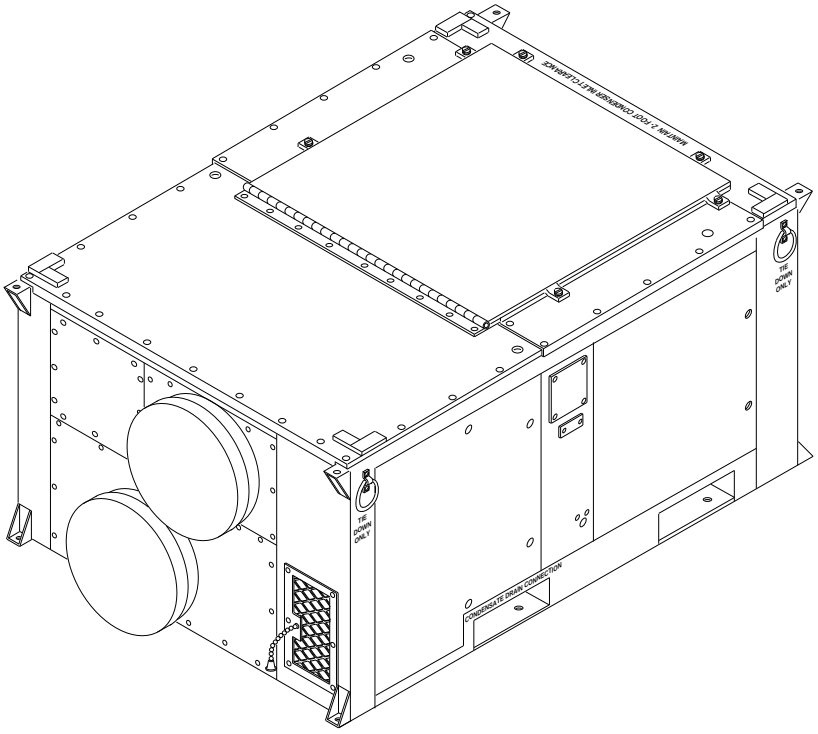
KM-F60S-11 (TM1)

TECHNICAL MANUAL

OPERATION, MAINTENANCE, AND ILLUSTRATED REPAIR PARTS LIST



AIR CONDITIONER: HORIZONTAL

54,000 BTUH
208/230 VOLT, THREE PHASE,
50/60 HERTZ
PART NUMBER 13230E3500

MODEL NUMBER F60S-11
(4120-01-432-6408)

SECTION

KECO INDUSTRIES, INC. FLORENCE, KENTUCKY

30 JUNE 1997

SAFETY WARNINGS SUMMARY

Read and understand all warnings, cautions, notes, and instructions related to a task you are to perform prior to starting the task. Carefully plan your work and never take unnecessary risks.

Never operate the air conditioner with any cover, screen, panel, etc. removed unless the instructions specifically direct you to. If instructed to operate this way, do so with extreme caution.

The following is a general list of warnings that apply to the operation and maintenance of this air conditioner. All personnel who operate or service this air conditioner should read and understand these warnings.

- Equipment is heavy, use care when moving to avoid personal injury. Do not allow anyone under the air conditioner when it is suspended from a lifting device.
- Wear gloves when working on the equipment to prevent personal injury from sharp components such as refrigerant coil fins.
- Electric heater elements can be hot and cause a severe burn, allow heaters to cool before servicing them or any component near them.
- Dangerous chemicals are used in this equipment as well as during maintenance/repair tasks. Perform operations only in well ventilated areas. Wash hands with soap and water after performing any task involving the use of chemicals. Wear gloves and protective goggles or face shield to protect eyes and skin. Sudden and irreversible tissue damage can result from contact with liquid refrigerant. Avoid heat or open flame when working with chemicals to prevent fire or release of toxic fumes.
- Exposed rotating parts are contained in the air conditioner. Personal injury can result if serviced when power is connected.
- Do not attempt any disassembly of refrigerant system components with a refrigerant charge in the system. Refrigerant will be sprayed out dangerously.
- Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.
- Never pressurize refrigerant lines with oxygen, mixture with oil could cause an explosion.
- Nitrogen is an inert gas that can cause suffocation and must be discharged in a well ventilated area. The pressure in a nitrogen cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times to avoid personal injury.
- 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 in a well ventilated area, wear gloves, and keep away from sparks or flame.
- Solder, brazing alloys, and flux contain materials which are hazardous to health. Avoid breathing vapors or fumes from soldering or brazing operations. Perform operations only in well-ventilated areas. Wash hands with soap and water after handling solder, brazing alloys, or flux. Wear thermal gloves and protective goggles or face shield to protect against burns.
- Burns can result from contact with acid formed in a system with a compressor winding burn out. Avoid inhaling fumes and wear a gas mask if area is not thoroughly ventilated. Wear protective goggles or glasses to protect eyes. Wear gloves to protect hands.
- High voltage is used in this air conditioner. Shutting the air conditioner off at the control panel does not disconnect power to all components in the air conditioner. Be sure power is disconnected prior to performing any maintenance to prevent personal injury or death.
- Do not use steam, open flame, heat gun, or any other high temperature heat source to thaw an iced coil. High heat can cause the coil to rupture and result in personal injury.

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SECTION I
GENERAL INFORMATION

1-1. EQUIPMENT MODEL NUMBER AND NAME. Keco Industries Model F60S-11, 54,000 btu/hr, 208/230 Volt, Three-Phase, 50/60 Hertz Air Conditioner.

1-2. PURPOSE OF EQUIPMENT. Cools, heats, filters, and ventilates air in rooms or enclosed spaces. The unit covered by this manual is designed for cooling and heating air to a desired predetermined range and circulating the conditioned air to provide heating and cooling of equipment or personnel within the conditioned area.

1-3. CAPABILITIES AND FEATURES OF EQUIPMENT.

- Provides a nominal 54,000 btu/hr of cooling or 31,000 btu/hr of heating.
- Has two stages of heat.
- Provides source of outside (fresh) ventilation air.
- Is fully transportable and self contained in a single cabinet that is suited to air condition van, shelter, or room installations.
- Operates in environmental conditions from tropic to arctic.

1-4. EQUIPMENT SPECIFICATIONS.

OPERATING TEMPERATURES	
Low	-50° F (-45° C)
High	+125° F (+46° C)
PERFORMANCE	
Cooling Capacity	54,000 btu/hr (Less than 115° F (46° C) condenser and 85° F (29° C) evaporator air temperature.)
Heating Capacity	31,000 btu/hr (High heat mode between 65° F (18° C) and 80° F (27° C) air temperature.)
POWER REQUIRED	
Voltage	208/230
Phase	3
Hertz	50/60
Amperage Cooling	33.5
Amperage Heating	30.1
Power Cooling	11.55 kw
Power Heating	10.8 kw
DIMENSIONS	
Width	48 in. (1219 mm)
Length	71 in. (1803 mm)
Height	32 in. (812 mm)
Weight	920 lb (418 kg)
REFRIGERANT	
Type	R-22
Charge	10 lb (4.5 kg)

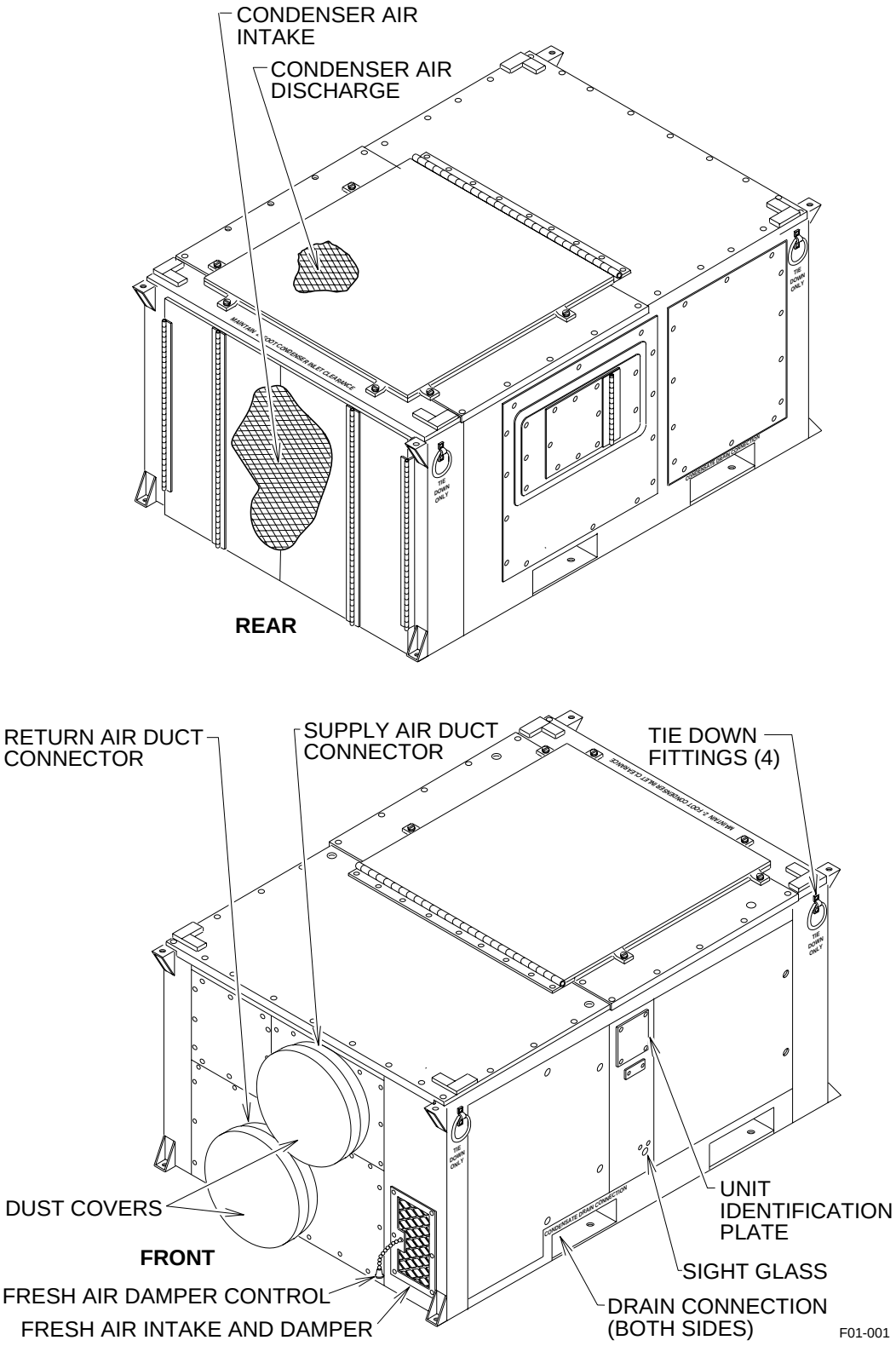

Figure 1-1. Air Conditioner.

1-5. RECEIVING. The air conditioner is shipped assembled and ready for subsequent operation.

WARNING

Do not lift the air conditioner by tie-down eyes. Injury to personnel or damage to equipment could result if dropped during hoisting.

NOTE

Packaging material should remain on the air conditioner until it is placed at the installation site and ready to be connected.

CAUTION

a. Check for any damage to the shipping container and report damage as appropriate.

b. Remove any shipping tie-down. Unload air conditioner using a fork lift.

c. Move air conditioner to installation site. Final placement will be determined during installation.

1-6. INSTALLATION.

a. Remove any packaging material from the air conditioner. Leave the air conditioner bolted to the shipping pallet until placed in final position.

b. Check for any damage to the air conditioner and report damage as appropriate.

c. Site Selection. 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 ducts can be attached. The following are minimum requirements for all installations.

(1) A relatively flat unobstructed space not less than 4 feet by 8 feet (1.2 meters to 2.4 meters) is required for placement of the air conditioner. If the air conditioner is to be located on uneven terrain, the highest corner must not be any more than 5 inches (13 centimeters) above the lowest corner. Clearance for condenser fan exhaust should be available.

NOTE

Provide a minimum distance of 2 feet (0.6 meter) at rear of unit for condenser air circulation.

(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 damper intake.

(5) Access to all sides of the cabinet for routine operation and servicing and for necessary maintenance actions.

(6) Access to the top of the cabinet for removal of the top panel and sufficient headroom to allow maintenance actions and internal component removal and installation through the top panel opening.

(7) A source of 208/230 volt, three phase, four wire, 50/60 hertz input power rated at 35 amps. The power source should be located as near as possible to the installed location of the air conditioner and should not exceed 25 feet. 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.

NOTE

- An earth ground capable of handling 35 amps is required.
- The power cable may be supplied with either a blue or orange wire in the bundle.

(8) An integral power cable is provided for operation of the air conditioner. Terminals are provided on the end of the power cord for attachment to the power source. A case ground is provided through the green wire of the power cable. Connect the black wire to phase A, red wire to phase B, blue or orange wire (as supplied) to phase C, and white wire to neutral.

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

(10) 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.

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

d. Place the air conditioner approximately 6 to 7 feet (1.8 to 2.1 meters) from the structure to be cooled with front of unit pointing toward the building. Position the air conditioner for duct attachment free of kinks or sharp bends to allow unobstructed passage through air delivery and air return ducts.

e. Remove the air conditioner from the pallet.

f. Duct Connections. Two flexible ducts are contained in the storage space inside the air conditioner. To remove the ducts and attach, proceed as follows.

(1) On the left side of the air conditioner observe two hinged panels. The panel toward the rear gives access to the interior storage space. Open the panel by rotating the lock fasteners 1/4 turn counterclockwise. Loosen the two wing nuts on each duct rack and lift out the flexible ducts and racks. Store racks inside condenser compartment after removing ducts.

(2) Remove the duct adapter flange covers from the front of the air conditioner. Store covers inside the condenser compartment.

NOTE

Observe airflow directional arrow on duct. The shorter duct attaches to the air return (lower flange) and the longer duct attaches to the air supply (upper flange).

(3) Slide the end of the duct onto the duct adapter. When properly in place, the hem containing the strap is passed over the raised rim of the flange. Make sure the strap ends are positioned to allow adequate space for working with tools.

(4) Insert the serrated end of the strap under the screw at the opposite end to engage the screw threads.

(5) Tighten the screw sufficiently to clamp the duct securely to the flange. Do not over-tighten, the duct will carry airflow at a relatively low pressure.

(6) Repeat above steps as necessary to attach the remaining duct end to the air conditioner and structure.

g. Drain Hose Connections. Condensation drain hoses are provided for connection to the drain outlets which are located in the fork lift opening on each side of the air conditioner. The barbed hose-to-pipe adapter is connected to these outlets and the hose is connected to the barbed fitting end. During shipment, the barb and hose must be disconnected and placed in the duct storage compartment along with the power cable.

h. Open and secure condenser air inlet and outlet hinged cover panels.

i. Check that all access doors and panels are secure, closed, and fastened.

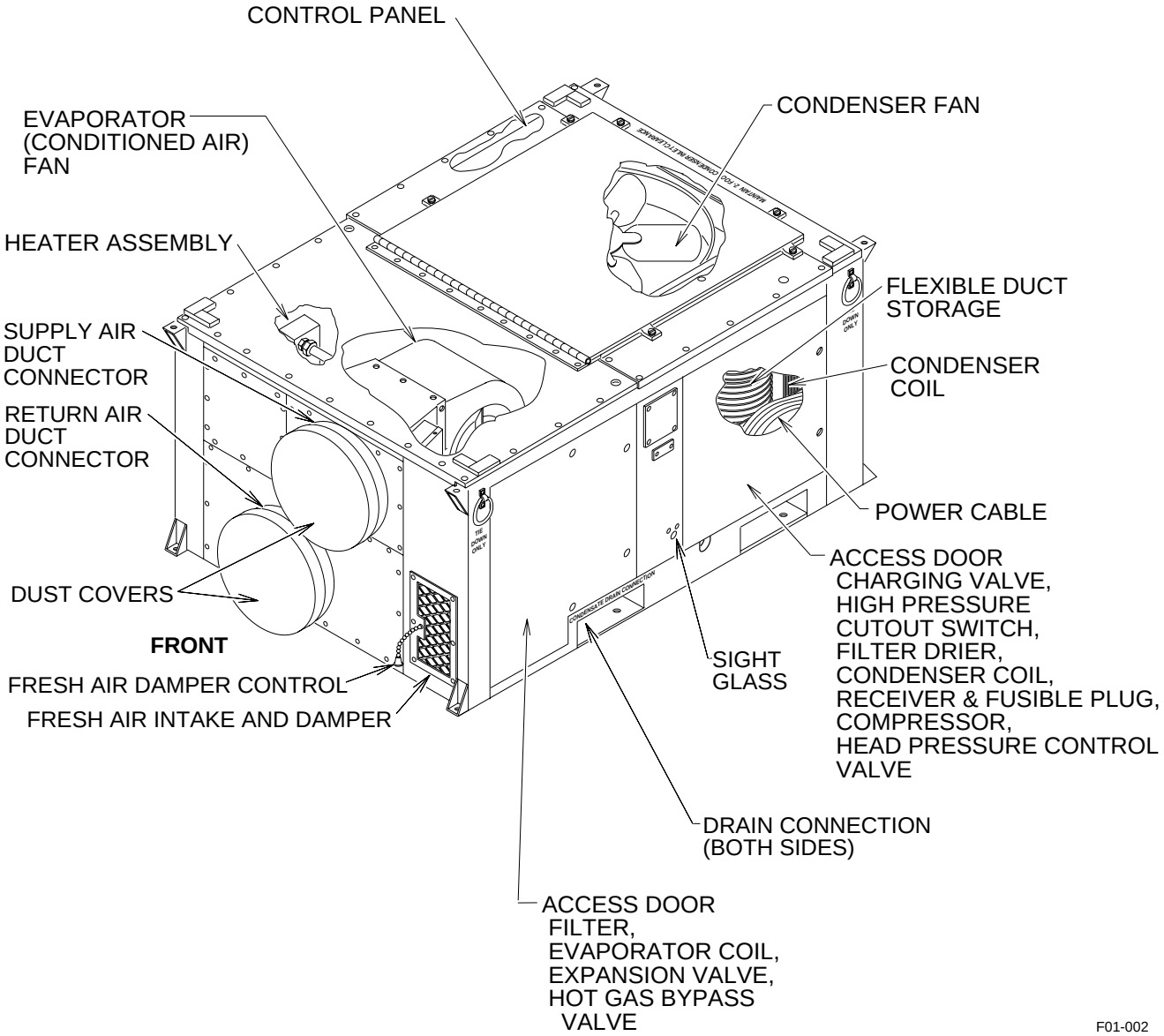

Figure 1-2. Component Location.

1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

a. Evaporator Fan and Motor. Draws air into the evaporator section through the evaporator coil and heater elements then exhausts it back into the room or enclosure.

b. Heater Assembly. Warms the air on a need for heating as it passes through the evaporator section.

c. Fresh Air Intake Damper and Control. The damper control operates a damper door that allows for a controlled amount of fresh outside air to be circulated through the evaporator section and into the room or enclosure.

d. Sight Glass. Allows for visual inspection of the liquid refrigerant condition when the air conditioner is operating in the cooling mode.

e. Control Panel. Contains the mode selector switch, temperature control, and circuit breaker for operating and controlling the air conditioner operation.

f. Evaporator Coil. Serves as a heat exchanger to cool the air by transferring heat from the air passing over the tubing and fins to the refrigerant passing through the tubing.

g. Compressor. Pumps refrigerant through the system during cooling mode.

h. Condenser Coil. Serves as a heat exchanger by transferring heat from the refrigerant passing through the tubing to the outside air passing over the tubing and fins.

i. Condenser Fan and Motor. Draws air through the condenser coil and condenser section then exhausts it out through the top.

j. Air Filter. Filters the air being circulated through the evaporator section to remove any airborne debris.

SECTION II
OPERATION

2-1. THEORY OF OPERATION.

a. Cooling. During air cooling operation, the compressor delivers refrigerant gas at high temperature and pressure to the condenser. A fan blowing across the condenser coil carries away refrigerant heat, causing the refrigerant to condense from a gas to a liquid, still under high pressure. From the condenser, the liquid refrigerant passes through an expansion (throttling) valve, emerging as a liquid at low pressure into the evaporator. The air to be conditioned is blown across the evaporator coils, where heat is extracted, causing the refrigerant to boil and become a heated gas. From the evaporator, refrigerant enters the compressor to repeat the continuing cycle. A thermostat cycles the compressor for conditioned air temperature control.

b. Airflow System. The air conditioner is divided into two separate airflow compartments. Cooling airflow takes place in the front compartment; heat rejection airflow takes place in the rear compartment. A metal wall seals the front compartment from the rear, preventing air from passing between the two compartments.

c. Condenser Airflow. Heat-filled refrigerant is pumped into the condenser. A fan draws in outside air through the finned condenser coil and delivers the heated air to the outside. The fan and coil are sized for adequate forced-air cooling with outside air entering at a temperature as high as 125° F (52° C).

d. Evaporator Airflow. From the conditioned space, the evaporator blower pulls air through a filter and across the evaporator coil then delivers the filtered, cooled air into the conditioned space. A manually operated damper can be adjusted to admit fresh air into the blower.

e. Humidity. Excess moisture is extracted from the air as it is cooled by the evaporator coil. This lowers the relative humidity of the air being delivered to the conditioned space. The moisture that is extracted collects on the evaporator coil where it drips down into a drain pan and empties through the drain line.

f. Refrigeration System. The following component functional descriptions will trace the flow of refrigerant through the system.

(1) Compressor. Low pressure, low temperature refrigerant vapor is drawn into the compressor shell near the top. It is then circulated around and through the motor to cool the windings and ensure that no only refrigerant gas enters the compression chamber. The compression chamber raises the pressure and consequently the temperature of the refrigerant gas. The high pressure, high temperature refrigerant gas leaves the compressor shell near the bottom.

(2) Condenser. The high pressure, high temperature refrigerant gas enters the condenser coil where airflow across the condenser coil extracts heat from it. The refrigerant gas condenses to a high pressure liquid by the time it leaves the coil.

(3) Filter Drier. The liquid refrigerant passes through a filter drier where any debris or moisture is extracted from it.

(4) Sight Glass. The liquid refrigerant passes through a sight glass where it can be observed for condition.

(5) Expansion Valve. High pressure liquid refrigerant enters the expansion valve where it is metered through an orifice that regulates the flow of refrigerant through the evaporator coil and causes the refrigerant pressure and temperature to drop. A sensor mounted at the outlet of the evaporator coil allows the expansion valve to adjust the refrigerant flow under various heat loads on the evaporator coil. An evaporator coil bypass line prevents excess pressure from building up behind the expansion valve.

(6) Evaporator Coil. Low pressure, low temperature liquid refrigerant enters the evaporator coil where it cools the air passing over it and causes the refrigerant to vaporize by the time it leaves the coil.

(7) Accumulator. Refrigerant vapor leaving the evaporator coil will contain some liquid. The compressor can be damaged if any liquid enters the compression chamber. The accumulator separates the liquid from the gas and allows only gas to enter the compressor.

g. Compressor Crankcase Heater. A tubular strip heater clamped around the compressor warms the oil and evaporates any refrigerant trapped in the compressor shell.

h. Heating System. Heating is accomplished by means of an electric heating element grid that warms the air as it passed through the evaporator compartment.

i. Operating Modes. The mode selector switch can be placed in one of three positions.

(1) Off/Reset. The system is not operating. If power is still connected to the air conditioner, the compressor crankcase heater can operate.

(2) Vent. Air is circulated through the evaporator compartment and the conditioned space. Fresh air can be introduced if the damper is open. No heating or cooling will occur.

(3) Automatic. The air conditioner will operate automatically in either the cooling, heating, or ventilating mode depending on the setting of the temperature control and the air temperature of the conditioned space.

j. Temperature Control. The mode of operation and temperature are maintained by the temperature control. This can be set to any desired temperature to be maintained in the conditioned space.

k. Safety Controls. A circuit breaker provides primary electrical circuit protection against overloads or short circuits. The circuit breaker can be manually reset in the event of a trip. Various other safety controls are used throughout the air conditioner system such as a high refrigerant pressure cut out, evaporator and condenser fan motor thermal overloads, and compressor motor thermal overload.

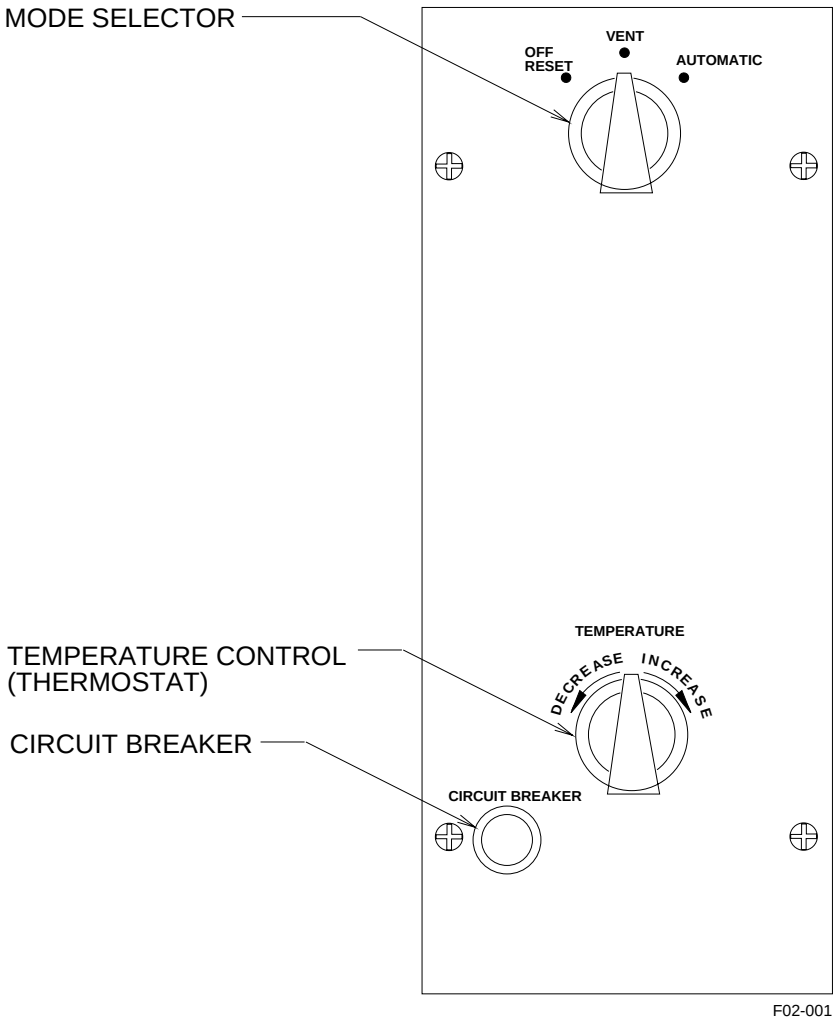

Figure 2-1. Operator Controls.

2-2. OPERATION UNDER USUAL CONDITIONS.

NOTE

It is normally better to keep the fresh air damper slightly open to create a slight over-pressure inside the conditioned space. This will provide a flow of fresh air and prevent room odors.

a. Initial Adjustments and Checks.

(1) Check to see that power cable has been connected to a source of 208/230 volt, 3 phase, 50/60 hertz power.

(2) Inspect all covers, panels, grilles, and screens for loose mounting, obstructions, or shipping damage. Report any deficiencies as appropriate.

(3) Perform all BEFORE PMCS tasks listed in table 3-1.

b. Operation in Ventilate Mode.

(1) Turn mode selector switch to VENT position. See figure 2-1.

NOTE

When admitting fresh outside air into the conditioned space, a window, door, or vent must be opened to allow circulation of air. A tightly sealed space will pressurize and prevent the flow of fresh air.

(2) The fresh air damper can be opened as needed to admit outside air into the conditioned space. Unhook the damper chain from its key slot and allow the hinge spring to pull the damper door open as needed. Hook the damper chain to hold the damper door in the desired position. See figure 1-1.

c. Operation in Automatic Mode.

CAUTION

- Compressor can be damaged if started with liquid refrigerant in crankcase. Power must be connected to air conditioner for a period of not less than 5 hours before starting in automatic mode.
- Do not operate the air conditioner in the automatic mode for cooling when the outside air temperature is below 50° F (10° C). Under these conditions, operate in the ventilate mode and admit fresh air as required to maintain desired temperature in the conditioned space.

(1) Turn mode selector switch to AUTOMATIC position. See figure 2-1.

(2) Turn TEMPERATURE control toward DECREASE or INCREASE as necessary to adjust and maintain the desired temperature in the conditioned space. When adjusting the TEMPERATURE control, the air conditioner must be given adequate time to change the temperature in the conditioned space before making additional adjustments. The temperature control has a control range of 40° F to 90° F (5° C to 32° C) with the mid-point being approximately 65° F (18° C). See figure 2-1.

NOTE

When admitting fresh outside air into the conditioned space, a window, door, or vent must be opened slightly to allow circulation of air. A tightly sealed space will pressurize and prevent the flow of fresh air.

(3) The fresh air damper can be opened as needed to admit outside air into the conditioned space. Unhook the damper chain from its key slot and allow the hinge spring to pull the damper door open as needed. Hook the damper chain to hold the damper door in the desired position. See figure 1-1.

d. Shutdown. Turn mode selector to the OFF/RESET position. See figure 2-1.

2-3. OPERATION UNDER UNUSUAL CONDITIONS.

a. Operation in Extreme Heat. Operate the air conditioner as described under usual conditions with the following exceptions.

(1) Check all openings in the conditioned space, especially doors and windows to be sure they are tightly closed. Limit in and out traffic if possible. Insulate or weather-strip if appropriate.

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

(3) Limit the use of electric lights and other heat producing equipment.

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

b. Operation in Extreme Cold. Operate the air conditioner as described under usual conditions with the following exceptions.

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.

(1) Check all openings in the conditioned space, especially doors and windows to be sure they are tightly closed. Limit in and out traffic if possible. Insulate or weather-strip if appropriate.

(2) Open shades and awnings to permit direct rays of the sun.

(3) Limit the amount of cold, outside air introduced through the fresh air damper to that absolutely needed for ventilation.

c. Operation in Dusty or Sandy Conditions. Operate the air conditioner as described under usual conditions with the following exceptions.

(1) Frequently clean the air filter, grilles, and all other areas of dust or sand accumulation. In extreme conditions, daily cleaning may be necessary.

(2) Limit the amount of dusty and sandy air introduced through the fresh air damper to that absolutely needed for ventilation.

d. Operation in Unusually Wet Conditions. Operate the air conditioner as described under usual conditions with the following exceptions.

(1) Frequently inspect and clean the condensation trap and drain lines to insure proper drainage.

(2) More frequent inspect of the interior of the evaporator section and air filter.

e. Operation in Salt Air or Sea Spray. Operate the air conditioner as described under usual conditions with the following exceptions.

(1) Frequently clean the air filter, grilles, and all other areas of salt accumulation. In extreme conditions, daily cleaning may be necessary.

(2) Rinse or wipe down all exposed surfaces with fresh water to remove salt.

2-4. OPERATOR TROUBLESHOOTING.

a. The following table contains troubleshooting instructions designed to be useful to the operator in diagnosing and correcting unsatisfactory operation or failure of the air conditioner. The table lists the common malfunctions which you may find during the operation of the air conditioner. Perform the steps listed in the table in the order given.

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

Table 2-1. Operator Troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. AIR CONDITIONER DOES NOT START IN ANY MODE.
Step 1. Check to see if power has been disconnected.
Connect power
Step 2. Check to see if circuit breaker is tripped. See figure 2-1.
Reset circuit breaker by pressing button. If circuit breaker continues to trip, notify supervisor.
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 operation of temperature control. See figure 2-1.
Set temperature control fully to DECREASE. If condition improves, adjust to desired setting.
Step 3. Check for restricted duct airflow.
Position ducts to eliminate restriction.

Table 2-1. Operator Troubleshooting. - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
2. REDUCED COOLING CAPACITY. - CONTINUED
Step 4. Check to be sure the fresh air damper is not open more than is necessary. See figure 1-1. Fully close fresh air damper. If condition improves, open as necessary.
Step 5. Check sight glass for continuous bubbles. Occasional flashes of bubbles is normal. See figure 1-2. If continuous bubbles are observed, turn off the air conditioner and notify supervisor.
Step 6. Check for obstructed air filter. Clean or replace as necessary.
Step 7. Check for iced-over evaporator coil. Defrost if iced-over.
3. REDUCED HEATING CAPACITY.
Step 1. Check that all doors, windows, and other openings in the conditioned space are tightly closed. Tightly close all openings.
Step 2. Check operation of temperature control. See figure 2-1. Set temperature control fully to INCREASE. If condition improves, adjust to desired setting.
Step 3. Check for restricted duct airflow. Position ducts to eliminate restriction.
Step 4. Check to be sure that the fresh air damper is not open more than is necessary. See figure 1-1. Fully close fresh air damper. If condition improves, open as necessary.
Step 5. Check for obstructed air filter. Clean or replace as necessary.

SECTION III
EQUIPMENT CARE

3-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES. 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 those functions which are described in the following table.

a. Before You Operate. Always keep in mind and observe the WARNINGS and CAUTIONS. Before you begin operating the air conditioner in any mode, perform your before (B) PMCS.

b. While You Operate. Always keep in mind and observe the WARNINGS and CAUTIONS. While the air conditioner is operating in any mode, perform your during (D) PMCS.

c. After You Operate. Always keep in mind and observe the WARNINGS and CAUTIONS. When the air conditioner has been shut down, perform your after (A) PMCS.

d. If your air conditioner fails to operate, troubleshoot using appropriate equipment or facilities and report any problems to your supervisor.

e. Perform weekly (W) as well as before (B) PMCS if any of the following apply.

(1) You are the assigned operator and have not operated the air conditioner since the last weekly (W) check.

(2) You are operating the air conditioner for the first time.

Table 3-1. Operator Preventive Maintenance Checks and Services.

Item No.	Interval				Item To Be Inspected	Procedures	Equipment Is Not Ready/Available If:
	B	D	A	W			
1	•				Power Cable	Check to see that power cable is connected to a source of 208/230 volt, three phase, 4 wire, 50/60 hertz power.	Power cable is not connected to a source of power.
2				•	Information and Data Plates	Check for legibility and loose or missing hardware.	
3	•				Flexible Ducts	Check for obstructions, kinks, damage, or loose/missing hardware.	Airflow is restricted.

Item No.	Interval				Item To Be Inspected	Procedures	Equipment Is Not Ready/Available If:
	B	D	A	W			
4	•				Covers, Doors, and Panels	Open and secure condenser air inlet and outlet panels.	Outlet panels are closed.
	•					Check that covers, doors, and panels are in place and are not cracked, dented, or have missing hardware.	Cover, door, or panel damage would interfere with safe or effective operation of the air conditioner.
				•		Check for stiffness or binding in hinges.	
5	•				Grilles	Check that grilles are in place.	Missing grille would interfere with safe or effective operation of the air conditioner.
	•					Check grilles for obstructions.	Grille is obstructed.
				•		Check grilles for damage or missing hardware.	Grille damage would interfere with safe or effective operation of the air conditioner.
6	•	•			Fresh Air Damper	Check for proper adjustment.	
				•		Check for freedom of operation.	
7	•				Drain Hose	Check that drains are either open or hose is routed to a satisfactory drain system.	Drains clogged.
		•				Check for water coming out the drain or hose end.	Water not draining but collecting inside the evaporator assembly.

Item No.	Interval				Item To Be Inspected	Procedures	Equipment Is Not Ready/Available If:
	B	D	A	W			
8	•				External Control Panel	Check for obvious damage or missing knobs.	Damage or missing part would interfere with safe or effective operation of the air conditioner.
		•				Check for proper operation of the air conditioner.	Air conditioner not operating properly.
9		•			Sight Glass	After 15 minutes of operation in continuous cooling mode, check for continuous bubbles or milky foamy flow. Occasional flashes of bubbles or foam is normal.	Continuous bubbles or milky foam are observed indicating low refrigerant charge.

SECTION IV

MAINTENANCE

4-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES. 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 PMCS program is to discover and correct defects and deficiencies before they can cause serious damage or complete failure of the equipment. A schedule for PMCS should be established immediately after installation of the air conditioner. The following table lists PMCS items applicable to this air conditioner and are arranged in logical sequence for greatest efficiency and least downtime.

WARNING

High voltage is used in the operation of this air conditioner, 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 equipment operation/hazards and who is competent in administering first aid. When an operator is assisting, they must be warned about dangerous areas.

Whenever possible, input power supply to the air conditioner must be shut off before beginning work. Be careful not to contact high voltage connections when installing or operating the air conditioner.

Whenever the maintenance task permits, keep one hand away from the air conditioner to reduce the risk of current flowing through vital organs of the body.

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

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

W - Weekly M - Monthly Q - Quarterly

Item No.	Interval			Item to be inspected	Procedures	Equipment is not ready/available if:
	W	M	Q			
1	•			Doors, Covers, and Panels	a. Check for loose or missing hardware or defective 1/4 - turn fasteners. Tighten or replace as indicated.	
		•			b. Lubricate as necessary.	
2	•			Air Filter	a. Open the evaporator access door and remove the air filter. Discard and replace if damaged.	Air filter is obstructed.
					b. If dirty, wash with water spray and dry thoroughly.	
					c. Install air filter and close evaporator access door.	
3	•			Flexible Ducts	a. Inspect for worn or torn spots. Replace if damaged.	
	•				b. Check for secure attachment to flanges. Tighten if loose.	
		•			c. Clean if necessary.	
4			•	External Control Panel	Inspect for missing, loose, or damaged knobs. Tighten or replace as indicated.	Knob missing that would affect safe operation of the air conditioner.
5			•	Internal Control Board	Check for loose terminal connections to components. Tighten as indicated.	Terminal connection loose.
6		•		Electrical Leads	Inspect for damaged insulation, broken terminals, and any evidence of deterioration or overheating. Repair or replace as indicated.	Electrical lead damaged or loose.
7		•		Power Cable	Inspect for frayed or damaged insulation secure terminal connections. Replace if damaged, tighten if loose.	Power cable damaged or loose.
8		•		Evaporator Blower	Inspect for loose or missing mounting hardware. Tighten or replace as indicated.	Evaporator blower loose.

Item No.	Interval			Item to be inspected	Procedures	Equipment is not ready/available if:
	W	M	Q			
9	•			Evaporator Belts	Check if belt is loose, damaged, worn, or missing. Tighten or replace as indicated.	Belt loose or damaged.
10	•			Evaporator Fan Motor	a. Inspect for loose or missing mounting hardware. Tighten or replace as indicated.	Fan motor loose or if electrical connections are loose or damaged.
		•			b. Check for secure or damaged electrical connections. Tighten or replace as indicated.	
11	•			Heater Assembly	a. Inspect for loose or missing mounting hardware. Tighten or replace as indicated.	Heater assembly loose or if electrical connections are loose or damaged.
		•			b. Check for loose or damaged electrical connections. Tighten or replace as indicated.	
12		•		Condenser Fan Impeller	Check for secure attachment to motor shaft. Tighten as necessary.	Impeller loose.
13			•	Evaporator Coil	a. Check for loose or missing mounting hardware. Tighten or replace as indicated. b. Inspect coil for bent or flattened fins. Straighten any bent fins with a fin comb. c. Clean the coil fins with a mild soap and water solution and brush. Use low pressure compressed air to push any dirt and water out of the coil in the opposite direction of airflow. Be careful not to damage fins.	Coil is obstructed with dirt or from bent fins.
14			•	Thermostatic Expansion Valve	Check if sensing bulb is damaged or loose from tubing. Replace expansion valve if damaged or secure if loose.	Expansion valve bulb loose or damaged.
15			•	Liquid Quench Valve	Check if sensing bulb is damaged or loose from tubing. Replace liquid quench valve if damaged or secure if loose.	Quench valve bulb loose or damaged.

Item No.	Interval			Item to be inspected	Procedures	Equipment is not ready/available if:
	W	M	Q			
16			•	Condenser Coil	a. Check for loose or missing mounting hardware. Tighten or replace as indicated. b. Inspect coil for bent or flattened fins. Straighten any bent fins with a fin comb. c. Clean the coil fins with a mild soap and water solution and brush. Use low pressure compressed air to push any dirt and water out of the coil in the opposite direction of airflow. Be careful not to damage fins.	Coil is obstructed with dirt or from bent fins.
17			•	Sight Glass	a. Check for cracked or broken glass lens. Replace sight glass if damaged. b. Clean lens as necessary.	Sight Glass lens is cracked or broken.
18		•		Compressor	a. Inspect for loose or missing mounting hardware. Tighten or replace as indicated.	Compressor loose or if electrical connections are loose or damaged.
		•			b. Check for loose or damaged electrical connections. Tighten or replace as indicated.	

4-2. MAINTENANCE TROUBLESHOOTING.

a. The following table contains troubleshooting instructions designed to be useful to the maintenance technician in diagnosing and correcting a failure in the air conditioner. The table lists the common failures which you may find in the air conditioner. Perform the steps listed in the table in the order given.

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

WARNING

High voltage is used in the operation of this air conditioner, 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 equipment operation/hazards and who is competent in administering first aid. When an operator is assisting, they must be warned about dangerous areas.

Whenever possible, input power supply to the air conditioner must be shut off before beginning work. Be careful not to contact high voltage connections when installing or operating the air conditioner.

Whenever the maintenance task permits, keep one hand away from the air conditioner to reduce the risk of current flowing through vital organs of the body.

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

Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissure damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin or eye contact is possible.

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

Table 4-2. Maintenance Troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. AIR CONDITIONER FAILS TO OPERATE IN ANY MODE.
Step 1. Check for a tripped circuit breaker.
Reset circuit breaker.
Step 2. Check for defective circuit breaker.
Replace if defective.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. AIR CONDITIONER FAILS TO OPERATE IN ANY MODE. - CONTINUED

Step 3. Check for defective power cable.

Replace if defective.

Step 4. Check for defective mode selector switch.

Replace if defective.

Step 5. Check for defective thermostat control.

Replace if defective.

Step 6. Check for defective control relay.

Replace if defective.

Step 7. Check if air conditioner fails to operate in any mode.

Notify supervisor.

2. AIR CONDITIONER STOPS IN VENT MODE.

Step 1. Check for a tripped circuit breaker.

Reset circuit breaker.

Step 2. Check for defective circuit breaker.

Replace if defective.

Step 3. Check for defective mode selector switch.

Replace if defective.

Step 4. Check for defective control relay.

Replace if defective.

Step 5. Check for tripped evaporator blower motor thermal cutout.

Allow blower motor to cool. If thermal cutout does not reset, replace motor.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

2. AIR CONDITIONER STOPS IN VENT MODE. - CONTINUED

Step 6. Check for defective evaporator blower motor.

Replace if defective.

Step 7. Check if air conditioner stops in vent mode.

Notify supervisor.

3. AIR CONDITIONER STOPS IN AUTOMATIC MODE.

Step 1. Check for a tripped circuit breaker.

Reset circuit breaker.

Step 2. Check that condenser air inlet and outlet hinged cover panels are open.

Open cover panels.

Step 3. Check for defective circuit breaker.

Replace if defective.

Step 4. Check for defective mode selector switch.

Replace if defective.

Step 5. Check for defective thermostat control switch.

Replace if defective.

Step 6. Check for defective control relay.

Replace if defective.

Step 7. Check for tripped high temperature cutout.

Allow heater elements to cool. If cutout does not reset, replace it.

Step 8. Check for defective high pressure cutout switch.

Replace if defective.

Step 9. Check if air conditioner stops in automatic mode.

Notify supervisor.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

4. REDUCED OR NO COOLING.

Step 1. Check sight glass for continuous bubbles when operating in full cool.

Check for refrigerant leaks, repair as necessary then recharge system.

Step 2. Check for defective time delay relay.

Replace if defective.

Step 3. Check for obstructed air filter.

Clean or replace as necessary.

Step 4. Check for defective thermostat control switch.

Replace if defective.

Step 5. Check for defective compressor motor starter.

Replace if defective.

Step 6. Check for tripped condenser blower motor thermal cutout.

Allow blower motor to cool. If thermal cutout does not reset, replace motor.

Step 7. Check for defective condenser blower motor.

Replace if defective.

Step 8. Check for proper refrigerant charge.

Check for leaks and charge as necessary.

Step 9. Check for obstructed evaporator coil.

Clean if dirty, straighten fins if bent, defrost if iced-over.

Step 10. Check for obstructed condenser coil.

Clean if dirty, straighten fins if bent.

Step 11. Check if still has reduced or no cooling.

Notify supervisor.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

5. EXCESSIVE COOLING.

Step 1. Check for defective thermostat control switch.

Replace if defective.

Step 2. Check for defective time delay relay.

Replace if defective.

Step 3. Check for defective compressor motor starter.

Replace if defective.

Step 4. Check if there is still excessive cooling.

Notify supervisor.

6. EVAPORATOR BLOWER INOPERATIVE.

Step 1. Check for loose or broken belt.

Tighten if loose, replace if broken.

Step 2. Check for loose pulleys.

Tighten pulleys.

Step 3. Check for defective mode selector switch.

Replace if defective.

Step 4. Check for defective control relay.

Replace if defective.

Step 5. Check for defective high temperature control switch.

Replace if defective.

Step 6. Check for defective evaporator fan motor starter.

Replace if defective.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. EVAPORATOR BLOWER INOPERATIVE. - CONTINUED

Step 7. Check for defective evaporator fan motor.

Replace if defective.

Step 8. Check if evaporator blower is still inoperative.

Notify supervisor.

7. CONDENSER FAN INOPERATIVE.

Step 1. Check for loose impeller.

Tighten set screws.

Step 2. Check for defective mode selector switch.

Replace if defective.

Step 3. Check for defective control relay.

Replace if defective.

Step 4. Check for defective condenser fan motor starter.

Replace if defective.

Step 5. Check for defective condenser fan motor.

Replace if defective.

Step 6. Check if condenser fan is still inoperative.

Notify supervisor.

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

8. COMPRESSOR RUNS CONTINUOUSLY.

Step 1. Check for defective thermostat

Replace if defective.

Step 2. Check for defective compressor motor starter.

Replace if defective.

Step 3. Check if compressor still runs continuously.

Notify supervisor.

9. REDUCED HEATING CAPACITY.

Step 1. Check for obstructed air filter.

Clean or replace as necessary.

Step 2. Check for defective control relay.

Replace if defective.

Step 3. Check for defective heating elements.

Replace if defective.

Step 4. Check for defective thermostat control switch.

Replace if defective.

Step 5. Check for defective evaporator blower and motor.

Replace either if defective.

Step 6. Check for tripped high temperature cutout.

Allow heater elements to cool. If cutout does not reset, replace it.

Step 7. Check if reduced heating capacity.

Notify supervisor.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

10. COMPRESSOR SHORT CYCLES.

Step 1. Check for obstructions in condenser coil.

Clean or straighten fins as necessary.

Step 2. Check if refrigerant system is under/over charged.

Add or remove refrigerant as necessary.

Step 3. Check quench valve.

Replace if defective.

Step 4. Check if comressor still short cycles.

Nofity supervisor.

11. AIR CONDITIONER NOISY DURING OPERATION.

Step 1. Check for loose evaporator fan pulley or belt.

Tighten or replace as indicated.

Step 2. Check for loose evaporator or condenser fan motor mounting.

Secure as indicated.

Step 3. Check for defective expansion valve.

Replace if defective.

Step 4. Check for defective quench valve.

Replace if defective.

Step 5. Check for loose compressor mounting.

Secure as indicated.

Step 6. Check if air conditioner is still noisy during operation.

Notify supervisor.

4-3. MAINTENANCE PROCEDURES. The following miantenance procedures are arranged in the order they appear in section 8 of this manual. The illustrations and item numbers in section 8 will be referenced throughout these procedures.

4-4. DUST COVER REPLACEMENT. See figure 8-1.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

NOTE

The following procedure applies to only one dust cover.

a. Remove two screws (9) or (15) and dust cover (1).

b. Install dust cover (1) and secure using two screws (9) or (15).

4-5. AIR INLET DUCT ADAPTER REPAIR AND REPLACEMENT. See figure 8-1.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected and the flexible duct is removed.

b. Remove 22 screws (2), lock washers (3), flat washers (4), and duct adapter (5).

c. Repair the duct adapter as follows:

(1) Straighten any bends or dents if possible.

(2) Remove any damaged gasket (6) or (7) or insulation (8) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(3) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

4-5. AIR INLET DUCT ADAPTER REPAIR AND REPLACEMENT. - CONTINUED

(4) Coat the mating surfaces of the metal and the new gasket (6) or (7) or insulation (8) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(5) Starting with and end, carfully attach the gasket (6) or (7) or insulation (8) to the metal surface. Press firmly to completely contact.

d. Install duct adapter (5) and secure with 22 flat washers (4), lock washers (3), and screws (2).

e. Install flexible duct and connect power.

4-6. DISCHARGE AIR DUCT ADAPTER REPAIR AND REPLACEMENT. See figure 8-1.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected and the flexible duct is removed.

b. Remove 14 screws (10), lock washers (3), flat washers (4), and duct adapter (11).

c. Repair the duct adapter as follows:

(1) Straighten any bends or dents if possible.

(2) Remove any damaged gasket (12) or (13) or insulation (14) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(3) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(4) Coat the mating surfaces of the metal and the new gasket (12) or (13) or insulation (14) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(5) Starting with and end, carfully attach the gasket (12) or (13) or insulation (14) to the metal surface. Press firmly to completely contact.

d. Install duct adapter (11) and secure with 14 flat washers (4), lock washers (3), and screws (10).

e. Install flexible duct and connect power.

4-7. CONDENSER FAN GRILLE REPLACEMENT. See figure 8-1.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected and hinged cover (26) is open.

b. Remove 10 screws (16), lock washers (3), flat washers (4), and grille (17).

c. Install grille (17), and secure using 10 flat washers (4), lock washers (3) and screws (16).

4-8. GRILLE AND COVER ASSEMBLY REPLACEMENT. See figure 8-1.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove 18 screws (18), lock washers (19), flat washers (20), and grille and cover assembly (21).

NOTE

The following procedure applies to only one door positioner.

c. Remove self locking nut (22), screw (23), and door positioner (24).

d. Install door positioner (24) and secure using screw (23) and self locking nut (22).

e. Install grille and cover assembly (21) and secure using 18 flat washers (20), lock washers (19), and screws (18).

f. Connect power.

4-9. HINGED COVER REPAIR AND REPLACEMENT. See figure 8-1.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected and the hinged cover (26) is unlatched.

b. Drill out nine rivets (25) using a drill bit slightly smaller than the rivet diameter.

c. Remove hinged cover (26) and any remaining rivet (25) material.

d. Repair the hinged cover as follows:

(1) Straighten any bends or dents if possible.

NOTE

The following procedure applies to only one stud.

(2) Remove retaining ring (30), eyelet (29), and stud (27) or (28).

(3) Install stud (27) or (28), eyelet (29), and retaining ring (30).

(4) Remove any damaged gasket (31), (32), (33), (34), (35), or (36) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(5) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(6) Coat the mating surfaces of the metal and the new gasket (31), (32), (33), (34), (35), or (36) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(7) Starting with and end, carfully attach the gasket (31), (32), (33), (34), (35), or (36) to the metal surface. Press firmly to completely contact.

e. Install hinged cover (26) and secure using nine rivets (25).

f. Connect power.

4-10. FRONT PANEL REPAIR AND REPLACEMENT. See figure 8-2.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove 12 screws (1), lock washers (2), flat washers (3), and front panel (8).

c. Repair the front panel (8) as follows:

(1) Straighten any bends or dents if possible.

(2) Remove any damaged gasket (5) or (6) or insulation (7) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(3) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(4) Coat the mating surfaces of the metal and the new gasket (5) or (6) or insulation (7) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(5) Starting with and end, carfully attach the gasket (5) or (6) or insulation (7) to the metal surface. Press firmly to completely contact.

d. Install front panel (8) and secure with 12 flat washers (3), lock washers (2), and screws (1).

e. Connect power.

4-11. FRESH AIR DAMPER REPAIR AND REPLACEMENT. See figure 8-2.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Using a drill bit slightly smaller than the rivet (9) diameter, drill out six rivets.

c. Remove fresh air damper (23) assembly and any remaining rivet (9) material.

4-11. FRESH AIR DAMPER REPAIR AND REPLACEMENT. - CONTINUED

NOTE

Repair is limited to replacement of damaged components.

d. Replace chain (12) if damaged.

(1) Remove pendant (11).

(2) Remove nut (16), lock washer (15), flat washer (14), screw (13), flat washer (14), and chain (12).

(3) Attach chain (12) to door (22) using flat washer (14), screw (13), flat washer (14), lock washer (15), and nut (16).

(4) Pass chain (12) through frame (23) and attach pendant (11).

e. Replace hinge (17) if damaged.

(1) Using drill bit slightly smaller than rivet (18) diameter, drill out four rivets. Remove hinge (17) and any remaining rivet material.

(2) Install new hinge (17) and secure using four rivets (18).

f. Replace gasket (20) or (21) if damaged.

(1) Remove any damaged gasket (20) or (21) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(2) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(3) Coat the mating surfaces of the metal and the new gasket (20) or (21) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(4) Starting with and end, carfully attach the gasket (20) or (21) to the metal surface. Press firmly to completely contact.

g. Install fresh air damper (23) assembly and secure using six rivets.

h. Connect power.

4-12. STACKING BOLT REPLACEMENT. See figure 8-2.

NOTE

The following procedure applies to only one stacking bolt.

a. Remove screw (1), lock washer (2), flat washer (3), and stacking bolt (24).

b. Install stacking bolt (24) and secure using flat washer (3), lock washer (2), and screw (1).

4-13. LEFT OR RIGHT TOP SIDE PANEL REPAIR AND REPLACEMENT. See figure 8-2.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

NOTE

The following procedure applies to only one top side panel.

b. Remove 10 screws (1), lock washers (2), flat washers (3), and left (25) or right (26) top side panel.

c. Repair the left (25) or right (26) top side panel by straightening any bends or dents if possible.

d. Install left (25) or right (26) top side panel, 10 flat washers (3), lock washers (2), and screws (1).

e. Connect power.

4-14. TOP REAR PANEL REPAIR AND REPLACEMENT. See figure 8-2.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove 10 screws (1), lock washers (2), flat washers (3), and top rear panel (27).

c. Repair the top rear panel (27) by straightening any bends or dents if possible.

d. Install top rear panel (27), 10 flat washers (3), lock washers (2), and screws (1).

e. Connect power.

4-15. TOP FRONT PANEL REPAIR AND REPLACEMENT. See figure 8-2.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove stacking bolts. See paragraph 4-12.

c. Remove 30 screws (1), lock washers (2), flat washers (3), and top front panel (28).

d. Repair the top front panel (28) as follows:

(1) Straighten any bends or dents if possible.

(2) Remove any damaged insulation (29) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(3) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(4) Coat the mating surfaces of the metal and the new insulation (29) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(5) Starting with and end, carfully attach the insulation (29) to the metal surface. Press firmly to completely contact.

e. Install top front panel (28) and secure with 30 flat washers (3), lock washers (2), and screws (1).

f. Install stacking bolts. See paragraph 4-12.

g. Connect power.

4-16. RING AND CLIP REPLACEMENT. See figure 8-3.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected and open left rear door.

b. Remove top right side panel (paragraph 4-13) and top front panel (paragraph 4-13).

NOTE

The following procedure applies to only one ring and clip.

c. Remove two nuts (1), lock washers (2), flat washers (3), screws (4), flat washers (3), and ring and clip (5).

d. Install ring and clip (5), two flat washers (3), screws (4), flat washers (3), lock washers (2), and nuts (1).

e. Connect power.

4-17. LEFT FRONT DOOR REPAIR AND REPLACEMENT. See figure 8-3.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Using a drill bit slightly smaller than the rivet (8) diameter, drill out five rivets.

c. Remove left front door (9) assembly and any remaining rivet (8) material.

NOTE

Repair is limited to replacement of damaged components.

4-17. LEFT FRONT DOOR REPAIR AND REPLACEMENT. - CONTINUED

d. Replace gasket (14), (15), (16), (17), (18), (19), (20), (21), (22) or insulation (24), (25) if damaged.

(1) Straighten any bends or dents if possible.

(2) Remove any damaged gasket (14), (15), (16), (17), (18), (19), (20), (21), (22) or insulation (24), (25) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(3) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(4) Coat the mating surfaces of the metal and the new gasket (14), (15), (16), (17), (18), (19), (20), (21), (22) or insulation (24), (25) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(5) Starting with and end, carfully attach the gasket (14), (15), (16), (17), (18), (19), (20), (21), (22) or insulation (24), (25) to the metal surface. Press firmly to completely contact.

e. Replace hinge (27) if damaged.

(1) Using drill bit slightly smaller than rivet (26) diameter, drill out five rivets. Remove hinge (27) and any remaining rivet material.

(2) Install new hinge (27) and secure using five rivets (26).

f. Replace stud (12) if damaged.

NOTE

The following procedure applies to only one stud.

(1) Remove retaining rings (10) and (11), eyelet (13), and stud (12).

(2) Install stud (12), eyelet (13), and retaining rings (11) and (10).

g. Install left front door (9) assembly and secure using five rivets (8).

h. Connect power.

4-18. LEFT REAR DOOR REPAIR AND REPLACEMENT. See figure 8-3.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Using a drill bit slightly smaller than the rivet (8) diameter, drill out five rivets.

c. Remove left rear door (28) assembly and any remaining rivet (8) material.

NOTE

Repair is limited to replacement of damaged components.

d. Replace gasket (33), (34), (35), (36), or (37) if damaged.

(1) Straighten any bends or dents if possible.

(2) Remove any damaged gasket (33), (34), (35), (36), or (37) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(3) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(4) Coat the mating surfaces of the metal and the new gasket (33), (34), (35), (36), or (37) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(5) Starting with and end, carfully attach the gasket (33), (34), (35), (36), or (37) to the metal surface. Press firmly to completely contact.

e. Replace hinge (39) if damaged.

(1) Using drill bit slightly smaller than rivet (38) diameter, drill out five rivets. Remove hinge (39) and any remaining rivet material.

(2) Install new hinge (39) and secure using five rivets (38).

4-18. LEFT REAR DOOR REPAIR AND REPLACEMENT. - CONTINUED

f. Replace stud (31) if damaged.

NOTE

The following procedure applies to only one stud.

(1) Remove retaining rings (29) and (30), eyelet (32), and stud (31).

(2) Install stud (31), eyelet (32), and retaining rings (30) and (29).

g. Replace fluid diagram plate (41) if damaged. See paragraph 4-20.

h. Install left rear door (28) assembly and secure using five rivets (8).

i. Connect power.

4-19. RIGHT PANEL REPAIR AND REPLACEMENT. See figure 8-3.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove 14 screws (42), lock washers (43), flat washers (44), and right panel (45) assembly.

c. Repair the right panel (45) assembly as follows:

(1) Straighten any bends or dents if possible.

(2) Remove any damaged gasket (46), (47) or insulation (48) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(3) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(4) Coat the mating surfaces of the metal and the new gasket (46), (47) or insulation (48) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(5) Starting with and end, carfully attach the gasket (46), (47) or insulation (48) to the metal surface. Press firmly to completely contact.

4-19. RIGHT PANEL REPAIR AND REPLACEMENT. - CONTINUED

d. Install rear panel (45) assembly and secure with 14 flat washers (44), lock washers (43), and screws (42).

e. Connect power.

4-20. PLATE REPLACEMENT. See figure 8-3.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Using a drill bit slightly smaller than the rivet (6) or (40) diameter, drill out rivets as necessary.

c. Remove the plate (7), (41), (50) and any remaining rivet (6) or (40) material.

d. Install plate (28) and secure using rivets (8) as necessary.

e. Connect power.

4-21. CONTROL PANEL COVER REPAIR AND REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Loosen two studs (12) and open control panel cover (9) door.

c. Remove eight screws (5), lock washers (6), flat washers (7), instruction plate (8), and control panel cover (9).

4-21. CONTROL PANEL COVER REPAIR AND REPLACEMENT. CONTINUED

NOTE

Repair is limited to replacement of damaged components.

d. Replace instruction plate (8) if damaged.

e. Replace gasket (14), (15), (16), or (17) if damaged.

(1) Straighten any bends or dents if possible.

(2) Remove any damaged gasket (14), (15), (16), or (17) material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

(3) Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

(4) Coat the mating surfaces of the metal and the new gasket (14), (15), (16), or (17) with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

(5) Starting with and end, carfully attach the gasket (14), (15), (16), or (17) to the metal surface. Press firmly to completely contact.

f. Install control panel cover (9), instruction plate (8), eight flat washers (7), lock washers (6), and screws (5).

g. Close control panel cover (9) door and tighten two studs (12).

h. Connect power.

4-22. CIRCUIT BREAKER CB1 TESTING AND REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Loosen two studs (12) and open control panel cover (9) door.

c. Remove four screws (5), lock washers (6), and flat washers (7).

d. Carefully pull instruction plate (24) and sub panel (25) out as far as wire leads will allow.

e. Tag (item 4, section 7) and disconnect wire leads from circuit breaker (22).

4-22. CIRCUIT BREAKER CB1 TESTING AND REPLACEMENT. CONTINUED

f. Test circuit breaker (22) as follows:

(1) Press circuit breaker (22) button to reset it.

(2) Using a multimeter set to measure continuity, check between terminals 1 and 2. If no continuity is indicated, replace circuit breaker (22).

(a) Remove reset button seal (21) and circuit breaker (22).

(b) Install circuit breaker (22) and reset button seal (21).

g. Connect wire leads to circuit breaker (22) using tags and wiring diagram (figure 9-3). Remove tags.

h. Carefully push instruction plate (24) and sub panel (25) into place.

i. Install four flat washers (7), lock washers (6), and screws (5).

j. Close control panel cover (9) door and tighten two studs (12).

k. Connect power.

4-23. ROTARY SWITCH S1 TESTING AND REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Loosen two studs (12) and open control panel cover (9) door.

c. Remove four screws (5), lock washers (6), and flat washers (7).

d. Carefully pull instruction plate (24) and sub panel (25) out as far as wire leads will allow.

e. Tag (item 4, section 7) and disconnect wire leads from rotary switch (23).

f. Test rotary switch (23) as follows:

(1) Turn rotary switch (23) knob to the OFF/RESET position.

(2) Using a multimeter set to measure continuity, check between terminals 31 and 22, 31 and 23, 21 and 12, 21 and 13, then 11 and 33. If continuity was indicated between any terminals, replace rotary switch (23).

(3) Turn rotary switch (23) knob to the VENT position.

(4) Using a multimeter set to measure continuity, check between terminals 31 and 22 then 21 and 12. If continuity was not indicated between any terminals, replace rotary switch (23).

4-23. ROTARY SWITCH S1 TESTING AND REPLACEMENT. CONTINUED

(5) Turn rotary switch (23) knob to the AUTO position.

(6) Using a multimeter set to measure continuity, check between terminals 31 and 23, 21 and 13, then 11 and 33. If continuity was not indicated between any terminals, replace rotary switch (23).

g. If necessary, replace rotary switch (23) as follows:

(1) Remove rotary switch (23) knob and rotary switch.

(2) Install rotary switch (23) and rotary switch knob.

h. Connect wire leads to rotary switch (23) using tags and wiring diagram (figure 9-3). Remove tags.

i. Carefully push instruction plate (24) and sub panel (25) into place.

j. Install four flat washers (7), lock washers (6), and screws (5).

k. Close control panel cover (9) door and tighten two studs (12).

l. Connect power.

4-24. THERMOSTAT S2 TESTING AND REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Loosen two studs (12) and open control panel cover (9) door.

c. Remove four screws (5), lock washers (6), and flat washers (7).

d. Carefully pull instruction plate (24) and sub panel (25) out as far as wire leads will allow.

e. Tag (item 4, section 7) and disconnect wire leads from thermostat (29).

4-24. THERMOSTAT S2 TESTING AND REPLACEMENT. CONTINUED

f. Test thermostat (29) as follows:

(1) Turn thermostat (29) temperature adjusting dial to the lowest temperature position.

(2) Using a multimeter set to measure continuity, check between terminals 1R and 1B then 2R and 2B. If continuity is indicated, replace thermostat (29).

(3) Check continuity between terminals 3R and 3Y. If no continuity is indicated, replace thermostat (29).

(4) Check continuity between terminals 3R and 3Y while slowly turning temperature adjusting dial toward the highest temperature position. Stop turning the adjusting dial when switch contacts open indicated by no continuity. If switch contacts do not open, replace thermostat (29).

(5) Check continuity between terminals 2R and 2B while continuing to slowly turn temperature adjusting dial toward the highest temperature position. Stop turning the adjusting dial when switch contacts close indicated by continuity. If switch contacts do not close, replace thermostat (29).

(6) Check continuity between terminals 1R and 1B while continuing to slowly turn temperature adjusting dial toward the highest temperature position. Stop turning the adjusting dial when switch contacts close indicated by continuity. If switch contacts do not close, replace thermostat (29).

g. If necessary, replace thermostat (29) as follows:

(1) Remove top front panel. See paragraph 4-15.

(2) Loosen clamps securing thermostat (29) sensing bulb.

(3) Remove four nuts (26), lock washers (27), and flat washers (28).

(4) Carefully remove thermostat (29).

(5) Route thermostat (29) sensing bulb through unit and install thermostat using four flat washers (28), lock washers (27), and nuts (26).

(6) Slip thermostat (29) sensing bulb into clamps and secure.

(7) Install top front panel. See paragraph 4-15.

h. Connect wire leads to thermostat (29) using tags and wiring diagram (figure 9-3). Remove tags.

i. Carefully push instruction plate (24) and sub panel (25) into place.

j. Install four flat washers (7), lock washers (6), and screws (5).

k. Close control panel cover (9) door and tighten two studs (12).

l. Connect power.

4-25. RELAY K4 OR K5 TESTING AND REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove control panel cover. See paragraph 4-21.

c. Remove relay (51).

d. Test relay (51) as follows:

(1) Using a multimeter set to measure continuity, check between terminals 7 and 4, 8 and 5, then 9 and 6. If continuity was indicated between any terminals, replace relay (51).

(2) Check continuity between terminals 9 and 3 then A and B. If continuity is not indicated, replace relay (51).

e. Install relay (51).

f. Install control panel cover. See paragraph 4-21.

g. Connect power.

4-26. RELAY K3 TESTING AND REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove control panel cover. See paragraph 4-21.

c. Tag (item 4, section 7) and disconnect wire leads from relay (58).

d. Test relay (58) as follows:

(1) Using a multimeter set to measure continuity, check between terminals L1 and T1, L2 and T2, L3 and T3, then A-COM and A-NO. If continuity was indicated between any terminals, replace relay (58).

(2) Check continuity between terminals 1 and 2, B-COM and B-NC, then A-COM and A-NC. If continuity was not indicated between any terminals, replace relay (58).

4-26. RELAY K3 TESTING AND REPLACEMENT. CONTINUED

e. If necessary, replace relay (58) as follows:

(1) Remove four nuts (76), lock washers (77), and flat washers (78).

(2) Carefully pull sub-panel (79) out as far as wire leads will allow.

(3) Remove four nuts (54), lock washers (55), flat washers (56), screws (57), and relay (58).

(4) Install relay (58), four screws (57), flat washers (56), lock washers (55), and nuts (54).

(5) Carefully push sub-panel (79) into place and install four flat washers (78), lock washers (77), and nuts (76).

f. Connect wire leads to relay (58) using tags and wiring diagram (figure 9-3). Remove tags.

g. Install control panel cover. See paragraph 4-21.

h. Connect power.

4-27. RELAY K1, K2, K7, AND K8 TESTING AND REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove control panel cover. See paragraph 4-21.

c. Tag (item 4, section 7) and disconnect wire leads from relay (61).

d. Test relay (61) as follows:

(1) Using a multimeter set to measure continuity, check between terminals L1 and T1, L2 and T2, L3 and T3, then A-COM and A-NO. If continuity was indicated between any terminals, replace relay (61).

(2) Check continuity between terminals 1 and 2. If no continuity was indicated, replace relay (61).

e. If necessary, replace relay (61) as follows:

(1) Remove four nuts (76), lock washers (77), and flat washers (78).

(2) Carefully pull sub-panel (79) out as far as wire leads will allow.

(3) Remove four nuts (59), lock washers (6), flat washers (7), screws (60), and relay (61).

(4) Install relay (61), four screws (60), flat washers (7), lock washers (6), and nuts (59).

(5) Carefully push sub-panel (79) into place and install four flat washers (78), lock washers (77), and nuts (76).

4-27. RELAY K1, K2, K7, AND K8 TESTING AND REPLACEMENT. CONTINUED

f. Connect wire leads to relay (61) using tags and wiring diagram (figure 9-3). Remove tags.

g. Install control panel cover. See paragraph 4-21.

h. Connect power.

4-28. TIME DELAY RELAY K6 TESTING AND REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove control panel cover. See paragraph 4-21.

c. Tag (item 4, section 7) and disconnect wire leads from time delay relay (66).

d. Test time delay relay (66) as follows:

(1) Using a multimeter set to measure continuity, check between terminals 1 and 3. If continuity was indicated, replace time delay relay (66).

(2) Check continuity between terminals H2 and H4. If no continuity was indicated, replace time delay relay (66).

e. If necessary, replace time delay relay (66) as follows:

(1) Remove four nuts (76), lock washers (77), and flat washers (78).

(2) Carefully pull sub-panel (79) out as far as wire leads will allow.

(3) Remove two nuts (62), lock washers (63), flat washers (64), screws (65), and time delay relay (66).

(4) Install time delay relay (66), two screws (65), flat washers (64), lock washers (63), and nuts (62).

(5) Carefully push sub-panel (79) into place and install four flat washers (78), lock washers (77), and nuts (76).

f. Connect wire leads to time delay relay (66) using tags and wiring diagram (figure 9-3). Remove tags.

g. Install control panel cover. See paragraph 4-21.

h. Connect power.

4-29. TERMINAL BOARD TB1, TB2, AND TB3 REPLACEMENT. See figure 8-4.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove control panel cover. See paragraph 4-21.

c. Remove two nuts (26) or (54), lock washers (27) or (55), flat washers (28) or (56), and cover (71) or (68).

d. Tag (item 4, section 7) and disconnect wire leads from terminal board (69) or (73).

e. Remove four nuts (76), lock washers (77), and flat washers (78).

f. Carefully pull sub-panel (79) out as far as wire leads will allow.

g. Remove two nuts (26) or (54), flat washers (28) or (56), spacer posts (72) or (67), screws (74) or (70), and terminal board (73) or (69).

h. Install terminal board (73) or (69), two screws (74) or (70), spacer posts (72) or (67), flat washers (28) or (56), and nuts (26) or (54).

i. Carefully push sub-panel (79) into place and install four flat washers (78), lock washers (77), and nuts (76).

j. Connect wire leads to terminal board (69) or (73) using tags and wiring diagram (figure 9-3). Remove tags.

k. Install cover (71) or (68), two flat washers (28) or (56), lock washers (27) or (55), and nuts (26) or (54).

l. Install control panel cover. See paragraph 4-21.

m. Connect power.

4-30. WIRES, CABLES, AND HARNESSES TESTING, REPAIR, AND REPLACEMENT.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Test wire, cable or harness as follows:

(1) Open/remove panels and covers as necessary to access wire, cable, or harness.

(2) Tag (item 4, section 7) and disconnect wire leads from components as necessary to isolate the wire, cable, or harness being tested.

(3) Using multimeter set to measure continuity, check each end of the wire lead(s).

(4) Replace any wire lead(s) that do not show continuity.

(5) Connect wire lead(s) per tag and wiring diagram (figure 9-3). Remove tag.

c. Repair wire, cable, or harness as follows:

WARNING

Solder and flux contain materials which are hazardous to health. Avoid breathing vapors or fumes from soldering operations. Perform operations only in well ventilated areas. Wash hands with soap and water after handling solder and flux. Wear thermal gloves and protective goggles or face shield to protect against burns.

NOTE

Repairs can be performed to replace terminal ends or to splice wire when cut.

(1) 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. Flux (item 5, section 7) should be brushed onto the joint before soldering. Wires should always be heated to the point at which the solder (item 6, section 7) 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.

(2) 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 length of 1 inch (2.5 cm) for covering joints at terminals or connectors, or to a length about 1/2 inch (1.3 cm) longer than the joint to be insulated. 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.

4-30. WIRES, CABLES, AND HARNESSES TESTING, REPAIR, AND REPLACEMENT. CONTINUED

(3) Splicing Wire. To repair broken or cut wires that are otherwise sound, the mating ends can be stripped and spliced. Solder and apply insulation as described above.

(4) Crimping Terminals. To install a terminal on the end of a wire, strip 1/4-1/2 inch (0.6-1.3 cm) of insulation from the end of the wire and apply a one inch (2.4 cm) piece of heat shrink tubing (if the terminals are of the uninsulated type). Insert wire-end into the shank of the terminal. Crimp the shank and install heat-shrink tubing, if necessary.

d. Replace wire, cable, or harness as follows:

(1) Tag (item 4, section 7) and disconnect wire lead(s) from component.

(2) Remove tiedown straps and loosen clamp(s) as necessary to remove wire(s).

(3) Remove any old silicone RTV remaining in grommets.

(4) Carefully route wire lead(s) through clamp(s) and grommet(s) as necessary.

(5) Connect wire lead(s) to component using tags and wiring diagram (figure 9-3). Remove tags.

(6) Install tiedown straps as necessary and tighten any clamp(s) that were loosened for removal.

(7) Apply silicone RTV (item 7, section 7) into evaporator frame grommets to seal evaporator enclosure.

(8) Install/close any covers or panels removed to access wire, cable, or harness.

e. Connect power.

4-31. CONDENSER FAN REPLACEMENT. See figure 8-6.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove condenser fan grille. See paragraph 4-9.

c. Loosen condenser fan (5) setscrews and remove condenser fan.

d. Install condenser fan (5) and tighten setscrews.

e. Install condenser fan grille. See paragraph 4-9.

f. Connect power.

4-32. CONDENSER FAN MOTOR B2 TESTING AND REPLACEMENT. See figure 8-6.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove condenser fan. See paragraph 4-31.

c. Tag (item 4, section 7) and disconnect wire leads from condenser fan motor (10).

d. Test condenser fan motor (10) as follows:

(1) Using a multimeter set to measure continuity, check between condenser fan motor (10) leads T1 and T2, T1 and T3, then T2 and T3. If no continuity was indicated, replace condenser fan motor.

(2) Check continuity between condenser fan motor (10) case and each lead T1, T2, and T3. If continuity was indicated between case and any lead, replace condenser fan motor.

(3) Check condenser fan motor (10) shaft for loosenes and free turning. Replace condenser fan motor if loose or binding.

4-32. CONDENSER FAN MOTOR B2 TESTING AND REPLACEMENT. CONTINUED

e. If necessary, replace condenser fan motor (10) as follows:

(1) Support condenser fan motor (10) then remove nut (6), lock washer (7), flat washer (8), screw (9), and flat washer (8). Carefully remove condenser fan motor.

(2) Install condenser fan motor (10) and support in place. Install flat washer (8), screw (9), flat washer (8), lock washer (7), and nut (6).

f. Connect wire leads to condenser fan motor (10) using tags and wiring diagram (figure 9-3). Remove tags.

g. Install condenser fan. See paragraph 4-31.

h. Install condenser fan grille. See paragraph 4-9.

i. Connect power.

4-33. CONDENSER FAN MOUNT AND VENTURI REPLACEMENT. See figure 8-6.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove condenser fan motor. See paragraph 4-32.

c. Remove 16 screws (1), lock washers (2), flat washers (3) and condenser fan venturi (16) with mount (15).

d. Remove four nuts (11), lock washers (12), flat washers (13), screws (14), and condenser fan mount (15).

e. Install condenser fan mount (15), four screws (14), flat washers (13), lock washers (12), and nuts (11).

f. Install condenser fan venturi (16) with mount (15), 16 flat washers (3), lock washers (2), and screws (1).

g. Install condenser fan motor. See paragraph 4-32.

h. Install condenser fan grille. See paragraph 4-9.

i. Connect power.

4-34. V-BELT REPLACEMENT. See figure 8-7.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Open left front door.

c. Note which pulley (3) or (5) is being used. Loosen/adjust nuts (10) to release tension on V-belt (1). Remove V-belt.

d. Install V-belt (1) onto pulley (3) or (5) as noted during removal. Adjust/tighten nuts (10) until V-belt deflects 3/8 in. when 4 lb force is applied to the mid-point of the belt.

e. Close left front door.

f. Connect power.

4-35. EVAPORATOR FAN MOTOR B1 TESTING AND REPLACEMENT. See figure 8-7.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Note which pulley (3) or (5) is being used then remove V-belt. See paragraph 4-34.

c. Tag (item 4, section 7) and disconnect wire leads from evaporator fan motor (9).

d. Test evaporator fan motor (9) as follows:

(1) Using a multimeter set to measure continuity, check between evaporator fan motor (9) leads T1 and T2, T1 and T3, then T2 and T3. If no continuity was indicated, replace evaporator fan motor.

(2) Check continuity between evaporator fan motor (9) case and each lead T1, T2, and T3. If continuity was indicated between case and any lead, replace evaporator fan motor.

(3) Check evaporator fan motor (9) shaft for loosenes and free turning. Replace evaporator fan motor if loose or binding.

4-35. EVAPORATOR FAN MOTOR B1 TESTING AND REPLACEMENT. CONTINUED

e. If necessary, replace evaporator fan motor (9) as follows:

(1) Support evaporator fan motor (9) then remove four screws (6), lock washers (7), and flat washers (8). Carefully remove evaporator fan motor.

(2) Remove variable drive pulley (2).

(3) Install evaporator fan motor (9) and support in place. Install four flat washers (8), lock washers (7), and screws (6).

(4) Install variable drive pulley (2) and align with pulley (3) or (5) as noted during removal.

f. Connect wire leads to evaporator fan motor (9) using tags and wiring diagram (figure 9-3). Remove tags.

g. Install and adjust V-belt. See paragraph 4-34.

h. Close left front door.

i. Connect power.

4-36. EVAPORATOR FAN REPLACEMENT. See figure 8-7.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Note which pulley (3) or (5) is being used then remove V-belt. See paragraph 4-34.

c. Remove top front panel. See paragraph 4-15.

d. Remove discharge air duct adapter. See paragraph 4-6.

e. Remove 12 screws (22), lock washers (7), and flat washers (8).

f. Remove two screws (24), lock washers (17), and flat washers (18). Carefully remove evaporator fan (25) and air discharge plenum (23).

g. Remove 10 nuts (13), lock washers (7), flat washers (8), screws (22), and air discharge plenum (23).

h. Note position of pulleys (3) and (5). Remove pulleys.

i. Install pulleys (3) and (5) as noted during removal.

j. Install air discharge plenum (23), 10 screws (22), flat washers (8), lock washers (7), and nuts (13).

4-36. EVAPORATOR FAN REPLACEMENT. CONTINUED

k. Carefully install evaporator fan (25) and discharge plenum (23). Install two flat washers (18), lock washers (17), and screws (24).

l. Install 12 flat washers (8), lock washers (7), and screws (22).

m. Loosen and align variable drive pulley (2) with pulley (3) or (5) as noted during removal. Tighten variable drive pulley.

n. Install discharge air duct adapter. See paragraph 4-6.

o. Install top front panel. See paragraph 4-15.

p. Install and adjust V-belt. See paragraph 4-34.

q. Close left front door.

r. Connect power.

4-37. FLEXIBLE DUCTS AND DUCT RACKS REPLACEMENT. See figure 8-8.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Open left rear door.

c. Turn latches on duct rack (2) or (4) and remove flexible duct (1) or (3).

d. Remove hardware securing duct rack (2) or (4) and remove duct rack.

e. Install duct rack (2) or (4) and secure with appropriate hardware.

f. Install flexible ducts (1) or (3) and secure by turning latches on duct rack (2) or (4).

g. Close left rear door.

h. Connect power.

4-38. HIGH TEMPERATURE CUTOUT SWITCH S4 TESTING AND REPLACEMENT. See figure 8-9.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove top front panel. See paragraph 4-15.

c. Tag (item 4, section 7) and disconnect wire leads from high temperature cutout switch (30).

d. Test high temperature cutout switch (30) as follows:

(1) Using a multimeter set to measure continuity, check between high temperature cutout switch (30) leads 1 and 2. If no continuity was indicated, replace high temperature cutout switch.

(2) Check continuity between high temperature cutout switch (30) case and each lead 1, and 2. If continuity was indicated between case and any lead, replace high temperature cutout switch.

e. If necessary, replace high temperature cutout switch (30) as follows:

(1) Remove two nuts (1), lock washers (2), flat washers (3), screws (29), and high temperature cutout switch (30).

(2) Install high temperature cutout switch (30), two screws (29), flat washers (3), lock washers (2), and nuts (1).

f. Connect wire leads to high temperature cutout switch (30) using tags and wiring diagram (figure 9-3). Remove tags.

g. Install top front panel. See paragraph 4-15.

h. Connect power.

4-39. HEATING ELEMENTS HR1 - HR6 TESTING AND REPLACEMENT. See figure 8-9.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove top front panel. See paragraph 4-15.

c. Remove right panel. See paragraph 4-19.

d. Remove four screws (11), lock washers (12), flat washers (13), and cover (14).

e. Tag (item 4, section 7) and disconnect wire leads from heating element(s) (31).

f. Test heating element(s) (31) as follows:

(1) Using a multimeter set to measure continuity, check between heating element(s) (31) leads. If no continuity was indicated, replace heating element(s).

(2) Check continuity between heating element(s) (31) sheath and each lead. If continuity was indicated between case and any lead, replace heating element(s).

g. If necessary, replace heating element(s) (31) as follows:

(1) Remove mounting nut and lock washer from heating element(s) (31) then remove heating element(s).

(2) Install heating element(s) (31) then mounting nut and lock washer.

h. Connect wire leads to heating element(s) (31) using tags and wiring diagram (figure 9-3). Remove tags.

i. Install cover (14), four flat washers (13), lock washers (12), and screws (11).

j. Install right panel. See paragraph 4-19.

k. Install top front panel. See paragraph 4-15.

l. Connect power.

4-40. REFRIGERATION SYSTEM REPAIRS.

The refrigeration system must be totally discharged before any maintenance is performed on system components. Purging is required whenever brazing/debrazing of component is required. Dehydrator replacement and leak testing are required after any system component has been removed and replaced. After repairs, the system must be properly evacuated and charged to function correctly.

4-41. SERVICE MANIFOLD INSTALLATION. See figure 8-10.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Install service manifold as follows:

(1) Open left rear door.

(2) Remove two charging valve (28) caps.

(3) Check that all four service manifold valves are closed then connect the compound and pressure gauge hoses to the appropriate charging valves (28).

(4) Connect charge hose to recovery unit.

(5) Open service manifold pressure gauge valve and charge valve. Operate recovery unit and allow refrigerant to purge for 3-5 seconds. Close pressure gauge and charge valves then shut down recovery unit.

c. Remove service manifold as follows:

(1) Close all four service manifold valves.

(2) Operate recovery unit and allow refrigerant to purge from charge hose. Shut down recovery unit.

(3) Disconnect pressure and compound gauge hoses from charging valves (28).

(4) Disconnect charge hose from recovery unit.

(5) Install two charging valve (28) caps.

(6) Close left rear door.

4-42. DISCHARGING THE REFRIGERANT SYSTEM.

a. Install service manifold. See paragraph 4-41.

CAUTION

Follow instructions for specific refrigerant recovery unit being used to avoid compressor oil loss. Loss of oil could result in compressor damage.

NOTE

Venting refrigerant into the atmosphere rather than recovering it is subject to pending EPA restrictions. Venting the refrigerant may be a violation of public law and subject to severe penalties.

b. Open service manifold pressure and compound gauge valves.

c. Open service manifold charge valve. Operate recovery unit until all refrigerant has been removed from system.

d. Close service manifold valves.

e. Shut-down refrigerant recovery unit.

f. Remove service manifold. See paragraph 4-41.

4-43. PURGING THE REFRIGERANT SYSTEM.

NOTE

The refrigeration system must be purged with dry nitrogen before brazing is performed on any component. A flow of dry nitrogen should be continued during all brazing operations to minimize internal oxidation and scaling.

a. Discharge the refrigerant system but leave service manifold installed. See paragraph 4-42.

b. Disconnect charge hose from recovery unit and connect to nitrogen regulator and nitrogen tank (item 8, section 7).

c. Disconnect the compound gage hose from the service manifold and place end in a suitable container to catch any oil that may come out.

d. Be sure the service manifold compound gage and vacuum valves are closed.

e. Open the service manifold pressure gage and charge valves.

f. Open the nitrogen tank valve and adjust the regulator so that approximately 1-2 cfm (0.028-0.057 m^3/minute) of nitrogen flows through the system.

g. Check discharge from the hose attached to the suction service valve to be sure that no oil is being forced out of the system.

4-43. PURGING THE REFRIGERANT SYSTEM. CONTINUED

h. Perform any brazing/debrazing operations necessary.

i. When purging is completed, close nitrogen tank valve.

j. Disconnect the charge hose from nitrogen regulator.

k. Connect the compound gage hose to service manifold.

4-44. BRAZE/DEBRAZE PROCEDURE.

a. Purge the refrigerant system. See paragraph 4-43.

a. Debraze as follows:

(1) Protect wiring harnesses and other components with appropriate heat shields.

NOTE

It may be easier to access a component by cutting or debrazing the copper lines in accessible areas and removing part of the interconnecting tubing with the component.

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

WARNING

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be discharged from the system and the entire system must be purged with dry nitrogen before beginning any brazing operation.

CAUTION

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.

(3) Check that the system is being purged and apply sufficient heat uniformly around the joint to quickly melt the filler alloy. Remove heat as soon as the joint is separated.

b. Clean all filler alloy from debrazed joints before assembly. Heat each piece of the joint until the filler is melted and then wipe it away with a wire brush. Be sure no filler alloy or other debris is left inside any tubing, fitting, or component. Use abrasive cloth (item 9, section 7) as necessary to clean joints.

4-44. BRAZE/DEBRAZE PROCEDURE. CONTINUED

c. Braze.

(1) Protect wiring harnesses and other components with appropriate heat shields.

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

NOTE

If interconnecting tubing was removed with a component, braze tubing to the new components before installation.

(3) Apply brazing flux (item 10, section 7) to mating joint surfaces then position component or assembly into place.

WARNING

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be discharged from the system and the entire system must be purged with dry nitrogen before beginning any brazing operation.

CAUTION

- 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.
- Brazing a joint without nitrogen flowing through the tubing, will cause deposits to form on the inside of the tube and may cause obstructions in the refrigeration system or equipment damage.

NOTE

- 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.
- 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.

(4) Check that the system is being purged and apply sufficient heat uniformly around the joint to quickly melt the filler alloy (item 11 or 12, section 7). Remove heat and stop purging as soon as brazing is completed.

4-45. LEAK TESTING THE REFRIGERANT SYSTEM.

a. Install service manifold. See paragraph 4-41.

NOTE

- To perform leak test, it is necessary that the system be pressurized with a proportion of refrigerant gas.
- The electronic gas tester is highly sensitive to the presence of a minute quantity of gas in the air, and is quite effective in the detection of small leaks. However, due to rapid dispersion of refrigerant gas into surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well ventilated area but draft free area. Use procedures contained in TM 9-4940-435-14, "Leak Detector, Refrigerant Gas".

b. To pressurize a system that has some refrigerant charge.

(1) Connect the charge hose to a refrigerant cylinder (item 13, section 7) set to deliver gas only.

(2) Check that service manifold vacuum valve is closed.

(3) Open the service manifold compound gage, pressure gage, and charge valves.

(4) Open refrigerant cylinder valve and pressurize system to 100 psi (7.1 kg/cm^2).

c. To pressurize a system that has been discharged and purged.

(1) Connect the charge hose to a refrigerant cylinder (item 13, section 7) set to deliver gas only.

(2) Check that service manifold vacuum valve is closed.

(3) Open the service manifold compound gage, pressure gage, and charge valves.

(4) Open refrigerant cylinder valve and pressurize system to 40-50 psi (2.8-3.5 kg/cm^2).

(5) Close service manifold valves and refrigerant cylinder valve.

(6) Disconnect charge hose from the refrigerant cylinder and connect it to a nitrogen regulator and nitrogen cylinder (item 8, section 7).

(7) Open the service manifold compound gage, pressure gage, and charge valves.

(8) Open nitrogen cylinder valve and pressurize system to 350 psi (24.7 kg/cm^2).

d. Test for leaks at all points of possible leakage using a refrigerant gas leak detector. If a leak is found, take necessary steps to replace damaged components or repair leak.

e. If no leak was found and refrigerant only was used to pressurize the system, check refrigeration unit charge.

f. If no leak was found and nitrogen was used to pressurize the system, discharge, evacuate, and charge the refrigeration unit.

4-46. EVACUATING THE REFRIGERANT SYSTEM.

NOTE

The refrigeration system must be evacuated to remove all moisture and non-condensables before it is charged.

a. Discharge the refrigerant system (see paragraph 4-42) but do not remove the service manifold.

b. Install new dehydrator (see paragraph 4-48).

c. Check that service manifold charge valve is closed then connect the vacuum hose to vacuum pump and start pump.

d. Open service manifold high pressure gauge, compound gauge, and vacuum valves.

e. Run vacuum pump until at least 29 inches of mercury is measured on compound gage. Continue running vacuum pump for one more hour, while observing the compound gauge. If gage needle moves back and forth, you have a leak which must be located and repaired.

NOTE

Inability to reach and hold 29 inches of mercury may indicate either a leak or a problem with the vacuum pump.

f. Close service manifold vacuum valve and stop vacuum pump. Note reading on compound gauge and observe for 10 minutes. If pressure rises, moisture may still be in the system or a leak exists. If pressure rose, repeat evacuation and re-check. If the pressure rise occurs again at the same speed, a leak is in the system and must be repaired. If the pressure rise was slower the second time, moisture remains in the system and the evacuation process must be repeated until there is no rise.

g. Close service manifold high pressure gauge and compound gauge valves.

h. Disconnect the vacuum hose from vacuum pump.

i. Charge the refrigerant system. See paragraph 4-47.

4-47. CHARGING THE REFRIGERANT SYSTEM.

a. If the unit refrigerant system has been evacuated and requires a full charge, install the service manifold (see paragraph 4-41) and proceed as follows:

CAUTION

The system must be evacuated before charging. Moisture in the system will prevent the refrigeration unit from operating properly.

(1) Connect the charge hose to a refrigerant tank (item 13, section 7) set to deliver gas and the vacuum hose to reclaim unit.

(2) Check that compound gauge and pressure gauge valves are closed.

(3) Open vacuum and charge valves.

(4) Open refrigerant tank valve. Operate reclaim unit for 3 to 5 seconds to purge hoses.

(5) Close refrigerant tank, vacuum, and charge valves then stop reclaim unit.

(6) Set refrigerant tank to deliver liquid only.

(7) Place refrigerant tank on an accurate scale to measure and record weight.

CAUTION

Never introduce liquid refrigerant into the suction side of the refrigerant system. This can cause damage to the compressor.

(8) With system shutdown, open refrigerant tank, pressure gauge, and charge valves. Allow liquid refrigerant to enter system until tank weight has decreased by 10 pounds (4.5 kg) or until system pressure has equalized, whichever occurs first.

(9) Close refrigerant tank, charge, and pressure gauge valves.

NOTE

If 11 pounds (5 kg) full charge was obtained, skip steps (10) through (15).

(10) Connect power at power source.

(11) Turn unit on and operate the refrigerant system.

(12) Set refrigerant tank to deliver gas only.

(13) Check that all service manifold valves are closed.

4-47. CHARGING THE REFRIGERANT SYSTEM. CONTINUED

WARNING

Never introduce high discharge pressure into a refrigerant tank. This can cause the tank to rupture and injure personnel.

CAUTION

Never introduce liquid refrigerant into the suction side of the refrigeration system. This can cause damage to the compressor.

(14) Open refrigerant tank, compound gauge, and charge valves.

(15) Monitor weight of the refrigerant tank until total 10 pounds (4.5 kg) charge is obtained. When system is fully charged, immediately close refrigerant tank, compound gauge, and charge valves.

(16) Run unit refrigerant system for 15 minutes and observe sight glass.

(a) Milky white or bubbly liquid means system has low charge.

(b) Clean bubble free liquid means the system is fully charged.

(17) Be sure all service manifold valves are closed.

(18) Shut off unit.

b. If the unit refrigerant system still has a partial charge, install the service manifold (see paragraph 4-41) and proceed as follows:

(1) Connect the charge hose to a tank of refrigerant (item 13, section 7) set to deliver gas and the vacuum hose to reclaim unit.

(2) Check that compound gauge and pressure gauge valves are closed.

(3) Open vacuum and charge valves.

(4) Open refrigerant tank valve. Operate reclaim unit for 3 to 5 seconds to purge hoses.

(5) Close refrigerant tank, vacuum, and charge valves then stop reclaim unit.

(6) Connect power at power source.

(7) Turn unit on and operate the refrigerant system.

(8) Set refrigerant tank to deliver gas only.

(9) Check that all service manifold valves are closed.

4-47. CHARGING THE REFRIGERANT SYSTEM. CONTINUED

WARNING

Never introduce high discharge pressure into a refrigerant tank. This can cause the tank to rupture and injure personnel.

CAUTION

Never introduce liquid refrigerant into the suction side of the refrigerant system. This can cause damage to the compressor.

(10) Open refrigerant tank, compound gauge, and charge valves.

(11) Run unit refrigerant system for 15 minutes and observe sight glass.

(a) Milky white or bubbly liquid means system has low charge.

(b) Clean bubble free liquid means the system is fully charged.

CAUTION

Never introduce liquid refrigerant into the suction side of refrigerant system. This can cause damage to the compressor.

(12) If charge is low, set refrigerant tank to deliver gas only.

WARNING

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

(13) Check that pressure gauge valve is closed.

(14) Open refrigerant tank, compound gauge, and charge valves.

(15) Charge until sight glass remains clear and bubble free for 15 minutes.

(16) When system is fully charged, immediately close refrigerant tank, compound gauge, and charge valves.

(17) Shut off unit.

(18) Remove service manifold. See paragraph 4-41.

4-48. DEHYDRATOR REPLACEMENT. See figure 8-10.

a. Open left rear door.

b. Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

c. Debraze (paragraph 4-44) the dehydrator (39) fittings and remove it.

d. Install new dehydrator (39) and braze (paragraph 4-44) fittings.

e. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

f. Close left rear door.

4-49. PRESSURE RELIEF VALVE REPLACEMENT. See figure 8-10.

a. Open left rear door.

b. Discharge (paragraph 4-42) the refrigerant system.

c. Remove the pressure relief valve (26).

d. Wrap antisieze tape around the new pressure relief valve (26) and install it.

e. Install new dehydrator. See paragraph 4-48.

f. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

g. Close left rear door.

4-50. LIQUID INDICATOR (SIGHT GLASS) REPLACEMENT. See figure 8-10.

a. Open left rear door.

b. Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

c. Remove two nuts (14), lock washers (15), flat washers (16), clamp (43), two screws (42), and flat washers (16).

d. Debraze (paragraph 4-44) the liquid indicator (45) fittings and remove it.

e. Install new liquid indicator (45) and braze (paragraph 4-44) fittings.

f. Install two flat washers (16), screws (42), clamp (43), two flat washers (16), lock washers (15), and nuts (14).

g. Install new dehydrator. See paragraph 4-48.

h. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

i. Close left rear door.

4-51. CHARGING VALVES REPLACEMENT. See figure 8-10.

a. Open left rear door.

b. Discharge (paragraph 4-42) the refrigerant system.

c. Remove the charging valve (28).

d. Wrap antisieze tape around the new charging valve (28) and install it.

e. Install new dehydrator. See paragraph 4-48.

f. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

g. Close left rear door.

4-52. QUENCH VALVE REPLACEMENT. See figure 8-10.

a. Open left front door.

b. Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

c. Remove any insulation from around quench valve (51) sensing bulb then loosen clamp and remove sensing bulb.

d. Debraze (paragraph 4-44) the quench valve (51) fittings and remove it.

e. Install new quench valve (51) and braze (paragraph 4-44) fittings.

f. Route quench valve (51) sensing bulb carefully into place and secure with clamp. Wrap insulation around sensing bulb and secure with tape (item 15, section 7).

g. Install new dehydrator. See paragraph 4-48.

h. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

i. Close left front door.

4-53. EXPANSION VALVE REPLACEMENT. See figure 8-10.

a. Open left front door.

b. Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

c. Remove any insulation from around expansion valve (57) sensing bulb then loosen clamp and remove sensing bulb.

d. Debraze (paragraph 4-44) the expansion valve (57) fittings and remove it.

e. Install new expansion valve (57) and braze (paragraph 4-44) fittings.

f. Route expansion valve (57) sensing bulb carefully into place and secure with clamp. Wrap insulation around sensing bulb and secure with tape (item 15, section 7).

g. Install new dehydrator. See paragraph 4-48.

h. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

i. Close left front door.

4-54. ACCUMULATOR REPLACEMENT. See figure 8-10.

a. Remove right panel. See paragraph 4-19.

b. Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

c. Remove nut (72), lock washer (73), and flat washer (74).

d. Debraze (paragraph 4-44) the accumulator (75) fittings and remove it.

e. Install new accumulator (75) and braze (paragraph 4-44) fittings.

f. Install flat washer (74), lock washer (73), and nut (72).

g. Remove insulation from old accumulator (75) and secure to new accumulator using tape (item 15, section 7).

h. Install new dehydrator. See paragraph 4-48.

i. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

j. Install right panel. See paragraph 4-19.

4-55. COMPRESSOR B3 TESTING AND REPLACEMENT. See figure 8-10.

WARNING

Voltages and rotating parts used in this air conditioner can kill or injure personnel. Always disconnect power at the source before performing any internal maintenance. Turning the air conditioner off at the control panel does not disconnect the power.

a. Be sure that the power has been disconnected.

b. Remove condenser fan venturi. See paragraph 4-33.

c. Tag (item 4, section 7) and disconnect wire leads from compressor (10).

d. Test compressor (10) as follows:

NOTE

The compressor uses internal thermal overloads for the motor windings. The compressor must be cool to the touch in order for the overloads to close and test to be valid.

(1) Using a multimeter set to measure continuity, check between compressor (10) leads L1 and L2, L1 and L3, then L2 and L3. If no continuity was indicated, replace compressor.

(2) Check continuity between compressor (10) case and each lead L1, L2, and L3. If continuity was indicated between case and any lead, replace compressor.

e. If necessary, replace compressor (10) as follows:

(1) Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

(2) Debraze (paragraph 4-44) the compressor (10) fittings.

(3) Remove four nuts (7), lock washers (2), screws (1), flat washers (3), isolator washers (6) compressor (10), four resilient mounts (4), and spacers (5).

(4) Install new compressor (10) onto four resilient mounts (4) with spacers (5). Install four isolation washers (6), flat washers (3), screws (1), lock washers (2), and nuts (7).

(5) Braze (paragraph 4-44) compressor (10) fittings.

(6) Install new dehydrator. See paragraph 4-48.

(7) Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

f. Connect wire leads to compressor (10) using tags and wiring diagram (figure 9-3). Remove tags.

g. Install condenser fan venturi. See paragraph 4-33.

h. Connect power.

4-56. CONDENSER COIL REPLACEMENT. See figure 8-10.

a. Remove grille and cover. See paragraph 4-8.

b. Remove top rear panel. See paragraph 4-14.

c. Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

d. Debraze (paragraph 4-44) the condenser coil (24) fittings and remove it.

e. Install new condenser coil (24) and braze (paragraph 4-44) fittings.

f. Install new dehydrator. See paragraph 4-48.

g. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

h. Install grille and cover. See paragraph 4-8.

i. Install top rear panel. See paragraph 4-14.

4-57. EVAPORATOR COIL REPLACEMENT. See figure 8-11.

a. Open left front panel.

b. Remove right panel. See paragraph 4-19.

c. Remove evaporator fan motor. See paragraph 4-35.

d. Remove evaporator fan. See paragraph 4-36.

e. Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

f. Remove air filter (1).

g. Remove four screws (2), lock washers (3), flat washers (4), and plate (6) assembly.

h. Debraze (paragraph 4-44) the evaporator coil (10) fittings.

i. Remove left side coil baffle (8) and right side coil baffle (9).

j. Remove six screws (2), lock washers (3), flat washers (4), drip shield (7), and evaporator coil (10) with plate (11).

k. Remove four screws (2), lock washers (3), flat washers (4), and plate (11).

l. Install plate (11), four flat washers (4), lock washers (3), and screws (2).

m. Install evaporator coil (10) with plate (11), drip shield (7), six flat washers (4), lock washers (3), and screws (2).

n. Install left side coil baffle (8) and right side coil baffle (9).

4-57. EVAPORATOR COIL REPLACEMENT. CONTINUED

o. Braze (paragraph 4-44) evaporator coil (10) fittings.

p. Install plate (6) assembly, four flat washers (4), lock washers (3), and screws (2).

q. Install air filter (1).

r. Install new dehydrator. See paragraph 4-48.

s. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

t. Install evaporator fan. See paragraph 4-36.

u. Install evaporator fan motor. See paragraph 4-35.

v. Install right panel. See paragraph 4-19.

w. Close left front panel.

4-58. TUBING AND FITTINGS REPAIR/REPLACEMENT.

a. Open/remove necessary doors/panels to access tubing or fitting being repaired/replaced.

b. Discharge (paragraph 4-42) and purge (paragraph 4-43) the refrigerant system.

c. Remove insulation as necessary from old tubing or fitting.

d. Debraze (paragraph 4-44) the tubing or fitting and remove it.

e. Install new tubing or fitting and braze (paragraph 4-44).

f. Secure insulation, if removed, to new tubing or fitting using tape (item 15, section 7).

g. Install new dehydrator. See paragraph 4-48.

h. Leak test (paragraph 4-45), evacuate (paragraph 4-46), and charge (paragraph 4-47) the refrigeration system.

i. Install/close any panels/doors used to access tubing or fitting.

4-59. AIR FILTER REPLACEMENT. See figure 8-11.

a. Open left front door.

b. Remove air filter (1).

c. Install air filter (1).

d. Close left front door.

4-60. INSULATION REPLACEMENT. See figure 8-12.

a. Open/remove necessary doors/panels to access insulation being replaced.

b. Remove any damaged insulation material by pulling or scraping as much as possible away from the metal surface.

WARNING

Dry cleaning solvent used to clean parts is flammable potentially dangerous to personnel and property. Do not use near flame or excessive heat.

c. Using dry cleaning solvent (item 1, section 7) and rag (item 2, section 7), clean any remaining adhesive from the metal surface.

d. Coat the mating surfaces of the metal and the new insulation with adhesive (item 3, section 7). Let both surfaces air dry until the adhesive is tacky but will not stick to fingers.

e. Starting with and end, carfully attach the insulation to the metal surface. Press firmly to completely contact.

f. Install/close any panels/doors used to access insulation.

SECTION V
TOOLS AND TEST EQUIPMENT

5-1. SPECIAL TOOLS/TEST EQUIPMENT. There are no special tools required to service and maintain this air conditioner.

5-2. STANDARD TOOLS/TEST EQUIPMENT. The equipment required to service this air conditioner are standard to any competent refrigeration/air conditioning repair shop. The following table lists the tools/kits referenced in this manual and are recommended for service of this air conditioner.

Table 5-1. Standard Tool/Test Equipment List.

Item Number	Nomenclature	National Stock Number	Tool Number
1	Shop Equipment (1), Automotive Vehicle	4910-00-754-0654	SC 4910-95-CL-A74
2	Comb, Fin	5120-00-916-6197	
3	Heat Gun	3439-01-037-7268	
4	Tool Kit, Service, Refrigeration Unit	5180-00-597-1474	SC 5180-90-CL-N18
5	Recovery and Recycle Unit, Refrigerant	4130-01-338-2707	
6	Nitrogen Regulator	6680-00-503-1327	

SECTION VI
ACCESSORIES

6-1. AIR CONDITIONER ACCESSORIES. There are no accessories available, or necessary for the air conditioner to operate. There are however several items which are shipped with/in the air conditioner that are loose and required for storage, installation, and operation. The following illustration lists those items.

Item Number	Nomenclature	Part Number
1	Dust Cover 2 each	(97403) 13230E3532
2	Flexible Duct (7 ft)	(97403) 13230E3537-1
3	Flexible Duct (9 ft)	(97403) 13230E3537-2
4	Duct Rack (7 ft)	(97403) 13230E3534-1
5	Duct Rack (9 ft)	(97403) 13230E3534-2
6	Operation, Maintenance, and Illustrated Repair Parts List Technical Manual	(94833) KM-F60S-11 (TM1)
7	Pulley (50 Hz operation)	(97403) 13230E3592-1
8	Pulley Bushing (50 Hz operation)	(97403) 13230E3590
9	Hose Adapter (Drain) 2 each	(97403) 13230E3587-11
10	Silicone Tubing 15 feet long (Drain hose) 2 each	(97403) 13230E6145-2

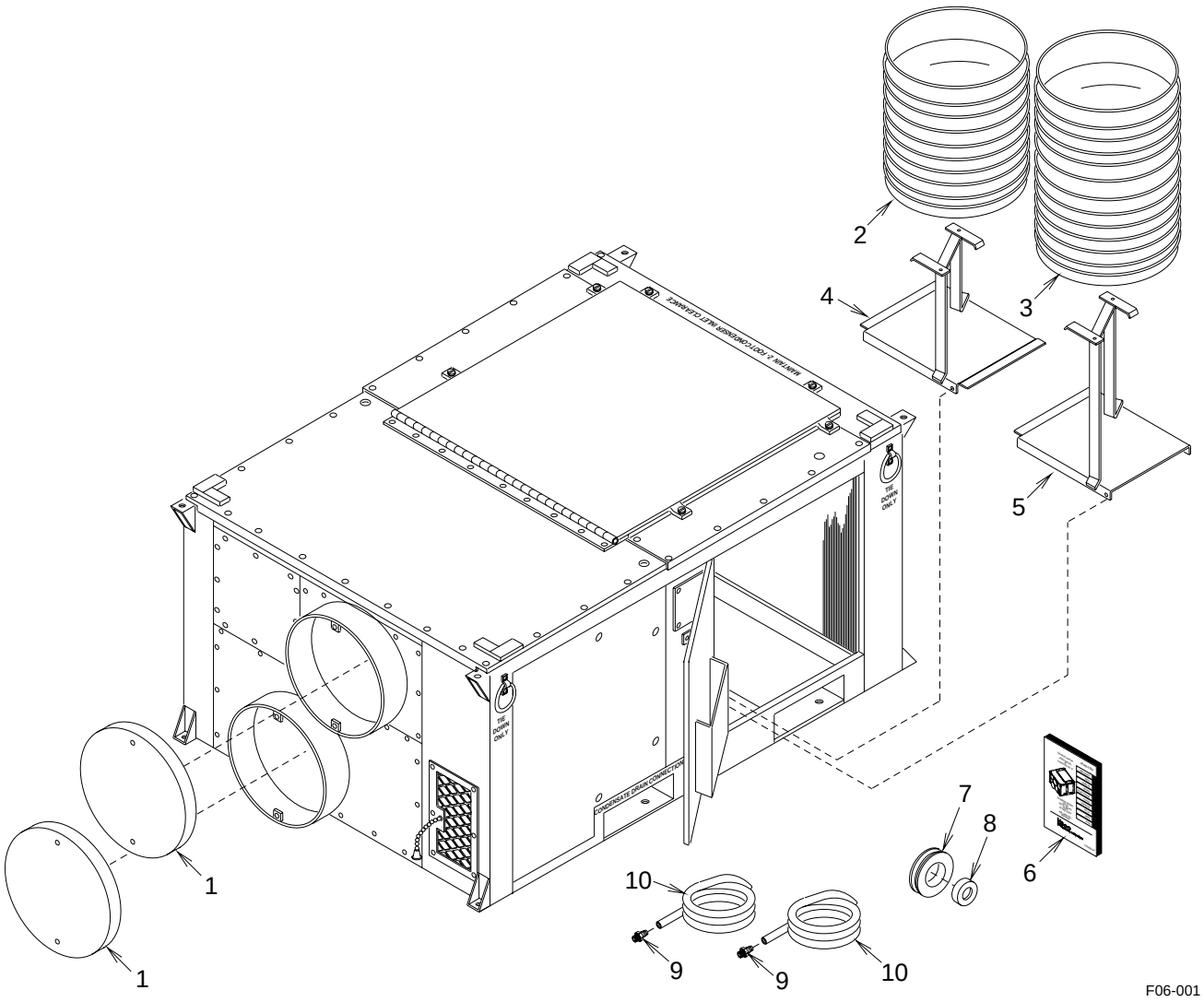

Figure 6-1. Loose Items

SECTION VII
CONSUMABLE ITEMS

7-1. SCOPE. This section lists the consumable items you will need to operate and maintain the air conditioner.

7-2. EXPLANATION OF COLUMNS.

a. Column (1) - Item Number. This number is assigned to the entry in the listing and may be referenced in the narrative instructions to identify the material (e.g., "Use silicone adhesive sealant Item 13, Section VII).

b. Column (2) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

c. Column (3) - 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.

d. Column (4) - 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.

Table 7-1. Consumable Items List.

(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
1	6850-00-274-5421	Solvent, Dry Cleaning, P-D-680 (81348)	gl
2	7920-00-205-1711	Rags	ea
3	3040-00-664-0439	Adhesive, General Purpose	pt
4	9905-00-537-8954	Marker Tag, MIL-T-12755	bx
5	3439-01-045-7940	Flux, Solder, Liquid, Rosin Base, MIL-F-14256	qt
6	3422-00-269-6110	Solder, Lead-Tin, QQ-S-571, Type SN60WRP2	lb
7	8040-00-142-9823	Sealant, Silicone Adhesive, RTV General Purpose, MIL-A-46106, Type I	qt
8	6830-00-292-0732	Nitrogen	cy
9	5350-00-192-5047	Cloth, Abrasive	pg
10	3439-00-640-3713	Flux, Brazing, O-F-499, Type B	qt
11	3439-00-224-3573	Brazing Alloy, Silver, QQ-B-654, Grade 0, I or II	to

(1) Item Number	(2) National Stock Number	(3) Description	(4) U/M
12	3439-00-853-9276	Brazing Alloy, Silver QQ-B-654, Grade III	to
13	6850-00-837-9927	Monoclorodifluoromethane, Technical: W/Cylinder 22 lb (Refrigerant-22) BB-F-1421, Type 22 (81348)	cy
14	8030-00-889-3534	Tape, Antisieze, Polytetrafluoroethylene, MIL-T-27730, Size I	rl
15	5640-00-103-2254	Tape, PPP-T-60, Type IV, Class I	rl

SECTION VIII
PARTS LIST

8-1. PARTS LIST GENERAL INFORMATION. The parts list contains a breakdown of all groups, assemblies, and subassemblies of the component parts that can be maintained on the air conditioner. All parts are listed in disassembly sequence, except where no specific sequence is indicated.

8-2. EXPLANATION AND USE OF COLUMNS.

a. Item Number Column. Lists the number used to identify the part on the illustration.

b. CAGEC Number Column. Lists the five digit Commercial And Government Entity Code as found in SB708-42 which is used to identify the manufacturer, distributor, or Government agency whose part number is used to identify the part.

NOTE

All parts listed with Government agency CAGEC numbers are available for purchase from:

Keco Industries, Inc.
7375 Industrial Road
P.O. Box 428
Florence, Kentucky 41022-0428
(CAGEC 94833)

c. Part Number Column. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), who controls the design and characteristics of the item through their engineering drawings, specifications, standards, or inspection requirements for that item.

d. Description and Usable On Code Column. Lists the item name and a minimum description if appropriate. A Usable On Code may appear in the lower left corner of the last line shown as "UOC:..." to indicate which model the part is used on. If no usable on code is listed, the part is used on all models.

e. Quantity Column. Indicates the quantity of the item used. If a "V" rather than a number is listed, then the quantity is as required (e.g., shims, spacers, etc.).

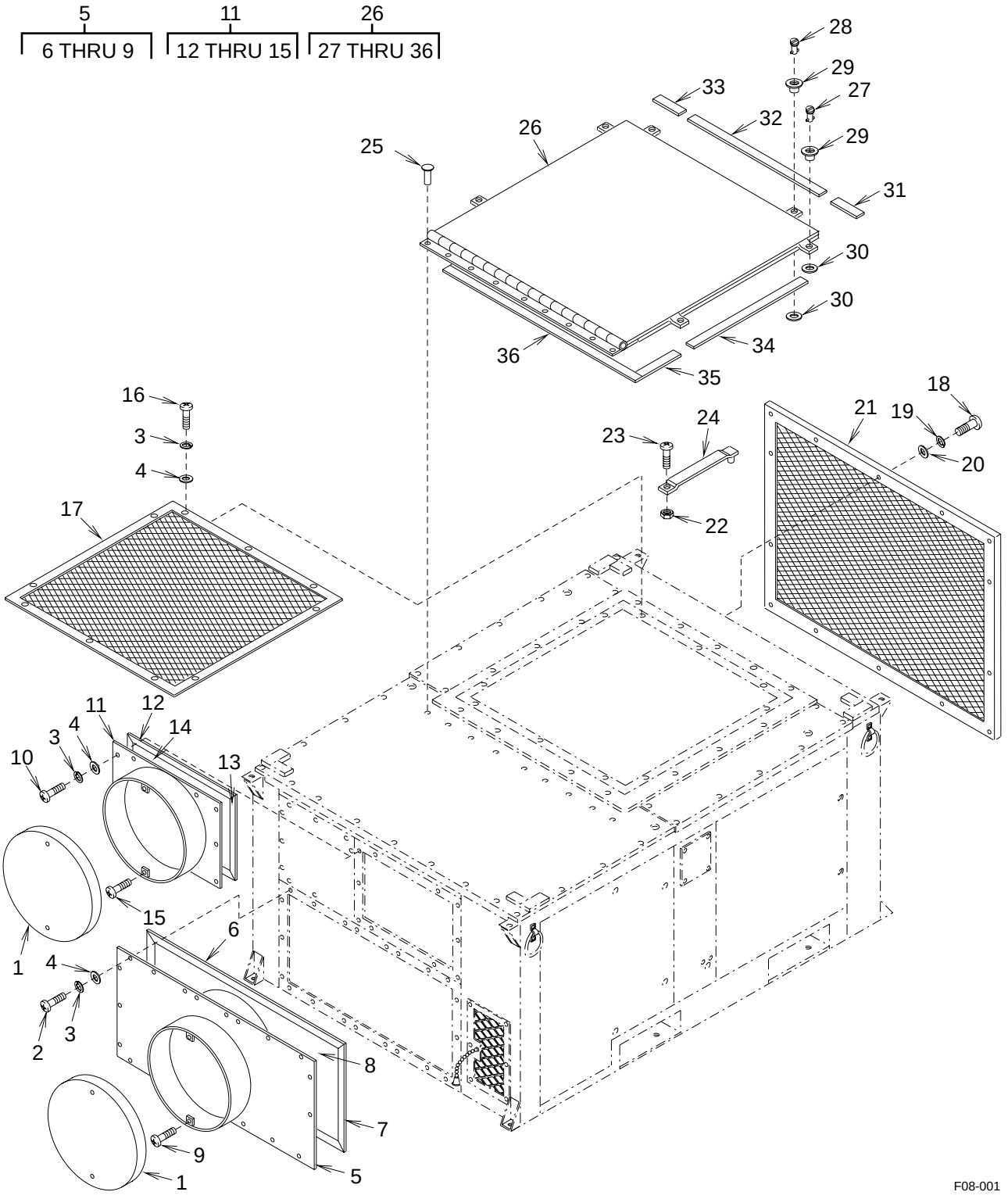

Figure 8-1. Covers, Adapters, and Grilles.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-1. COVERS, ADAPTERS, AND GRILLES.	
1	97403	13230E3532	. COVER, DUST	2
2	96906	MS51957-130	. SCREW, MACH, PAN HD (AP)	34
3	96906	MS35338-62	. WASHER, LOCK SPRING HELICAL	46
4	96906	MS15795-808	.WASHER, FLAT, ROUND	46
5	97403	13230E3531	. ADAPTER, DUCT, AIR INLET	1
6	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT .125 X .50 X 34.88	2
7	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT .125 X .50 X 16.44	2
8	81348	A-A-52404	. . INSULATION 1.00 X 16.44 X 34.88	1
9	96906	MS35207-263	. . SCREW, MACH, PAN HD (AP)	2
10	96906	MS51958-63	. SCREW, MACH, PAN HD	2
11	97403	13230E3533	. ADAPTER, DUCT, DISCHARGE AIR	1
12	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT .125 X .50 X 18.88	2
13	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT .125 X .50 X 14.56	2
14	81348	MIL-I-16562, TYPE M	. . INSULATION 0.50 X 13.56 X 17.88	1
15	96906	MS51958-63	. . SCREW, MACH, PAN HD (AP)	2
16	96906	MS51957-67	. SCREW, MACH, PAN HD	10
17	97403	13230E3571	. GRILLE CONDENSER FAN	1
18	96906	MS51957-80	. SCREW, MACH, PAN HD	18
19	96906	MS35338-63	. WASHER, LOCK SPRING HELICAL	18
20	96906	MS15795-810	. WASHER, FLAT, ROUND	18
21	97403	13230E3509	. GRILLE AND COVER ASSEMBLY	1
22	96906	MS21044C08	. NUT, SELF-LOCKING	2
23	96906	MS51957-45	. SCREW, MACH, PAN HD	2
24	97403	13230E3518	. POSITIONER, DOOR	2
25	81349	M24243/1D402	. RIVET	9
26	97403	13230E3575	. COVER, HINGED	1
27	97403	13214E6499-7	. . STUD	4
28	97403	13214E6499-8Z	. . STUD	2

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
29	97403	13211E3363-2	. . EYELET, METALLIC	6
30	97403	13211E3364-2	. . RING, RETAINING	6
31	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT, ADHESIVE BACKED .125 X .38 X 4.19	1
32	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT, ADHESIVE BACKED .125 X .38 X 16.00	1
33	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT, ADHESIVE BACKED .125 X .38 X 4.94	1
34	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT, ADHESIVE BACKED .125 X .38 X 13.75	2
35	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT, ADHESIVE BACKED .125 X .38 X 10.63	2
36	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT, ADHESIVE BACKED .125 X .38 X 29.69	1

END OF FIGURE

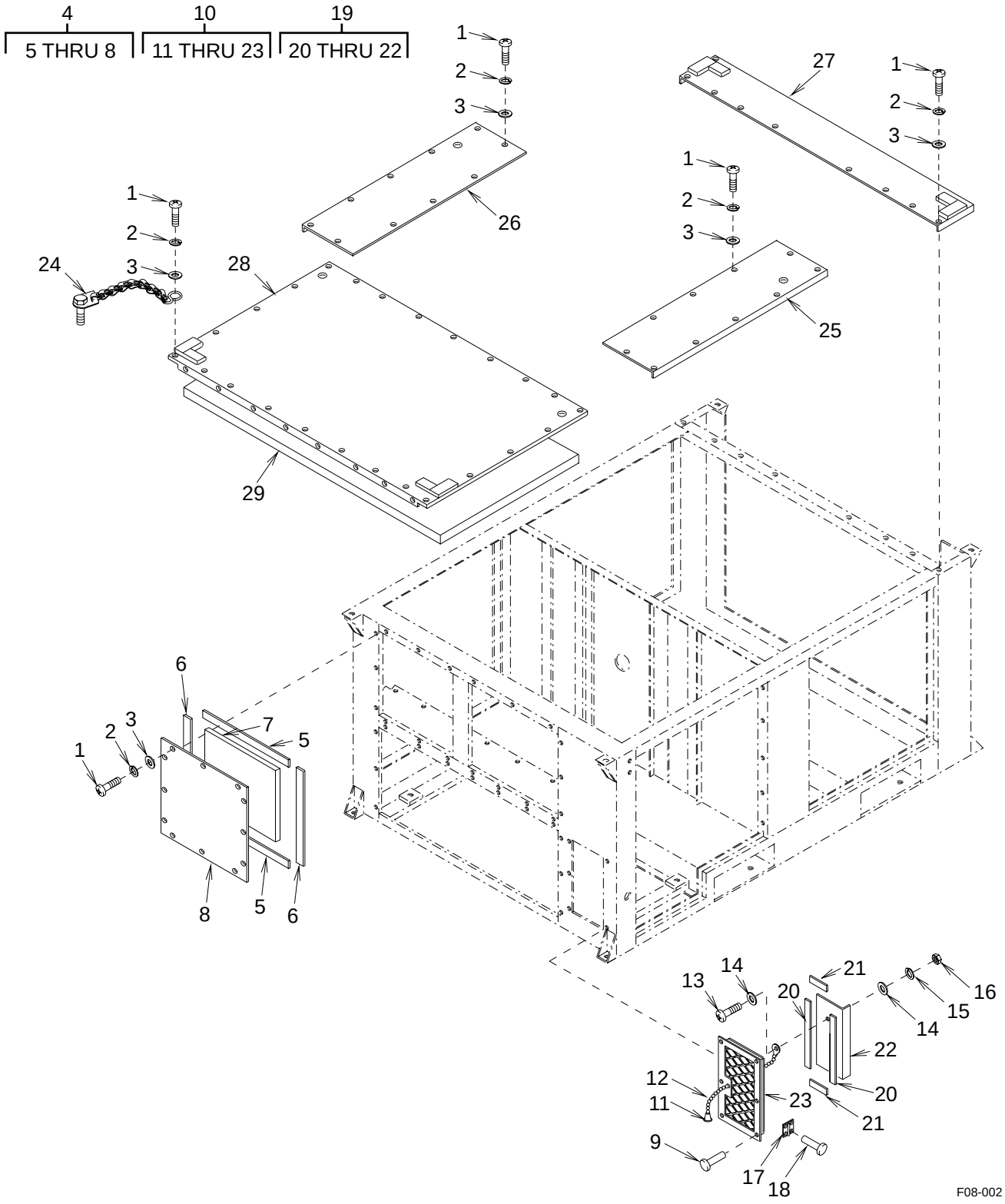

Figure 8-2. Outside Panels-Front, Top, and Rear.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-2. OUTSIDE PANELS-FRONT, TOP, AND REAR.	
1	96906	MS51957-63	SCREW, MACH, PAN HD	42
2	96906	MS35338-62	WASHER, LOCK SPRING HELICAL	42
3	96906	MS15795-808	WASHER, FLAT, ROUND	42
4	97403	13230E3530	PANEL, FRONT	1
5	81349	MIL-R-6130,TYPE II	. GASKET, GRADE A, CONDITION SOFT .125 X .50 X 15.88	2
6	81349	MIL-R-6130,TYPE II	. GASKET, GRADE A, CONDITION SOFT .125 X .50 X 13.69	2
7	81348	A52404-1-A	. INSULATION 1.00 X 12.19 X 13.38	1
8	97403	13230E3530/1	. PANEL	1
9	81349	M24243/1D402	RIVET, BLIND	6
10	97403	13230E3583	DAMPER, FRESH AIR	1
11	97403	13211E8305	. PENDANT, DETACHABLE WITH SLEEVE	1
12	97403	13211E8322	. CHAIN ASSEMBLY	1
13	96906	MS51957-63	. SCREW, MACH, PAN HD	1
14	96906	MS15795-808	. WASHER, FLAT, ROUND	2
15	96906	MS35338-138	. WASHER, LOCK SPRING HELICAL	1
16	96906	MS35649-204	. NUT, HEX	1
17	97403	1311E8191-2	. HINGE	2
18	81349	M24243/1D402	. RIVET, BLIND	8
19	97403	13230E3516	. DOOR, OUTSIDE AIR DAMPER	1
20	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT .125 X .50 X 10.50	2
21	81349	MIL-R-6130,TYPE II	. . GASKET, GRADE A, CONDITION SOFT .125 X .50 X 5.31	2
22	97403	13230E3516/1	. . DOOR	1
23	97403	13230E3515	. FRAME, OUTSIDE AIR DAMPER	1
24	97403	13230E3572	BOLT STACKING	8
25	97403	13230E3503	PANEL, TOP LEFT SIDE	1
26	97403	13230E3502	PANEL, TOP RIGHT SIDE	1
27	97403	13230E3553	PANEL, TOP REAR	1
28	97403	13230E3554	PANEL, TOP FRONT	1

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
29	81348	A52404-1-A	. INSULATION 1.00 X 25.38 X 43.66	1

END OF FIGURE

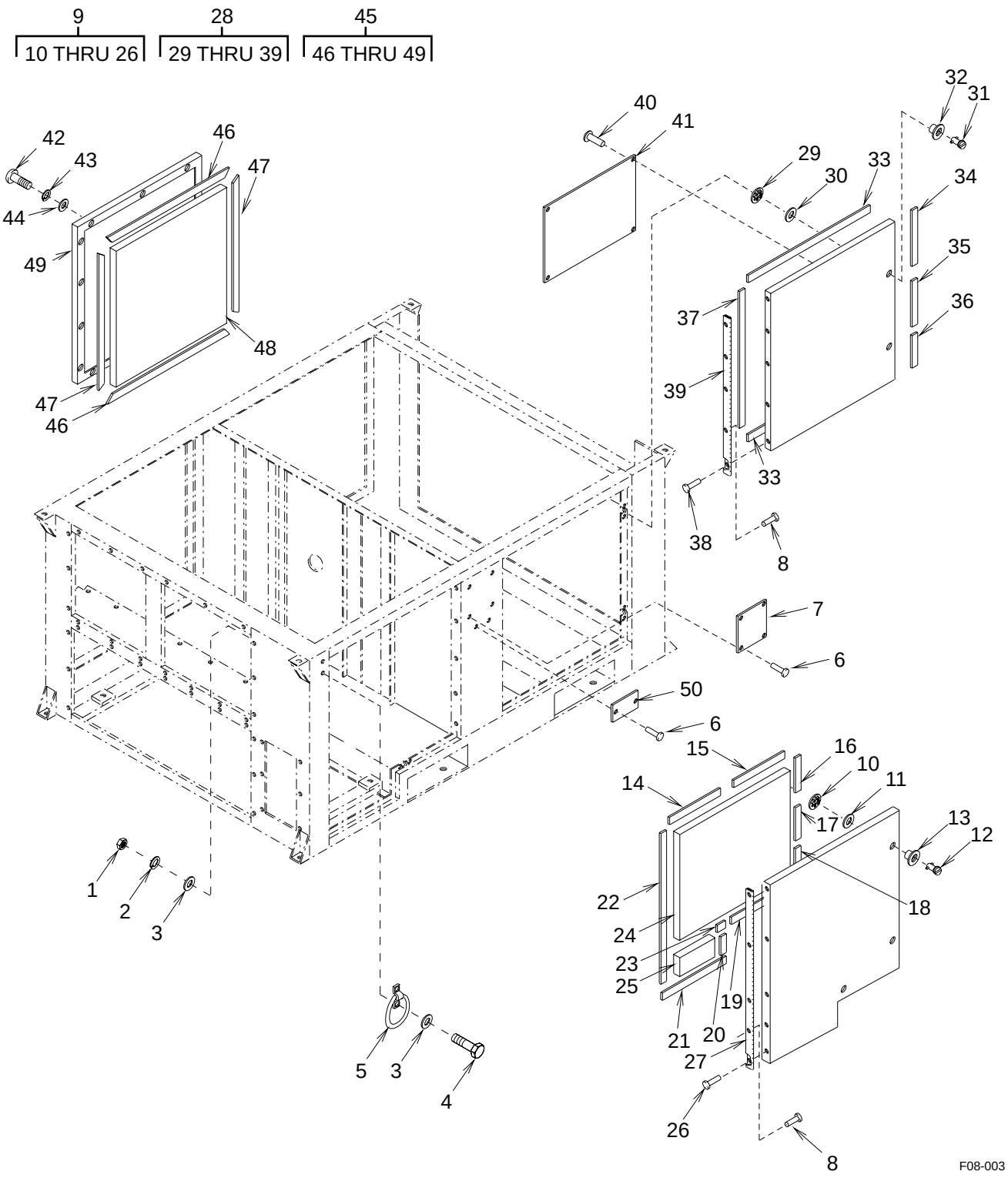

Figure 8-3. Outside Panels-Left and Right Sides.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-3. OUTSIDE PANELS-LEFT AND RIGHT SIDES.	
1	96906	MS51971-2	NUT, PLAIN HEX	8
2	96906	MS35338-64	WASHER, LOCK, SPRING	8
3	96906	MS15795-812	WASHER, FLAT, ROUND	16
4	96906	B18218H031C100N	SCREW, CAP, HEX HD	8
5	97403	13216E6360-2	RING AND CLIP	4
6	81349	M24243/1D402	RIVET, BLIND	10
7	94833	120K1573	PLATE, IDENTIFICATION	1
8	81349	M24243/1D602	RIVET, BLIND	10
9	97403	13230E3504	DOOR, LEFT FRONT	1
10	97403	13230E3496	. RING, RETAINING	4
11	97403	13211E3364-2	. RING, RETAINING	4
12	97403	13214E6499-30Z	. STUD	4
13	97403	13211E3363-2	. EYELET, METALLIC	4
14	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 12.81	1
15	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 9.94	1
16	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 5.38	1
17	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 12.81	1
18	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 3.75	1
19	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 10.13	1
20	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 3.50	1
21	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 11.59	1
22	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 28.13	1
23	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 1.63	1

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
24	81349	MIL-I-16562	. INSULATION 0.50 X 2.88 X 12.13	1
25	81349	MIL-I-16562	. INSULATION 0.50 X 26.46 X 30.47	1
26	81349	M24243/1D602	. RIVET, BLIND	5
27	96906	MS20257C2-2800	. HINGE	1
28	97403	13230E3507	DOOR, LEFT REAR	1
29	97403	13230E3496	. RING, RETAINING	2
30	97403	13211E3364-2	. RING, RETAINING	2
31	97403	13214E6499-30	. STUD	2
32	97403	13211E3363-2	. EYELET, METALLIC	2
33	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 21.63	2
34	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 5.38	1
35	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 12.81	1
36	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 5.38	1
37	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT 0.12 X .50 X 25.13	1
38	81349	M24243/1D602	. RIVET, BLIND	1
39	96906	MS20257C2-2500	. HINGE	1
40	81349	M24243/1D402	. RIVET	4
41	97403	13230E3497	. PLATE, FLUID DIAGRAM REFRIGERATION	1
42	96906	MS51957-130	SCREW, MACH, PAN HD	14
43	96906	MS35338-62	WASHER, LOCK SPRING, HELICAL	14
44	96906	MS15795-808	WASHER, FLAT ROUND	14
45	97403	13230E3570	PANEL, RIGHT	1
46	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT .12 X .50 X 23.25	2
47	81349	MIL-R-6130, TYPE II	. GASKET, GRADE A, CONDITION SOFT .12 X .50 X 25.38	2
48	81348	A-A-52404	. INSULATION 1 X 23.13 X 25.25	1
49	97403	13230E3570/1	. PANEL	1

50	97403	13214E3957	PLATE, INFORMATION	1

END OF FIGURE

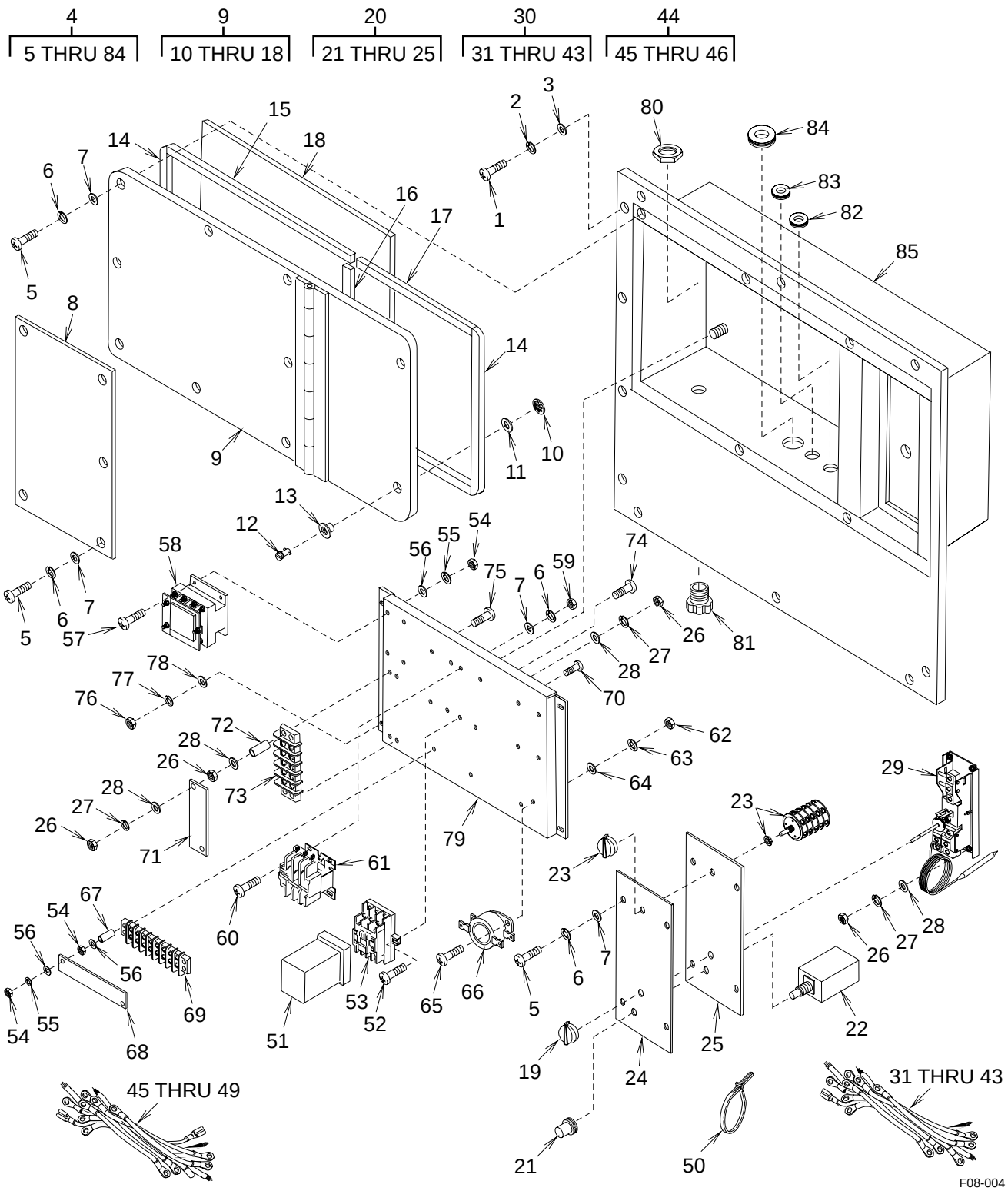

Figure 8-4. Control Panel.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-4. CONTROL PANEL.	
1	96906	MS51957-130	SCREW, MACH, PAN HD	14
2	96906	MS35338-62	WASHER, LOCK SPRING, HELICAL	14
3	96906	MS15795-808	WASHER, FLAT ROUND	14
4	97403	13230E3586	CONTROL PANEL ASSY	1
5	96906	MS51957-63	.SCREW, MACH, PAN HD	12
6	96906	MS35338-62	.WASHER, LOCK SPRING HELICAL	20
7	96906	MS15795-808	.WASHER, FLAT ROUND	20
8	97403	13230E3505	. PLATE, INSTRUCTION	1
9	97403	13230E3546	. COVER, CONTROL PANEL	1
10	97403	13230E3496	. . RING, RETAINING	2
11	97403	13211E3364-2	. . RING, RETAINING	2
12	97403	13214E6499-10Z	. . STUD	2
13	97403	13211E3363-2	. . EYELET, METALLIC	2
14	81349	MIL-R-6130, TYPE II	. . GASKET, GRADE A, CONDITION SOFT .12 X .50 X 14.44	2
15	81349	MIL-R-6130, TYPE II	. . GASKET ,GRADE A, CONDITION SOFT .12 X .50 X 17.42	2
16	81349	MIL-R-6130, TYPE II	. . GASKET ,GRADE A, CONDITION SOFT .12 X .50 X 13.44	1
17	81349	MIL-R-6130, TYPE II	. . GASKET, GRADE A, CONDITION SOFT .12 X .50 X 7.88	2
18	97403	13230E3498	. . SCHEMATIC DIAGRAM	1
19	97403	13230E3562	. KNOB	1
20	97403	13230E3567	. SUBPANEL, CONTROL PANEL RH	1
21	97403	13230E3559	. . SEAL, RESET BUTTON	1
22	97403	13230E3558	. . CIRCUIT BREAKER	1
23	97403	13230E3565	. . SWITCH, ROTARY	1
24	97403	13230E3548	. . PLATE, INSTRUCTION	1
25	97403	13230E3549	. . SUB-PANEL, RIGHT HAND	1
26	96906	MS35649-63	. NUT, HEX, PLAIN	12
27	96906	MS35338-60	. WASHER, LOCK, SPRING	12
28	96906	MS15795-806	. WASHER, FLAT, ROUND	12

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
29	97403	13230E3566	. THERMOSTAT, MULTI STAGE	1
30	97403	13230E3564-1 THRU -41	. LEAD, ELECTRICAL	1
31	97403	13216E6191-1	. . TERMINAL, LUG	9
32	96906	MS25036-156	. . TERMINAL, LUG	18
33	96906	MS25036-102	. . TERMINAL, LUG	29
34	96906	MS25036-150	. . TERMINAL, LUG	2
35	96906	MS25036-149	. . TERMINAL, LUG	14
36	96906	MS25036-112	. . TERMINAL, LUG	6
37	96906	MS25036-157	. . TERMINAL, LUG	6
38	96906	MS25036-116	. . TERMINAL, LUG	2
39	96906	MS25036-103	. . TERMINAL, LUG	4
40	81349	M5086/2-18-9	. . WIRE, ELEC 18 AWG	41 FT
41	81349	M5086/2-12-9	. . WIRE, ELEC 12 AWG	8 FT
42	81349	M5086/2-10-9	. . WIRE, ELEC 10 AWG	2.4 FT
43	81349	M5086/2-8-9	. . WIRE ,ELEC 8 AWG	1.1 FT
44	97403	13230E3604	. WIRING HARNESS, ELECTRICAL CONTROL CIRCUITS	1
45	96906	MS25036-150	. . TERMINAL, LUG	1
46	96906	MS25036-149	. . TERMINAL, LUG	8
47	96906	MS25036-102	. . TERMINAL, LUG	13
48	97403	13216E6191-1	. . TERMINAL, LUG	2
49	96906	MS3367-1-9	. . STRAP, TIEDOWN	20
50	96906	MS3367-5-9	. STRAP, SELF CLINCHING	20
51	97403	13230E3596	. RELAY, ELECTROMAGNETIC	2
52	96906	MS51957-	. SCREW, MACH, PAN HD	4
53	97403	13225E8167	. SOCKET, CONTROL RELAY	2
54	96906	MS35649-83	. NUT, PLAIN HEX	8
55	96906	MS35338-61	. WASHER, LOCK SPRING HELICAL	8
56	96906	MS15795-841	. WASHER, FLAT ROUND	8
57	96906	MS51957-45	. SCREW, PAN HD	4
58	97403	13230E3595	. RELAY, ELECTROMAGNETIC 3 PDT	1
59	96906	MS35649-103	. NUT	8
60	96906	MS51957-130	. SCREW	8

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
61	97403	13230E3597	. RELAY, CONTACTOR DEFINITE PURPOSE 3 PST	4
62	96906	MS35649-23	. NUT PLAIN HEX	2
63	96906	MS35338-58	. WASHER, LOCK, SPRING	2
64	96906	MS15795-802	. WASHER, FLAT ROUND	2
65	96906	MS51957-8	. SCREW	2
66	97403	13230E3593	. RELAY, TIME DELAY	1
67	97403	13216E6159-17	. POST SPACER	2
68	97403	13230E3585	. COVER, TERMINAL BOARD	1
69	81349	38TB-8B	. TERMINAL BOARD (MIL-T-55164/2)	1
70	96906	MS51957-52	. SCREW, PAN HD	2
71	97403	13229E6705	. COVER, TERMINAL BOARD	1
72	97403	13216E6159-18	. POST, SPACER	2
73	97403	13229E6702	. TERMINAL BOARD	1
74	96906	MS51957-33	. SCREW, MACH, PAN HD	2
75	96906	MS51957-38	. SCREW, MACH, PAN HD	2
76	96906	MS35649-2254	. NUT, PLAIN HEX	4
77	96906	MS35338-63	. WASHER, LOCK, SPRING	4
78	96906	MS15795-810	. WASHER, FLAT ROUND	4
79	97403	13230E3584	. SUB-PANEL CONTROL PANEL LEFT	1
80	97403	13230E3536	. LOCKNUT, CONDUIT	1
81	97403	13230E3535-1	. CONNECTOR, LIQUID TIGHT, STRAIN RELIEF	1
82	96906	MS35489-2	. GROMMET	1
83	96906	MS35489-12	. GROMMET	1
84	96906	MS35489-22	. GROMMET	1
85	97403	13230E3547	. ENCLOSURE, CONTROL PANEL	1

END OF FIGURE

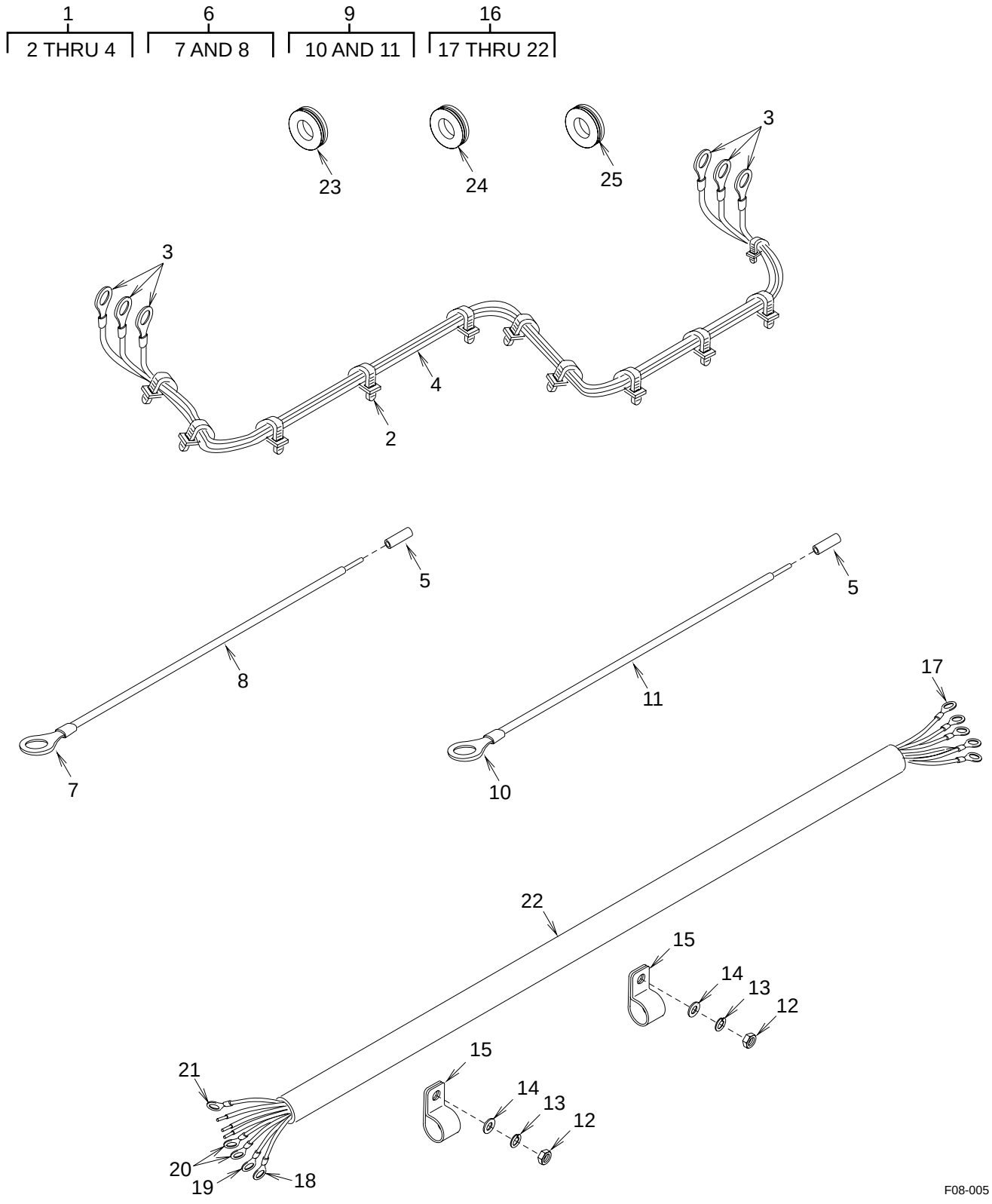

Figure 8-5. Miscellaneous Harnesses, Leads, and Power Cable.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-5. MISCELLANEOUS HARNESSES, LEADS, AND POWER CABLE.	
1	97403	13230E3605	WIRING HARNESS, B3 TO K3	1
2	96906	MS3367-5-9	. STRAP, TIEDOWN	10
3	96906	MS25036-112	. TERMINAL, LUG	6
4	81349	M5086/2-10-9	. WIRE, ELECTRIC 10 AWG	20 FT
5	81349	M23053/5-104-9	INSULATION SLEEVING 1.00 IN LONG	2
6	97403	13230E3564-42	LEAD, ELECTRICAL	1
7	96906	MS25036-102	. TERMINAL, LUG	1
8	81349	M5086/2-18-9	. WIRE ELECTRIC 18 AWG	6 FT
9	97403	13230E3564-43	LEAD, ELECTRICAL	1
10	96906	MS25036-102	. TERMINAL, LUG	1
11	81349	M5086/2-18-9	. WIRE, ELECTRIC 18 AWG	6 FT
12	96906	MS35650-103	NUT PLAIN HEX	2
13	96906	MS35338-62	WASHER, LOCK SPRING HELICAL	2
14	96906	MS15795-808	WASHER, FLAT	2
15	96906	MS21919WDG19	CLAMP, LOOP	2
16	97403	13230E3561	CABLE, POWER INPUT	1
17	96906	MS25036-120	. TERMINAL, LUG	5
18	96906	MS25036-157	. TERMINAL, LUG	1
19	96906	MS25036-113	. TERMINAL, LUG	1
20	96906	MS25036-114	. TERMINAL, LUG	2
21	96906	MS25036-122	. TERMINAL, LUG	1
22	97403	13230E3560	. CABLE, POWER, ELECTRIC	37 FT
23	97403	13230E3535-2	CONNECTOR, LIQUID TIGHT	1
24	96906	MS35489-2	GROMMET	2
25	96906	MS35489-12	GROMMET	1

END OF FIGURE

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5 THRU 16

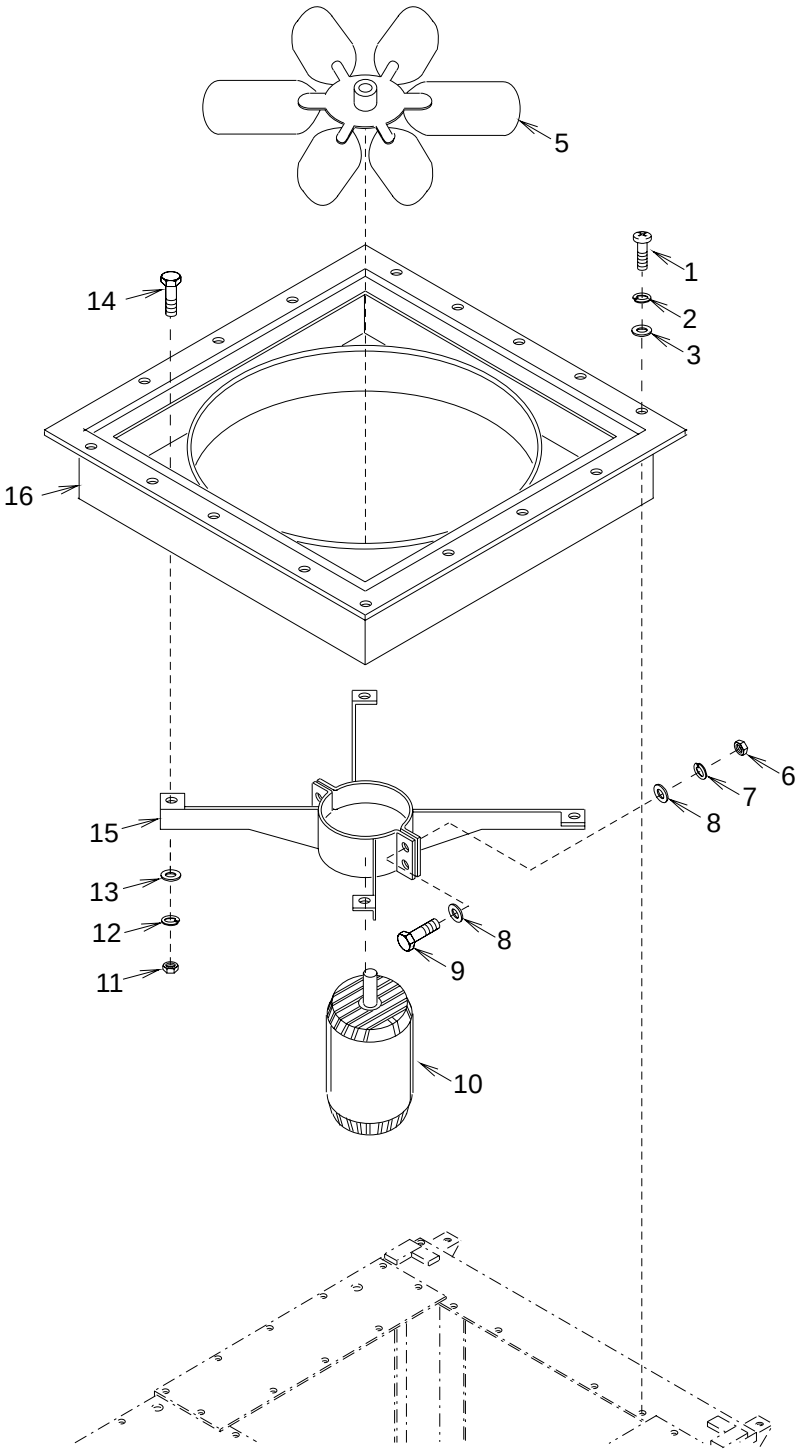


Figure 8-6. Condenser Fan Assembly.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-6. CONDENSER FAN ASSEMBLY.	
1	96906	MS51957-63	SCREW, MACH, PAN HD	16
2	96906	MS35338-62	WASHER, LOCK, SPRING	16
3	96906	MS15795-808	WASHER, FLAT, ROUND	16
4	97403	13230E3569	FAN, CONDENSER ASSEMBLY	1
5	97403	13230E3568	. FAN, CONDENSER PROPELLER AXIAL FLOW	1
6	96906	MS51971-2	. NUT, PLAIN, HEX	4
7	96906	MS35338-64	. WASHER, LOCK, SPRING	4
8	96906	MS15795-812	. WASHER, FLAT, ROUND	8
9	80204	B1821BH031C138N	. SCREW, CAP, HEX HD	4
10	97403	13230E3512	. MOTOR, A.C.	1
11	96906	MS51971-1	. NUT, PLAIN, HEX	4
12	96906	MS35338-63	. WASHER, LOCK, SPRING	4
13	96906	MS15795-810	. WASHER, FLAT, ROUND	4
14	80204	B1821BH025C075	. SCREW, CAP, HEX HD	4
15	97403	13230E3511	. MOUNT, CONDENSER FAN	1
16	97403	13230E3551	. VENTURI, CONDENSER FAN	1
			END OF FIGURE	

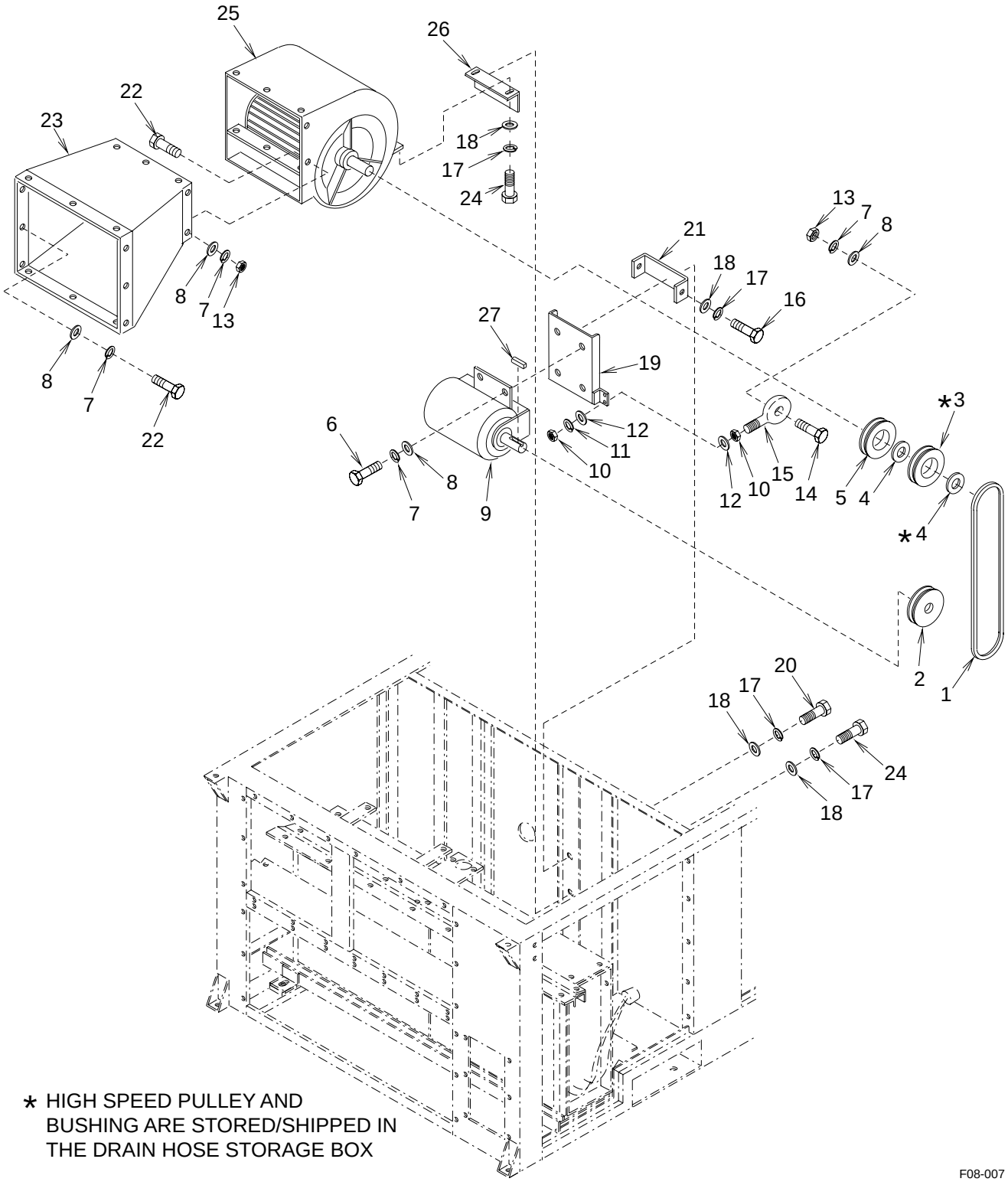


Figure 8-7. Evaporator Fan and Drive.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-7. EVAPORATOR FAN AND DRIVE.	
1	71176	A34	INDUSTRIAL V-BELT 35.3 PITCH LENGTH	1
2	97403	13230E3591	PULLEY, GROOVED MOTOR VARIABLE DRIVE	1
3	97403	13230E3592-1	PULLEY, GROOVED	1
4	97403	13230E3590	BUSHING, PULLEY	2
5	97403	13230E3592-2	PULLEY, GROOVED	1
6	80204	B1821BH025C075N	SCREW, CAP, HEX HD	4
7	96906	MS35338-63	WASHER, LOCK, SPRING	27
8	96906	MS15795-810	WASHER, FLAT, ROUND	31
9	97403	13230E3523	MOTOR, ALTERNATING CURRENT	1
10	96906	MS51971-3	NUT, PLAIN, HEX	2
11	96906	MS35338-65	WASHER, LOCK, SPRING	1
12	96906	MS15795-814	WASHER, FLAT, ROUND	2
13	96906	MS51971-1	NUT, PLAIN HEX	8
14	80204	B1821BH025C150N	SCREW, CAP, HEX HD	1
15	97403	13230E3522	BOLT, ADJUSTING	1
16	80204	B1821BH031C100N	SCREW, CAP, HEX HD	2
17	96906	MS35338-64	WASHER, LOCK, SPRING	8
18	96906	MS15795-812	WASHER, FLAT, ROUND	8
19	97403	13230E3520	SUPPORT, MOTOR	1
20	80204	B1821BH031C175N	SCREW, CAP, HEX HD	2
21	97403	13230E3521	BRACKET, MOTOR	1
22	80204	B1821BH025C063N	SCREW, CAP, HEX HD	22
23	97403	13230E3603	PLENUM, AIR DISCHARGE	1
24	80204	B1821BH031C063N	SCREW, CAP HEX HD	4
25	97403	13230E3602	FAN, EVAPORATOR	1
26	97403	13230E3517	SUPPORT, BLOWER	1
27	96906	MS20066-147	KEY, MACHINE SQUARE	1
			END OF FIGURE	

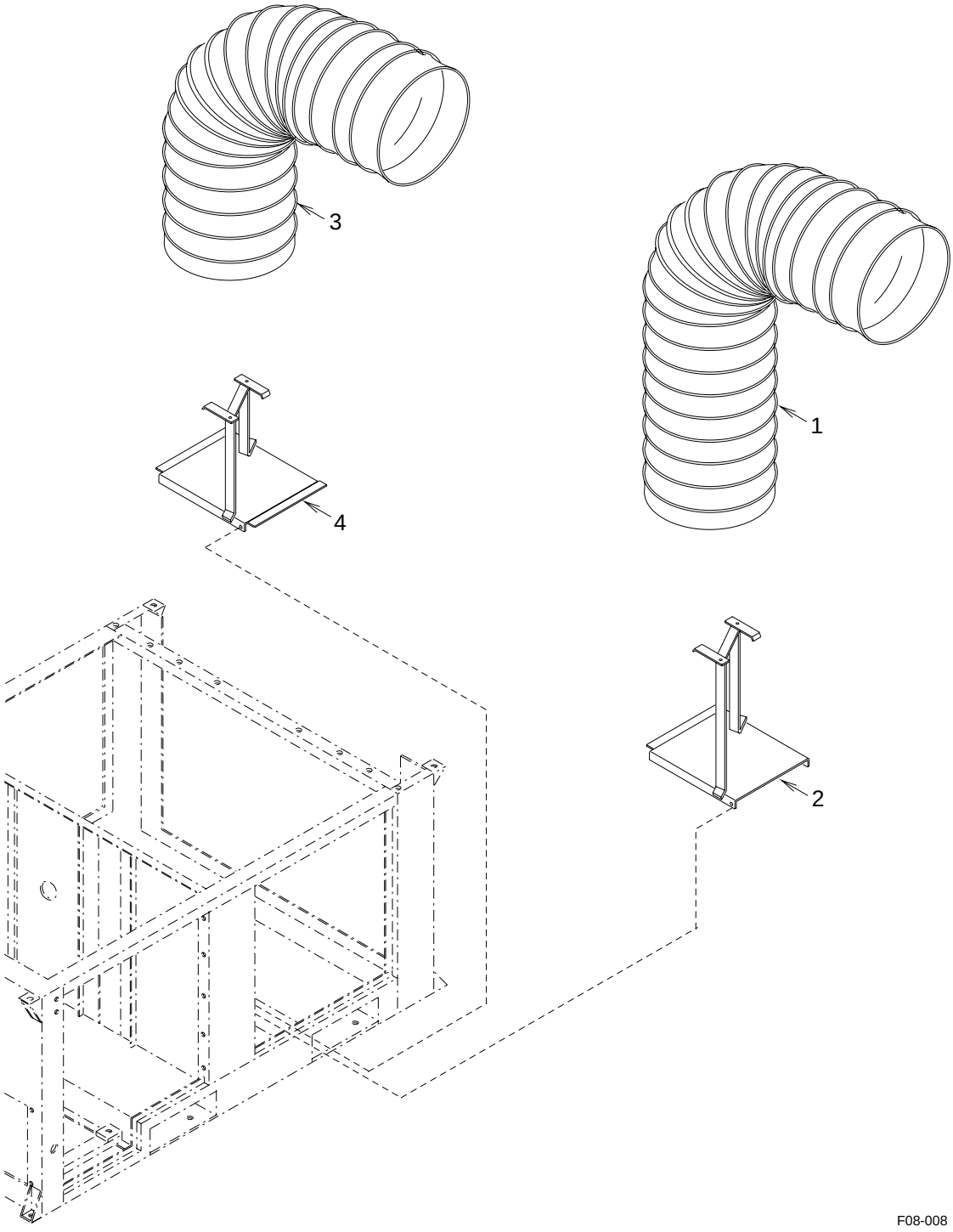


Figure 8-8. Flexible Ducts and Racks.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-8. FLEXIBLE DUCTS AND RACKS.	
1	97403	13230E3537-2	DUCT FLEXIBLE (9 FT)	1
2	97403	13230E3534-2	RACK, DUCT (9 FT)	1
3	97403	13230E3537-1	DUCT FLEXIBLE (7 FT)	1
4	97403	13230E3534-1	RACK, DUCT (7 FT)	1
			END OF FIGURE	

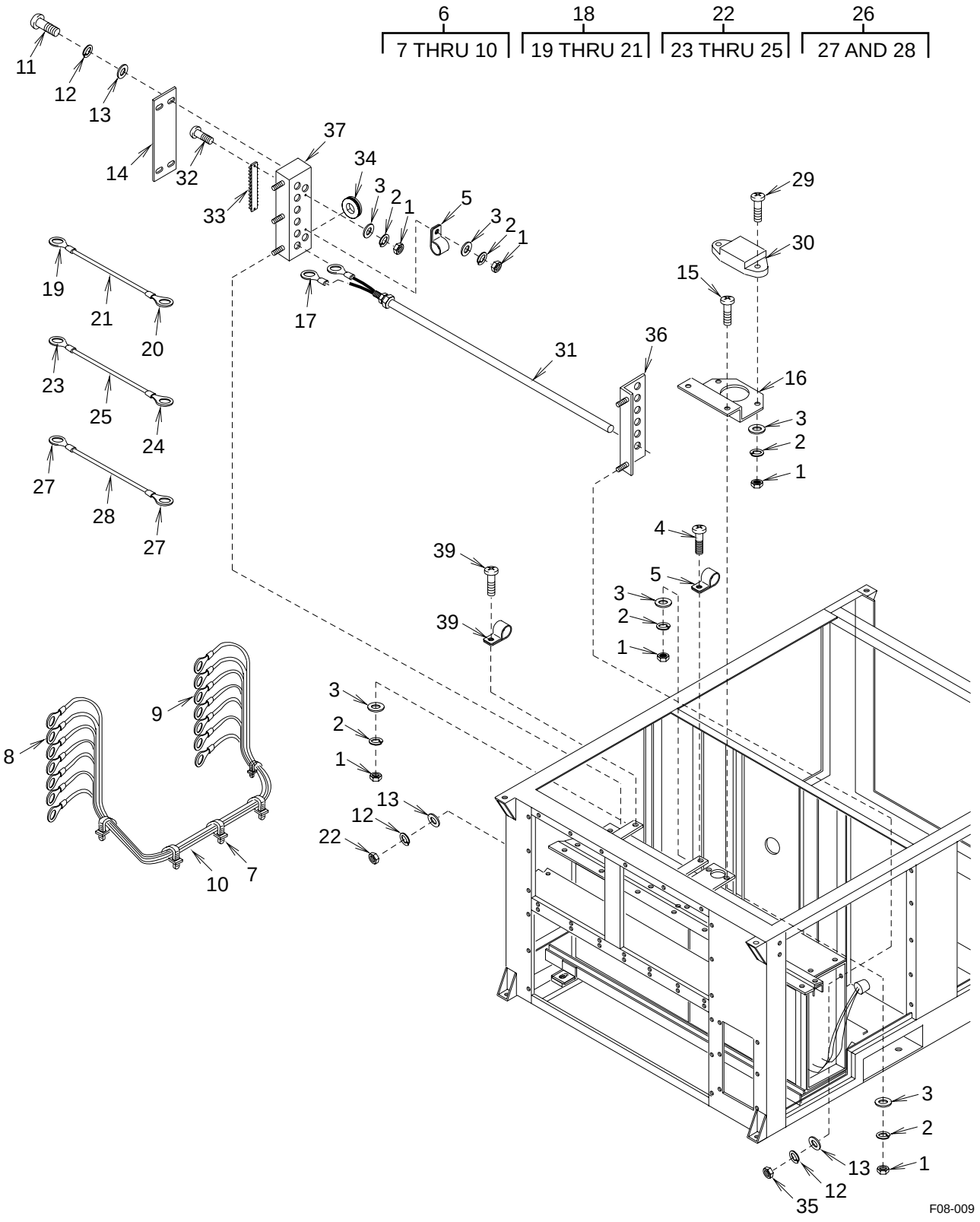


Figure 8-9. Heater Assembly.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-9. HEATER ASSEMBLY.	
1	96906	MS35649-83	NUT, HEX, PLAIN	9
2	96906	MS35338-61	WASHER, LOCK, SPRING	9
3	96906	MS15795-841	WASHER, FLAT, ROUND	9
4	96906	MS51957-46	SCREW, MACH, PAN HD	2
5	96906	MS21919WDG3	CLAMP, LOOP	3
6	97403	13230E3582	WIRING HARNESS TB3 TO K7 AND K8	1
7	96906	MS3367-1-9	. STRAP, TIE DOWN	6
8	96906	MS17143-15	. TERMINAL, LUG	6
9	96906	MS25036-156	. TERMINAL, LUG	6
10	81349	M5086/2-12-9	. WIRE, ELECTRIC 12 AWG WHITE	30 FT
11	96906	MS51957-63	SCREW, MACH, PAN HD	4
12	96906	MS35338-62	WASHER, LOCK SPRING HELICAL	9
13	96906	MS15795-808	WASHER, FLAT ROUND	9
14	97403	13230E3555	COVER	1
15	96906	MS51957-44	SCREW, MACH, PAN HD	2
16	97403	13230E3524	BRACKET HIGH TEMPERATURE SWITCH	1
17	96906	MS25036-107	TERMINAL, LUG	12
18	97403	13230E3564-44	LEAD, ELECTRIC	1
19	96906	MS25036-103	. TERMINAL, LUG	1
20	96906	MS25036-102	. TERMINAL, LUG	1
21	81349	M5086/2-18-9	. WIRE, ELECTRIC 18 AWG WHITE	6 FT
22	97403	13230E3564-45	LEAD, ELECTRIC	1
23	96906	MS25036-103	. TERMINAL, LUG	1
25	96906	MS25036-102	. TERMINAL, LUG	1
25	81349	M5086/2-18-9	. WIRE, ELECTRIC 18 AWG WHITE	6 FT
26	97403	13230E3564-46	LEAD, ELECTRIC	1
27	96906	MS25036-103	. TERMINAL, LUG	2
28	81349	M5086/2-18-9	. WIRE, ELECTRIC 18 AWG WHITE	1 FT
29	96906	MS51957-46	SCREW, MACH, PAN HD	2
30	97403	13216E6224	SWITCH, HIGH TEMP CUTOUT	1

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
31	97403	13230E3557	ELEMENT, HEATING	6
32	96906	MS51957-48	SCREW, MACH, PAN HD	2
33	81349	38TB8B	TERMINAL BOARD	1
34	96906	MS35489-16	GROMMET	1
35	96906	MS35649-103	NUT, HEX, PLAIN	5
36	97403	13230E3563	BRACKET, HEATER	1
37	97403	13230E3556	END, HEATER	1
38	96906	MS51957-64	SCREW, MACH, PAN HD	1
39	96906	MS21919WDG6	CLAMP, LOOP	1

END OF FIGURE

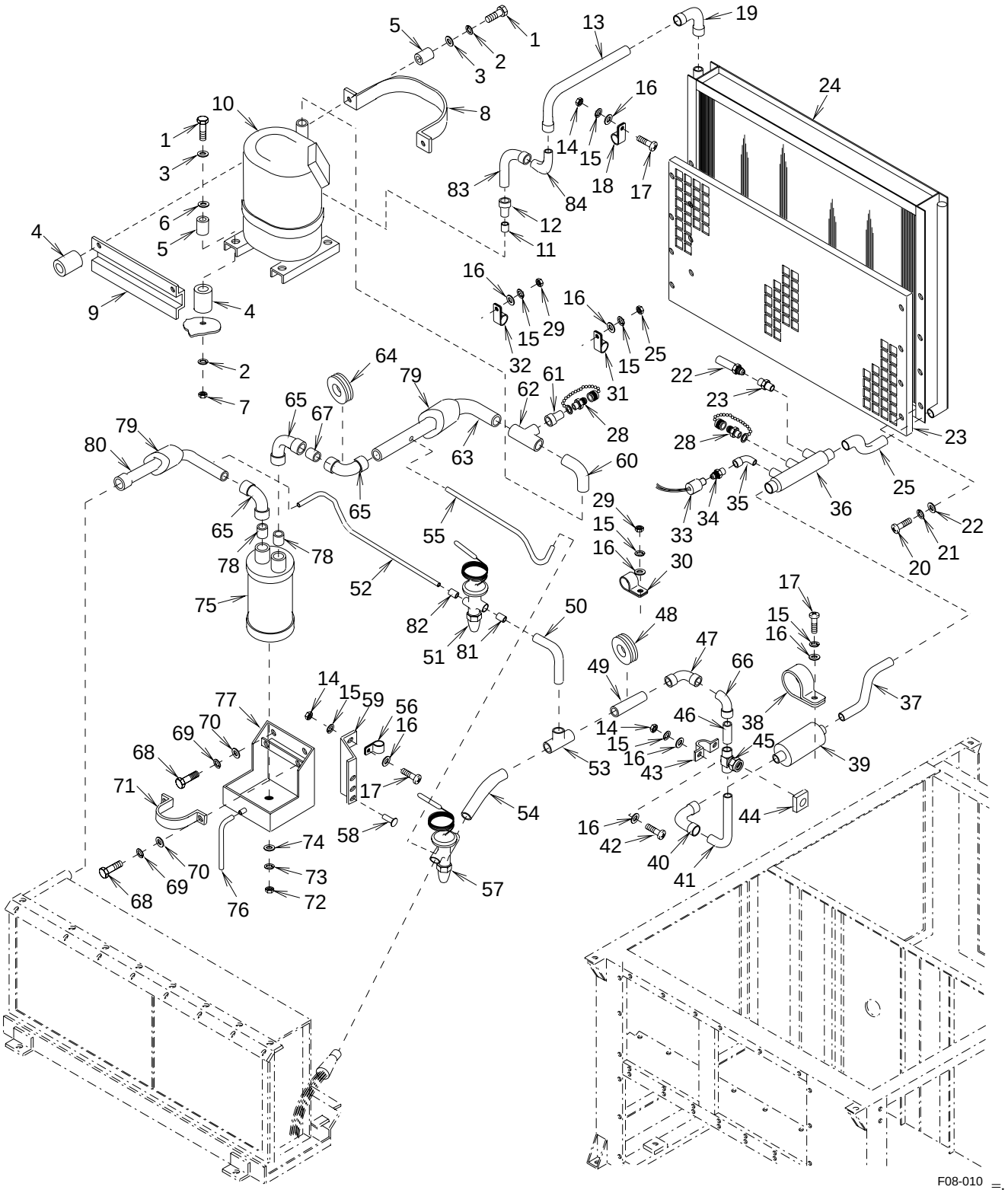


Figure 8-10. Refrigeration System.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-10. REFRIGERATION SYSTEM.	
1	80204	B1821BH031C225N	SCREW, CAP, HEX HD	6
2	96906	MS35338-64	WASHER, LOCK, SPRING	6
3	96906	MS15795-812	WASHER, FLAT, ROUND	6
4	97403	13230E3526	MOUNT, RESILIENT	6
5	80205	NAS1057T5-139	SPACER	6
6	97403	13230E3527	WASHER, COMPRESSOR ISOLATOR	4
7	96906	MS51971-2	NUT, PLAIN, HEX	4
8	97403	13230E3528	STRAP, COMPRESSOR	1
9	97403	13230E3529	BAR, SUPPORT, COMPRESSOR	1
10	97403	13230E3525	COMPRESSOR	1
11	97403	13230E3500/119	TUBE, COPPER	1
12	96906	MS35923-10	REDUCER, COUPLING	1
13	97403	13230E3500/116	TUBE, COPPER	1
14	96906	MS35649-103	NUT, PLAIN, HEX	5
15	96906	MS35338-62	WASHER, LOCK, SPRING	9
16	96906	MS15795-808	WASHER, FLAT, ROUND	11
17	97403	MS51957-64	SCREW, MACH, PAN HD	4
18	96906	MS21919WDG14	CLAMP, LOOP	2
19	96906	MS35917-7	ELBOW	1
20	97403	MS51957-50	SCREW, MACH, PAN HD	8
21	96906	MS35338-61	WASHER, LOCK, SPRING	8
22	96906	MS15795-841	WASHER, FLAT, ROUND	8
23	97403	13230E3873	GUARD, CONDENSER COIL	1
24	97403	13230E3599	COIL, CONDENSER	1
25	97403	13230E3500/118	TUBE, COPPER	1
26	97403	13211E8369	VALVE, PRESSURE RELIEF	1
27	96906	MS35918-1	ADAPTER	1
28	97403	13216E6168-2	VALVE, CHARGING WITH CAP	2
29	96906	MS35650-103	NUT, PLAIN HEX	3
30	96906	MS21919WDG6	CLAMP, LOOP TYPE	1

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
31	96906	MS21919WDG8	CLAMP, LOOP TYPE	1
32	96906	MS21919WDG11	CLAMP, LOOP TYPE	1
33	97403	13230E3594	SWITCH, HIGH PRESSURE	1
34	96906	MS35919-23	ADAPTER	1
35	97403	13216E9963-1	ELBOW	1
36	97403	13230E3550	MANIFOLD	1
37	97403	13230E3500/114	TUBE, COPPER	1
38	96906	MS21919WDG48	CLAMP, LOOP TYPE	1
39	97403	13230E3545	DEHYDRATOR, DESICCANT REFRIGERANT	1
40	96906	MS35928-5	ELBOW	1
41	97403	13230E3500/145	TUBE, COPPER	1
42	96906	MS51957-63	SCREW, MACH, PAN HD	2
43	97403	13230E3543	CLAMP, LIQUID INDICATOR	1
44	97403	13230E3544	GASKET, LIQUID INDICATOR	1
45	97403	13230E3542	INDICATOR, LIQUID	1
46	97403	13230E3500/144	TUBE COPPER	1
47	96906	MS35917-5	ELBOW	1
48	96906	MS35489-17	GROMMET	1
49	97403	13230E3500/113	TUBE, COPPER	1
50	97403	13230E3500/139	TUBE, COPPER	1
51	97403	13230E3588	VALVE, QUENCH	1
52	97403	13230E3500/141	TUBE, COPPER	1
53	97403	13211E4043-25	TEE	1
54	97403	13230E3500/140	TUBE, COPPER	1
55	97403	13230E3500/109	TUBE, COPPER	1
56	96906	MS21919WDG16	CLAMP, LOOP	1
57	97403	13230E3589	VALVE, EXPANSION	1
58	81349	M24243/1D40Z	RIVET, BLIND	2
59	81349	MIL-P-15280, FORM T, 1.13 X 0.75 WALL	INSULATION, TUBING	4 FT
60	97403	13216E9963-4	ELBOW, TUBE	1
61	96906	MS35920-3	REDUCER, COUPLING	1
62	97403	13211E4043-64	TEE	1

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
63	97403	13230E3500/124	TUBE, COPPER	1
64	96906	MS35489-25	GROMMET	1
65	96906	MS35917-9	ELBOW	3
66	96906	MS35928-5	ELBOW,TUBE STREET	1
67	97403	13230E3500/125	TUBE, COPPER	1
68	80204	B1821BH025C063N	SCREW, CAP, HEX HD	6
69	96906	MS35338-63	WASHER, LOCK, SPRING	6
70	96906	MS15795-810	WASHER, FLAT, ROUND	6
71	97403	13230E3538	CLAMP, ACCUMULATOR TANK	1
72	96906	MS51971-3	NUT, PLAIN, HEX	1
73	96906	MS35338-65	WASHER, LOCK, SPRING	1
74	96906	MS15795-814	WASHER, FLAT, ROUND	1
75	97403	13230E3540	ACCUMULATOR	1
76	97403	13229E6145-1	HOSE, DRAIN 0.25 I.D. X 0.38 O.D. X 7.75 LG	1
77	97403	13230E3539	BRACKET, ACCUMULATOR	1
78	97403	13230E3500/189	TUBE, COPPER	2
79	81349	MIL-P-15280, FORM T, 1.13 X 0.38 WALL	INSULATION, TUBING	2 FT
80	97403	13230E3500/107	TUBE, COPPER	1
81	96906	MS35920-3	REDUCER COUPLING	1
82	96906	MS35920-9	REDUCER COUPLING	1
83	97403	13230E3500/190	TUBE, COPPER	1
84	97403	13230E3500/191	TUBE, COPPER	1

END OF FIGURE

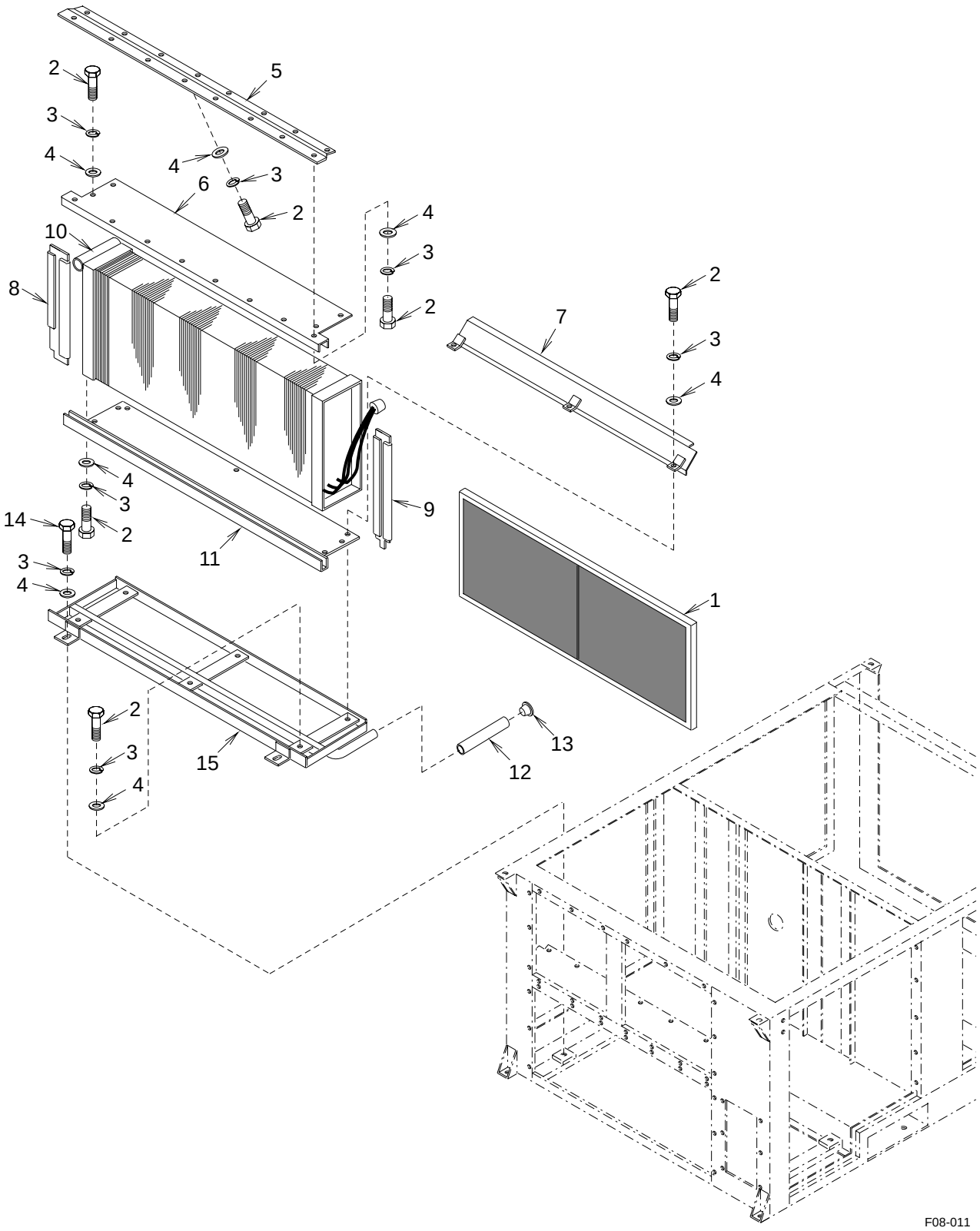


Figure 8-11. Evaporator Coil.

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-11. EVAPORATOR COIL.	
1	97403	13230E3574	FILTER, AIR	1
2	80204	B1821BH025C050N	SCREW, CAP, HEX HEAD	27
3	96906	MS35338-63	WASHER, LOCK, SPRING	31
4	96906	MS15795-810	WASHER, FLAT	31
5	97403	13230E3580	BAFFLE, COIL, TOP	1
6	94833	74736-1	PLATE, TOP, COIL AND FILTER	1
7	97403	13230E3576	SHIELD, DRIP	1
8	97403	13230E3578	BAFFLE, COIL, LEFT SIDE	1
9	97403	13230E3579	BAFFLE, COIL, RIGHT SIDE	1
10	97403	13230E3598	COIL, EVAPORATOR	1
11	97403	13230E3577	PLATE, BOTTOM COIL AND FILTER	1
12	97403	13229E6145-2	HOSE, DRAIN 0.50 I.D. X 0.75 O.D. X 2.50 LONG	2
13	97403	13230E3587-11	ADAPTER STRAIGHT	2
14	80204	B1821BH025C063N	SCREW, CAP, HEX HEAD	4
15	97403	13230E3506	PAN, DRAIN	1
			END OF FIGURE	

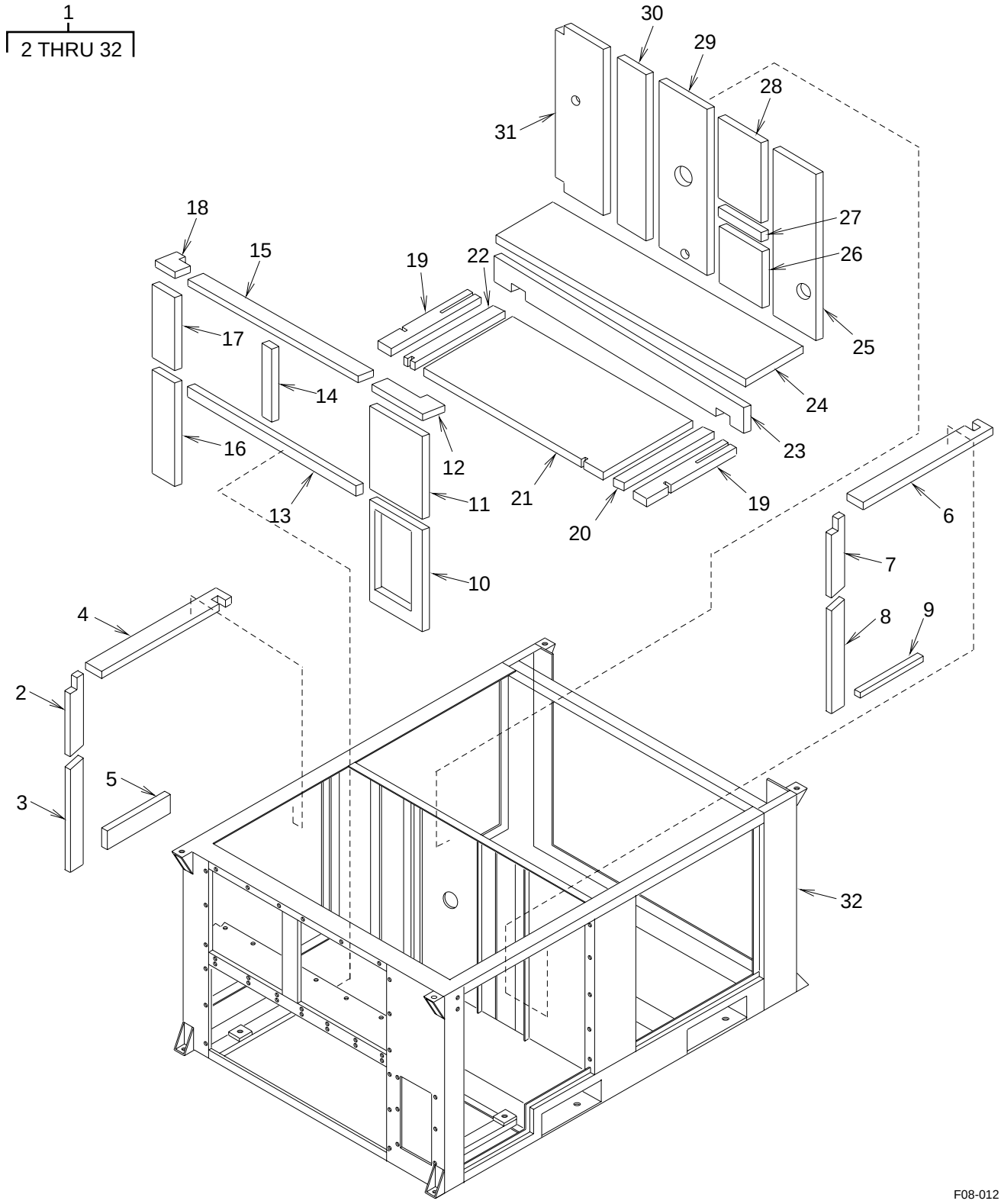


Figure 8-12. Frame and Insulation.

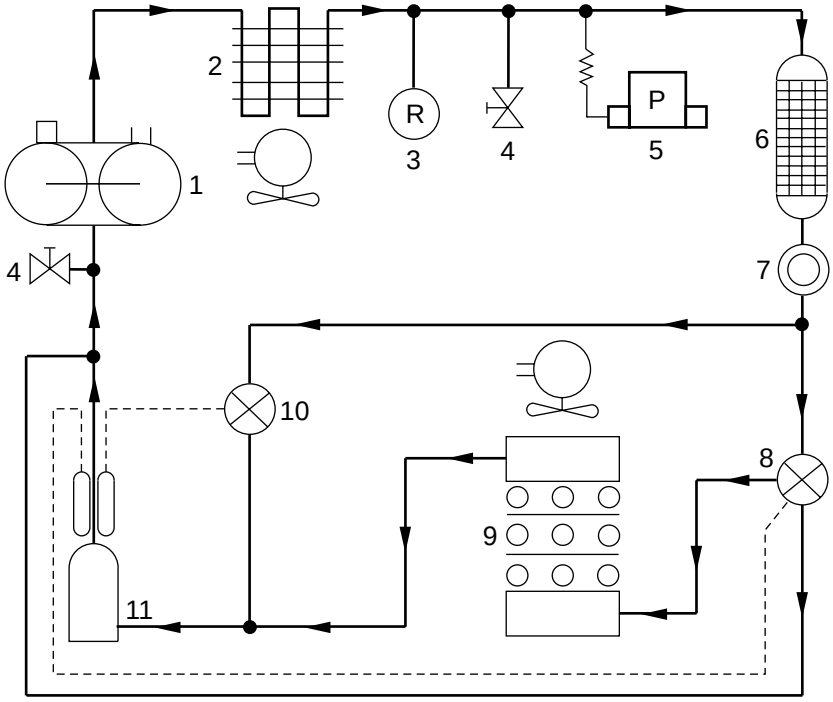
ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
			FIG. 8-12. FRAME AND INSULATION.	
1	97403	13230E3501	HOUSING	1
2	97403	13230E3501-77	. INSULATION, POST, RIGHT SIDE	1
3	97403	13230E3501-64	. INSULATION, POST, RIGHT SIDE	1
4	97403	13230E3501-72	. INSULATION, HORIZONTAL POST, RIGHT	1
5	97403	13230E3501-75	. INSULATION, SIDE, RIGHT	1
6	97403	13230E3501-78	. INSULATION, HORIZONTAL POST, LEFT	1
7	97403	13230E3501-79	. INSULATION, POST, LEFT SIDE	1
8	97403	13230E3501-80	. INSULATION, POST, LEFT SIDE	1
9	97403	13230E3501-81	. INSULATION, SIDE, LEFT	1
10	97403	13230E3501-70	. INSULATION, POST, LEFT FRONT	1
11	97403	13230E3501-71	. INSULATION, POST, LEFT FRONT	1
12	97403	13230E3501-58	. INSULATION, LEFT TOP	1
13	97403	13230E3501-61	. INSULATION, HORIZONTAL CHANNEL FRONT	1
14	97403	13230E3501-60	. INSULATION, VERTICAL CHANNEL FRONT	1
15	97403	13230E3501-59	. INSULATION, HORIZONTAL POST FRONT	1
16	97403	13230E3501-64	. INSULATION, POST RIGHT FRONT	1
17	97403	13230E3501-63	. INSULATION, POST RIGHT FRONT	1
18	97403	13230E3501-62	. INSULATION, POST RIGHT TOP	1
19	97403	13230E3501-69	. INSULATION, BOTTOM SIDE	2
20	97403	13230E3501-68	. INSULATION, RAIL LEFT	1
21	97403	13230E3501-67	. INSULATION, BOTTOM CENTER	1
22	97403	13230E3501-66	. INSULATION, RAIL RIGHT	1
23	97403	13230E3501-74	. INSULATION, BOTTOM	1
24	97403	13230E3501-73	. INSULATION, BOTTOM REAR	1
25	97403	13230E3501-55	. INSULATION, PARTITION	1
26	97403	13230E3501-57	. INSULATION, PARTITION	1
27	97403	13230E3501-56	. INSULATION, PARTITION	1
28	97403	13230E3501-54	. INSULATION, PARTITION	1
29	97403	13230E3501-53	. INSULATION, PARTITION	1
30	97403	13230E3501-52	. INSULATION, PARTITION	1

ITEM NO.	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
31	97403	13230E3501-51	. INSULATION, PARTITION	1
32	97403	13230E3501/WELD	. HOUSING WELDMENT	1

END OF FIGURE

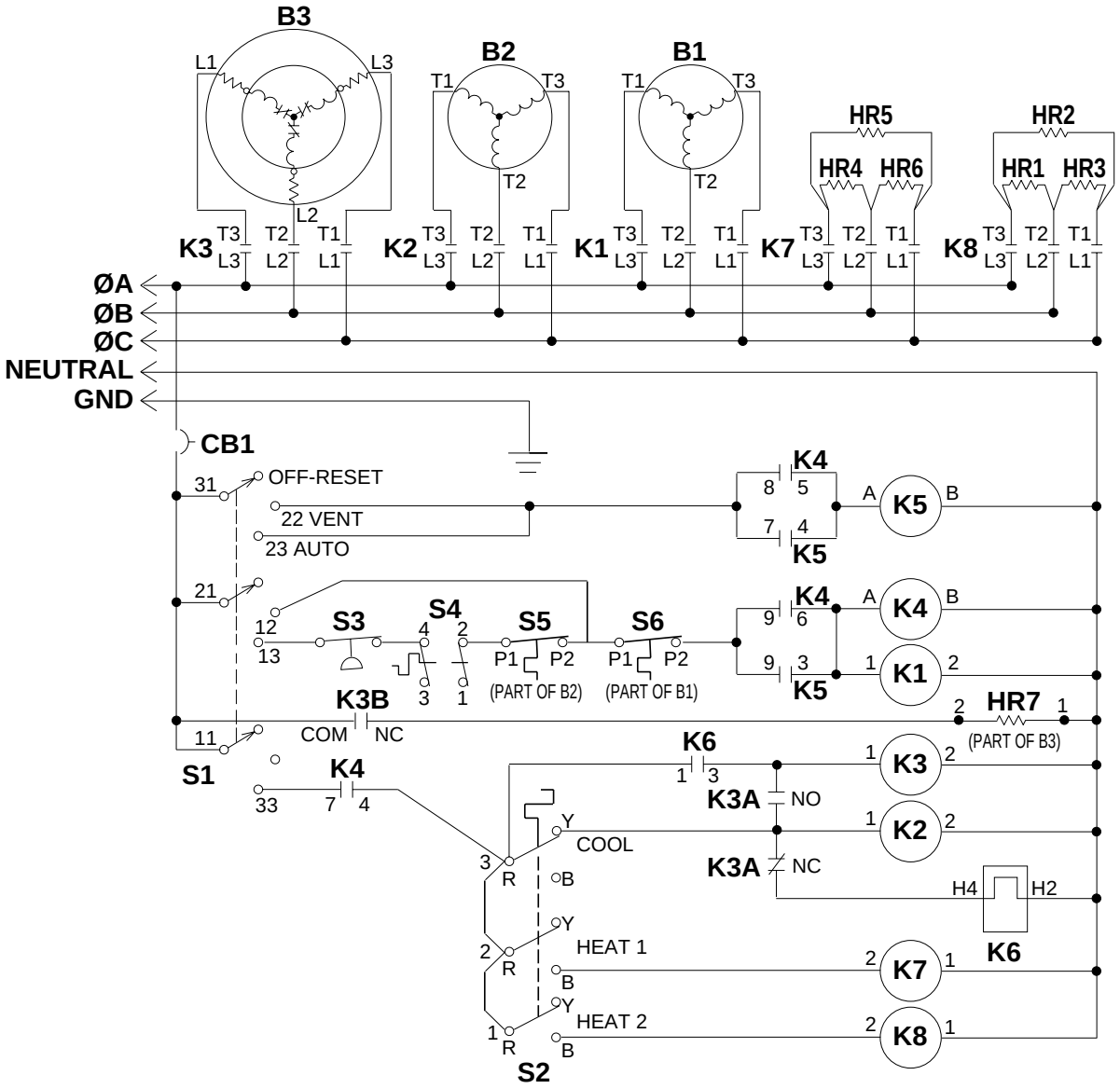
SECTION IX
SCHEMATICS AND DIAGRAMS

9-1. SCHEMATICS/DIAGRAMS. The following are the air conditioner system schematics and diagrams used for reference in this manual.



LEGEND	
FIND NO.	NOMENCLATURE
1	COMPRESSOR, RECIPROCATING
2	COIL, CONDENSER
3	VALVE, PRESSURE RELIEF
4	VALVE, CHARGING
5	SWITCH, HIGH PRESSURE
6	DEHYDRATOR,DESSICANT
7	INDICATOR, LIQUID
8	VALVE, EXPANSION
9	COIL, EVAPORATOR
10	VALVE, QUENCH
11	ACCUMULATOR

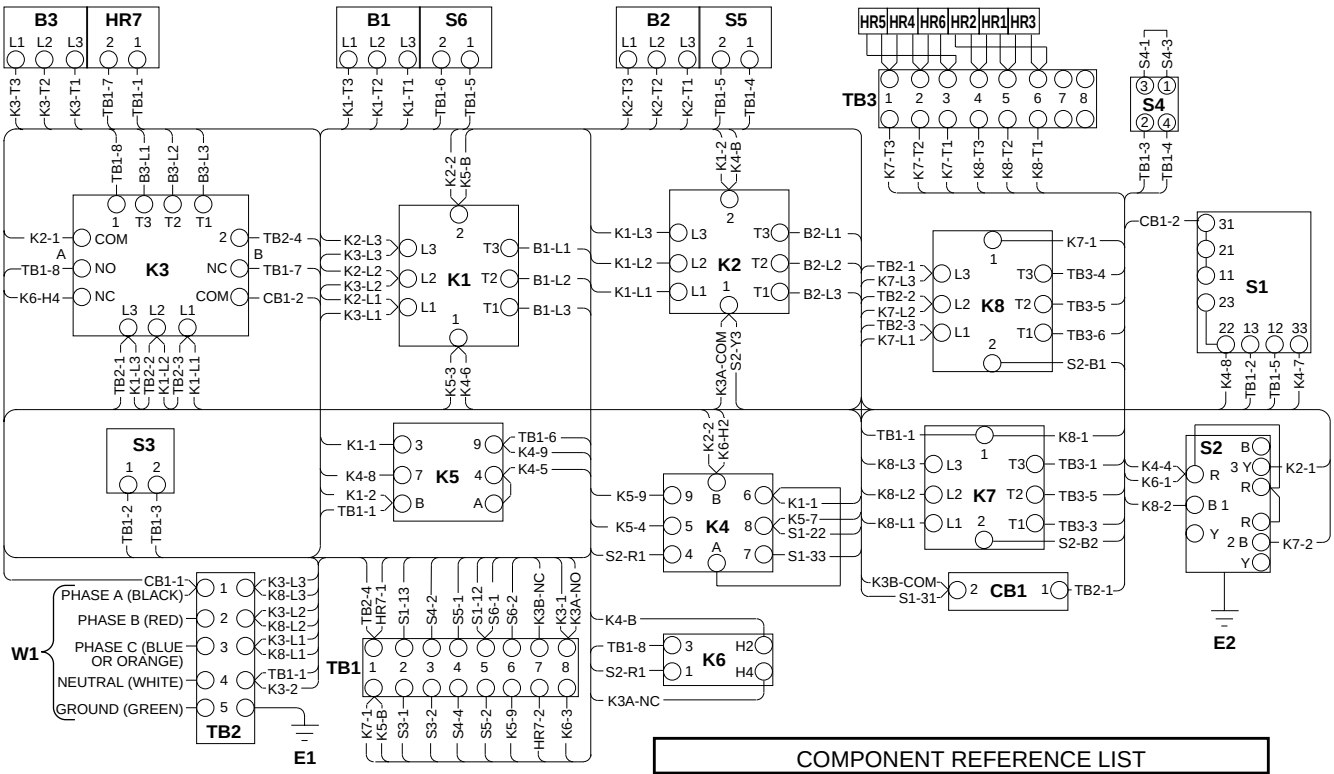
Figure 9-1. Refrigeration System Schematic.



COMPONENT REFERENCE LIST			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
B1	MOTOR, EVAPORATOR	K4,5	RELAY
B2	MOTOR, CONDENSER FAN	K6	RELAY, TIME DELAY
B3	COMPRESSOR	K7, K8	RELAY, HEATERS
CB1	CIRCUIT BREAKER	S1	SWITCH, SELECTOR
HR1-6	HEATER ELEMENT	S2	SWITCH, THERMOSTAT
HR-7	CRANKCASE HEATER	S3	SWITCH, HIGH PRESSURE CUTOUT
K1	RELAY, EVAPORATOR FAN	S4	SWITCH, HIGH TEMPERATURE CUTOUT
K2	RELAY, CONDENSER FAN	S5	SWITCH, CONDENSER FAN, THERMAL CUTOUT
K3	RELAY, COMPRESSOR	S6	SWITCH, EVAPORATOR FAN, THERMAL CUTOUT

F09-002

Figure 9-2. Electrical Schematic.



COMPONENT REFERENCE LIST	
SYMBOL	DESCRIPTION
B1	MOTOR, EVAPORATOR
B2	MOTOR, CONDENSER
B3	COMPRESSOR
CB1	CIRCUIT BREAKER
E1	TERMINAL, GROUNDING
E2	TERMINAL, GROUNDING
HR1-HR6	HEATER ELEMENT
HR-7	CRANKCASE HEATER
K1	RELAY, EVAPORATOR FAN
K2	RELAY, CONDENSER FAN
K3	RELAY, COMPRESSOR
K4,5	RELAY
K6	RELAY, TIME DELAY
K7,8	RELAY, HEATERS
S1	SWITCH, SELECTOR
S2	SWITCH, THERMOSTAT
S3	SWITCH, HIGH PRESSURE CUTOUT
S4	SWITCH, HIGH TEMPERATURE CUTOUT
S5	SWITCH, CONDENSER FAN, THERMAL CUTOUT
S6	SWITCH, EVAPORATOR FAN, THERMAL CUTOUT
TB1,3	TERMINAL BOARD (MIL-T-55164/2)
TB2	TERMINAL BOARD
W1	CABLE, POWER INPUT

F09-003

Figure 9-3. Wiring Diagram.

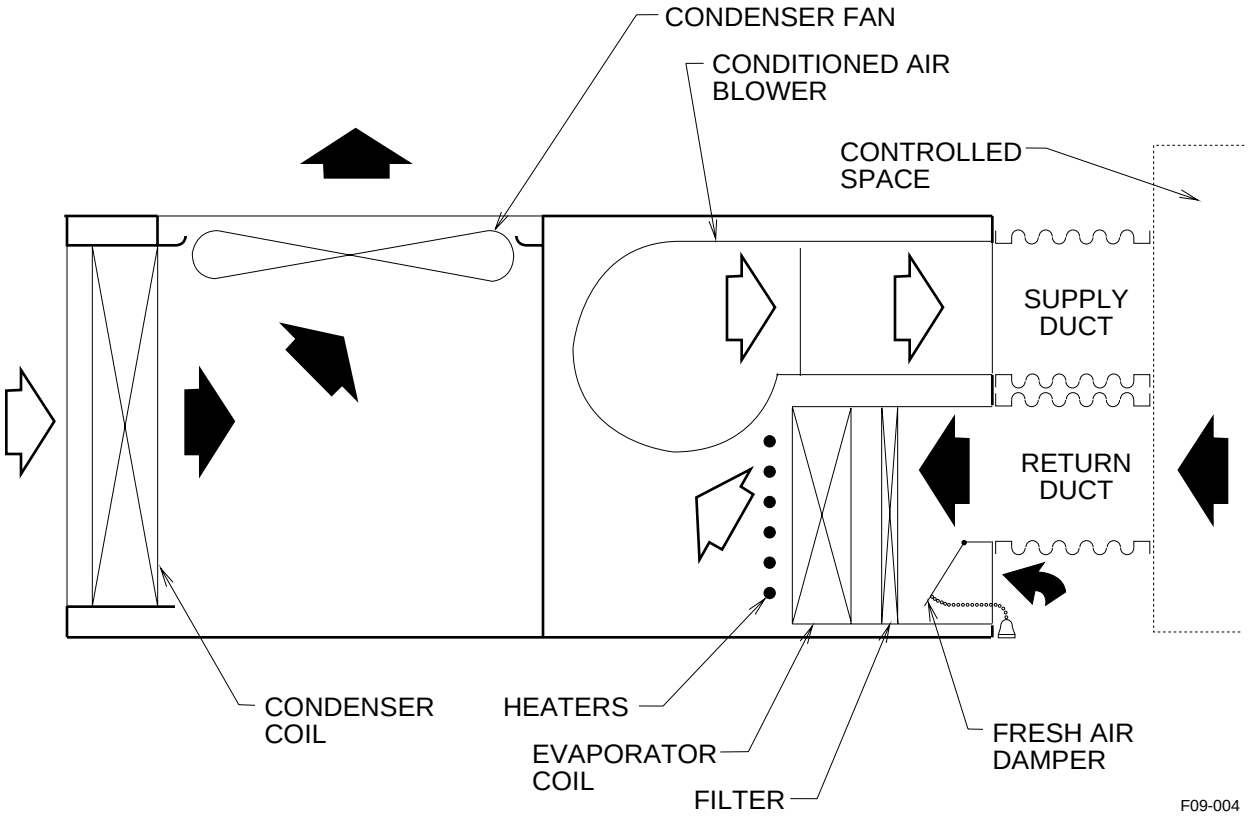


Figure 9-4. Air Flow Diagram.

SECTION X
STORAGE

10-1. PREPARATION FOR STORAGE.

a. Perform all preventive maintenance checks and services.

b. Disconnect power cable and store in condenser section storage compartment door.

c. Disconnect the condensate drain hoses and remove the barbed hose-to-pipe adapters. Store in the condenser section storage compartment.

d. Disconnect ducts and store in the condenser section storage compartment. Install duct covers on air duct openings.

e. Close and secure all cover doors.

f. Clean and dry the air conditioner thoroughly inside and out. Touch-up any chipped paint.

g. Bolt the air conditioner to an appropriate pallet, preferably the one it was originally shipped on.

10-2. STORAGE SITE SELECTION. Indoor storage is preferred for the air conditioner. If indoor storage is not available, protected storage such as a truck, van, conex or other suitable container may be used. The air conditioner is capable of withstanding a reasonably wide range of temperatures and environmental conditions when stored.

10-3. INDOOR OR PROTECTED STORAGE.

a. Wrap the air conditioner in one layer of heavy plastic or barrier paper and secure with tape (item 15, section 7).

b. Place the air conditioner in a location to allow access for annual inspection.

c. Inspect the air conditioner annually for any damage such as dents, corrosion, dry rot of ducts or power cable. Correct any problems found and relocate the air conditioner if necessary.

10-4. OUTDOOR UNPROTECTED STORAGE.

a. Wrap the air conditioner in two layers of heavy plastic or barrier paper and secure with tape (item 15, section 7).

b. Place the air conditioner in a location to allow access for annual inspection and where water is not likely to flood pool around it.

c. Inspect the air conditioner annually for any damage such as dents, corrosion, dry rot of ducts or power cable. Correct any problems found and relocate the air conditioner if necessary.