24. Charge refrigerant system (para 5-17).
25. Allow the air conditioner to run for 48 hours, check color and odor of oil, if oil is still discolored or has an acid odor perform the following:
    a. Drain compressor oil.
    b. Repeat steps 19, 23, 24, and 25 until the oil remains clean, odor free and oil color approaches that of new oil.

FOLLOW ON PROCEDURE

1. Connect air conditioner input power at source.
2. Charge refrigerant system (para 5-17).

5-47. VALVE PLATE ASSEMBLY.

This task covers:

Disassembly **Inspection** **Repair** **Reassembly**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Wrench, torque, 1/2", 10-150 ft lbs (Item 20, Appendix B)
Material:
Rags (Item 12, Appendix E)
Personnel: 1

Equipment Conditions:
Remove compressor (para 5-46).

DISASSEMBLY

1. Remove eight bolts (1).
2. Remove head (11).
3. Remove cylinder head gasket (2).
4. Remove valve plate gasket (10) .
5. Remove discharge valve screw (3) and discharge valve step (4).
6. Remove discharge valve (5).
7. Remove valve plate (9).
8. Remove suction valve (6) and suction valve positioning spring (7).

INSPECTION

1. Check cylinder heads for warping, cracks or damage to gasket surfaces. Replace if necessary.
2. Inspect components for wear or damage. Replace if necessary.

REPAIR

Repair consists of replacing head (11), valve plate (10), discharge valve (5), suction valve (6), and positioning spring (7).

REASSEMBLY

1. Install suction valve positioning spring (7).
2. Install suction valve (6).
3. Install valve plate gasket (10).
4. Install discharge valve (5).
5. Install discharge valve stop (4) and discharge valve screw (3).

NOTE

If side head gasket is being replaced, cut replacement gasket to match gasket being replaced.

6. Install cylinder head gasket (2).

5-47. VALVE PLATE ASSEMBLY - Continued.

REASSEMBLY - Continued.

7. Place head (11) in mounting position.
8. Install eight bolts (1) and torque to 30-35 ft-lbs.

FOLLOW ON PROCEDURE

Install compressor (para 5-46).

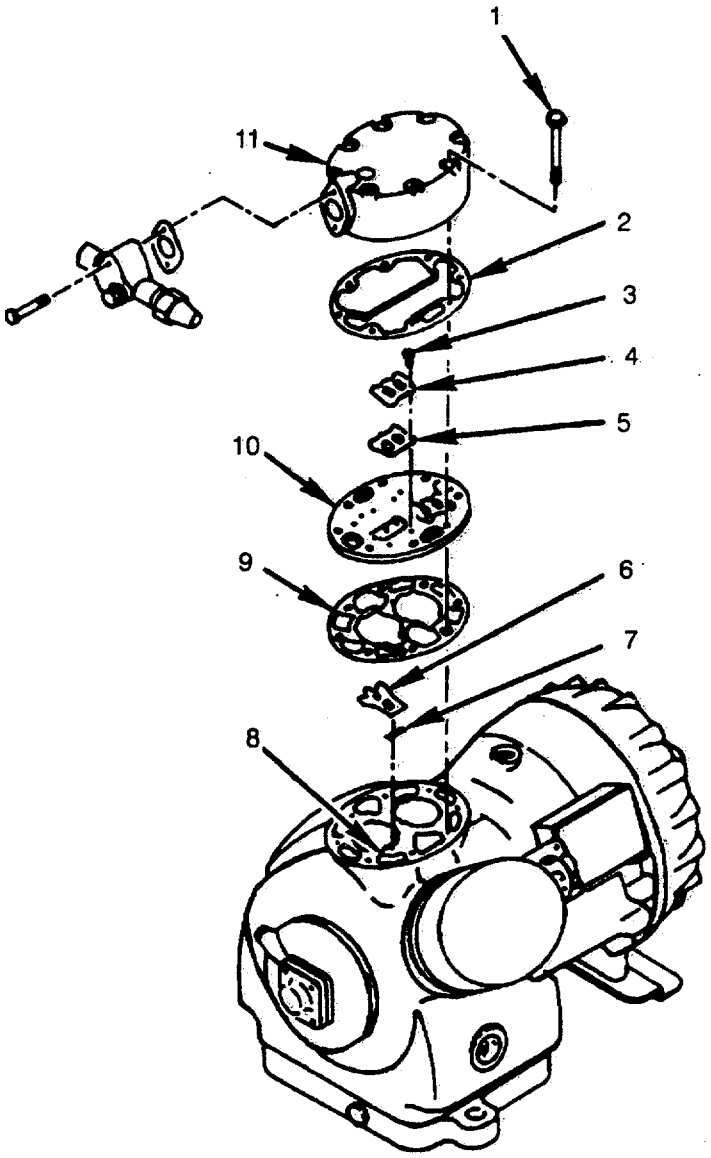


Figure 5-37. Valve Plate Assembly

5-48. PUMP END BEARING ASSEMBLY.

This task covers:

Disassembly **Inspection** **Repair** **Reassembly**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Wrench, torque, 1/2", 10-150 ft lbs (Item 20, Appendix B)
Material:
Rags (Item 12, Appendix E)
Personnel: 1

Equipment Conditions:
Remove compressor (para 5-46).

DISASSEMBLY

1. Remove four cap screws (1).
2. Remove cover plate (2) and gasket (3).
3. Remove oil feed guide vane and spring (4).
4. Remove two cap screws (5).
5. Remove drive segment (6).
6. Remove pump rotor retaining ring (7).
7. Remove pump rotor (11)
8. Remove eight cap screws (10).
9. Remove oil pump bearing head assembly (9).
10. Remove oil pump gasket (8).
11. Clean old gasket material off compressor.

INSPECTION

1. Inspect the bearing surfaces for evidence of wear or damage.
2. If bearing surface is worn or scored, or oil pump is defective, replace oil pump bearing head assembly.

REPAIR

Repair consists of replacing oil pump bearing head assembly.

5-48. PUMP END BEARING ASSEMBLY - Continued.

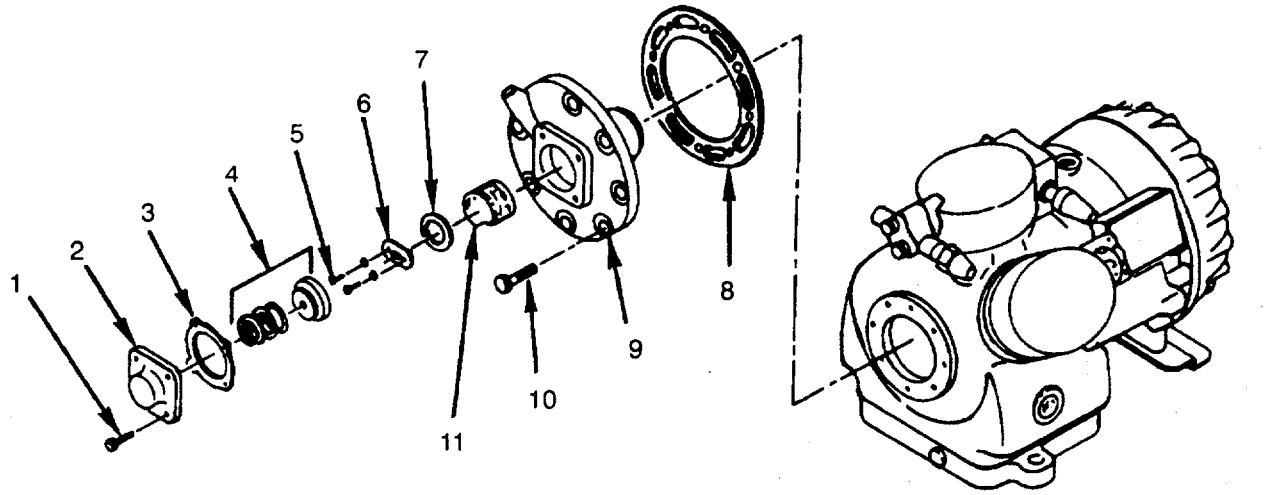


Figure 5-38. Pump End Bearing Head Assembly

REASSEMBLY

1. Install oil pump gasket (8).
2. Place oil pump bearing head assembly (9) in mounting position.
3. Install eight cap screws (10) and torque to 30-35 ft-lbs.
4. Install pump rotor (11).
5. Install pump rotor retaining ring (7).
6. Install drive segment (6).
7. Install two cap screws (5) and torque to 4-6 ft-lbs.
8. Install oil feed guide vane and spring (4).
9. Place gasket (3) and cover plate (2) in mounting position.
10. Install four cap screws (1) and torque to 16-20 ft-lbs.

FOLLOW ON PROCEDURE

Install compressor (para 5-46).

5-49. CRANKSHAFT, PISTONS AND RODS.

This task covers:
Disassembly Inspection Repair Reassembly

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Wrench, torque, 1/2", 10-150 ft-lbs (Item 20, Appendix B)
Personnel: 1

Material:
Rags (Item 12, Appendix E)
Equipment Conditions:
1. Remove compressor (para 5-46).
2. Remove valve plate assembly (para 5-47).
3. Remove pump end bearing assembly (para 5-48).

DISASSEMBLY

1. Remove 18 cap screws (15) and flat washers (16).

CAUTION

Use extreme care when removing motor end cover to prevent damage to stator.

2. Remove motor end cover (14) by pulling and lifting off horizontally until it clears windings.
3. Remove motor end cover gasket (17).
4. Remove suction strainer (13).

NOTE

If shaft turns, preventing tube assembly from being loosened, block shaft with a piece of wood.

5. Remove equalizer tube assembly (18) and lockwasher (12).
6. Remove 22 cap screws (27) and cap screw gaskets (26).
7. Remove bottom plate (28) and gasket (25).
8. Remove oil filter screen assembly (24).
.9. Remove tube assembly (23) and (29).
10. Remove thrust washer pin (10).
11. Remove thrust washer (9).

CAUTION

Support rotor while it is being removed to prevent stator damage.

12. Insert brass plug into rotor hole to protect end of crankshaft (7) from jackbolt.
13. Remove rotor (11) using a jackbolt.
14. Remove rotor drive key (8) and retain for reassembly.

5-49. CRANKSHAFT, PISTONS AND RODS - Continued

DISASSEMBLY - Continued

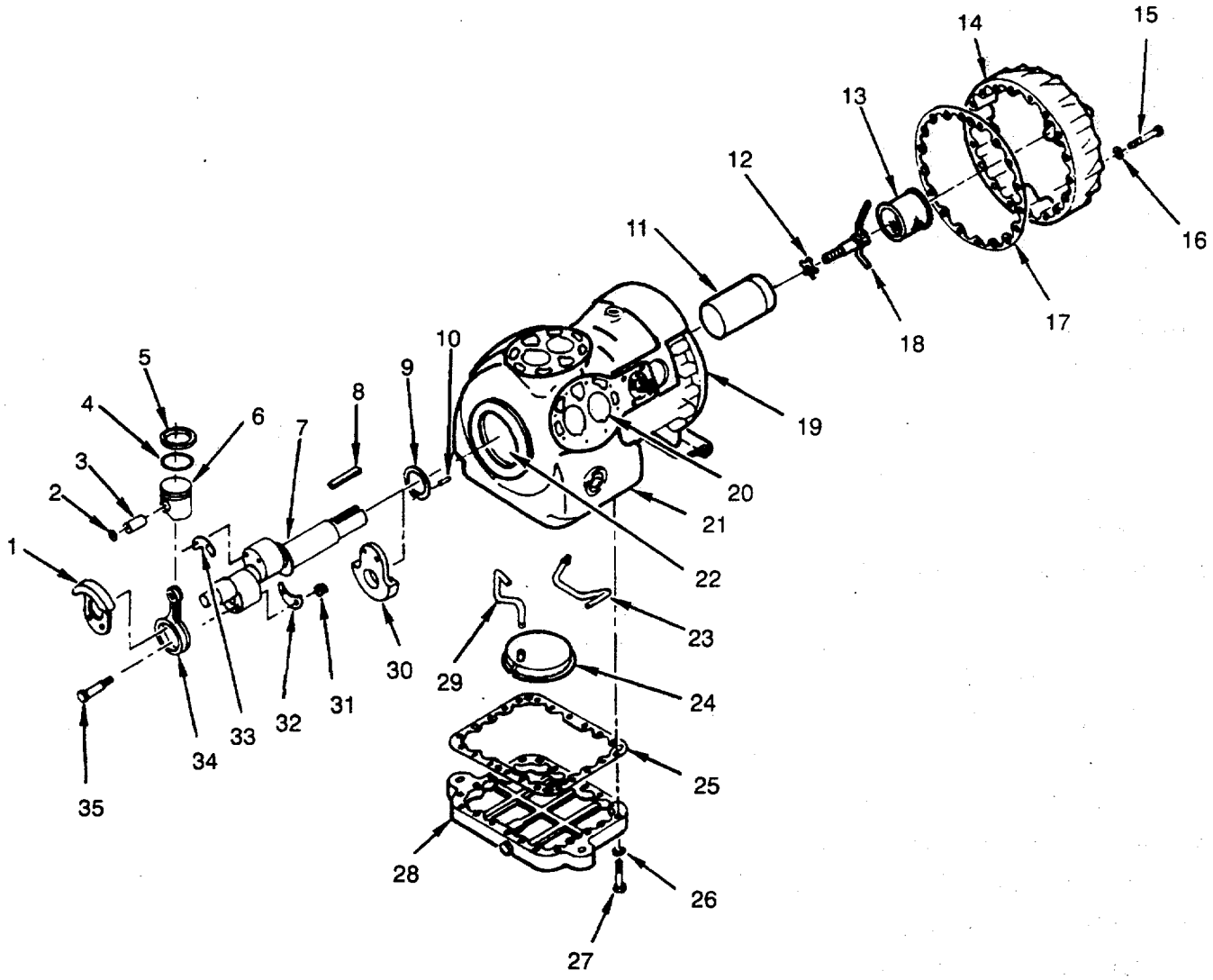


Figure. 5-39. Crankshaft, Pistons And Rods

15. Remove four counterweight and eccentric strap capscrews (35) and locknuts (31).

NOTE

- Motor end counterweight) will remain on eccentric shaft until shaft is removed.
- Label counter weights and eccentric shaft shields so they can be reinstalled in same position on eccentric shaft.

16. Remove oil pump end counterweight (1) and two eccentric strap shields (32) and (33).

NOTE

Label eccentric straps so they may be reinstalled in the same position on eccentric shaft.

17. Pull eccentric shaft out thru pump end (22). Guide eccentric straps (34) from eccentric shaft during removal process. Rotate shaft and tap it lightly to prevent straps from jamming.
18. Remove motor end counter weight (30).
19. Remove eccentric straps (34) thru bottom cover plate opening (21).

NOTE

Keep each piston assembly together for reassembly.

20. Remove lockrings (2) and piston pins (3).
21. Remove pistons (6) from eccentric straps (34).
22. Remove oil ring (4) and compression rings (5).

INSPECTION

1. Check all removed components for damage, replace as necessary.
2. Check tolerance of parts removed (Table 5-4).
3. Replace crankshaft, pistons and rods if out of tolerance.
4. Check cylinder bore (20) and motor end (19) main bearing tolerances, replace compressor if either one is out of tolerance.

REPAIR

Repair consists of replacing pistons, eccentric straps, oil and compression rings, and eccentric shaft.

REASSEMBLY

1. Position pistons (6) on eccentric straps (34).

NOTE

When lockrings are installed on pistons, they should be tight enough so they can not be turned by hand.

2. Install piston pins (3) and lockrings (2).
3. Check ring gap by inserting each ring separately in cylinder (6), approximately 3/8 inch (0.95 cm) from top. Ring gap should be between 0.013 and 0.005 inch (0.03 and 0.013 cm) .
4. Install oil ring (4) in bottom groove of piston (6) with notch end on bottom.
5. Install compression rings (5) in top groove of piston (6) with side marked top towards piston head.
6. Stagger ring gaps around pistons (6).

5-49. CRANKSHAFT, PISTONS AND RODS - Continued.

REASSEMBLY - Continued.

Table 5-4. Compressor Wear Limits (Factory Tolerances In.)

COMPRESSOR PART	TOLERANCE		MAX ALLOW WEAR
MOTOR END			
Main bearing diameter	Max	1.6260	.002
Journal Diam	Min	1.6233	.002
PUMP END			
Main bearing diameter	Max	1.3755	.002
Journal diameter	Min	1.2735	.002
CRANKPIN diameter	Min	2.2030	.0025
THROW	Min	1.250	
	Max	1.246	
THRUST WASHER	Min	.157	.025
	Max	.155	.025
ECCENTRIC			
Eccentric diameter	Max	2.2053	.002
Piston pin bearing	Min	6.878	.001
CYLINDERS			
Bore	Max	2.0005	.002
Piston diameter	Min	1.996	.002
Piston pin diameter	Min	.6873	.001
Piston pin bearing		Press Fit	
Piston ring gap	Max	.013	.025
	Min	.005	.025
Piston ring side clearance	Max	.002	.002
	Min	.001	.002

7. Measure side clearance between ring and piston (6) (Table 5-4).
8. Check rings (4) and (5) rotate freely.

NOTE

- Use matched pistons and eccentric straps removed in disassembly for assembly if pistons or eccentric straps are not replaced.
- While installing eccentric shaft and straps, tap shaft lightly and rotate shaft to prevent straps from jamming.

9. Install piston and eccentric strap (34) assemblies through bottom plate (21) into cylinder heads (20).
10. Guide eccentric shaft (7) thru pump end (22) and eccentric straps (34).

NOTE

Counter weights and eccentric strap shields must be reassembled in same position as labeled in disassembly.

11. Position counterweights (1, 30) and two eccentric strap shields (32, 33) in mounting position.
12. Install four counterweight and eccentric strap capscrews (35) and locknuts (31) and torque to 8-10 lb-ft.

13. Install rotor drive key (8) on eccentric shaft.
14. Place thrust washer (9) on eccentric shaft (7) in mounting position.
15. Install thrust pin (10).

CAUTION

Support rotor while it is being installed to prevent stator damage.

16. Install rotor (11) on eccentric shaft (7).

NOTE

Block shaft with a piece of wood if shaft turns preventing tube assembly from being installed.

17. Install equalizer tube assembly (18) and lockwasher (12).
18. Install filter strainer (13).
19. Position motor end gasket (17) and cover (14) in mounting position.
20. Install 18 cap screws (15) and gasket (16), and torque to 25-30 ft-lb.
21. Install tube assembly (23) and (29).
22. Install oil filter screen assembly (24).
23. Position bottom plate gasket (25) and plate (28) in mounting position.
24. Install 22 cap screw gaskets (26) and screws (27), and torque to 25-30 ft-lb.

FOLLOW ON PROCEDURE

1. Install pump end bearing assembly (para 5-48).
2. Install valve plate assembly (para 5-47).
3. Install compressor into air conditioner (para 5-46).

5-50. ELECTRICAL BOX ASSEMBLY.

This task covers:

Inspection **Repair/Replace** **Removal** **Installation**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Wrench, torque, 1/2", 10-150 ft-lbs (Item 20, Appendix B)
Material:
Rags (Item 12, Appendix E)
Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

Disconnect air conditioner input power at source.

INSPECTION

1. Check electrical box is not bent, cracked, or punctured. Replace electrical box if damaged.
2. Check for damaged bushings, loose, or missing mounting hardware.

REPAIR/REPLACE

Repair consists of replacing bushings or electrical box.

REMOVAL

1. Remove compressor from air conditioner (para 5-46).
2. Remove two screws (6), star washers (7), and cover (8).
3. Tag and disconnect leads from terminal plate (3) and current overloads (5).
4. Remove current overload (para 5-52).
5. Remove terminal plate (para 5-51).
6. Pull crankcase heater wire harness through crankcase heater bushing (9).
7. Pull wiring harness through wiring harness bushing (1).
8. Remove two bushings (1) and (9). Retain bushings for installation.
9. Remove two screws (2) and current overload mounting bracket (4). Retain screws and bracket for installation.
10. Remove two screws (10) and electrical box (11).

INSTALLATION

1. Install electrical box (11) with two screws (10) and torque to 16-20 ft-lb.
2. Install current overload mounting bracket (4) with two screws (2).
3. Install two bushings (1) and (9).
4. Pull crankcase heater wire harness through bushing (9) and secure.
5. Pull wiring harness through wiring harness bushing(1).
6. Install terminal plate (para 5-51).
7. Install current overload (para 5-52).
8. Reconnect leads to terminal plate (3) and current overloads (5), and remove tags.
9. Install cover (8) with two screws (6) and star washers (7).
10. Install compressor into air conditioner (para 5-46).

FOLLOW ON PROCEDURE

Connect air conditioner input power at source.

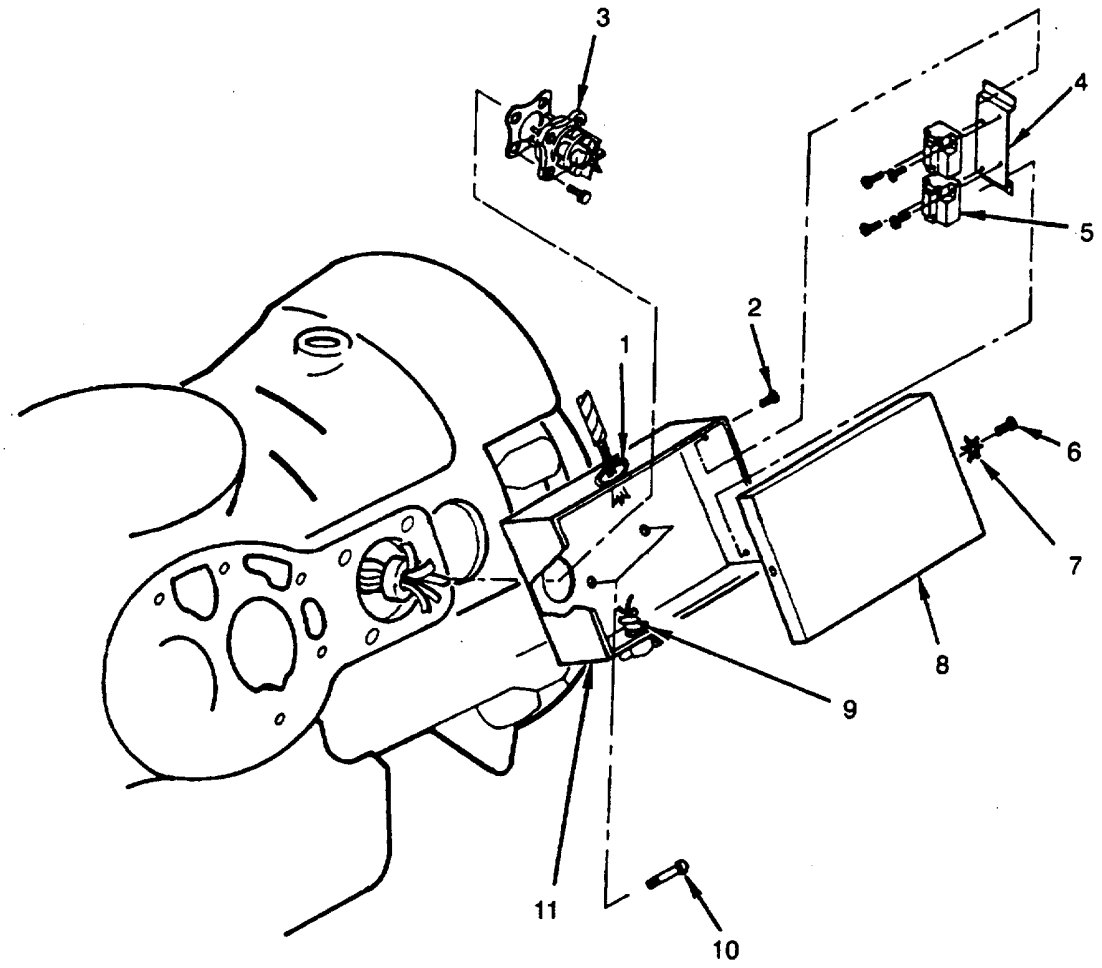


Figure 5-40. Electrical Box Assembly

5-51. TERMINAL PLATE.

This task covers:
Inspection **Removal** **Test** **Installation**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Wrench, torque, 1/2", 10-150 ft-lbs (Item 20, Appendix B)
Goggles, industrial (Appendix C)
Materials:
Rags (Item 12, Appendix E)
Lubricating oil (Item 9, Appendix E)
Solder, lead-tin alloy (Item 18, Appendix E)
Flux, solder, liquid rosin base (Item 19, Appendix E)
Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove compressor from air conditioner (para 5-46).
3. Remove electrical box cover (para 5-50).

INSPECTION

Check terminal plate for corrosion, burned thermal barrier, and loose or missing mounting hardware. Replace plate if defective.

REMOVAL

1. Tag and disconnect external leads (3) from terminal plate (2).
2. Remove four capscrews (4).
3. Pull terminal plate (2) out from crankcase (6).

NOTE

When disconnecting internal wire leads, cut leads as close as possible to terminal plate.

4. Tag and disconnect internal leads (5) from terminal plate (2).
5. Remove terminal plate (2).

TEST

Using multimeter, measure each feed through terminal of terminal plate for continuity. If any feed through terminal does not have continuity, replace terminal plate.

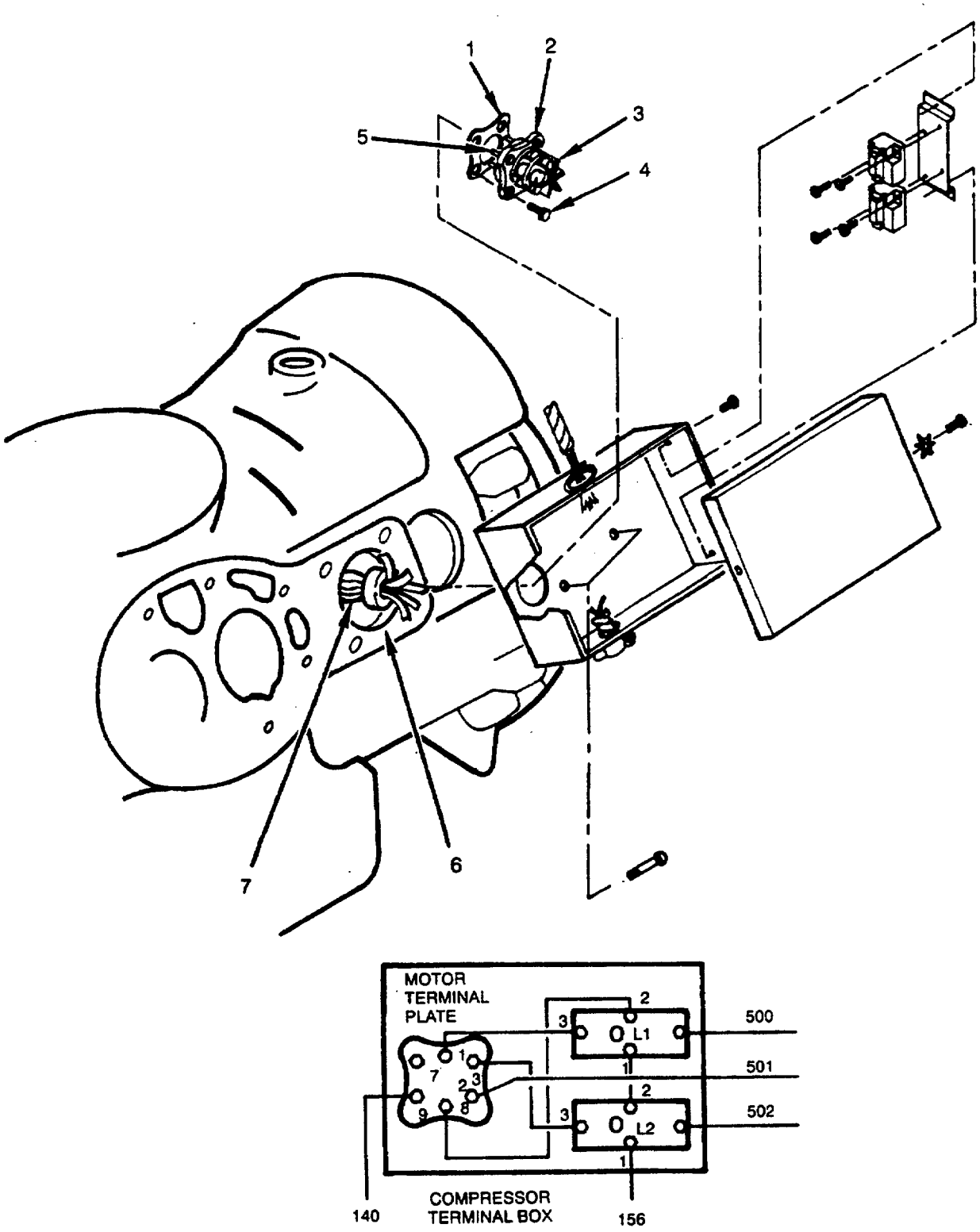


Figure. 5-41. Terminal Plate

5-51. TERMINAL PLATE - Continued.

INSTALLATION

1. Cut and strip internal wires to 3/8 inch (0.95 cm).
2. Twist and tin each internal wire.
3. Trim high voltage wires (7) so they will fit into terminal post.

NOTE

Low voltage wires will not fit into terminal post. A larger diameter wire needs to be installed.

4. On low voltage wires (7) install larger diameter wire and butt connector, if necessary.

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

5. Remove and clean old gasket material from crankcase (6).
6. Coat gasket (1) with refrigerant oil and place in mounting position.
7. Reconnect internal leads to terminals (5) and remove tags. (Wires require soldering).
8. Place terminal plate (2) in mounting position.
9 Install four capscrews (4) and torque to 16-20 ft-lbs.
10. Reconnect external leads to terminals (3) and remove tags.

FOLLOW ON PROCEDURE

1. Install electrical box cover (para 5-50).
2. Install compressor into air conditioner (para 5-46).
3. Connect air conditioner input power at source.

5-52. CURRENT OVERLOADS (K23 AND K24).

This task covers:

Inspection Test Removal Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Soldering iron (Item 16, Appendix B)
Goggles, industrial (Appendix C)

Materials:
Rags (Item 12, Appendix E)
Solder, lead-tin alloy (Item 18, Appendix E)
Flux, solder, liquid rosin base (Item 19, Appendix E)

Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove compressor from air conditioner (para 5-46).
3. Remove electrical box cover (para 5-50).

INSPECTION

Check current overloads for corrosion, burned insulation, and loose or missing mounting hardware. Replace current overload if defective.

TEST

1. Disconnect wire leads from overload terminals 1 and 2
2. Using multimeter, measure across terminals 1 and 2 for continuity. Replace overload if no continuity exists.
3. Connect wire leads to overload terminals 1 and 2.

REMOVAL

1. Tag and disconnect leads.
2. Remove two screws (1).
3. Remove Overload (2).

INSTALLATION

1. Place overload (2) in mounting position.
2. Install two screws (1).
3. Reconnect leads and remove tags.

5-52. CURRENT OVERLOADS (K23 AND K24) - Continued.

FOLLOW ON PROCEDURE

1. Install electrical box cover (para 5-50).
2. Install compressor into air conditioner (para 5-46).
3. Connect air conditioner input power at source.

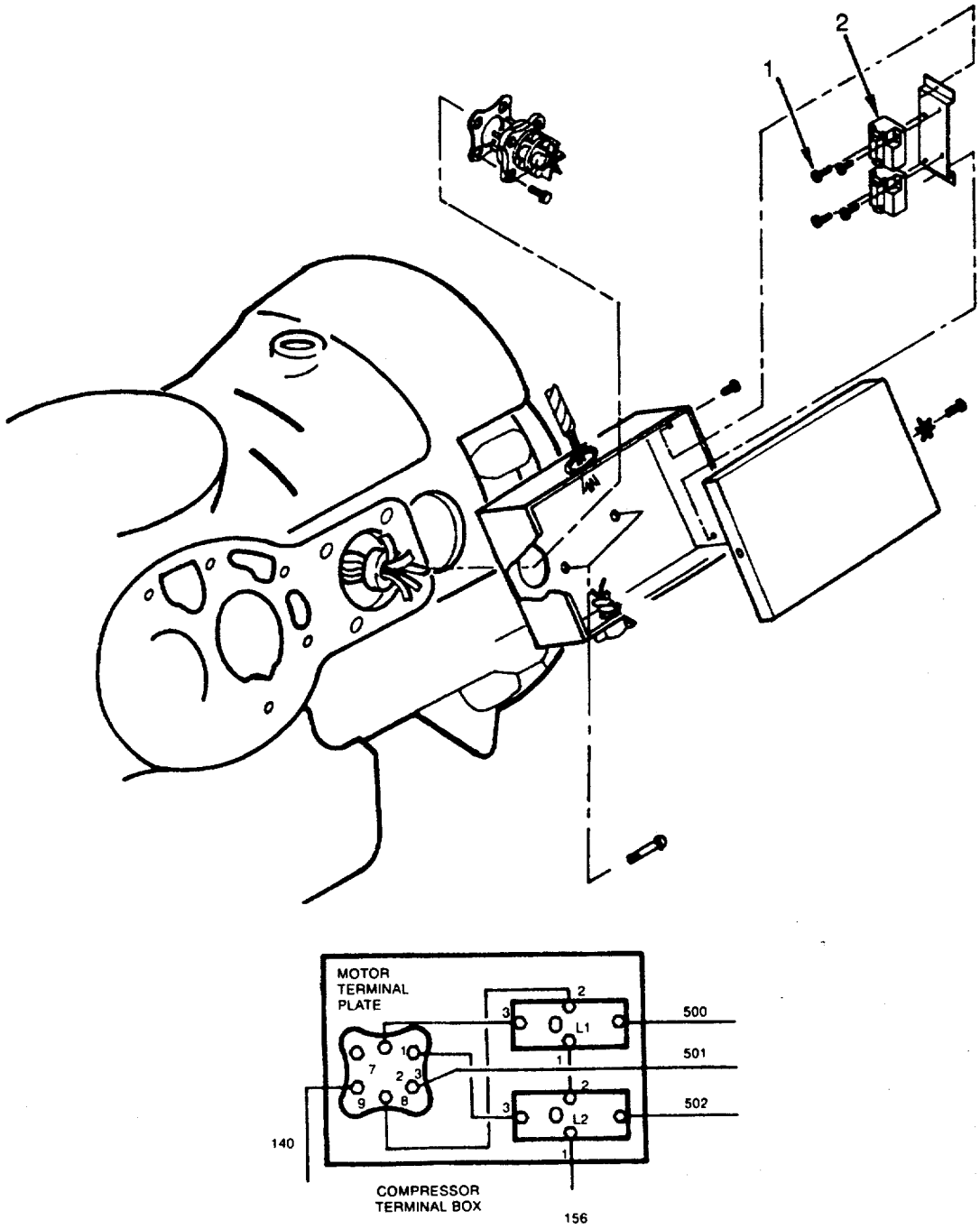


Figure 5-42. Current Overloads (K23 And K24)

5-53. CONDENSER COIL.

This task covers:

Inspection **Repair**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Material:
Rags (Item 12, Appendix E)
Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser panel (para 4-27).
3. Remove right front condenser panel (para 4-28).

INSPECTION

1. If a leak is suspected or indicated, test per paragraph 5-15.
2. If coil is damaged beyond repair, contact General Support Maintenance.

REPAIR

1. Repair of the condenser coil is limited to checking for leaks and brazing damaged tubing (paras 5-15 and 5-14).
2. If condenser coil is beyond repair, contact General Support Maintenance.

FOLLOW ON PROCEDURE

1. Install left front condenser panel (para 4-27).
2. Install right front condenser panel (para 4-28).
3. Check refrigerant charge (para 5-17).
4. Connect air conditioner input power at source.

5-53. CONDENSER COIL - Continued

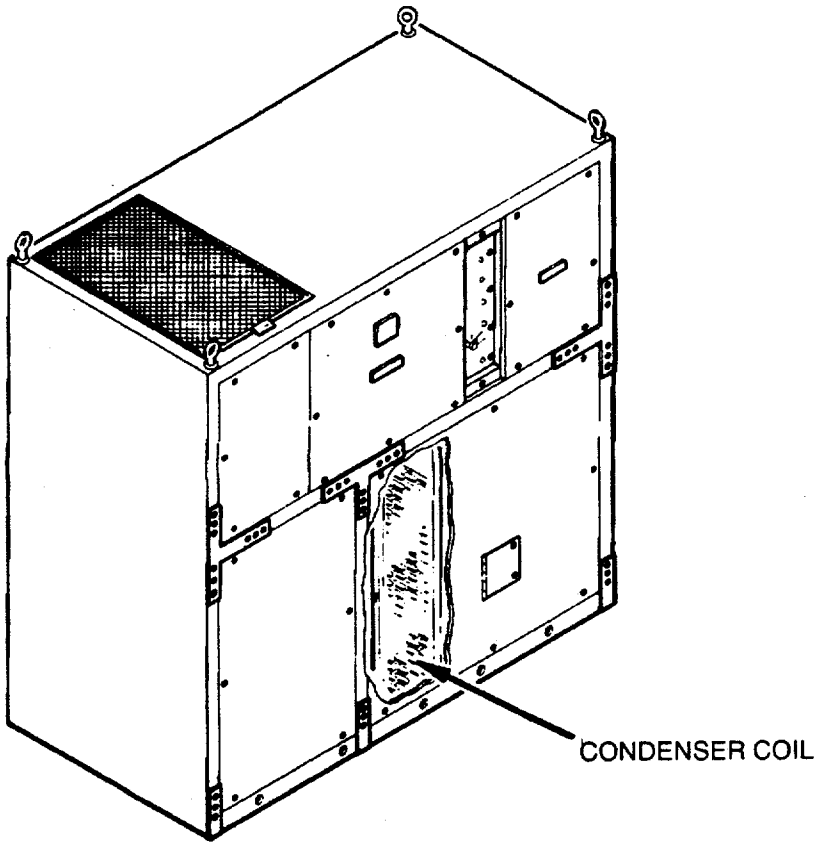


Figure. 5-43. Condenser Coil

5-54. EVAPORATOR COIL.

This task covers:

Inspection **Repair**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Material:
Rags (Item 12, Appendix E)
Personnel: 1

Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).
3. Remove right front evaporator panel (para 4-25).
4. Swing open control box (para 4-45).

INSPECTION

1. If a leak is suspected or indicated, test per paragraph 5-15.
2. If coil is damaged beyond repair, contact General Support Maintenance.

REPAIR

1. Repair of the evaporator coil is limited to checking for leaks and brazing damaged tubing (para 5-15 and para 5-14).
2. If condenser coil is beyond repair, contact General Support Maintenance.

FOLLOW ON PROCEDURE

1. Close control box (para 4-45).
2. Install left front evaporator panel (para 4-23).
3. Install right front evaporator panel (para 4-25).
4. Check refrigerant charge (para 5-17).
5. Connect air conditioner input power at source.

5-54. EVAPORATOR COIL - Continued

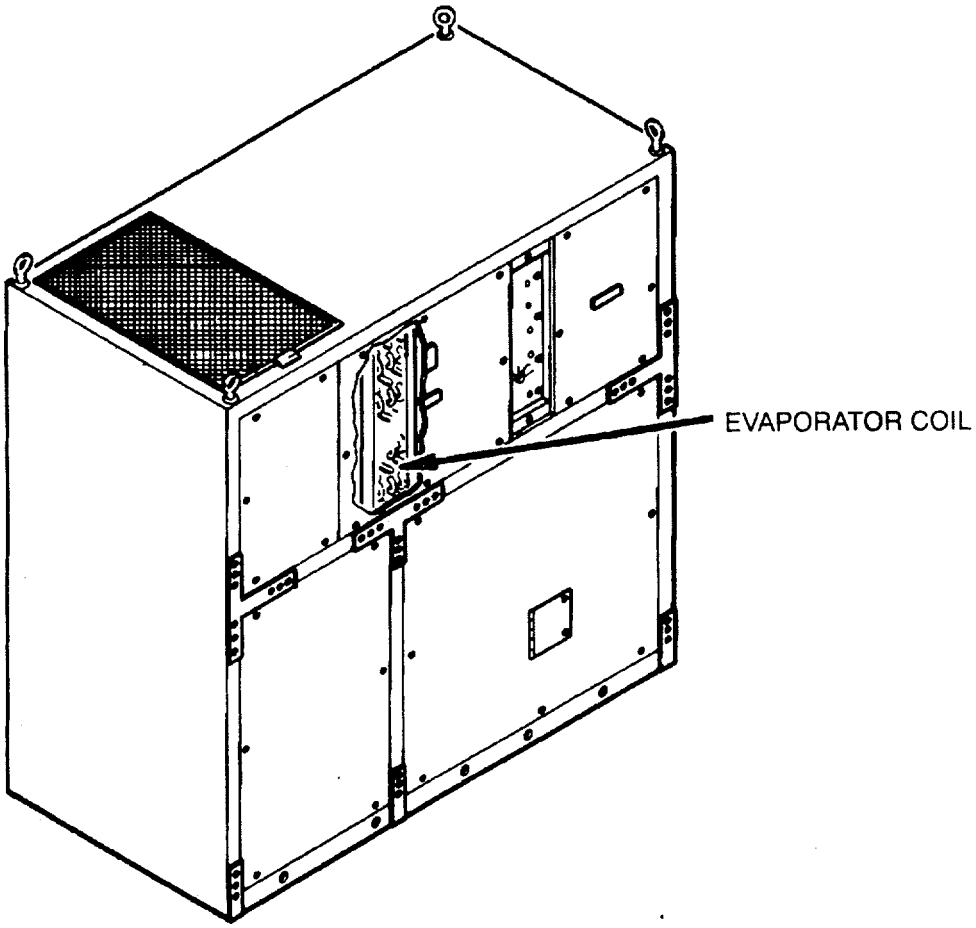


Figure. 5-4. Evaporator Coil

CHAPTER 6

GENERAL SUPPORT MAINTENANCE
Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

6-1. COMMON TOOLS AND EQUIPMENT. For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

6-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT. No special tools are required for General Support Maintenance of the air conditioner.

6-3. REPAIR PARTS. Repair parts are listed and illustrated in the Repair and Special Tools List (RPSTL), TM 9-4120-381-24P, covering Unit, Direct Support, and General Support Maintenance for this equipment.

Section II. GENERAL SUPPORT MAINTENANCE PROCEDURES

6-4. GENERAL. The only items restricted to General Support Maintenance level by the Maintenance Allocation Chart (MAC) are to replace elements of the air conditioner housing. However, General Support Maintenance may be called upon, at times, to perform any or all of the MAC items listed for Unit and Direct Support Maintenance for rehabilitation or overhaul of an air conditioner.

6-5. SHEET-METAL PARTS (CHASSIS).

a. Disassemble the air conditioner to the extent necessary to gain access to damaged area for repair.

b. Remove insulation from area to be repaired (para 5-7).

WARNING

Toxic fumes are emitted by burning or overheating insulation. Heated refrigeration piping can burst with explosive force. Shield wiring and piping, and remove insulation in the area if weld repair is necessary.

c. Repair damage using standard sheet-metal repair procedures. Rivet or weld patches to inside surface when required.

d. Replace insulation (para 5-7) as necessary and reassemble the air conditioner.

6-6 REAR EVAPORATOR PANEL

This task covers:
Removal Inspection Repair/Replace
Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Blind riveter (Item 8, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:
Adhesive compound (Item 1, Appendix E)
Bulk gasket material
Bulk insulation material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)

Equipment Conditions:

NOTE

For removal of the rear evaporator panel the air conditioner may have to be removed from the van or shelter. Refer to the van or shelter technical manual for removal instructions.

REMOVAL

1. Remove 10 screws (7), flat washers (9), and lockwashers (8) (see Figure 6-1).
2. Lift panel (6) out slightly, loosen duct clamp (2) and remove hose (1).
3. Rotate panel (6) counterclockwise and set on ground.

INPECTION

1. Check that panel is not bent, cracked, or punctured.
2. Check that gaskets and insulation are not torn, loose, or missing.
3. Check rivets and rivnuts for missing or loose mounting hardware.

REPAIR/REPLACE

NOTE

Repair consists of replacing RFI gasket, insulation, rivnuts and rivets, or panel.

1. For RFI gasket, insulation, or panel removal/installation remove the following components as necessary.
   a. Remove/install thermostat box and cover (para 6-7).
   b. Remove/install fresh air inlet box (para 6-8).
   c. Remove/install fresh air damper operator bracket (para 6-9).

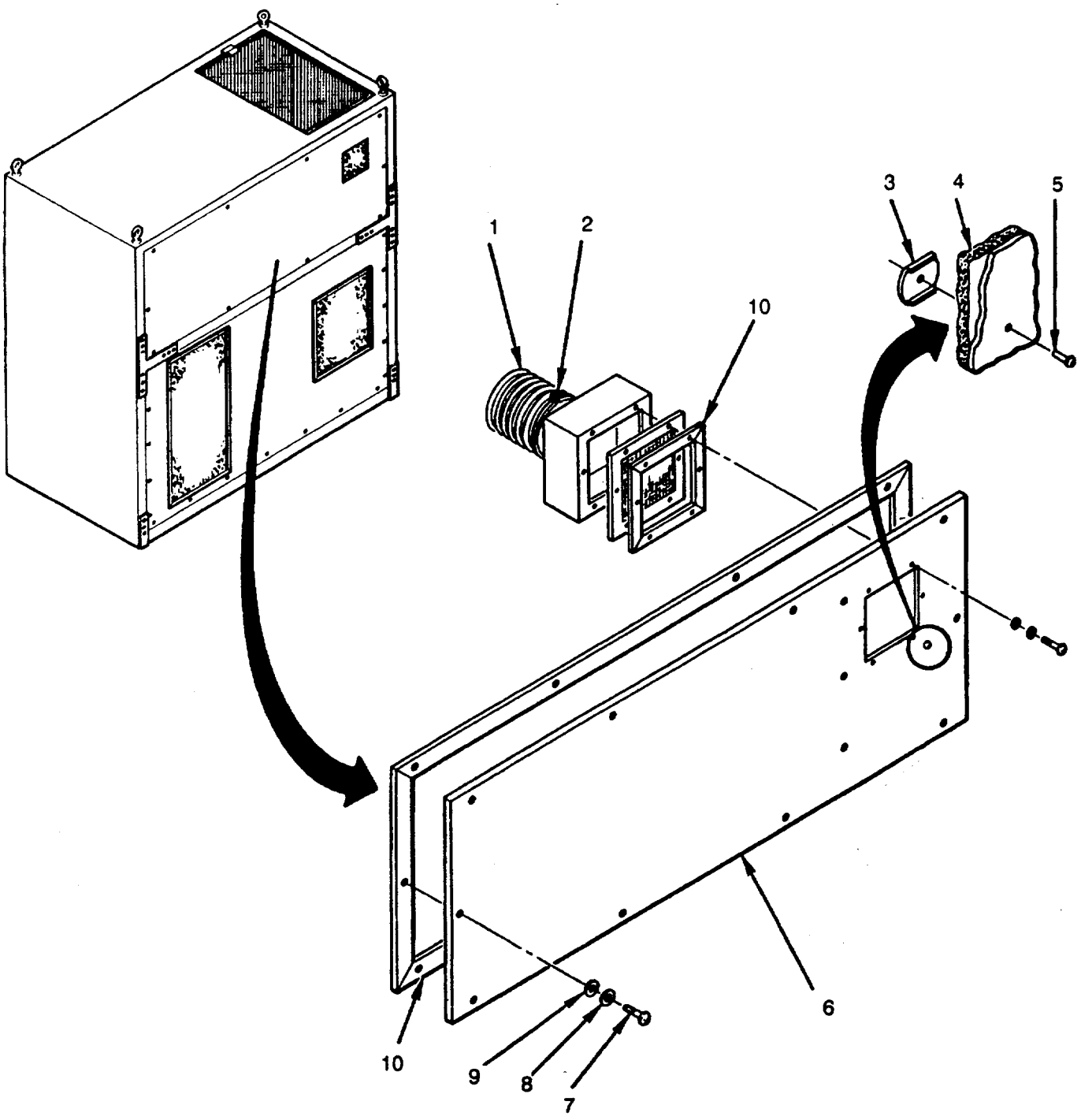


Figure 6-1. Rear Evaporator Panel

6-6. REAR EVAPORATOR PANEL - Continued.

2. RFI Gasket.
   a. Remove damaged gasket (10) from panel (6).

WARNING

Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

   b. Clean area for new gasket, using acetone or MEK and a stiff brush.
   c. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick To fingers.
   d. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.

3. Insulation
   a. Remove damaged insulation (4).
   b. Clean area for new insulation, using acetone or MEK and a stiff brush.
   c. Cut insulation (4) to fit.
   d. Coat surfaces of metal and insulation with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
   e. Starting with an end, carefully attach insulation to metal surface. Press into firm contact all over.
   f. If insulation retainer (3) and rivet (5) were removed, install new retainer (3) and rivet (5).

INSTALLATION

1. Install hose (1) and tighten clamp (2).
2. Place panel (6) into mounting position.
3. Install 10 screws (7), lockwashers (8), and flat washers (9).

FOLLOW ON PROCEDURE

If air conditioner is to be installed in a van or shelter, refer to the van or shelter technical manual for installation procedures.

6-7 THERMOSTAT BOX AND COVER

This task covers:
Inspection Removal Repair/Replace
Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)
Gloves, chemical (Appendix C)
Personnel: 1
Materials:
Methyl-ethyl ketone (MEK) (Item 13, Appendix E)
Sealant tape (Item 15, Appendix E)
Equipment Conditions:
Open rear evaporator panel (para 6-6).

INSPECTION

1. Check that box is not bent, cracked, or punctured. Replace box, if defective (see Figure 6-2).
2. Check for damaged, loose, or missing mounting hardware.

NOTE
For removal of the thermostat box the air conditioner must be removed from the van or shelter.

REMOVAL

1. Remove cool control thermostat (para 4-87).
2. Remove two screws (9), locknuts (7), and four flat washers (8).
3. Remove two screws (2), locknuts (6), and four flat washers (3) and (5).
4. Remove box (4).

REPARI/REPLACE

NOTE
Repair consists of replacing bushing, gaskets, rivnuts, or thermostat box and cover.

1. Remove grommet (12).
2. Remove damaged gasket (10) from cover (11).

WARNING
Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or Inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

3. Clean area for new gasket, using acetone or MEK and a stiff brush.

6-7. THERMOSTAT BOX AND COVER - Continued.

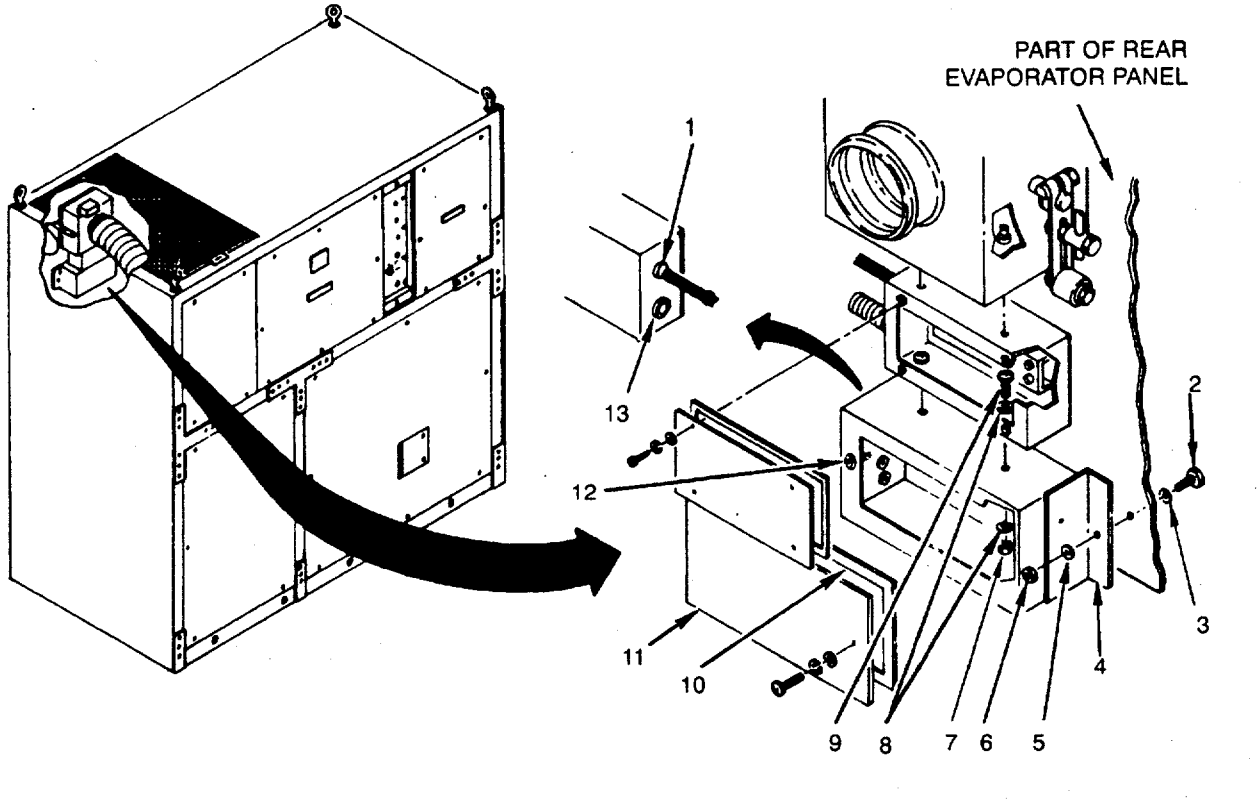


Figure 6-2. Thermostat Box And Cover

REPAIR/REPLACE - Continued

4. Remove insulator bushing (13).
5. Install insulator bushing (13).
6. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
7. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
8. Install grommet (1).
9. Use sealant tape to seal holes between boxes, bushing, and conduit fitting.
10. If required, drill out and replace damaged (total of eight) rivnuts (12).

INSTALLATION

1. Place thermostat box (4) in mounting position.
2. Install two screws (9), four flat washers (8), and two locknuts (7).
3. Install two screws (2), four flat washers (3) and (5), and two locknuts (6).
4. Install cool control thermostat (para 4-87).

FOLLOW ON PROCEDURE

Close rear evaporator panel (para 6-6).

6-8 FRESH AIR INLET BOX

This task covers:
Inspection Removal Repair/Replace
Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)

Personnel: 1

Equipment Conditions:
Open rear evaporator panel (para 6-6).

INSPECTION

1. Check that box is not bent, cracked, or punctured. Replace box, if defective (see Figure 6-3).
2. Check for damaged, loose, or missing mounting hardware.

NOTE
For removal of the thermostat box the air conditioner must be removed from the van or shelter.

REMOVAL

1. Remove control wire J-box (para 4-33).
2. Remove fresh air connecting link (para 4-34).
3. Remove thermostat bracket (para 4-35).
4. Remove six screws (8), flat washers (6), and lockwashers (7).
5. Remove filter (4), and filter box (3).

REPAIR/REPLACE

Repair consists of replacing rivnuts (5) or box (3).

INSTALLATION

1. Place box (3) in mounting position.
2. Install six screws (8), lockwashers (7), and flat washers (6).
3. Install fresh air connecting link (para 4-34).
4. Install control wire J-box (para 4-33).
5. Install thermostat bracket (para 4-35).

FOLLOW ON PROCEDURE

Close rear evaporator panel (para 6-6).

6-9. FRESH AIR DAMPER OPERATOR BRACKET - Continued.

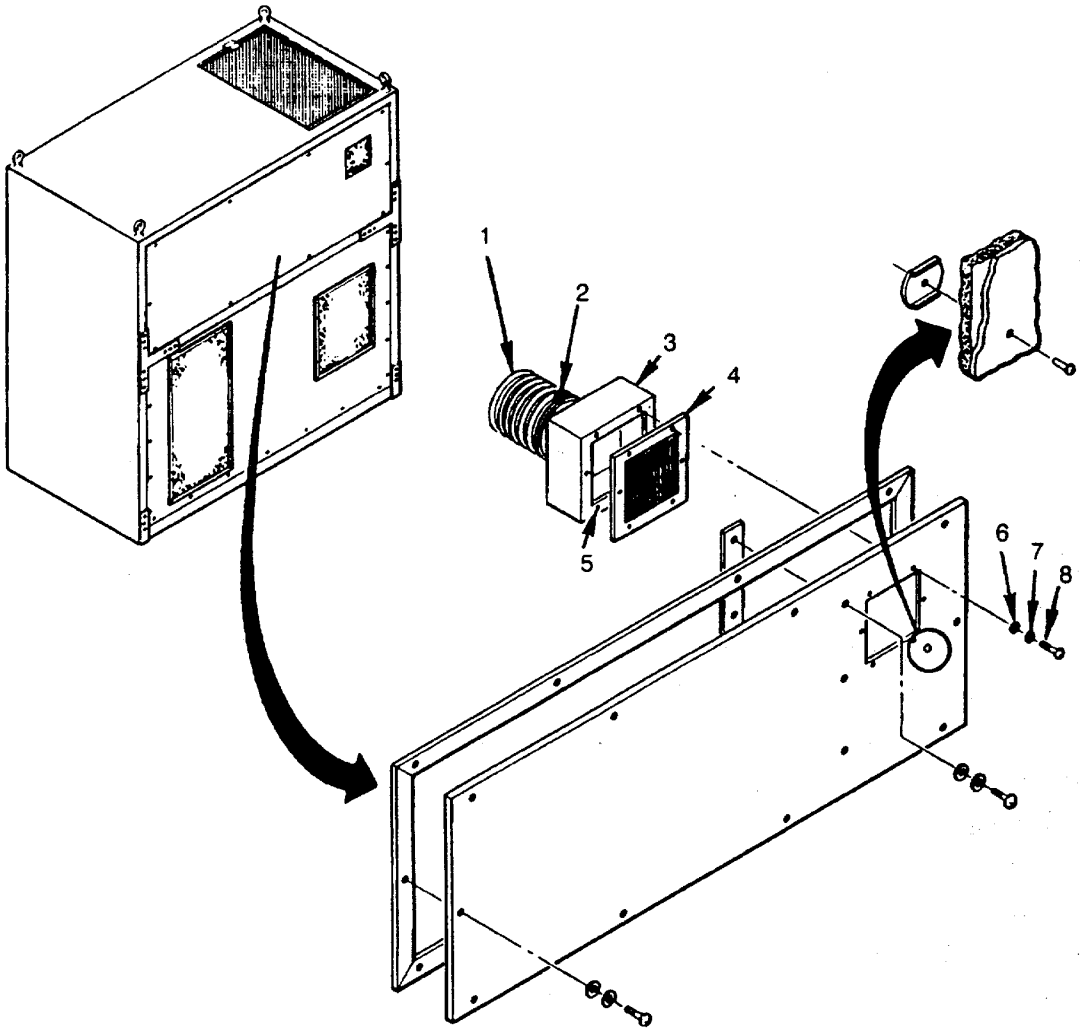


Figure 6-3. Fresh Air Box

6-9 FRESH-AIR DAMPER OPERATOR BRACKET.

This task covers:
Inspection Removal Repair/Replace
Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (Item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Riveter (Rivnut) (Item 9, Appendix B)

Personnel: 1

Equipment Conditions:
Open rear evaporator panel (para 6-6).

INSPECTION

1. Check that bracket (5) is not bent, cracked, or punctured. Replace bracket, if defective (see Figure 6-4).
2. Check for damaged, loose, or missing mounting hardware.

NOTE
For removal of the thermostat box the air conditioner must be removed from the van or shelter.

REMOVAL

1. Remove fresh air damper solenoid (para 4-66).
2. Remove three screws (1), locknuts (4), and six flat washers (2) and (3).
3. Remove bracket (5).

REPAIR/REPLACE

Repair consists of replacing rivnuts (6) or bracket (5).

INSTALLATION

1. Place bracket (5) in mounting position.
2. Install three screws (1), six flat washers (2) and (3),, and three locknuts (4).
3. Install fresh air damper solenoid (para 4-66).

FOLLOW ON PROCEDURE

Close rear evaporator panel (para 6-6).

6-9. FRESH AIR DAMPER OPERATOR BRACKET - CONTINUED.

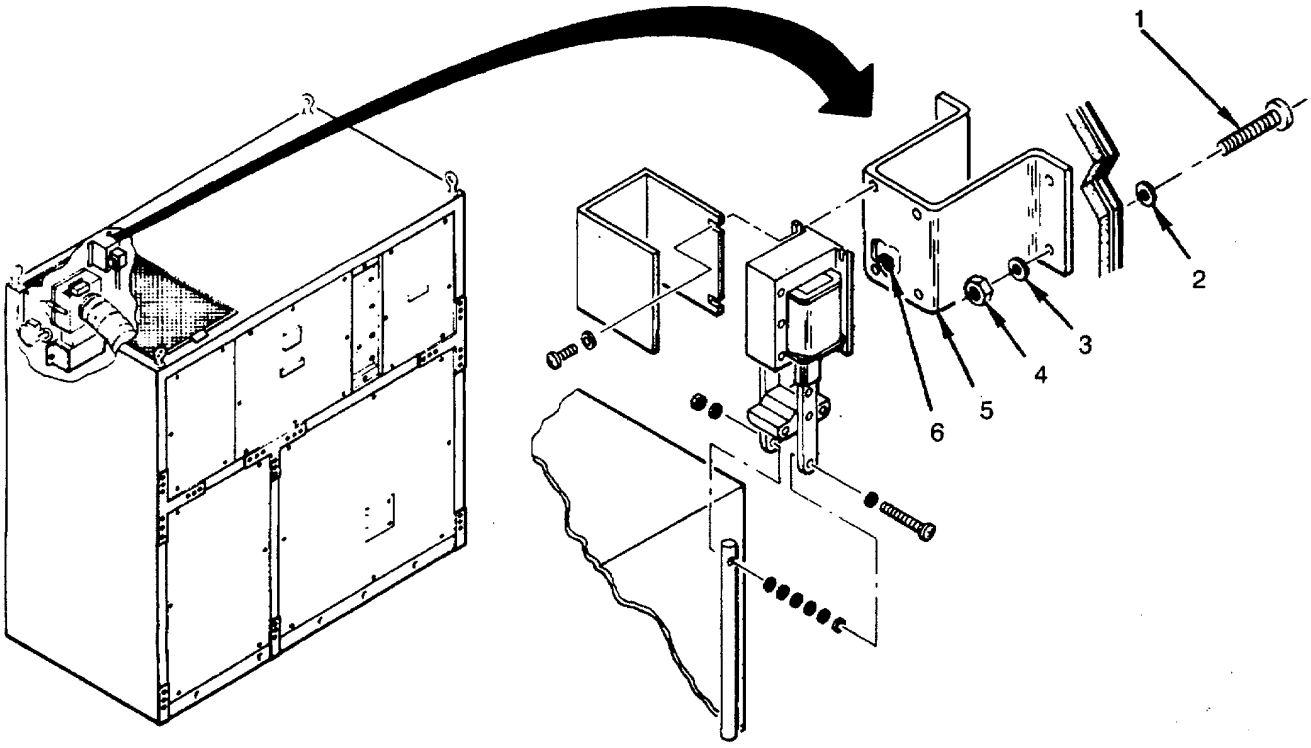


Figure 6-4. Fresh Air Damper Operator Bracket

6-10. REAR CONDENSER PANEL

This task covers:
Removal Inspection Repair
Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Electric portable drill (item 6, Appendix B)
Twist drill set (Item 7, Appendix B)
Riveter, blind set (Item 8, Appendix B)
Riveter, (Rivnut) (Item 9, Appendix B)
Gloves, chemical (Appendix C)

Personnel: 1

Materials:
Adhesive (Item 1, Appendix E)
Bulk gasket material
Bulk insulation material
Rags (Item 12, Appendix E)
Methyl-ethyl ketone (Item 13, Appendix E)

Equipment Conditions:

NOTE
For removal of the rear condenser panel the air conditioner may have to be removed from the van or shelter. Refer to the van or shelter technical manual for removal or installation instructions.

1. Remove condenser air out RFI filter (para 6-12).
2. Remove condenser air in RFI filter (para 6-13).

REMOVAL

1. Remove 42 screws (1), lockwashers (2), and flat washers (3) (see Figure 6-5).
2. Remove panel (4).

INSPECTION

1. Check that panel (4) is not bent, cracked, or punctured. Replace panel, if defective.
2. Check that gaskets (5) are not torn, loose, or missing.
3. Check for missing or damaged rivnuts.

REPAIR

NOTE
Repair consists of replacing RFI gasket, rivnuts or panel.

Gasket.
a. Remove damaged gasket (5) from panel (4).

WARNING
Acetone and Methyl-Ethyl Ketone (MEK) are flammable and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well ventilated area, wear gloves, and keep away from sparks or flame.

6-10. REAR CONDENSER PANEL- Continued.

REPAIR - Continued.

b. Clean area for new gasket, using acetone or MEK and a stiff brush.

c. Coat surfaces of metal and gasket with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.

d. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.

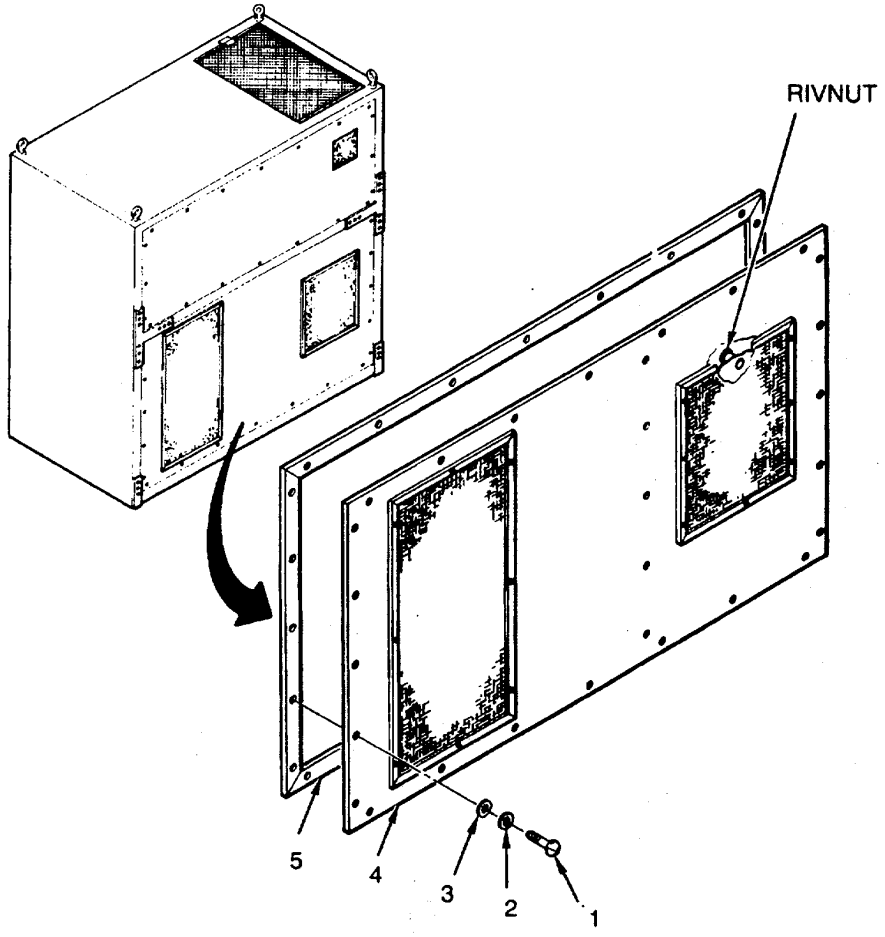


Figure 6-5. Rear Condenser Panel

INSTALLATION

1. Place panel (4) in mounting position.
2. Install 42 screws (1), lockwashers (2), and flat washers (3).

FOLLOW ON PROCEDURE

1. Install condenser air out RFI filter (para 6-12).
2. Install condenser air in RFI filter (para 6-13).

6-11 FRESH AIR RFI FILTER

This task covers:
Removal Replace Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1

Material:
Rags (Item 12, Appendix E)
Equipment Conditions:

NOTE

For removal of the fresh air RFI filter the air conditioner may have to be removed from the van or shelter. Remove rear evaporator panel (para 6-6).

REMOVAL

1. Remove six screws (4), flat washers (2), and lockwashers (3).
2. Remove filter (7).

REPLACE

Replace consists of replacing filter if found to be damaged.

NOTE

If RFI panel (filter) gasket is damaged, see paragraph 6-6.

INSTALLATION

1. Place filter (7) in mounting position.
2. Install six screws (4), lockwashers (3), and flat washers (2).

FOLLOW ON PROCEDURE

Install rear evaporator panel (para 6-6).

6-11. FRESH AIR RFI FILTER - Continued

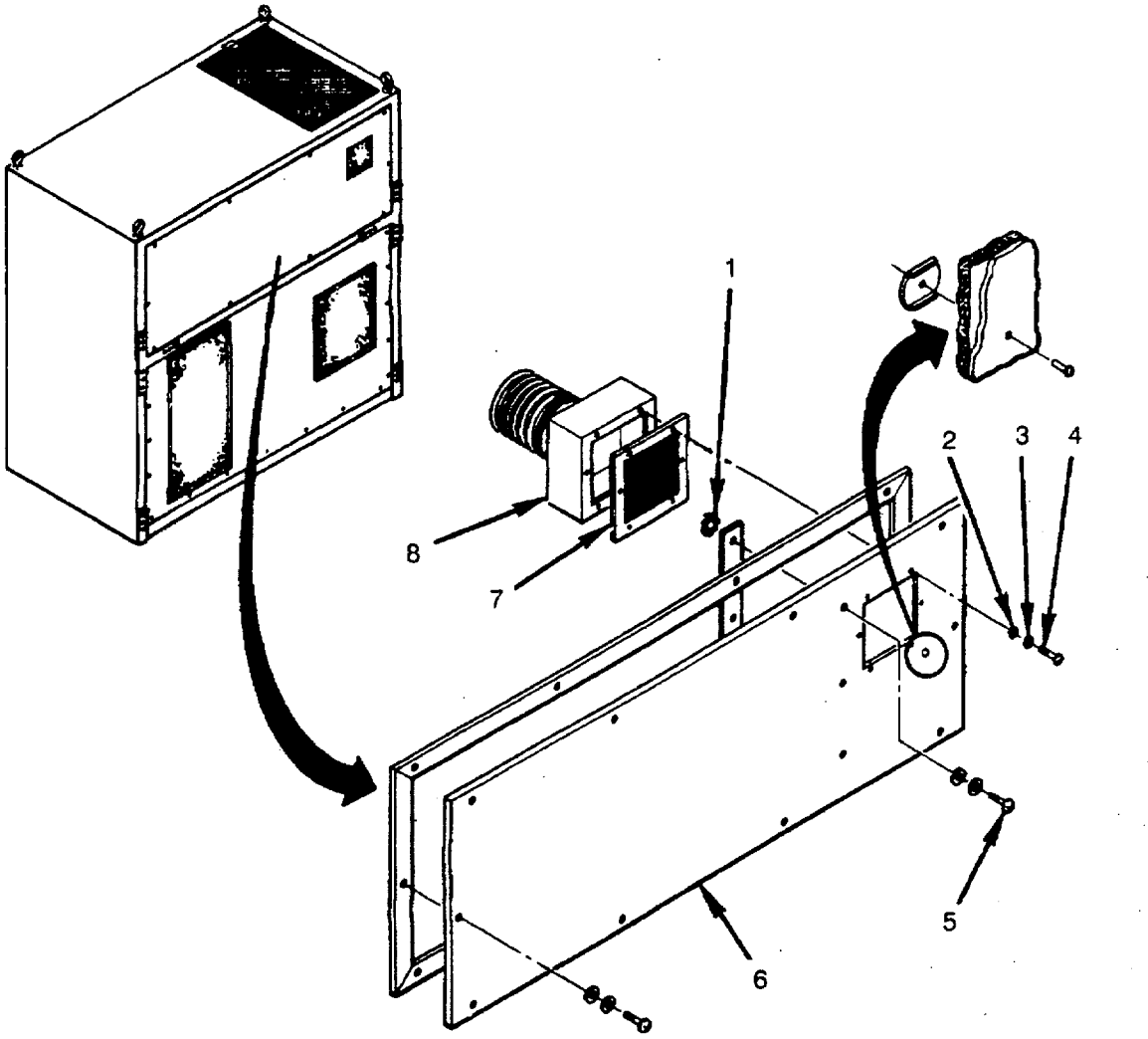


Figure 6-6. Fresh Air RFI Filter

6-12 CONDENSER AIR OUT RFI FILTER.

This task covers:
Removal Replace Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Materials:
Adhesive (Item 1, Appendix E)
Bulk gasket material
Rags (Item 12, Appendix E)
Equipment Conditions:

NOTE

If the condenser RFI filter screws are not accessible from outside the shelter or van, the air conditioner may have to be removed from the van or shelter. Remove rear condenser panel (para 6-10).

REMOVAL

1. Remove ten screws (3), flat washers (1), and lockwashers (2) (see Figure 6-7).
2. Remove filter (4).

REPLACE

Replace consists of replacing condenser air out RFI filter.

INSTALLATION

1. Coat surfaces of metal and gasket (5) with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
2. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
3. Place filter (4) in mounting position.
4. Install ten screws (3), lockwashers (2), and flat washers (1).

FOLLOW ON PROCEDURE

Install rear condenser panel (para 6-10).

6-12 CONDENSER AIR OUT RFI FILTER.

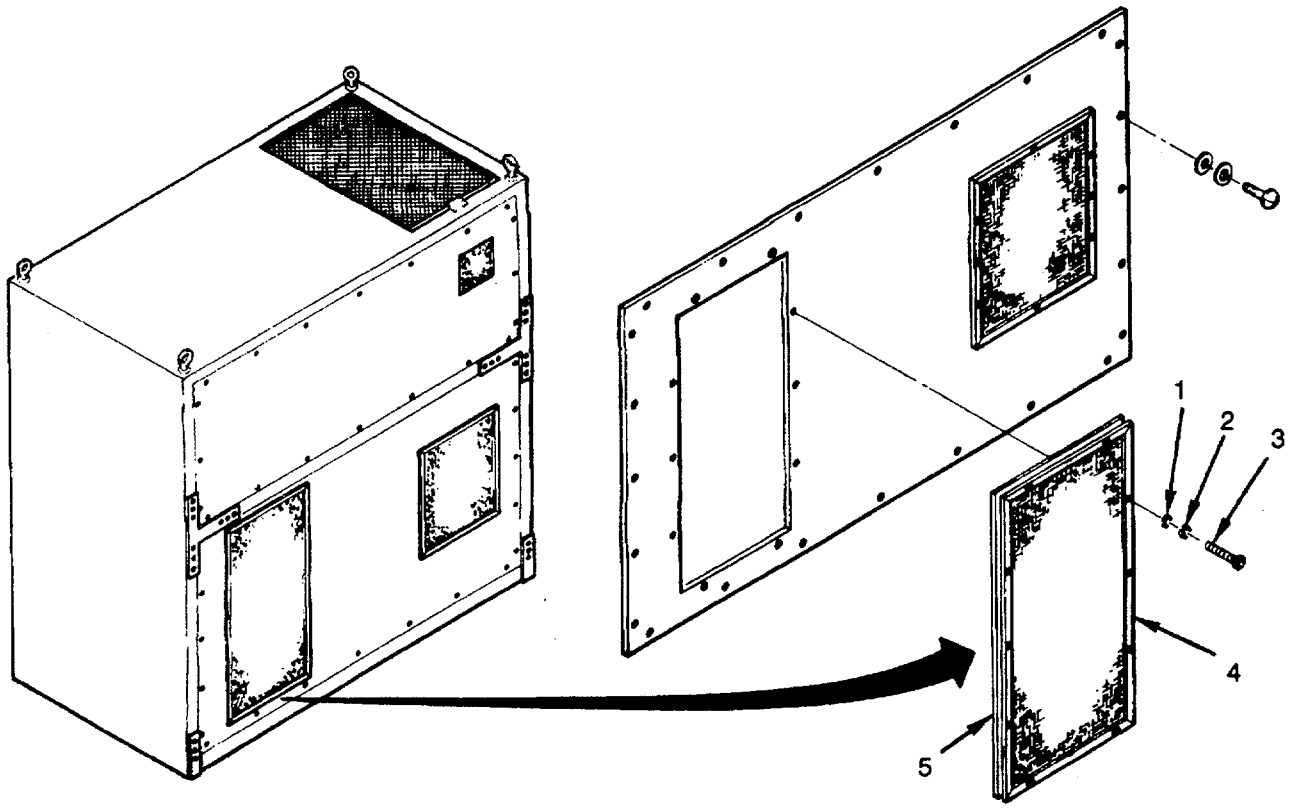


Figure 6-7. Condenser Air Out RFI Filter

6-13 CONDENSER AIR IN RFI FILTER

This task covers:
Removal Replace Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Materials:
Adhesive (Item 1, Appendix E)
Bulk gasket material
Rags (Item 12, Appendix E)
Equipment Conditions:

NOTE

If the condenser RFI filter screws are not accessible from outside the shelter or van, the air conditioner may have to be removed from the van or shelter. .Remove rear condenser panel (para 6-10).

REMOVAL

1. Remove ten screws (1), flat washers (3), and lockwashers (2) (see Figure 6-8).
2. Remove filter (4).

REPLACE

Replace consists of replacing condenser air in RFI filter (4).
INSTALLAI ION
1. Coat surfaces of metal and gasket (5) with adhesive. Let both surfaces dry until adhesive is tacky but will not stick to fingers.
2. Starting with an end, carefully attach gasket to metal surface. Press into firm contact all over.
3. Place filter (4) in mounting position.
4. Install ten screws (1), lockwashers (2), and flat washers (3).

FOLLOW ON PROCEDURE

Install rear condenser panel (para 6-10).

6-13 CONDENSER AIR IN RFI FILTER - Continued

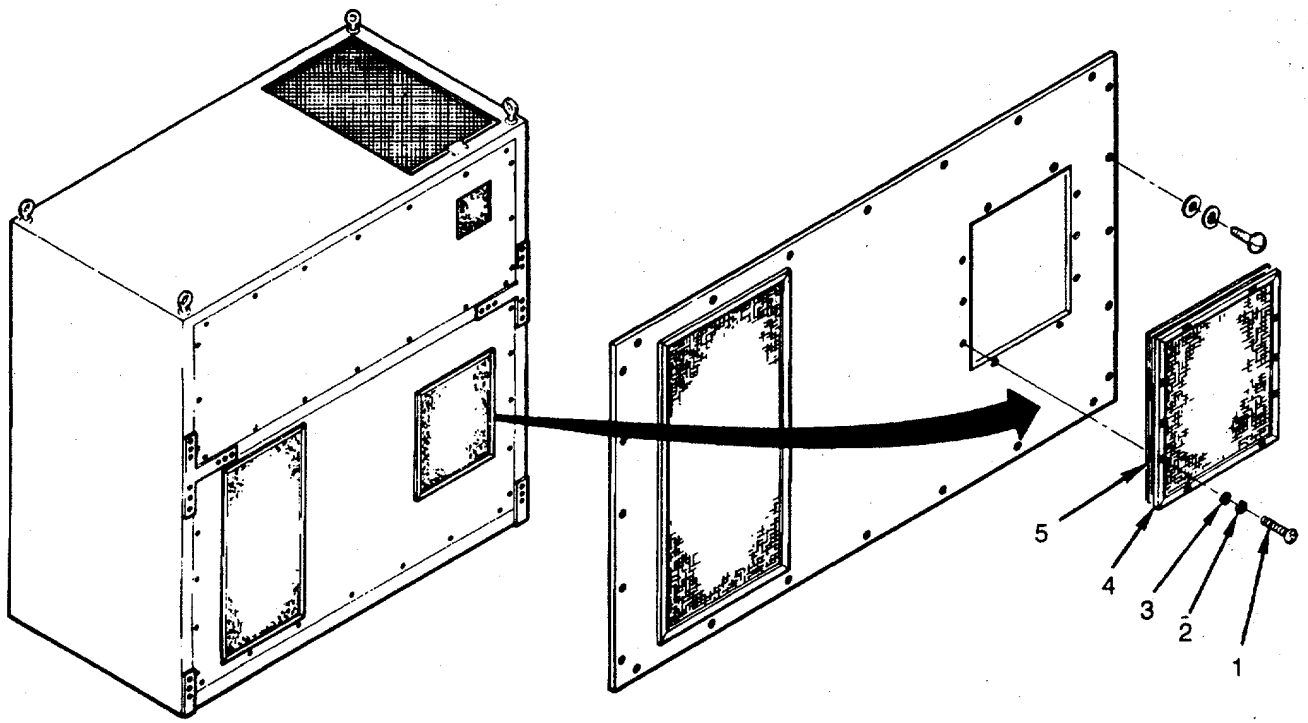


Figure 6-8. Condenser Air In RFI Filter

6-14. RFI FILTER

This task covers:

Replace | Inspection | Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

NOTE

If the RFI filter screws are not accessible, the air conditioner must be removed from the van or shelter. Refer to the van or shelter technical manual for removal and installation procedures.

Remove RFI filter top and bottom covers (para 4-42).

REPLACE

Replace RFI filter, if defective (see Figure 69).

REMOVAL

1. Tag and disconnect RFI filter input and output leads.
2. If necessary remove air conditioner to gain access to side of air conditioner.
3. Remove four bolts (1), locknuts (4), and eight flatwashers (2) and (3).
4. Remove RFI filter (5).

INSTALLAION

1. Place RFI filter (5) in mounting position.
2. Install four bolts (1), eight flatwashers (2) and (3), and four locknuts (4).
3. If air conditioner was removed, install air condition.
4. Connect leads tagged in removal.

FOLLOW ON PROCEDURE

Install RFI filter top and bottom covers (para 4-42).

6-14. RFI FILTER - Continued.

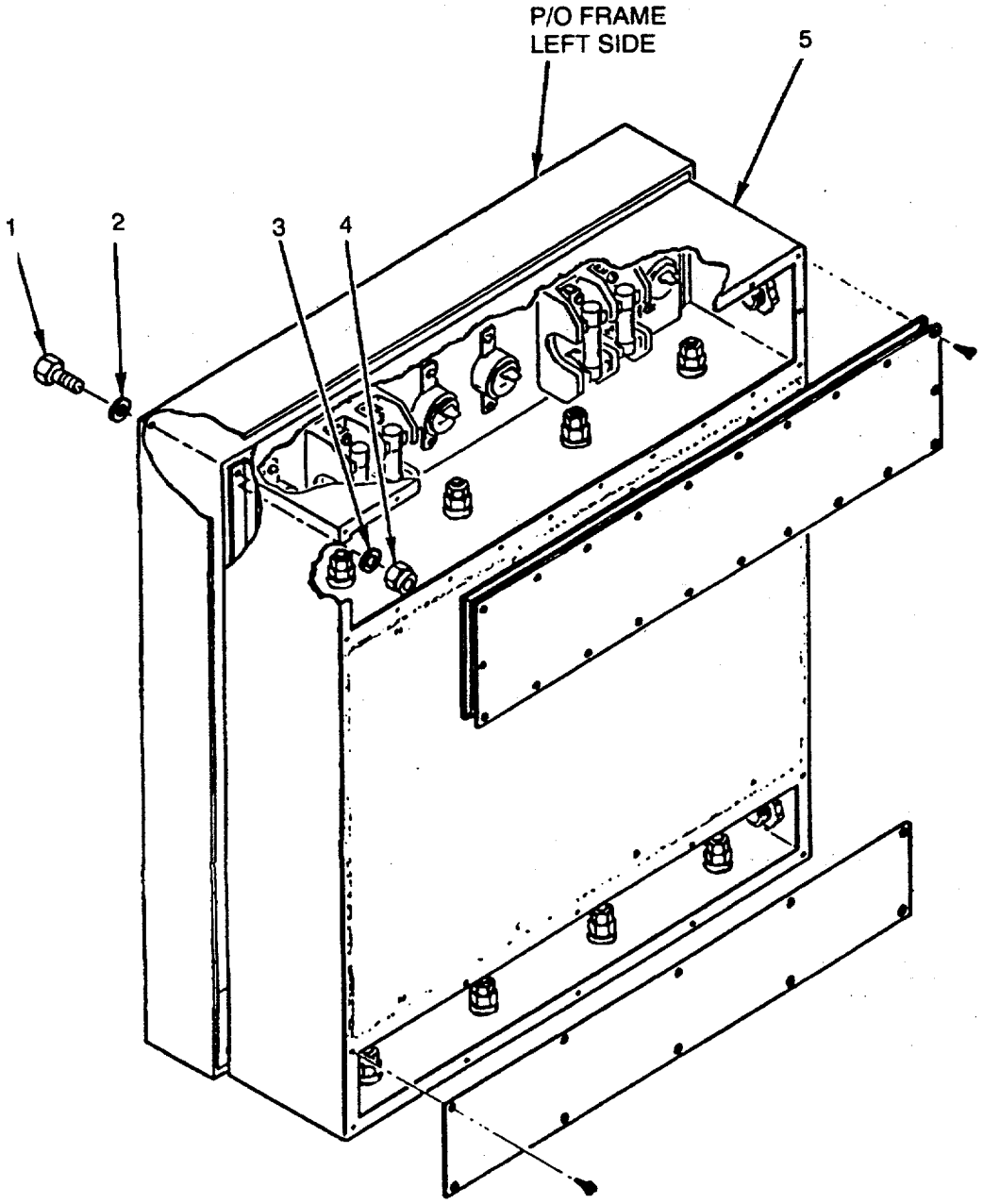


Figure 6-9. RFI Filter

6-15 FUSE HOLDER (RFI BOX)

This task covers:

Replace | Removal | Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:
Remove RFI filter (para 6-14).

Replace fuse holder, if defective (see Figure 6-10).

REMOVAL

1. Remove two screws (3), nuts (5), and lockwashers (4).
2: Remove varistor and fuse holder mounting assembly (1).
3. Remove two screws (6), flat washers (7), lockwashers (8), and nuts (9).
4. 'Remove fuse holder (2).

INSTALLATION

1. Place fuse holder (2) on varistor and fuse mounting assembly (1).
2. Install two screws (6), lockwashers (8), flat washers (7), and nuts (9).
3. Place varistor and fuse holder mounting assembly (1) in mounting position.
4. Install two screws (3), lockwashers (4), and nuts (5).

FOLLOW ON PROCEDURE

Install RFI filter (para 6-14).

6-15. FUSE HOLDER (RFI BOX) - Continued.

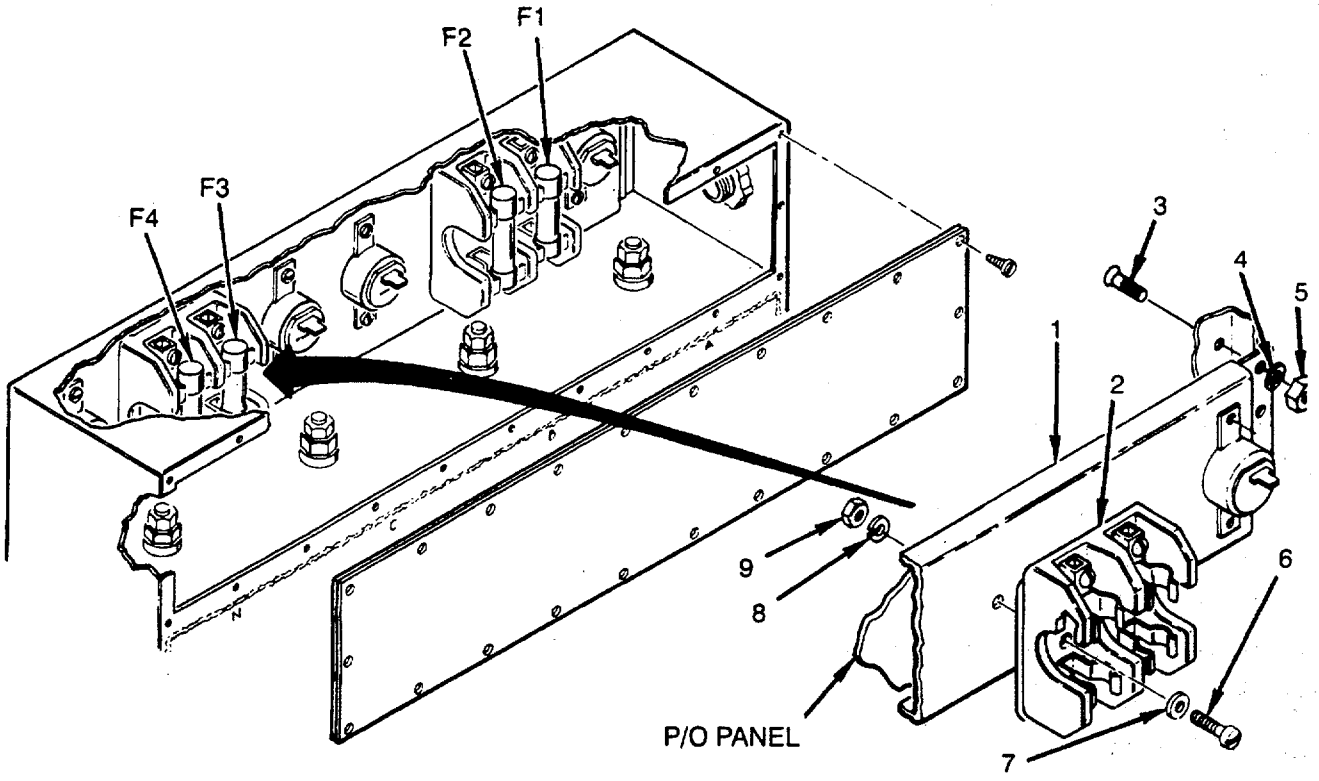


Figure 6-10. Fuse Holder (RFI Box)

6-16. VARISTORS (VR-1 THRU VR-4).

This task covers:

Removal Inspection Repair/Replace
Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:
Remove RFI filter (para 6-14).

REPLACE

Replace varistor, if defective (see Figure 6-11).

REMOVAL

1. Remove two screws (8), nut (2), and lockwashers (1).
2. Remove varistor and fuse holder mounting assembly (5).
3. Remove two screws (3), nuts (7), and lockwashers (6).
4. Remove varistor (4).

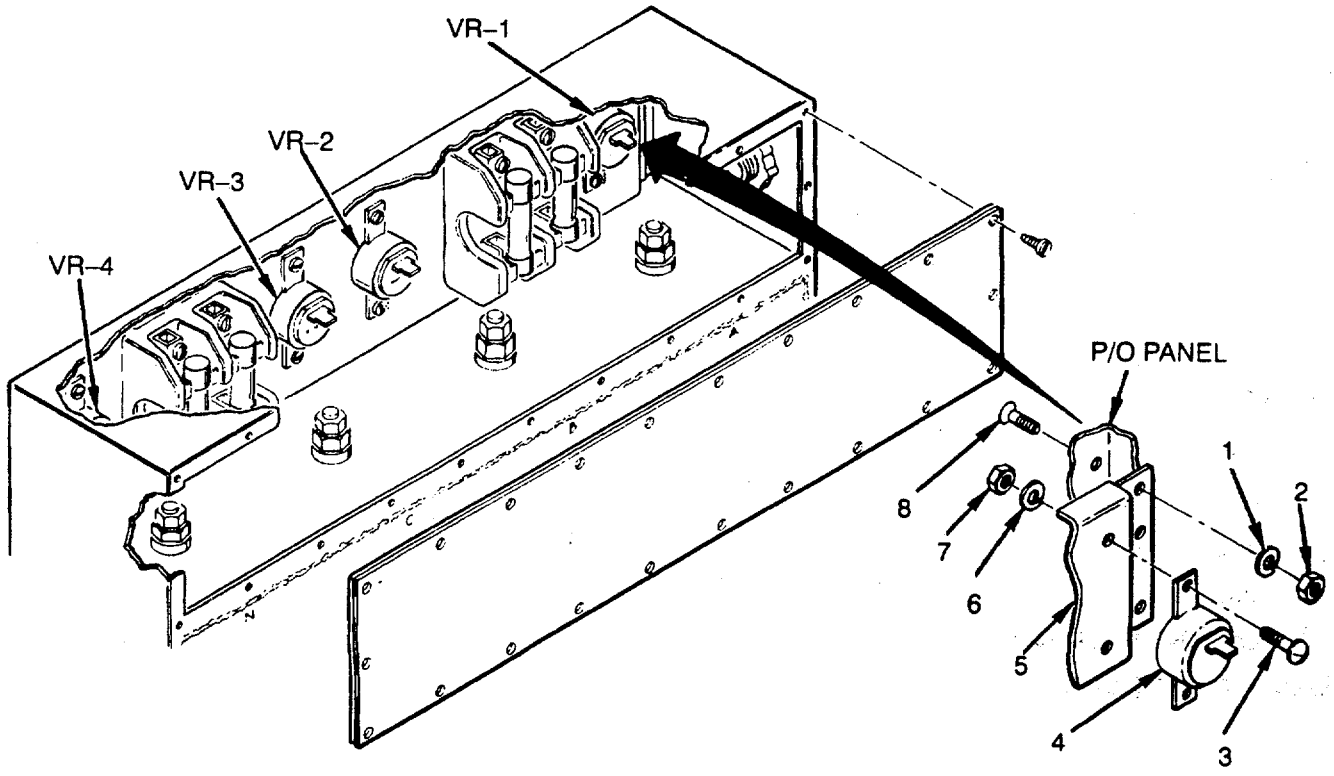
INSTALLATION

1. Place varistor (4) in mounting position.
2. Install two screws (3), lockwashers (6), and nuts (7).
3. Place varistor and fuse holder mounting assembly (5) in mounting position.
4. Install two screws (8), lockwashers (1), and nuts (2).

FOLLOW ON PROCEDURE

Install RFI filter (para 6-14).

6-16.VARISTORS (VR-1 THRU VR-4) - Continued.



6-11. VARISTORS (VR-1 THRU VR-4).

6-6 REAR EVAPORATOR PANEL

This task covers:

Removal	Dissasembly	Repair/Replace
Reassembly	Installation	

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:
1. Remove rear evaporator panel (para 66).
2. Pump down refrigerant system (para 5-21) (see Figure 6-12).

REMOVAL

1. Remove valve cap (8).
2. Remove locknut (13), screw (17), and two flat washers (14) and (16).
3. Remove two clamps (15) from refrigerant lines.
4. Loosen two screws (10) and nuts (12) on sensing bulb retaining clamps (11).
5. Remove sensing bulb (9) from retaining clamp (11).

NOTE

If expansion valve body is to be replaced, disassemble before debrazing.
If expansion valve body is not damaged and will not be removed, proceed to the disassembly procedure.

6. Remove external equalizer line (18).
7. Remove expansion valve body (5) by debrazing tubing (4) and distributor (3) at joints (para 5-14).

DISASSEMBLY

1. Remove two bolts (2).
2. Remove powerhead (7) from valve body (5).
3. Remove cage assembly (6).
4. Examine cage assembly for damage or defects.

REPAIR/REPLACE

Repair consists of replacing powerhead (7), cage assembly (6), valve body (5), or valve.

REASSEMBLY

1. Examine replacement cage assembly (6) for defects or damage before reassembly.
2. Install cage assembly (6).
3. Install powerhead (7) onto valve body (5).
4. Install two bolts (2).

6-17. THERMOSTATIC EXPANSION VALVE (PRIMARY) - Continued

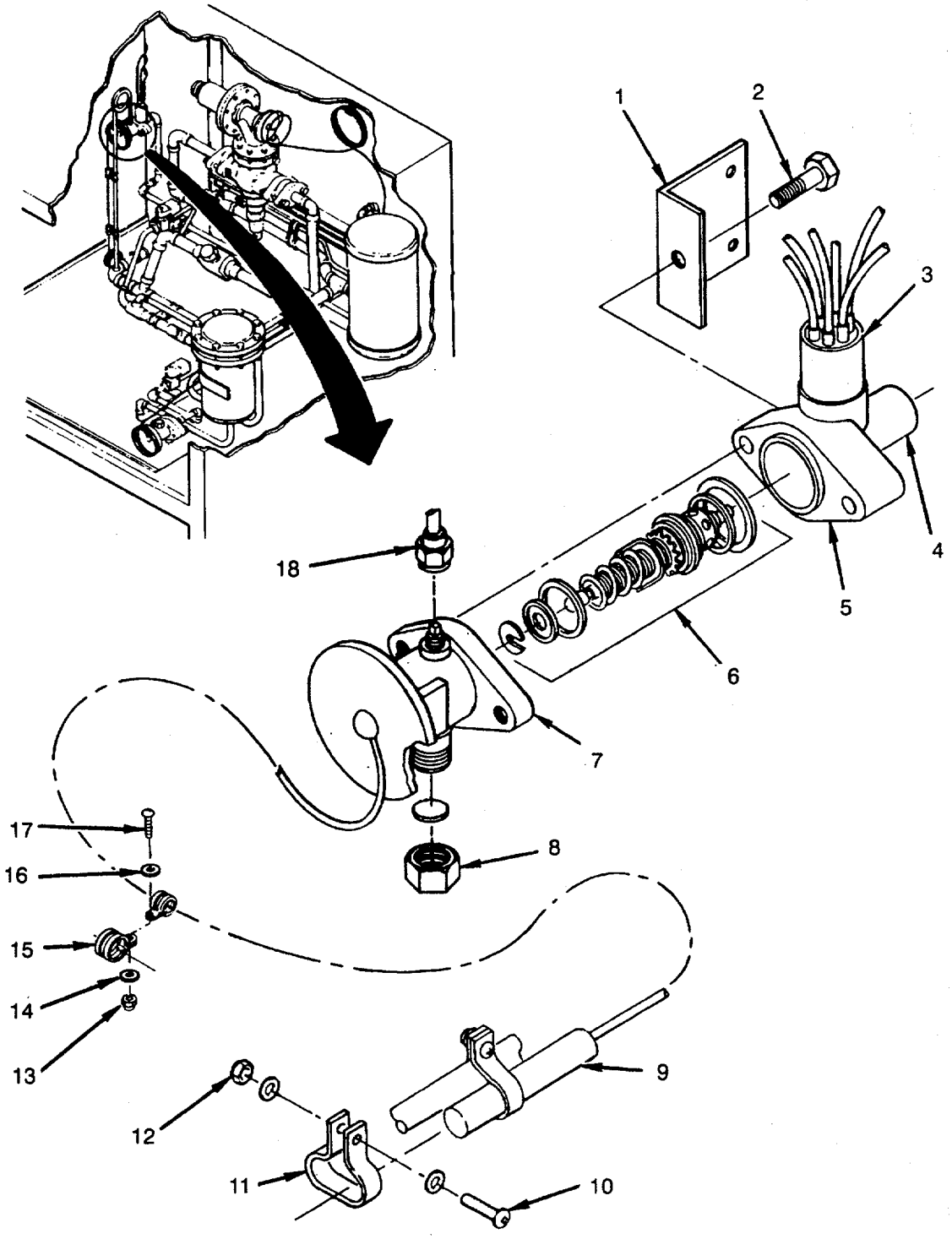


Figure 6-12. Thermostatic Expansion Valve (Primary)

INSTALLATION

NOTE

If expansion valve body is not being installed, proceed to step 2.
If expansion valve body is being installed, proceed to disassembly before brazing valve body.

1. Install expansion valve body (5) by brazing tubing (4) and distributor (3) at joints (para 5-14).
2. Install sensing bulb (9) in retaining clamp (11).
3. Tighten two screws (10) and nuts (12) on sensing bulb retaining clamp (11).
4. Install two clamps (15) to refrigerant lines.
5. Install two flat washers (14) and (16), one screw (17), and locknut (13).
6. Install valve cap (8).
7. Install external equalizer line (18).
8. Leak test all brazed connections in repaired area (para 5-15).

FOLLOW ON PROCEDURE

1. Install rear evaporator panel (para 6-6).
2. Perform start up after repairs (para 5-22).

6-18. DISTRIBUTOR.

This task covers:

Removal Inspection Repair/Replace
Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Material:
Brazing alloy, silver, QQ-B-654, Grade III (Item 21, Appendix E)

Personnel: 1

Equipment Conditions:
1. System has been pumped down (para 5-21).
2. Remove rear evaporator panel (para 6-6).
3. Disassemble thermostatic expansion valve (para 6-17).

REMOVAL

1. Debraze distributor (3) at valve joint (2) (para 5-14).

NOTE
Check the length of the new distributor lines before cutting lines distributor lines to coil.

2. Cut distributor lines (1) to coil (see Figure 6-13).
3. Remove distributor (3).

INSTALLATION

1. Braze distributor lines (1) to coil lines (para 5-14).
2. Braze distributor (3) to valve joint (2) (para 5-14).
3. Leak test all newly connected joints and those in the repair area (para 5-15).

FOLLOW ON PROCEDURE

1. Reassemble thermostatic expansion valve (para 6-17).
2. Perform start up after repairs (para 5-22).
3. Install rear evaporator panel (para 6-6).

6-18. DISTRIBUTOR - Continued.

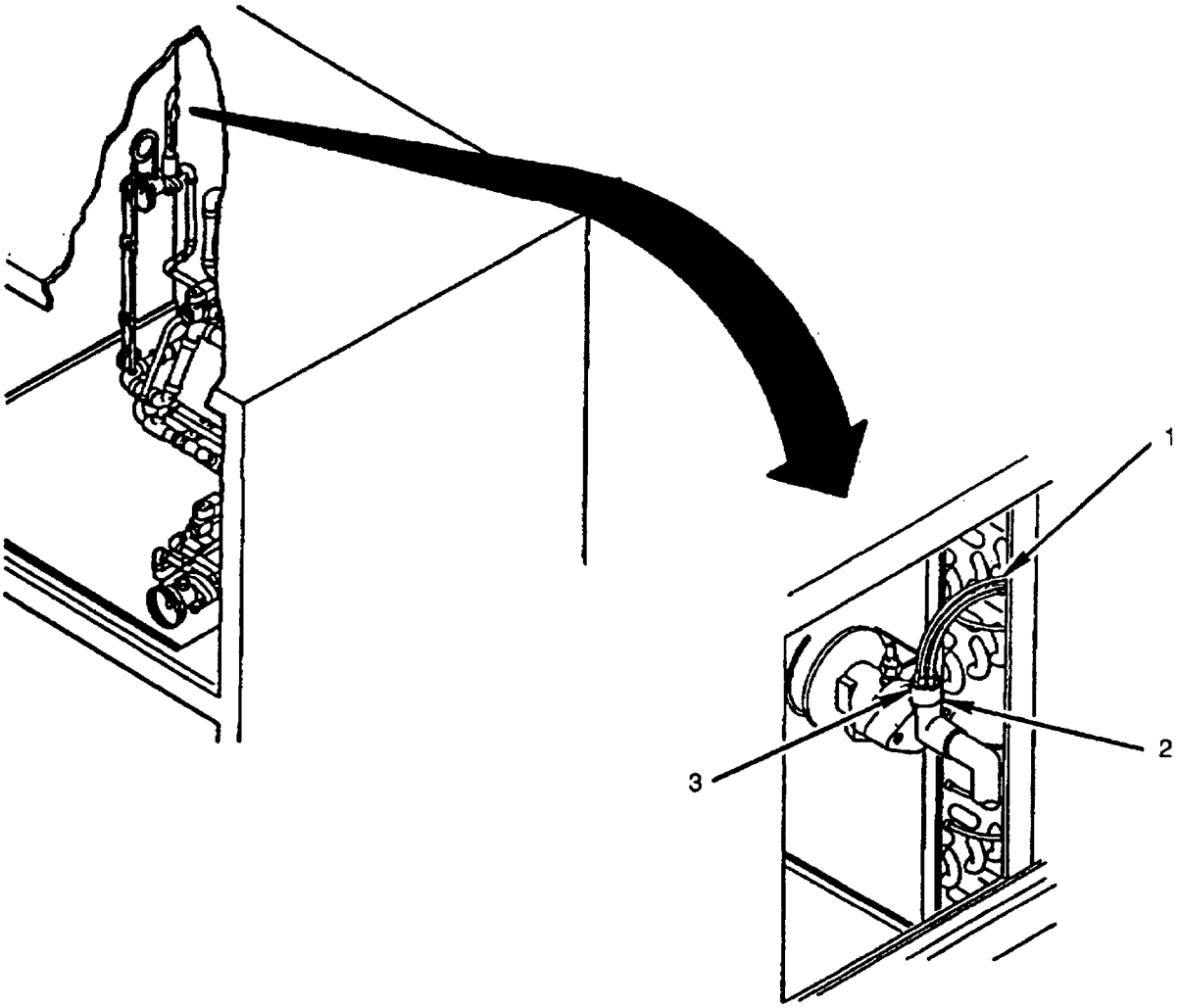


Figure 6-13. Distributor

6-19. PRESSURE REGULATOR VALVE.

This task covers:

Removal Inspection Repair/Replace
Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)

Personnel: 1

Equipment Conditions:
1. Pump down refrigerant system (para 5-21).
2. Remove rear evaporator panel (para 6-6).

REMOVAL

1. Remove two screws (1), locknuts (9), eight flat washers (2) and (10), and two clamps (3) from refrigerant lines (see Figure 6-14).
2. Loosen screw (6) and locknut (8) in circulating air out RFI filter compartment (para 4-41).
3. Remove sensing bulb (5) from clamp (7).
4. Pull two grommets (4) and (11), and sensing bulb (5) up to evaporator compartment.
5. Remove two bolts (12), nut (16), and four clamp halves (13).
6. Remove four bolts (17) and nuts (14).
7. Remove valve body (15).

INSTALLATION

1. Place valve body (15) in mounting position.
2. Install four bolts (17) and nuts (14).
3. Install clamp halves (13) with two bolts (12) and nuts (16).
4. Route sensing bulb to supply air out RFI filter compartment (para 4-41) and install two grommets (4) and (11).
5. Place sensing bulb (5) in clamp (7).
6. Tighten screw (6) and locknut (8).
7. Install two clamps (3) on refrigerant line with two screws (1), eight flatwashers (2) and (10), and two locknuts (9).

FOLLOW ON PROCEDURE

1. Install rear evaporator panel (para 6-6).
2. Perform start up after repairs (para 5-22).

6-19. PRESSURE REGULATOR VALVE - Continued.

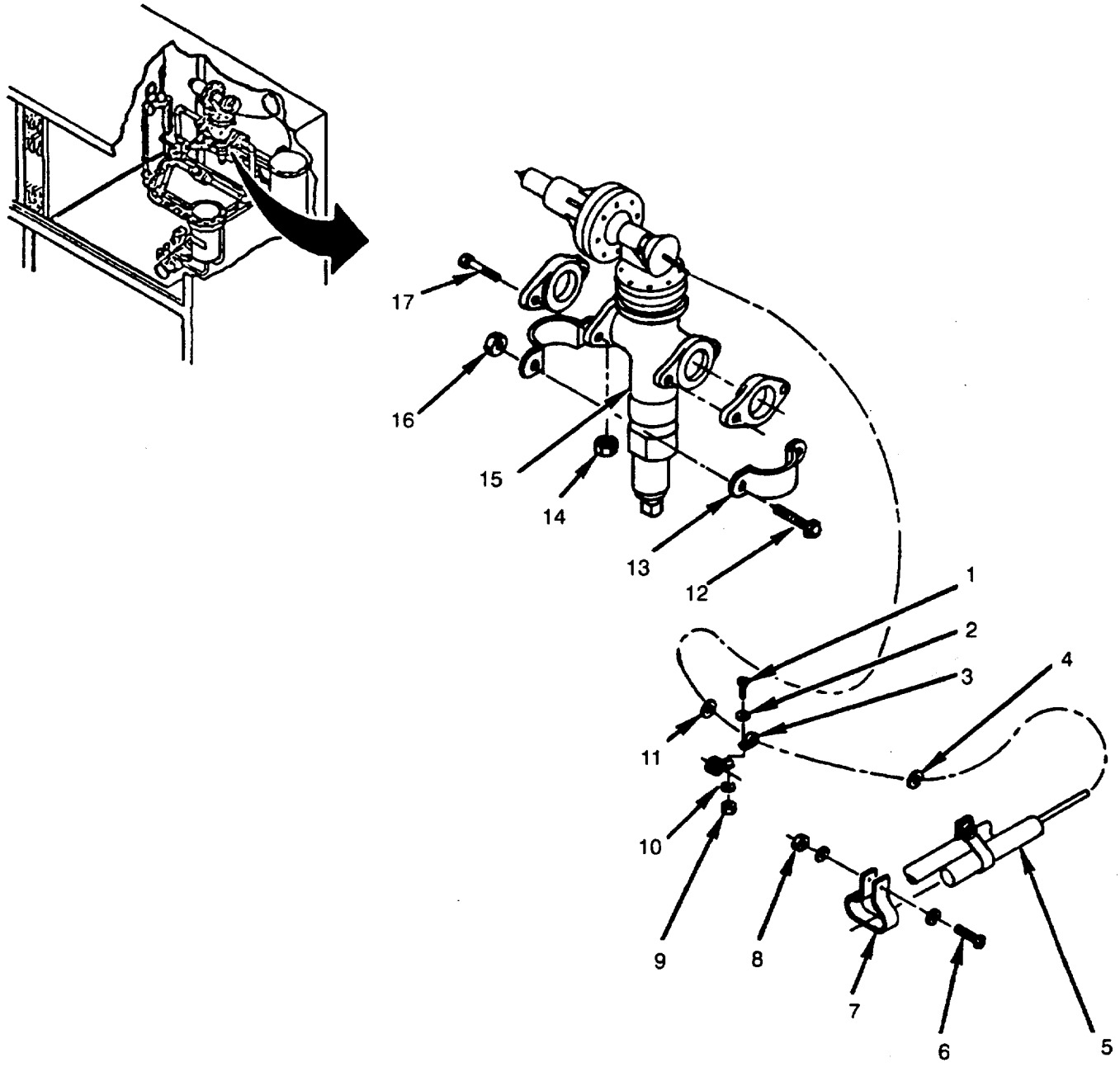


Figure 6-14. Pressure Regulator Valve

6-20. TUBING AND FITTINGS

This task covers: **Inspection** **Removal** **Installation**

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove covers and panels as necessary to have access to repair area.

NOTE

The refrigeration system contains a number of pieces of copper tubing in a variety of material grades, sizes, lengths, and shapes, and a number of elbows, tees, and adapters in several sizes.

INSPECTION

Check tubing and fittings for signs of leakage. Leak test if leak is suspected (para 5-15).

REMOVAL

1. Discharge refrigerant system (para 5-12).
2. Purge refrigerant system (para 5-13).
3. Debraze (para 5-14) the tube connections.
4. Remove part.

INSTALLATION

1. Place replacement part on tube end.
2. Purge refrigerant system (para 5-13).
3. Braze replacement part (para 5-14).
4. Replace drier filter cartridge (para 5-26).
5. Clean filter strainer (para 5-26).
6. Leak test (para 5-15) all newly connected joints and those in the repair area.

FOLLOW ON PROCEDURE

1. Evacuate refrigerant system (para 5-16).
2. Connect air conditioner input power at source.
3. Charge refrigerant system (para 5-17).
4. Install all covers and panels that were removed.

6-21. CONDENSOR COIL REMOVAL

This task covers: Repair Removal Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Materials:
Rags (Item 12, Appendix E)
Brazing alloy, silver, QQ-B-654, Grade III (Item 21, Appendix E)
Personnel: 1
Equipment Conditions:

WARNING

Disconnect input power to the air conditioner before performing any internal maintenance. Voltages used can KILL. Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front condenser panel (para 4-27).
3. Remove right front condenser panel (para 4-28).
4. Discharge system (para 5-12).
5. Remove rear condenser panel (para 6-10).
6. Remove high/low refrigerant switches from condenser coil (para 5-23 and 5-24).
7. Remove low oil switch from condenser coil (para 5-25).

REPAIR

General Support Maintenance repair of the condenser coil is limited to checking for leaks and brazing damaged tubing (para 5-15 and 5-14).

REMOVAL (See Figure 6-15)

1. Front of Coil.
   a. Remove seven screws (10), locknuts (3), and fourteen flat washers (4) and (9) securing upper bracket (8) to frame.
   b. Remove upper bracket (8).
   c. Remove eight screws (12), locknuts (16), and sixteen flat washers (13) and (15) securing lower bracket (14) to frame.
   d. Remove screw (20) and locknut (2),
   e. Move wiring harness and clamp (1) out of way.
   f. Remove four screws (22), locknuts (6), eight flat washers (5) and (21).
   g. Remove two rivets (19) and captive receptacle (18).

6-21. CONDENSER COIL REMOVAL - Continued.

2. Rear of coil.
   a. Remove two screws (39), locknuts (38), and four washers (24) and (28)securing thermostat bracket (37) to coil frame.
   b. Remove four screws (36), locknuts (28), and eight flat washers (29) and (35) securing refrigerant lines support bracket (34) to coil frame.
   c. Debraze headers (23) and (33) from coil (para 5-14).
   d. Cut condenser damper actuator line (30).
   e. Pull condenser damper actuator line (30) through coil and frame.

WARNING

When handling coil, wear gloves to avoid injury to personnel and to reduce fin damage on the coil.

   f. Remove four screws (27), locknuts (32), and eight flat washers (26) and (31).
   g. Remove condenser coil (7) through front of frame.

INSTALLATION

1. On replacement coil cut notch for damper actuator line.

WARNING

When handling coil, wear gloves to avoid injury to personnel and to reduce fin damage on the coil.

2. Place coil (7) in mounting position.

3. Front of Coil.

   a. Install upper bracket (8) to frame with seven screws (10), and fourteen flat washers (4) and (9), and four locknuts (3).
   b. Install lower bracket (14) to frame with eight screws (12), sixteen flat washers (13) and (15).
   c. Secure front of coil to frame with four screws (22), eight flat washers (5) and (21), and four locknuts (6).
   d. Install wiring harness clamp with screw (20) and locknut (2).
   e. Install captive receptacle (18) with two rivets (19).

4. Rear of Coil.

   a. Insert condenser damper actuator line (30) through coil (7) and frame.
   b. Place coupling on actuator line (30).
   c. Secure rear of coil to frame with four screws (27), eight flat washers (26) and (31), and four locknuts (32).
   d. Install thermostat bracket (37) to coil frame with two screws (39), four flat washers (24) and (38), and two locknuts (25).

e. Install line support bracket (34) to coil frame with four screws (36), eight flat washers (29) and (35), and four locknuts (28).

WARNING

To avoid injury to personnel and/or damage to equipment entire system must be purged with nitrogen before beginning any brazing operation.

f. Braze headers (23 and 33), and condenser damper actuator line (30) (para 5-14).
g. Install high/low refrigerant switches to condenser coil (para 5-23 and 5-24).
h. Install low oil pressure switch to condenser coil (para 5-25).
i. Leak test all newly connected and surrounding area joints (para 5-15).
j. Evacuate and charge the refrigerant system (para 5-16 and 5-17).

FOLLOW ON PROCEDURE

1. Install all condenser panels (para 4-27, 4-28, and 6-10).
2. Connect air conditioner input power at source.

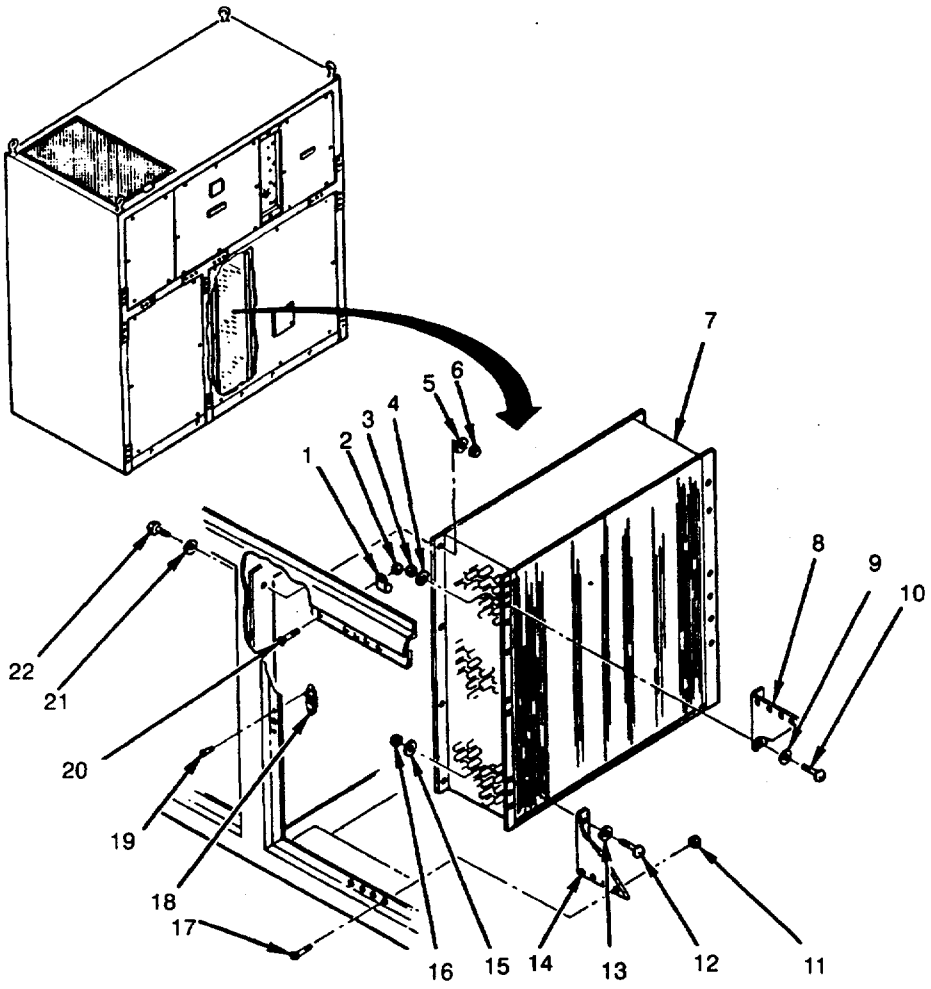


Figure 6-15. Condenser Coil Removal (Sheet 1 of 2)

6-21. EVAPORATOR COIL REMOVAL - Continued.

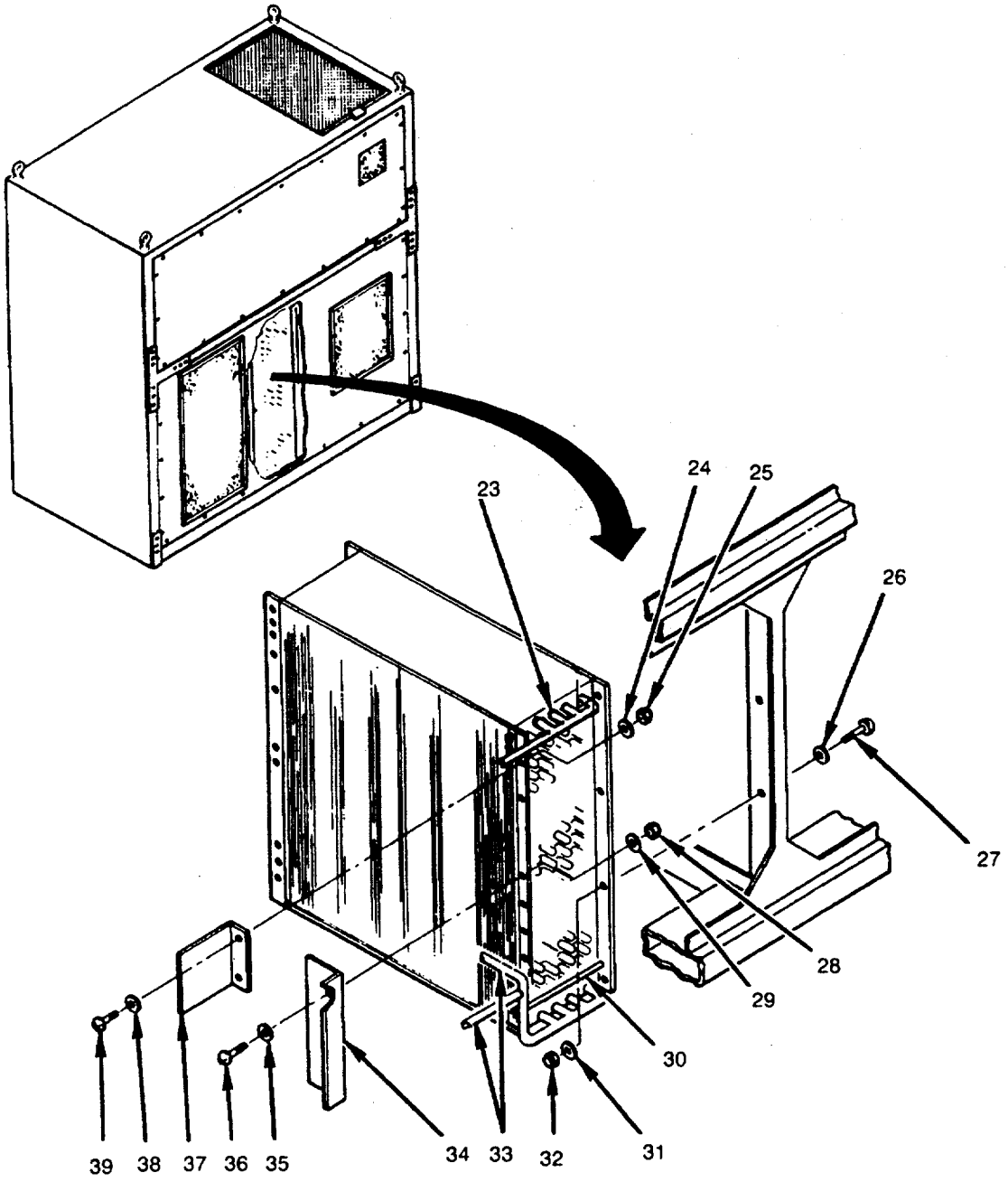


Figure 6-15. Condensor Coil Removal (Sheet 2 of 2)

6-22. EVAPORATOR COIL REMOVAL

This task covers: Repair Removal Installation

INITIAL SETUP:

Tools:
Tool kit, service, refrigeration unit (Item 1, Appendix B)
Gloves, chemical (Appendix C)
Personnel: 2
Material:
Rags (Item 12, Appendix E)
Equipment Conditions:

WARNING

Disconnect Input power to the air conditioner before performing any internal maintenance. Voltages used can KILL Shutting the unit off at the control panel does not disconnect unit power.

1. Disconnect air conditioner input power at source.
2. Remove left front evaporator panel (para 4-23).
3. Remove right front evaporator panel (para 4-25)
4. Remove rear evaporator panel (para 6-6).
5. Discharge system (para 5-12).
6. Remove evaporator motor (para 4-70).
7. Remove evaporator circulator fan (para 4-71).
8. Remove plastic heater protector (para 4-80).
9. Remove solenoid (12) coil, power head and nut securing solenoid to bracket (para 5-35).
10. Remove solenoid coil (L1) from solenoid value and set aside (para 4-88).
11. Remove power head, cage assembly, and sensing bulb from primary expansion valve (para 5-38).

REPAIR

General Support Maintenance repair of the evaporator coil is limited to checking for leaks and brazing damaged tubing (para 5-15 and 5-14).

REMOVAL (See Figure 6-16)

NOTE

- Two persons are required for removing control box
- Access is needed to rear of air conditioner.

1. Remove screw (24), locknut (18), and two flat washers (20) securing control box wiring harness clamp (1) (see Figure FO-5).
2. Remove four screws (23), lockwasher (22), flat washers (21), and bracket (19).
3. Remove control box (para 4-63) from side of coil and set on top of frame.
4. Remove four bolts (6), locknuts (4), eight flat washers (3) and (5) from shock mounts.
5. Remove evaporator motor and fan mounting bracket.
6. Remove four screws (29), lockwashers (28), flat washers (40) mounting heater assembly (27) to unit frame (32).
7. Remove four rivnuts (26) from unit frame (32) and coil frame (25).

6-22. EVAPORATOR COIL REMOVAL - Continued.

REMOVAL - Continued.

8. Remove four screws (30), locknuts (34), and twelve flat washers (31) and (33) securing evaporator coil to frame (32).
9. Remove two screws (44), four locknuts (41), six flat washers (42), and two damps (43) from evaporator coil frame.
10. Remove receptacles if necessary.

WARNING

When handling coil, wear gloves to avoid injury to personnel and to reduce fin damage on the coil.

11. Protect fins of coil with metal plate.

WARNING

To avoid Injury to personnel or damage to equipment, entire system must be purged with nitrogen before beginning any debrazing operation.

12. Debraze tubing and couplings six places (2), (13), (14), (15), (16), and (17) (para 5-14).
13. Debraze evaporator header (2).
14. Remove six screws (9), locknuts (7), and flat washers (8) mounting T-support to frame.
15. Remove receiver damp (10).
16. Remove sensing bulb line clamp (11).
17. Move plumbing assembly (12) to the right side of evaporator compartments.
18. Raise evaporator coil (25) and swing out and away from heating element compartment.
19. Remove evaporator coil (25).
20. Debraze distributor from primary expansion valve and coil (para 6-18).
21. Remove two bolts (38), locknuts (35), and four flat washers (36) and (37).
22. Remove expansion bracket (39).

INSTALLATION

WARNING

When handling coil, wear gloves to avoid injury to personnel and to reduce fin damage on the coil.

1. Braze distributor to expansion valve and coil (para 6-18).
2. Place expansion valve and bracket (39) in mounting position on coil (25).
3. Install two bolts (38), locknuts (35), and flat washers (36) and (37).
4. Protect fins of coil with metal plate.

6-22. EVAPORATOR COIL REMOVAL - Continued.

5. Position evaporator coil (25) into frame.
6. Cut two inch lengths of 1-1/8 OD tubing.
7. Place coupling on evaporator header joint (2).
8. Install evaporator coil (25) to frame with four screws (30), eight flat washers (31) and (33), and four locknuts (34).
9. Install two screws (44), six flat washers (42), two damps (43), and four locknuts (41).
10. Install four rivnuts (26) for mounting heater assembly to frame.
11. Place plumbing assembly (12) in position.
12. Install receiver clamp (10).
13. Install mounting T-support with six screws (9), flatwashers (8), and locknuts (7).
14. If receptacles were removed, install quarter turn receptacles with four rivets.
15. Install heater assembly (27) to frame with four screws (29), lockwashers (28), and flat washers (40).
16. Position evaporator motor and fan mounting bracket in mounting position.
17. Install four bolts (6), eight flat washers (3) and (5), and four locknuts (4).
18. Braze tubing and coupling (2), (13), (14), (15), (16), and (17) (para 5-14).
19. Install evaporator circulator fan (para 4-71).
20. Install evaporator motor (para 4-70).
21. Install control box to coil and fame (para 4-63).
22. Install control box wiring harness bracket (19) with four screws (24), lock washers (22), and flat washers (21).
23. Install wiring harness damp (1).

FOLLOW ON PROCEDURE

1. Install cage assembly, power head, and sensing bulb to primary expansion valve (para 5-38).
2. Install solenoid coil (L1) to solenoid valve (para 4-88).
3. Install power head, solenoid (L2) coil, and nut securing solenoid to bracket (para 5-35).
4. Install high voltage plastic heater protector (para 4-80).
5. Leak test all newly connected joints and those in the repair area (para 5-15).
6. Evacuate and charge the refrigeration system (para 5-16 and 5-17).
7. Install rear evaporator panel (para 6-6).
8. Install right front evaporator panel (para 4-25).
9. Install left front evaporator panel (para 4-23).

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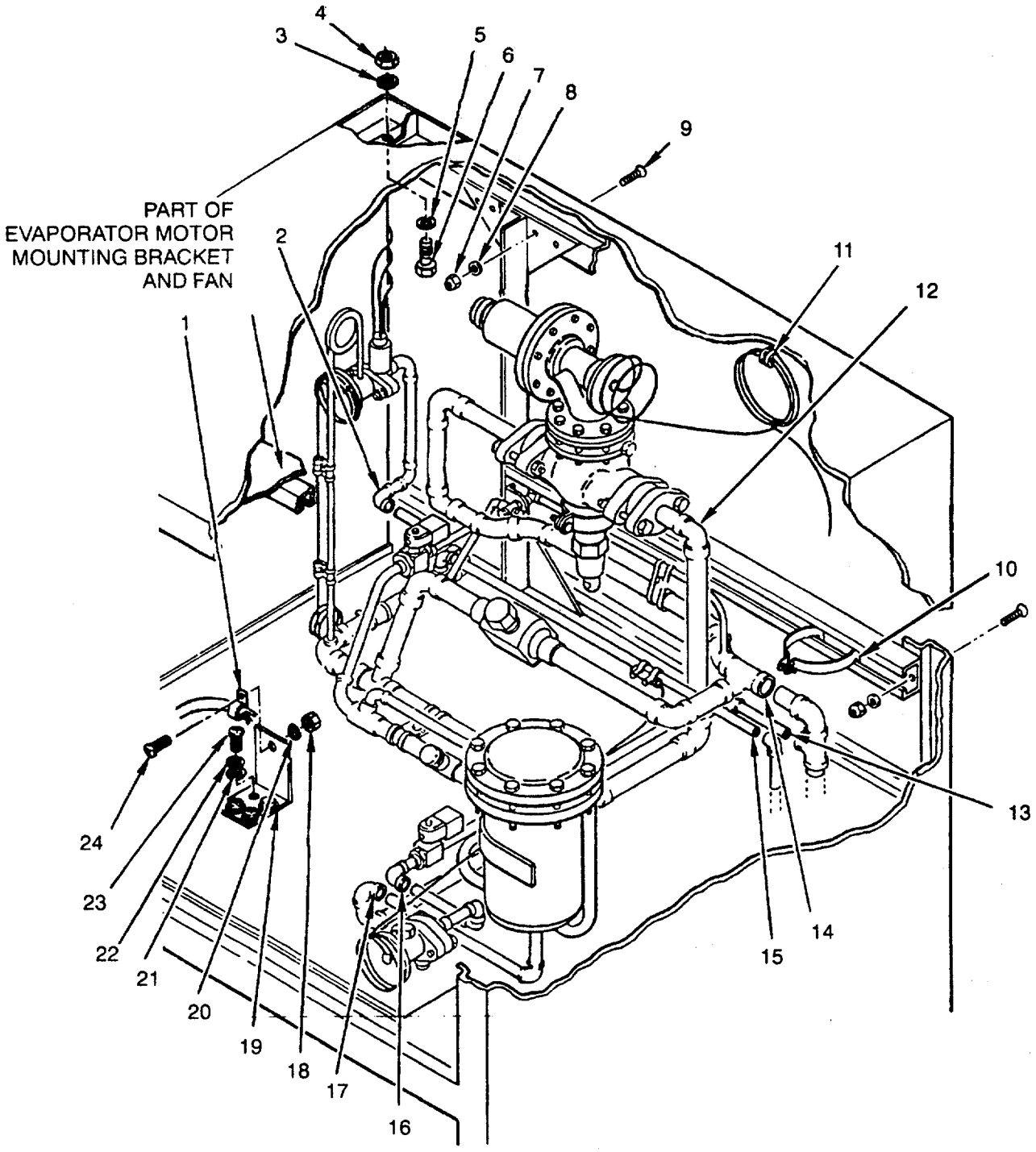

Figure 6-16. Evaporator Coil Removal (Sheet 1 of 2)

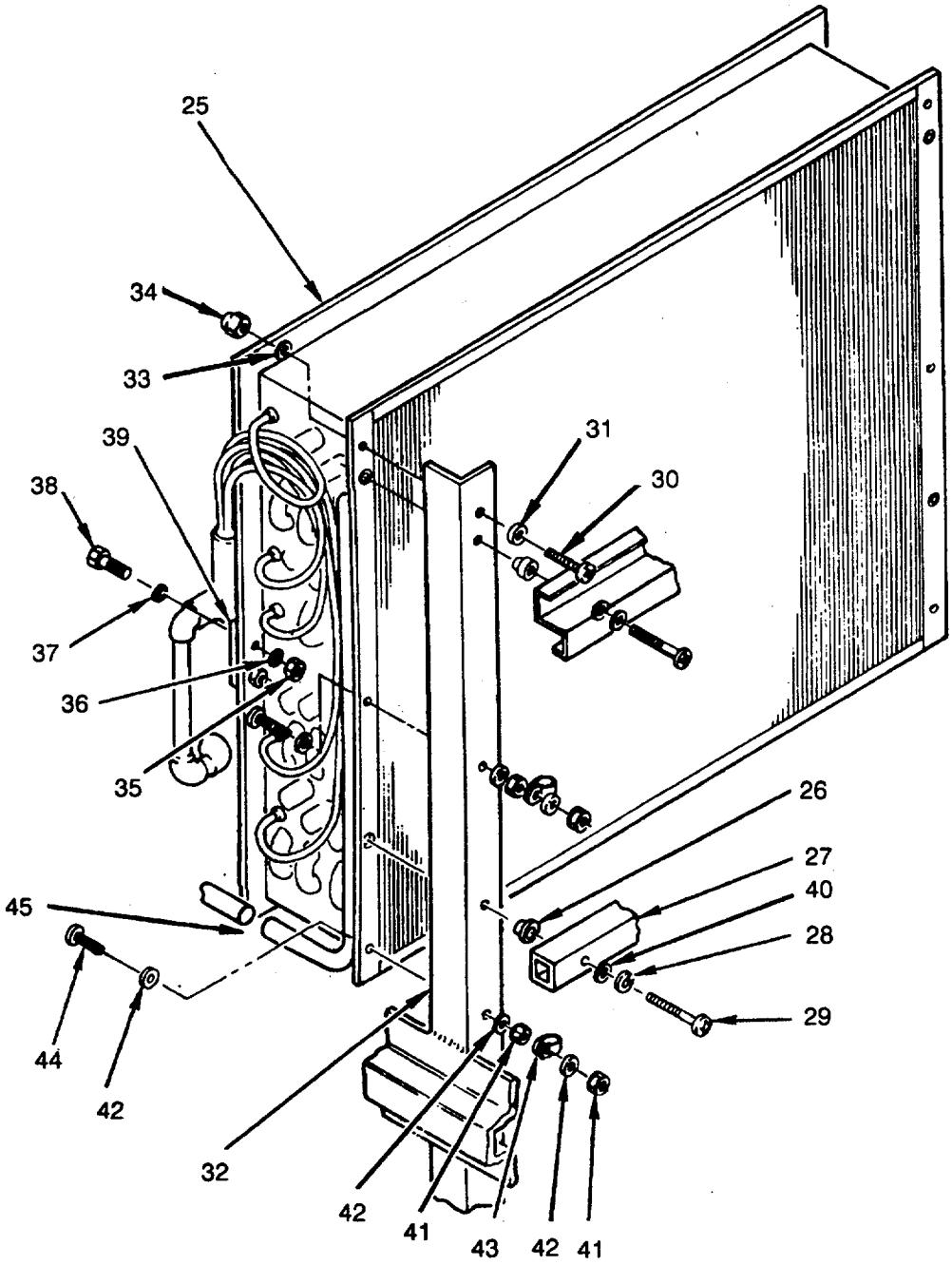

Figure 6-16. Evaporator Coil Removal (Sheet 2 of 2)

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 Publications On Blank Forms	DA-2028
Recommended Changes To Equipment Technical Publications	DA-2028-2
Quality Deficiency Report	SF-368
Packaging Improvement Report	DD-Form-6
Equipment Control Record	DA-2408-9
Report of Discrepancy	SF 364
Transportation Discrepancy Report	SF 361

A-3. DEPARTMENT OF THE ARMY PUBLICATION.

The Army Maintenance Management System (TAMMS)	DA PAM 738-750

A-4. TECHNICAL MANUALS.

Unit, Intermediate Direct Support and Intermediate General Support Maintenance Repair Parts and Special Tools List, Air Conditioner, 50,000 BTU	TM 9-4120-381 -24P
Destruction of Equipment to Prevent Enemy Use	TM 750-244-3
Painting Instructions for Field Use	TM 43-0139
Leak Detector, Refrigerant Gas	TM 9-4840-435-14
Hand Portable Fire Extinguisher	TB 5-4200-200-10

A-5. MISCELLANEOUS PUBLICATIONS.

Varnish, Moisture and Fungus Resistant	MIL-V-173C
The Air Force Suggestion Program (PA)	AFR 900-4

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL.

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

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section II lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

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

B-2. MAINTENANCE FUNCTIONS. Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination (e.g. by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep 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 gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. 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 of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of equipment or a 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 third position code of the SMR code.

i. Repair. The application of maintenance services1 including fault location/troubleshooting2, removal/installation, and disassembly/assembly3 procedures, and maintenance actions4 to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) 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 higher assembly. End item group number shall be "00".

b. Column 2, Component/Assembly. Column 2 contains the item 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 Level. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s). The level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each. 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 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 designations for the various maintenance levels are as follows:

C ..... Operator or Crew
O ..... Unit Maintenance
F ..... Direct Support Maintenance
H ..... General Support Maintenance
D ..... Depot Maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetical order, which shall be keyed to the remarks contained in Section IV.

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1 Services - Inspect, test, service, adjust, align, calibrate, and/or replace.

2 Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

3 Disassembly/assembly - 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.

4 Actions - Welding, grinding, riveting, straightening, facing, remachining, and/or resurfacing.

B-4. EXPLANATION OF COLUMNS IN TOOLS 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 Level. 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.

REMARKS

Section II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
01	PANELS, BOXES AND INFORMA-TION PLATES								
	CENTER FRONT	INSPECT	0.1						A
	EVAP PANEL	REPAIR		0.5				1,6,7,8	B,C,D,E,F,G.
		REPLACE		0.5				1	
	LEFT FRONT	INSPECT	0.1						A
	EVAP	REPAIR		0.5				1,6,7,8,9	B,C,D,E,F,G,H.Q
	PANEL	REPLACE		0.5				1	
	FRESH AIR INLET	INSPECT		0.1					A
	FILTER BOX	REPAIR		0.5				1,6,7,8,9	B,H,Q
		REPLACE		0.5				1	
	RIGHT FRONT	INSPECT	0.1						A
	EVAP	REPAIR		0.5				1,6,7,8	B,C,D,E.F,G
	PANEL	REPLACE		0.5					
	INFORMATION	INSPECT		0.1					A
	PLATES	REPLACE		0.5				6,7.8	B
	LEFT FRONT	INSPECT	0.1						A
	COND	REPAIR		0.5				1,6,7,	B,C,D,E,F
	PANEL							8.9	G,H
		REPLACE		0.5				1	
	RIGHT FRONT	INSPECT	0.1						A
	COND	REPAIR		0.5				1,6,7,8	B,C,D,E.F,G.I
	PANEL	REPLACE		0.5					
	FRONT SERVICE	INSPECT	0.1						A
	VALVE	REPAIR		0.5				1,6,7,8	B,C.D,G,H,I
	PANEL	REPLACE		0.5				1,6,7,8	
	LEFT ELECTRIC	INSPECT		0.1					A
	PLATE	REPAIR		0.5				1	C,L
		REPLACE		0.5				1	
	RIGHT ELECTRIC	INSPECT		0.1					A
	PLATE	REPAIR		0.5				1	C,E
		REPLACE		0.5				1	

Section II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
	REAR	INSPECT		0.1		0.1		A	
	EVAPORATOR	REPAIR				1.0		1,6,7,	B,D,E,F.G.Q
	PANEL							8,9	
		REPLACE				0.5		1	
	THERMOSTAT	INSPECT				0.1			A
	BOX & COVER	REPAIR				0.5		1,9	J,K,L,O,BN
		REPLACE				0.5		1	
	CONTROL WIRE J	INSPECT		0.1					A
	BOX	REPAIR		0.5				1,6,7,	J,L,M,O,
								8,9	BN,BX
		REPLACE		0.5				1	
	FRESH AIR	INSPECT				0.1			A
	INLET BOX	REPAIR				1.0		1,6,7,9	Q,BZ
		REPLACE				1.0		1	
	FRESH AIR	INSPECT		0.1					A
	CONNECTING	ADJUST		0.5				1	O
	LINK	REPAIR		1.0				1	N
	ASSEMBLY	REPLACE		0.5				1	P
	FRESH AIR	INSPECT				0.1		A	
	DAMPER	REPAIR				0.5		1,6,7,9	0
	OPERATOR	REPLACE				1.0		1	
	BRACKET								
	THERMOSTAT	INSPECT		0.1					A
	BRACKET	REPAIR		0.5				1,6,.7,9	Q
		REPLACE		0.5				1	
	REAR	INSPECT				0.1		A	
	CONDENSER	REPAIR				1.0		1,6,7,	B,E,G,Q
	PANEL	8,9							
		REPLACE				1.0		1	
02	FILTERS								
	RETURN AIR	INSPECT	0.1						A
	FILTER	SERVICE	0.5					1,13	T
		REPLACE	0.5					1	
	CIRCULATING	INSPECT	0.1						A
	AIR IN RFI	SERVICE		0.5				1,13	T
	FILTER	REPLACE		0.5				1	S
	FRESH AIR	INSPECT		0.1					A
	FILTER	SERVICE		0.5				1	T
		REPAIR		1.0				1	C
		REPLACE		0.5				1	
	FRESH AIR RFI	INSPECT		0.1					A
	FILTER	SERVICE		0.5				1,13	T
		REPLACE				1.0		1	S
	CONDENSER	INSPECT		0.1					A
	AIR OUT RFI	SERVICE		0.5				1,13	T
	FILTER	REPLACE				1.0		1	S

Section II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
	CONDENSER	INSPECT		0.1					A
	AIR IN RFI	SERVICE		0.5				1,13	T
	FILTER	REPLACE				0.1		1	S
	CIRCULATING	INSPECT		0.1					A
	AIR OUT RFI	SERVICE		0.5				1,13	T
	FILTER	REPLACE		0.5				1	
03	ELECTRICAL								
	RFI FILTER	INSPECT		0.5					A
		TEST		1.0				1	AF,AM
		REPAIR		0.5				1	E
		REPLACE				2.0		1	
	FUSES	INSPECT		0.5					A
		TEST		1.0				1	AM
		REPLACE		0.5				1	BL
	FUSE HOLDER (RFI BOX)	REPLACE				2.0		1	BL
	VARISTORS	INSPECT		0.5					A
		TEST		1.0				1	AM
		REPLACE				2.0		1	AB
	CONTROL BOX AND COMPONENTS								
	RECTIFIER	INSPECT		0.1					A
		TEST		1.0				1	AM
		REPLACE		0.5				1	U
	SUPPRESSION	INSPECT		0.1					A
	DIODES	TEST		1.0				1	AM
	1N4005	REPLACE		0.5				1,2,16	V
	INDICATOR	INSPECT	0.1	A					
	LIGHTS	REPLACE		1.0				1,10	
	CONTROL	INSPECT		0.1					A
	RELAYS	TEST		1.0				1	AM
		REPLACE		1.0				1	U
	RELAY	INSPECT		0.1					A
	SOCKETS	TEST		1.0				1	AM
		REPLACE		1.0				1	U
	FAN	INSPECT		0.1					A
	CONTACTORS	TEST		1.0				1	AM
		REPAIR		1.0				1	W
		REPLACE		1.0				1	U
	COMPRESSOR	INSPECT		0.1					A
	CONTACTOR	TEST		1.0				1	AM
		REPLACE		1.0				1	U
	HEATER	INSPECT		0.1					A
	CONTACTOR	TEST		1.0				1	AF
		REPLACE		1.0				1	U

Section II MAINTENANCE ALLOCATION CHART-Continued

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
	TIME DELAY	INSPECT		0.1					A
	RELAYS	TEST		1.0				1	AM
		REPLACE		0.5				1	U
	RESISTORS	INSPECT		0.1					A
		TEST		0.5				1	AM
		REPLACE		1.0				1,5	BQ,BT
	MODE SELECT	INSPECT		0.1					A
	SWITCH	TEST		1.0				1	AM
		REPLACE		2.0				1,2,11,16	
	KNOB	INSPECT		0.1					A
		REPLACE		0.2				11	X
	SERVICE LIGHT	INSPECT		0.1					A
	SWITCH	TEST		1.0				1	AM
		REPLACE		1.0				1	
	FAULT RESET	INSPECT		0.1					A
	SWITCH	TEST		1.0				1	AM
		REPAIR		0.5				1	Y
		REPLACE		1.0				1,2,16	
	TRANSFORMER	INSPECT		0.1					A
		TEST		1.0				1	AF
		REPLACE		1.0				1	U.Z
	TERMINAL	INSPECT		0.1					A
	BOARDS	REPLACE		1.0				1	
	CIRCUIT	INSPECT		0.1					A
	BREAKERS	TEST		1.0				1	AM
		REPLACE		1.0				1	
	CONTROL BOX	INSPECT		0.1					A
		REPAIR		0.5				1,6,7,8	B,H,I,J,R
		REPLACE		0.5				1	
	TERMINAL	INSPECT		0.1					A
	BOARD	REPLACE		1.0				1	
	SERVICE LIGHT	INSPECT		0.1					A
		TEST		1.0				1	AF
		REPAIR		1.0				1	AA
		REPLACE		1.0				1	AA
	FRESH AIR	INSPECT		0.1					A
	DAMPER	TEST		0.5				1	AM
	SOLENOID	REPLACE		1.0				1	U
	WIRE	INSPECT		0.1					A
	HARNESS	TEST		1.0				1	AM
		REPAIR		1.0				1,2,5,10,16	AB

Section II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
04	EVAPORATOR (CIRCULATOR) MOTOR & HOUSING ASSEMBLY								
	FAN BELT	INSPECT		0.1					AJ
		ADJUST		0.5				1	AK
		REPLACE		1.0				1	
	EVAPORATOR	INSPECT		0.1					A
	MOTOR (B1)	SERVICE		0.5				15	AC
		TEST		1.0				1	AM
		REPAIR			1.0			1	AD
		REPLACE		1.0				1,10	AE
	CIRCULATOR	INSPECT		0.1					A
	FAN	SERVICE		0.5				1	AH
	(EVAPORATOR)	REPAIR		1.0				1	AG
		REPLACE		2.0				1	
	PULLEYS (60HZ)	INSPECT		0.1					A
	CIRC	ADJUST		0.5				1	AI
	FAN, CIRC MTR	REPLACE		1.0				1	
	PULLEYS (50HZ)	INSPECT		0.1					A
	CIRC MTR, CIRC	ADJUST		0.5				1	AI
	FAN	REPLACE		1.0				1	
05	CONDENSER MOTOR & HOUSING ASSEMBLY								
	FAN BELT	INSPECT		0.1					AJ
		ADJUST		0.5				1	AK
		REPLACE		1.0				1	
	CONDENSER	INSPECT		0.1					A
	MOTOR (B3)	SERVICE		0.5				15	AC
		TEST		1.0				1	AM
		REPAIR			1.0			1	AD
		REPLACE		1.0				1,10	AE
	CIRCULATOR	INSPECT		0.1					A
	FAN	SERVICE		0.5				1	AH
	(CONDENSER)	REPAIR		1.0				1	AG
		REPLACE		1.0				1	
	PULLEYS (60HZ)	INSPECT		0.1					A
	COND	ADJUST		0.5				1	AI
	MTR, COND FAN	REPLACE		1.0				1	
	PULLEYS (50HZ)	INSPECT		0.1					A
	COND	ADJUST		0.5				1	AI
	MTR, COND FAN	REPLACE		1.0					

Section II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
06	HEATERS, SENSORS								
	ELECTRIC	INSPECT		0.1					A
	HEATERS	TEST		1.0				1	AM
		REPLACE		1.0				1	AL
	COMPRESSOR	INSPECT		0.1					A
	CRANKCASE	TEST		1.0				1	BY
	HEATER	REPLACE		1.0				1	AN
	DIRTY FILTER	INSPECT		0.5					A
	SWITCH	ADJUST		1.0				1,3	AV
		TEST		1.0				1	AM
		REPLACE		1.0				1,8	U
	HIGH TEMP	INSPECT		0.1					A
	SWITCH	TEST		1.0				1	AM
		REPLACE		1.0				1,2	
	AIR FLOW	INSPECT		0.1					A
	SWITCH	TEST		1.0				1	AM
		REPLACE		1.0				1	U
	HEAT	INSPECT		0.1					A
	CONTROL	ADJUST		0.5				1	AS
	THERMOSTAT	TEST		1.0				1	AM
		REPLACE		1.0				1	U,J
	LOW AMBIENT	INSPECT		0.1					A
	TEMP	ADJUST		0.5				1	AU
	THERMOSTAT	TEST		1.0				1	AM
		REPLACE		1.0				1	U
	COOL	INSPECT		0.1					A
	CONTROL	ADJUST		1.0				1	AT
	THERMOSTAT	TEST		1.0				1	AM
		REPLACE		1.0				1	J,U
	HIGH REFRIG	INSPECT		0.1					A
	PRESSURE	ADJUST			1.0			1	AP
	SWITCH	TEST			1.0			1	AM
		REPLACE			1.0			1,6,7	U,AR
	LOW REFRIG	INSPECT		0.1					A
	PRESSURE	ADJUST			1.0			1	AQ
	SWITCH	TEST			1.0			1	AM
		REPLACE			1.0			1,6,7	U,AR
	LOW OIL	INSPECT		0.1					A
	PRESSURE	ADJUST			0.5			1	AO
	SWITCH	TEST			1.0			1	AM
		REPLACE			1.0				

Section II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4)					(5)	(6)
			MAINTENANCE LEVEL						
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
07	PIPING AND VALVES, REFRIGERANT								
	DRIER FILTER	INSPECT			0.1				A
	SERVICE				2.0			1	AW,BG
		REPAIR			2.0				BD
		REPLACE			2.0			1	AX,AW
	REFRIGERANT	INSPECT			0.1				A
	STRAINER	SERVICE			2.0			1	BG
		REPAIR			1.0			1	AW,BI,BJ
		REPLACE			5.0			1	
	SIGHT	INSPECT		0.1					A
	REFRIGERANT	REPAIR			0.5			1	BF
	GLASS	REPLACE			5.0			1	BE
	SERVICE VALVES	INSPECT			0.1				A
		REPLACE			5.0			1	
	SOLENOID VALVES								
	VALVES	INSPECT			0.1				A
		REPLACE			5.0			1	
	COILS	INSPECT		0.1					A
		TEST		1.0	1				AM
		REPLACE		1.0	1,10				U,BA,BV, BW
	THERMOSTATIC	INSPECT			0.1				A
	EXPANSION	ADJUST			0.5			1,17,18	AY
	VALVE	REPAIR			2.0			1	AZ
	(LIQUID QUENCH)	REPLACE			2.0			1	AL
	HOT GAS	INSPECT			0.1				A
	BYPASS VALVE	ADJUST			0.5			1	BB
		REPAIR			2.0			1	AZ
		REPLACE			2.0				AL
	THERMOSTATIC	INSPECT			0.1				A
	EXPANSION	ADJUST			0.5			1.17,18	AY
	VALVE	REPAIR			2.0			1	AZ
	(PRIMARY)	REPLACE			5.0			1	AL
	MANUAL VALVE	INSPECT			0.1				A
		REPLACE			2.0			1	
	VIBRATION	INSPECT			0.1				A
	ELIMINATOR	REPLACE			5.0			1	BE
	CONDENSER	INSPECT			0.1				A
	FAN DAMPER	TEST			1.0			1	BR
	ACTUATOR	REPLACE			2.0			1	
	CONDENSER	INSPECT		0.1					A
	FAN	ADJUST		1.0	1				O
	CONNECTING	REPLACE		1.0	1				P
	LINK ASSY								

Section II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
	RECEIVER	INSPECT			0.1				A,CD
		REPLACE			2.0			1	BH
	DISTRIBUTOR	INSPECT			0.1				A
		REPLACE				5.0		1	
	PRESSURE	INSPECT			0.1				A
	REGULATOR	ADJUST			1.0			1,17,18	BC
	VALVE	REPAIR			2.0			1	BD
		REPLACE				5.0		1	AL
	TUBING AND	INSPECT			0.1				A
	FITTINGS	REPLACE			5.0			1	BO
08	COMPRESSOR ASSEMBLY (B2)								
		SERVICE			1.0			1	CE,CF
		TEST			5.0			1	
		REPAIR			5.0			1,19,20,	BD
21									
		REPLACE			5.0			1,4,14	BE
	VALVE PLATE	INSPECT			0.5			1	A
	ASSEMBLY	REPAIR			2.0				BD
		REPLACE			2.0			1,20	BE
	PUMP END	INSPECT			0.5			1	A
	BEARING HEAD	REPAIR			2.0				BD
	ASSEMBLY	REPLACE			2.0			1,19,21	BE
	CRANKSHAFT,	INSPECT			0.5			1	A
	PISTONS AND	REPAIR			2.0				BD
	RODS	REPLACE			2.0			1,19	BE
	ELECTRICAL	INSPECT			0.5			1	A
	BOX	REPAIR			2.0				BD
	ASSEMBLY	REPLACE			2.0			1	BE
	TERMINAL	INSPECT			0.1			1	A
	PLATE	TEST			0.5			1	AM
		REPLACE			2.0			1	
	CURRENT	INSPECT			0.1			1	A
	OVERLOADS	TEST			0.5				AM
		REPLACE			2.0				
09	COILS								
	CONDENSER	INSPECT		0.5					A
	COIL	SERVICE		1.0				12,13	BU
		REPAIR			2.0			1	BS
		REPLACE				5.0		1	
	EVAPORATOR	INSPECT		0.5					A
	COIL	SERVICE		1.0				12,13	BU
		REPAIR			2.0			1	BS
		REPLACE				5.0		1	

Section II MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4)					(5)	(6)
			MAINTENANCE LEVEL						
			UNIT		DS	GS	DEPOT		
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	TOOLS AND EQUIPMENT	REMARKS
10	CHASSIS								
	CHASSIS	INSPECT			0.5				A
	REPAIR PARTS	REPAIR			1.0			1.6,7, 8,9	B,D,G,H,J,K L,M,BM ,BN,BO,BP
	DRAIN AREAS	INSPECT		0.5				1	CB
		SERVICE		1.0				1	CC

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
MAINTENENCE ALLOCATION CHART

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
1	O-F-H	TOOL KIT, SERVICE, REFRIGERATION UNIT	5180-00-596-1474	
2	O-F-H	HEAT GUN	4940-01-042-4855	
3	O	MANOMETER	6685-00-273-7007	
4	F-H	BAR,WRECKING	5120-00-242-0762	
5	O-F-H	CRIMPING TOOL	5120-00-278-2423	47100 (00779)
6	O-F-H	DRILL, ELECTRIC, PORTABLE	5130-00-935-7354	
7	O-F-H	DRILL SET, TWIST	5130-00-293-0983	
8	O-F-H	RIVETER, BLIND	5120-00-017-2849	98 (61957)
9	O-F-H	TOOL KIT, RIVET NUT		(11530)
		CONSISTING OF:		
		INSTALLATION TOOL	5120-01-245-7549	TA7533 (08524)
		NOSE PIECE	5120-00-126-2008	HN7513-6 (08524)
		DIE, BLIND BOLT	5120-00-126-1964	HN7513-8 (08524)
		STUD, NOSE UNIT	5120-00-133-3830	HN7513-10 (08524)
		NOSE UNIT	5120-01-084-4094	HN7513-12 (08524)
		PULLER ATTACHMENT	5120-00-104-2685	HP7523-6 (08524)
		PULLER ATTACHMENT	5120-00-104-2626	HP7523-8 (08524)
		PULLER ATTACHMENT	5120-00-104-2528	HP7523-10 (08524)
		PULLER	5120-01-084-4092	HP7523-12 (08524)
10	O-F-H	CRIMPING TOOL (PIGTAIL)		H18 (26132)
11	O-F-H	SCREW DRIVER, FLAT TIP, 1/8" WD	5120-00-542-2281	
12	O-F-H	FIN COMB		P12 (17529)
13	O-F-H	VACUUM CLEANER	7910-01-178-7953	S1015030W (29335)
14	F-H	KIT, COMPRESSOR REMOVAL		43N3-102-2 (98437)
15	O-F-H	LUBRICATING GUN	4930-01-114-2121	

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
MAINTENANCE ALLOCATION CHART

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
16	O-F-H	SOLDERING IRON	3439-00-930-1638	450K4 (11103)
17	H	THERMOMETER, DIGITAL		52 (53431)
18	H	THERMOCOUPLE		80PK-1 (53431)
19	H	WRENCH, TORQUE, 1/4" 30-200 INCH LBS	5120-00-177-7065	
20	H	WRENCH, TORQUE, 1/2" 10-150 FT LBS	5120-00-902-3549	
21	H	WRENCH SET, SOCKET	5120-01-187-8434	11OTMA (55719)
22	F	FILE, HAND	5110-01-257-8922	12MA (55719)
23	F	CALIPER SET, MICROMETER	5210-00-117-0468	CM6171 (55719)
24	F	GAUGE SET, TELESCOPIC	5210-00-570-6894	5229G (57163)
25	F	REGULATOR ASSY (NITROGEN)	6680-00-503-1327	
26	F-H	RECOVERY AND RECYCLING UNIT, REFRIGERANT	4130-01-338-2707	175008 (07295)

Section IV. REMARKS

MAINTENANCE ALLOCATION CHART

REF CODE	REMARKS
A	VISUAL INSPECTION
B	REPLACE RIVETS
C	REPLACE CAPTIVE FASTENER, EJECTOR SPRING, THERMOPLASTIC WEAR WASHER AND SPLIT RING RETAINER
D	REPLACE INSULATION MATERIAL
E	REPLACE RFI GASKET
F	REPLACE INSULATION RETAINER AND/OR WASHER
G	USE ADHESIVE COMPOUND
H	REPLACE RECEPTACLE REPLACE STAINLESS STEEL HINGE
J	REPLACE INSULATOR BUSHING
K	REPLACE GROMMET
L	REPLACE GASKET
M	REPLACE CONDUIT FITTING
N	REPLACE COUNTER WEIGHT, REMOTE CONTROL LEVER
O	ADJUST LINKAGE FOR FRESH AIR DAMPER OPERATION AND/OR CONDENSER FAN DAMPER OPERATION
P	CUT REPLACEMENT CONNECTING LINK ASSEMBLY TO 4 1/2 INCHES LONG FOR FRESH AIR DAMPER OPERATION. CUT REPLACEMENT CONNECTING LINK ASSEMBLY TO 13 INCHES FOR CONDENSER FAN ACTUATOR OPERATION
Q	REPLACE RIVET NUT
R	REPLACE LOCKING RING
S	WHEN REPLACING FILTER, INSTALL FRESH RFI GASKET MATERIAL. USE CLEAR SEALANT ADHESIVE.
T	CLEAN FILTERS. MILD DETERGENT AND WATER AND/OR VACUUM
U	FUNGUS PROOF REPLACEMENT ITEM PER MIL-V-173
V	ASSEMBLE REPLACEMENT DIODE WITH WIRE TERMINALS AND SHRINK TUBING.
.	COLOR BAND DENOTES CATHODE END
W	REPLACE CONTACTOR HEATER ELEMENTS
X	REPLACE KNOB
Y	REPLACE SPLASH PROOF SEAL
Z	ON REPLACEMENT ITEM, CUT AND STRIP ALL WIRES TO 6 1/2 INCHES LONG. DEAD END RED AND ORANGE WIRES TOGETHER
AA	REPLACE LAMP, LAMP HOLDER, LIGHT GUARD, AND/OR INSULATOR BUSHING
AB	REPLACE WIRES, TERMINAL LUGS, CLAMPS AND/OR TIE WRAPS
AC	LUBRICATE MOTOR

Section IV. REMARKS

MAINTENANCE ALLOCATION CHART - Continued

REF CODE	REMARKS
AD	REPLACE BEARINGS
AE	WHEN REPLACING MOTOR, STRIP AND DEAD END WIRES TOGETHER FOR 208VAC, 3 PHASE OPERATIONINSTALL INSULATOR BUSHINGS TO MOTOR JUNCTION BOX. INSTALL AND CRIMP PIG TAILS TO WIRES
AF	TEST FOR PRESENCE OF AC VOLTAGE
AG	REPLACE BEARINGS, SHAFT AND/OR BEARING COLLAR. REPLACEMENT SHAFT MUST BE CUT TO LENGTH.
AH	LUBRICATE IMPELLER SHAFT
AI	ADJUST PULLEY ON EVAPORATOR (CIRCULATOR) MOTOR AND/OR CONDENSER MOTOR FOR PROPER FAN ROTATION
AJ	INSPECT FOR LOOSE OR WORN FAN BELTS
AK	ADJUST FAN BELT TENSION FOR 1/2 INCH DEFLECTION
AL	SUBSTITUTE CAST IRON HARDWARE ON REPLACEMENT WITH STAINLESS STEEL. APPLY SEALANT COMPOUND^
AM	CONTINUITY CHECK
AN	WHEN REPLACING CRANKCASE HEATER, PERFORM THE FOLLOWING ALTERATIONS: CUT CONDUIT TO 10 1/2 INCHES CUT WIRES TO -18 INCHES STRIP WIRE ENDS TO 1/2 INCH MAXIMUM.
AO	ADJUST LOW OIL PRESSURE LIMIT SET POINT
AP	ADJUST HIGH REFRIGERANT PRESSURE LIMIT SET POINT
AQ	ADJUST LOW REFRIGERANT PRESSURE LIMIT SET POINT
AR	DRILL (3) 5/32 INCH HOLES THROUGH TERMINALS OF REPLACEMENT PART
AS	ADJUST THERMOSTAT TO NOMINAL 72 DEGREES F
AT	ADJUST AND LOCK MINIMUM/MAXIMUM TEMPERATURE RANGE SETTING TO NOMINAL 68 AND 95 DEGREES F
AU	ADJUST THERMOSTAT TO NOMINAL 0 DEGREES F
AV	ADJUST PRESSURE TO 0.4 INCHES WC
AW	REPLACE FILTER ELEMENT UPON COMPRESSOR BURN-OUT OR WHENEVER REFRIGERANT SYSTEM IS OPENED FOR PURGING OR EVACUATION
AX	USE 9/16 X 2 INCH BOLTS FOR EARLY MODEL FILTER DRIER COVER PLATE AND 1/2 X 1 3/4 INCH BOLTS FOR LATER MODEL
AY	RAISE/LOWER SUPERHEAT SETTING
AZ	REPLACE CAGE ASSEMBLY AND/OR POWER HEAD ASSEMBLY
BA	STRIP AND DEAD END WIRES WHEN INSTALLING REPLACEMENT ITEM
BB	ADJUST FOR VALVE RESPONSE RATE AND/OR SUCTION PRESSURE
BC	ADJUST FOR DISCHARGE AIR TEMPERATURE
BD	REPLACE SUBORDINATE HARDWARE

Section IV. REMARKS

MAINTENANCE ALLOCATION CHART - Continued

REF CODE	REMARKS
BE	REPLACE ENTIRE ASSEMBLY ON FAILURE
BF	TIGHTEN SIGHT GLASS IF LEAK IS DETECTED
BG	CLEAN FILTER SCREEN UPON COMPRESSOR BURN-OUT OR WHEN REFRIGERANT SYSTEM IS OPENED FOR PURGING OR EVACUATING
BH	CAP, CRIMP AND SOLDER INLET ON REPLACEMENT ITEM
BI	MINIMUM 17 INCH EXTENSION IS REQUIRED TO REMOVE STRAINER CAP
BJ	POSITION RAGS TO ABSORB EXCESS OIL DURING SERVICE AND/OR REMOVAL
BK	REPLACE VARISTOR
BL	REPLACE FUSE OR FUSE HOLDER
BM	USE SEALANT COMPOUND (LOCKTITE) FOR ALL BOLTS WITHOUT LOCKNUTS
BN	USE INDUSTRIAL SEAL (DUX SEAL) TO SEAL HOLES BETWEEN COMPARTMENTS AND/OR BOXES
BO	REPLACE TUBING AND/OR HOSE MATERIAL
BP	REPLACE FLEXIBLE CONDUIT
BQ	REPLACE RESISTOR
BR	APPLY GAS PRESSURE TO VERIFY ACTUATOR OPERATION
BS	BRAZE EXTERNAL TUBING
BT	ASSEMBLE REPLACEMENT RESISTORS WITH WIRE TERMINALS AND SHRINK TUBING
BU	STRAIGHTEN DAMAGED FINS WITH FIN COMB AND VACUUM
BV	REMOVE ONE KNOCKOUT ON REPLACEMENT ITEM
BW	INSTALL AND CRIMP PIG TAILS TO WIRES
BX	REPLACE CONDUIT FITTING
BY	MEASURE CURRENT
BZ	REPLACE PIVOT AND BLADE
CA	INSPECT OIL LEVEL
CB	INSPECT DRAIN PAN FOR CONDENSATION DRAINAGE. INSPECT FOR RUST AND CORROSION. APPLY CORROSION PREVENTATIVE AS REQUIRED
CC	CLEAN AND VACUUM DRAIN PAN AND/OR DRAIN HOLES
CD	REPLACE FUSIBLE PLUG
CE	REPLENISH REFRIGERANT OIL
CF	SUBSTITUTE OIL IN REPLACEMENT ITEM WITH 2% SYNTHETIC OIL AND 98% COMPRESSOR OIL

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. SCOPE. This appendix lists components of end item and basic issue items for the air conditioner to help you inventory the items for safe and efficient operation of the equipment.

C-2. GENERAL. The components of end item list and basic issue Items list 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, Basic Issue Items must be with the air conditioner during operation and whenever it is transferred between property accounts. The illustration will assist you with hard to identify items. This manual is your authority to request/requisition replacement Basic Issue Items, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS. The following provides an explanation of 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. This column 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 indicates the CAGEC (in parentheses) followed by the part number.

d. Column (4) Unit of Measure (U/M). Indicates the measure used in performing the actual 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) NATIONAL STOCK NUMBER	(2) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(3) U/M	(4) QTY AUTH
7240-00-943-7105	Pail, Utility (81348) L-P-65	ea	1
8415-00-266-8677	Gloves, Chemical (81348)	pr	1
4240-00-052-3776	Goggles, Industrial (58576)	ea.	1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. SCOPE. This appendix lists additional items you are authorized for the air conditioner.

D-2. GENERAL. This list identifies items that do not have to-accompany the air conditioner and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

D-3. EXPLANATION OF LISTINGS. National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorized the item(s) to you.

SECTION II. ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION CAGEC AND PART NUMBER USABLE ON CODE	(3) U/M	(4) QTY AUTH
4210-00-555-8837	FIRE EXTINGUISHER (06535) #FH900-2	ea	1

APPENDIX E

EXPENDABLE/DURABLE 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. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you be CTA 50-970, Expendable/Durable Items (Except Medical, Class V, repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

E-2. EXPLANATION OF COLUMNS IN SECTION II.

a. Column (1), Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material(e.g. "Use lubricating oil, Item, Appendix E.").

b. Column (2), Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Unit Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. Column (3), National Stock Number. This is the National Stock Number assigned to the item; use it to requisition or request 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 Commercial and Government Entity Code (CAGEC) in parentheses followed by the part number.

e. Column (5), Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two character alphabetical abbreviation (e. g. , ea, in pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE / DURABLE SUPPLIES AND MATERIAL LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION CAGEC AND PART NUMBER	(5) U/M
1	F	8040-00-225-4548	Adhesive #732 RTV (71984)	tube
2	F	8030-01-129-7171	Grease aeroshell 22 (54527)	tube
3	F	8040-00-841-9733	Adhesive #520 (03938)	tube
4	F	8030-01-135-0685	Sealing compound #241-31 (05972)	bottle
5	F	8030-01-262-9962	Corrosion preventative #244 (04963)	gl
6	F	8030-00-275-8114	Sealing compound #612 (04963)	rl
7	F		Sealant #116 (94836)	2gl
8	F		Paint FED STD 595A #26250 (08882)	gl
9	F	9150-01-064-2666	Lubricating oil #Zerol 150 (99252)	qt
10	F		Lubricating oil SS-291	qt
11	F	6850-00-837-9927	Monochlorodifluoromethane, technical: w/cylinder 22 lb (Refrigerant 22) BB-F-1421 type 22 (81348)	cl
12	O	7920-00-205-1711	Rags (81348)	pg
13	F		Methyl-ethyl ketone (MEK)	gl
14	F	6830-00-292-0732	Nitrogen, technical (81348)	cy
15	F		Sealant tape #5354 (04963)	oz
16	O	8810-00-799-9830	Varnish, moisture and fungus resistant MIL-V-173 (72688)	gl
17	F	8030-01-041-1596	Corrosion preventative MIL-C-85054 TYPE 1 (80244)	oz
18	F	3439-00-269-9610	Solder, lead-tin alloy (81348)	sl
19	F	3439-00-045-7940	Flux, solder, liquid rosin base, MIL-F-14256 (81348)	qt
20	F	7930-00-764-5066	Detergent Dishwashing P-D-410 TY2 (80244)	oz
21	F	3439-00-853-9276	Brazing alloy, silver, QQ-B-654, Grade III	oz
22	F	6830-00-872-5120	Trichlormonofluoromethane, technical: w/cylinder 50 lb (refrigerant -11) BB-F-1421 Type 11 (81348)	cy
23	O	9150-00-086-3734	Oil, air filter, Filter Kotee (40736)	oz

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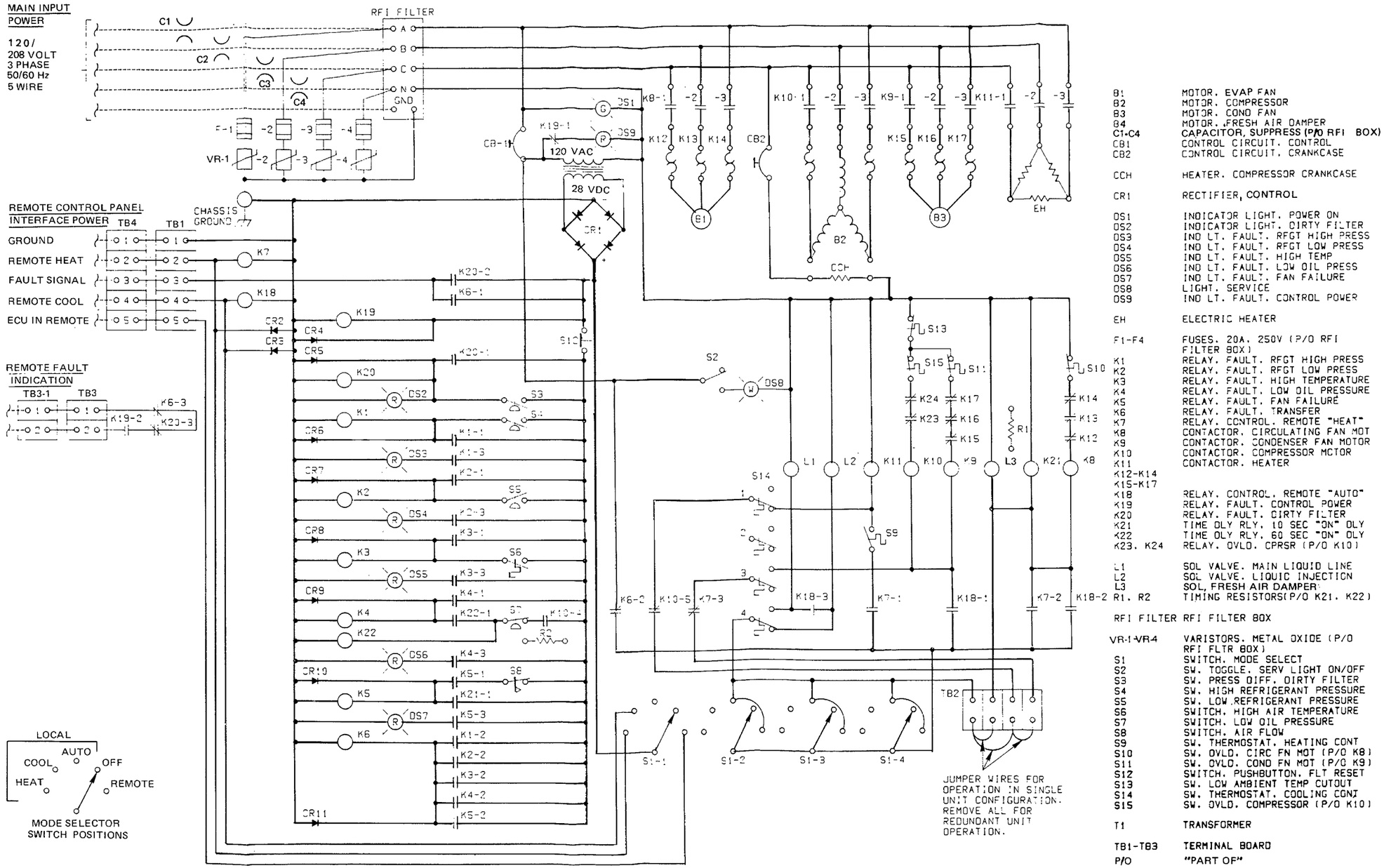
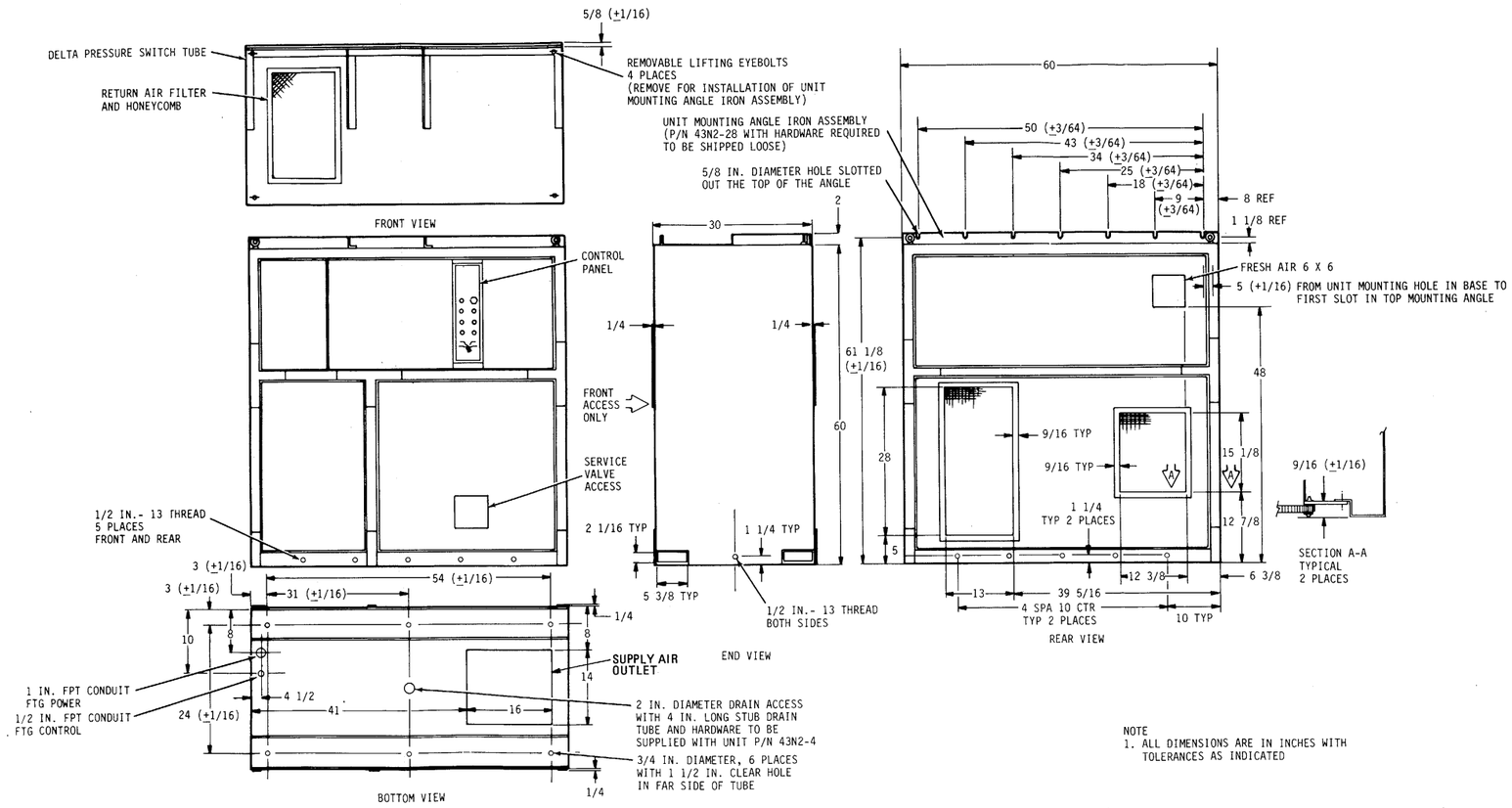


B1	MOTOR, EVAP FAN
B2	MOTOR, COMPRESSOR
B3	MOTOR, COND FAN
B4	MOTOR, FRESH AIR DAMPER
C1-C4	CAPACITOR, SUPPRESS (P/O RFI BOX)
CB1	CONTROL CIRCUIT, CONTROL
CB2	CONTROL CIRCUIT, CRANKCASE
CCH	HEATER, COMPRESSOR CRANKCASE
CR1	RECTIFIER, CONTROL
DS1	INDICATOR LIGHT, POWER ON
DS2	INDICATOR LIGHT, DIRTY FILTER
DS3	IND LT, FAULT, RFGT HIGH PRESS
DS4	IND LT, FAULT, RFGT LOW PRESS
DS5	IND LT, FAULT, HIGH TEMP
DS6	IND LT, FAULT, LOW OIL PRESS
DS7	IND LT, FAULT, FAN FAILURE
DS8	LIGHT, SERVICE
DS9	IND LT, FAULT, CONTROL POWER
EH	ELECTRIC HEATER
F1-F4	FUSES, 20A, 250V (P/O RFI FILTER BOX)
K1	RELAY, FAULT, RFGT HIGH PRESS
K2	RELAY, FAULT, RFGT LOW PRESS
K3	RELAY, FAULT, HIGH TEMPERATURE
K4	RELAY, FAULT, LOW OIL PRESSURE
K5	RELAY, FAULT, FAN FAILURE
K6	RELAY, FAULT, TRANSFER
K7	RELAY, CONTROL, REMOTE "HEAT"
K8	CONTACTOR, CIRCULATING FAN MOT
K9	CONTACTOR, CONDENSER FAN MOTOR
K10	CONTACTOR, COMPRESSOR MCTOR
K11	CONTACTOR, HEATER
K12-K14	
K15-K17	
K18	RELAY, CONTROL, REMOTE "AUTO"
K19	RELAY, FAULT, CONTROL POWER
K20	RELAY, FAULT, DIRTY FILTER
K21	TIME DLY RLY, 10 SEC "ON" DLY
K22	TIME DLY RLY, 60 SEC "ON" DLY
K23, K24	RELAY, OVLD, CPRSR (P/O K10)
L1	SOL VALVE, MAIN LIQUID LINE
L2	SOL VALVE, LIQUID INJECTION
L3	SOL, FRESH AIR DAMPER
R1, R2	TIMING RESISTORS(P/O K21, K22)
RFI FILTER	RFI FILTER BOX
VR-1-VR4	VARISTORS, METAL OXIDE (P/O RFI FLTR BOX)
S1	SWITCH, MODE SELECT
S2	SW, TOGGLE, SERV LIGHT ON/OFF
S3	SW, PRESS DIFF, DIRTY FILTER
S4	SW, HIGH REFRIGERANT PRESSURE
S5	SW, LOW REFRIGERANT PRESSURE
S6	SWITCH, HIGH AIR TEMPERATURE
S7	SWITCH, LOW OIL PRESSURE
S8	SWITCH, AIR FLOW
S9	SW, THERMOSTAT, HEATING CONT
S10	SW, OVLD, CIRC FN MOT (P/O K8)
S11	SW, OVLD, COND FN MOT (P/O K9)
S12	SWITCH, PUSHBUTTON, FLT RESET
S13	SW, LOW AMBIENT TEMP CUTOUT
S14	SW, THERMOSTAT, COOLING CONT
S15	SW, OVLD, COMPRESSOR (P/O K10)
T1	TRANSFORMER
TB1-TB3	TERMINAL BOARD
P/O	"PART OF"

Figure FO-1. Electrical Schematic.



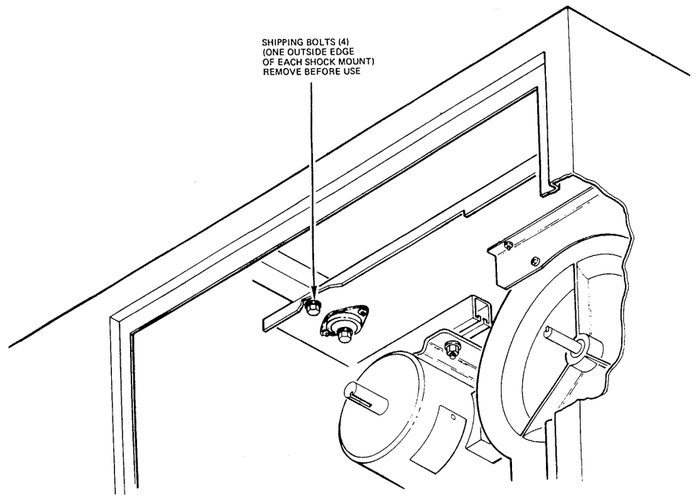
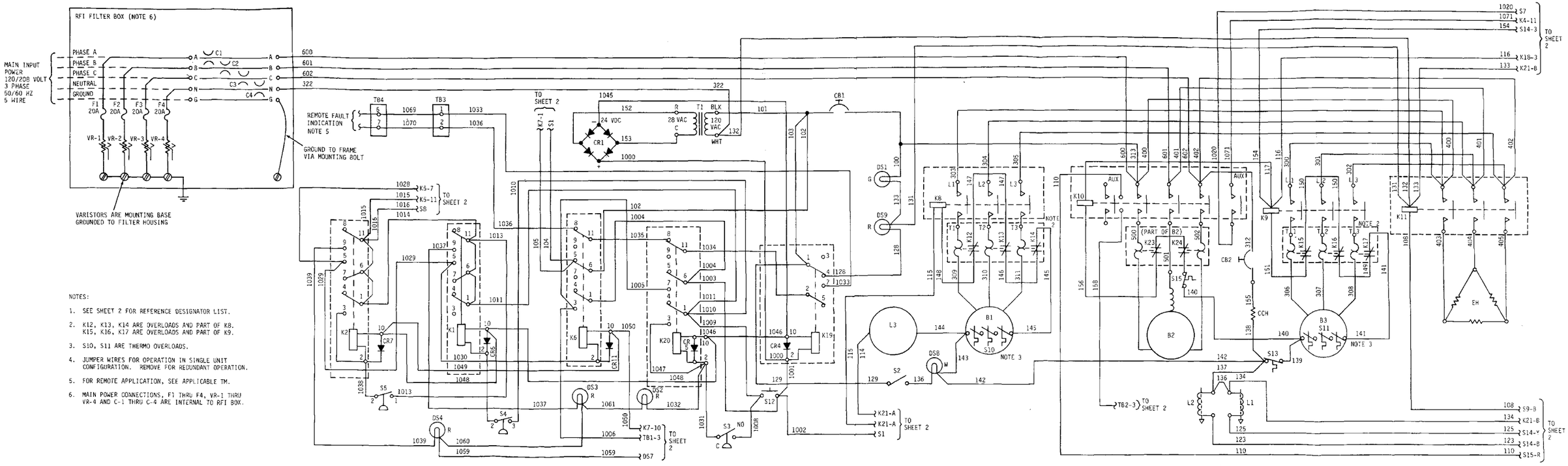


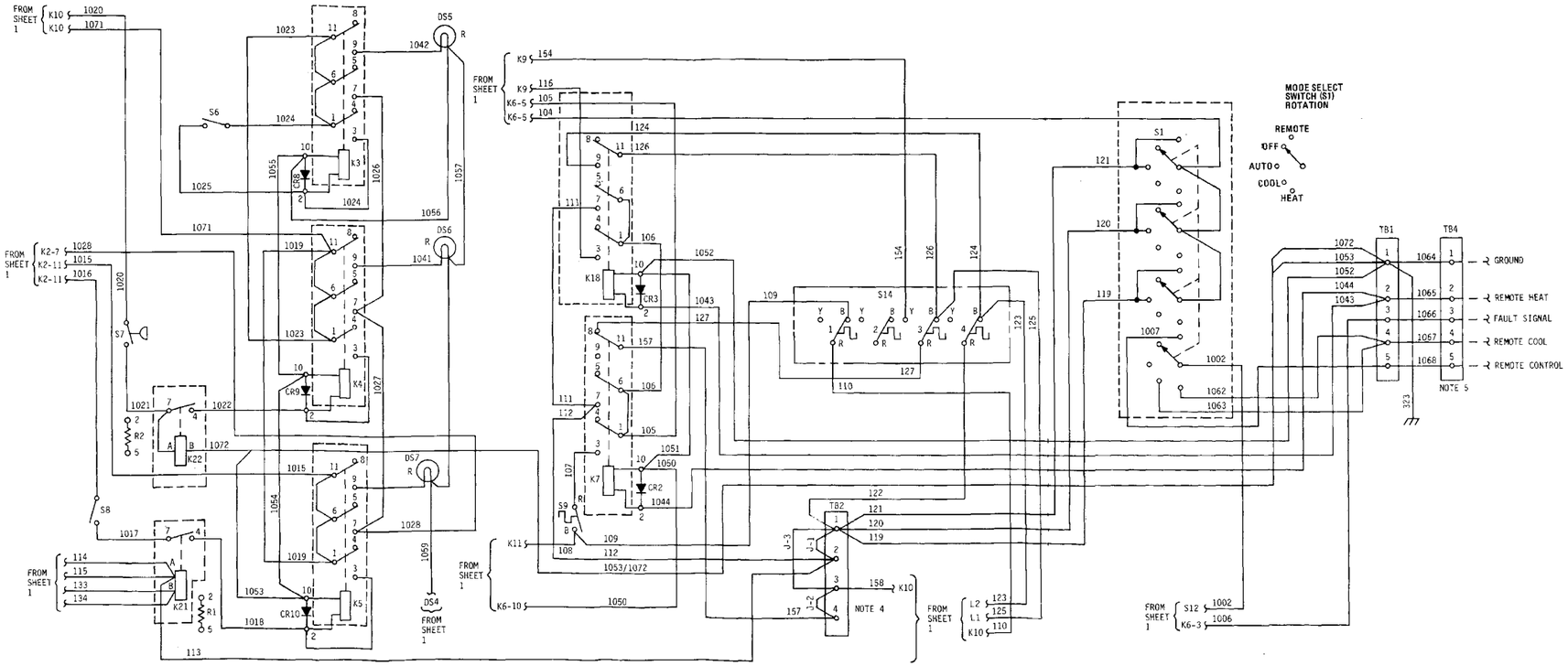
Figure FO-2. Dimensions.



NOTES:

1. SEE SHEET 2 FOR REFERENCE DESIGNATOR LIST.
2. K12, K13, K14 ARE OVERLOADS AND PART OF K8. K15, K16, K17 ARE OVERLOADS AND PART OF K9.
3. S10, S11 ARE THERMO OVERLOADS.
4. JUMPER WIRES FOR OPERATION IN SINGLE UNIT CONFIGURATION. REMOVE FOR REDUNDANT OPERATION.
5. FOR REMOTE APPLICATION, SEE APPLICABLE TM.
6. MAIN POWER CONNECTIONS, F1 THRU F4, VR-1 THRU VR-4 AND C-1 THRU C-4 ARE INTERNAL TO RFI BOX.

Figure FO-3. Wiring Diagram. (Sheet 1 of 2)



REFERENCE DESIGNATOR	DESCRIPTION	REFERENCE DESIGNATOR	DESCRIPTION
B1	MOTOR, EVAPORATOR	K12, 13, 14	THERMO; OVERLOAD, EVAPORATOR FAN MOTOR
B2	MOTOR, COMPRESSOR	K15, 16, 17	THERMO; OVERLOAD, CONDENSER FAN MOTOR
B3	MOTOR, CONDENSER	K18	RELAY, CONTROL, REMOTE "AUTO"
C1-C4	CAPACITOR, SUPPRESSION (P/O RFI BOX)	K19	RELAY, FAULT, CONTROL POWER
CB1	CIRCUIT BREAKER, CONTROL	K20	RELAY, FAULT, DIRTY FILTER
CB2	CIRCUIT BREAKER, CRANKCASE HEATER CIRCUIT	K21	TIME DELAY RELAY, 10 SECOND "ON" DELAY
CCH	HEATER, COMPRESSOR CRANKCASE	K22	TIME DELAY RELAY, 60 SECOND "ON" DELAY
CR1	RECTIFIER, CONTROL	K23, K24	THERMO; OVERLOAD, COMPRESSOR (PART OF B2)
CR2-11	DIODE, SUPPRESSION	L1	SOLENOID VALVE, PRIMARY
DS1	INDICATOR LIGHT, POWER ON	L2	SOLENOID VALVE, LIQUID QUENCH
DS2	INDICATOR LIGHT, DIRTY FILTER	L3	SOLENOID, FRESH AIR DAMPER
DS3	INDICATOR LIGHT, FAULT, REFRIGERANT, HIGH PRESSURE	R1, R2	RESISTORS, TIMING (P/O K21, K22)
DS4	INDICATOR LIGHT, FAULT, REFRIGERANT, LOW PRESSURE	VR1-4	VARISTOR, METAL OXIDE
DS5	INDICATOR LIGHT, FAULT, HIGH TEMPERATURE	S1	SWITCH, MODE SELECT
DS6	INDICATOR LIGHT, FAULT, LOW OIL PRESSURE	S2	SWITCH, TOGGLE, SERVICE LIGHT ON/OFF
DS7	INDICATOR LIGHT, FAULT, FAN FAILURE	S3	SWITCH, PRESSURE DIFFERENTIAL, DIRTY FILTER
DS8	LIGHT, SERVICE	S4	SWITCH, HIGH REFRIGERANT PRESSURE
DS9	INDICATOR LIGHT, FAULT, CONTROL POWER	S5	SWITCH, LOW REFRIGERANT PRESSURE
EH	ELECTRIC HEATER	S6	SWITCH, HIGH AIR TEMPERATURE
F1-4	FUSE	S7	SWITCH, LOW OIL PRESSURE
J1-J4	JUMPER WIRE	S8	SWITCH, AIR FLOW
K1	RELAY, FAULT, REFRIGERANT HIGH PRESSURE	S9	SWITCH, HEAT CONTROL THERMOSTAT
K2	RELAY, FAULT, REFRIGERANT LOW PRESSURE	S10	SWITCH, THERMAL, CIRCULATING FAN MOTOR
K3	RELAY, FAULT, HIGH TEMPERATURE	S11	SWITCH, THERMAL, CONDENSER FAN MOTOR
K4	RELAY, FAULT, LOW OIL PRESSURE	S12	SWITCH, PUSHBUTTON, FAULT RESET
K5	RELAY, FAULT, FAN FAILURE	S13	SWITCH, LOW AMBIENT TEMPERATURE CUTOUT
K6	RELAY, FAULT TRANSFER	S14	SWITCH, COOL CONTROL THERMOSTAT
K7	RELAY, CONTROL, REMOTE "HEAT"	S15	SWITCH, THERMAL, COMPRESSOR
K8	CONTACTOR, EVAPORATOR FAN MOTOR	T1	TRANSFORMER
K9	CONTACTOR, CONDENSER FAN MOTOR	TB-1, 2, 3	TERMINAL BOARD
K10	CONTACTOR, COMPRESSOR MOTOR	TB-4	TERMINAL BOARD, REMOTE
K11	CONTACTOR, HEATER		
P/O	"PART OF"		

Figure FO-3. Wiring Diagram. (Sheet 2 of 2)

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

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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 inches
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

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

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

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. ft.
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
pounds-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: 072243-000