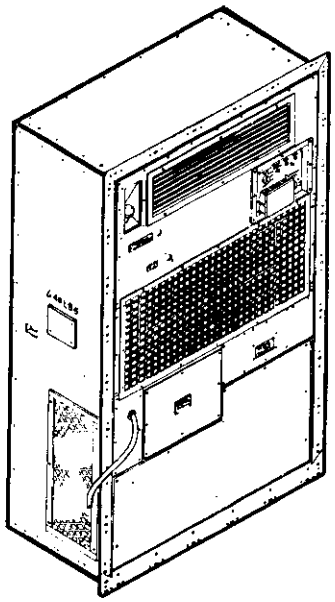
KM-F36-GE (TM1)

TECHNICAL MANUAL

INSTALLATION, OPERATION,
MAINTENANCE, AND
ILLUSTRATED REPAIR PARTS LIST



AIR CONDITIONER

36,000 BTU/HR COOLING
28,000 BTU/HR HEATING
120/208 VOLT, 3 PHASE, 50/60 HERTZ
37 FULL LOAD AMPS AT 60 HERTZ
22 FULL LOAD AMPS AT 50 HERTZ
PART NO. 19200-12712700-1

MODEL NUMBER F36-GE

*Keco INDUSTRIES, INC. FLORENCE, KENTUCKY...CORONA, CALIFORNIA

1 MAY 1983
CHANGE 2-AUGUST 1987

Keco Industries, Inc.
7375 Industrial Road
Florence, Kentucky 41042

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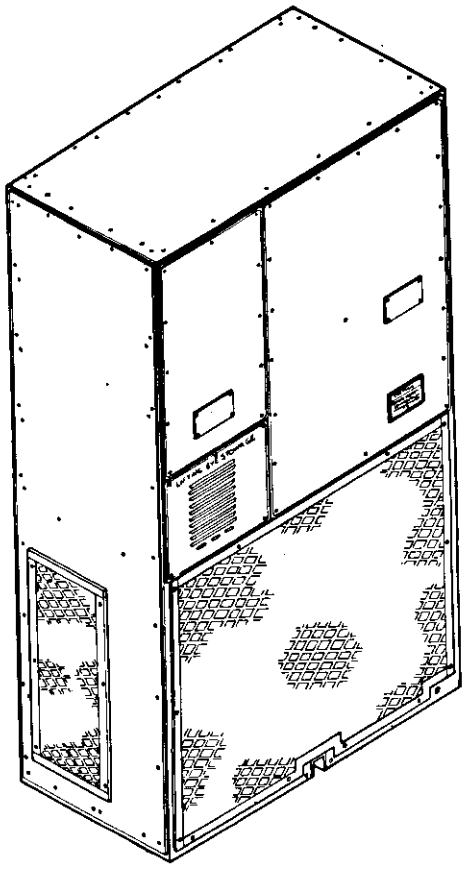
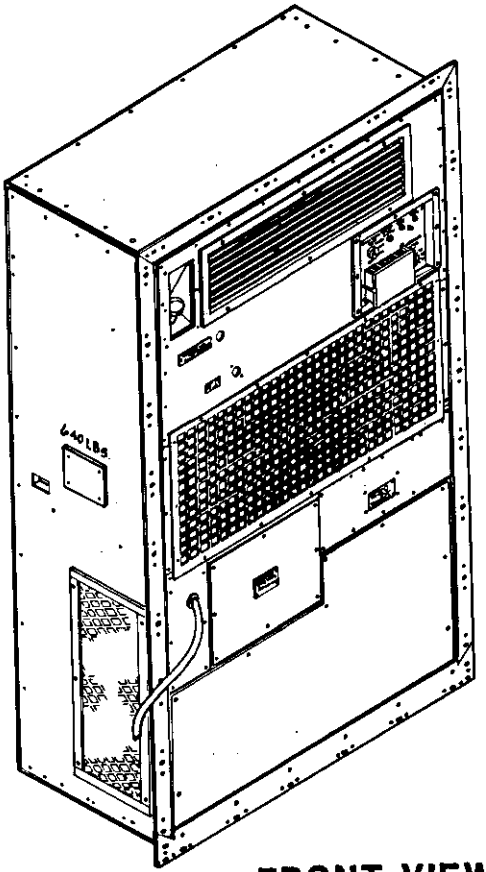


REAR VIEW
(LESS MOUNTING
ANGLES)



FRONT VIEW

Figure 1-1. Air Conditioner

CHAPTER 1

INTRODUCTION

Section I GENERAL INFORMATION

1-1. SCOPE

a. Type of manual. This manual contains information for the installation, operation, troubleshooting, maintenance and repair, and an illustrated repair parts list for selection of replacement parts.

b. Model number. Keco Industries, Inc. model number F36-GE.

c. Equipment description. Air conditioner, 36,000 BTU/HR cooling, 28,000 BTU/HR heating, 120/208 volt, 3 phase, 50/60 hertz, 37 full load amps at 60 hertz, 22 full load amps at 50 hertz.

d. Purpose and function of equipment. The air conditioner i designed to cool, heat, ventilate, and control humidity of the shelter subsystem of the U.S. Army Unit-Conduct of Fire Trainer (U-COFT).

Section II EQUIPMENT DESCRIPTION

1-2. CAPABILITIES AND FEATURES

a. Provides a maximum of 36,000 BTU/HR of cooling or 28,000 BTU/HR of heat.

b. Provides controlled humidity.

c. Provides filtered outside (fresh) ventilation air.

d. Filters the return (shelter) air.

e. Operates in environmental condition from tropic to artic.

f. Is equipped with an outside safety maintenance switch.

g. Has heavy duty welded aluminum frame.

h. Has quick release fasteners on all frequently removed panels.

i. Is equipped with stowable lifting eyes to ease handling.

j. Is designed to slide into interior of shelter for system transport.

1-3. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

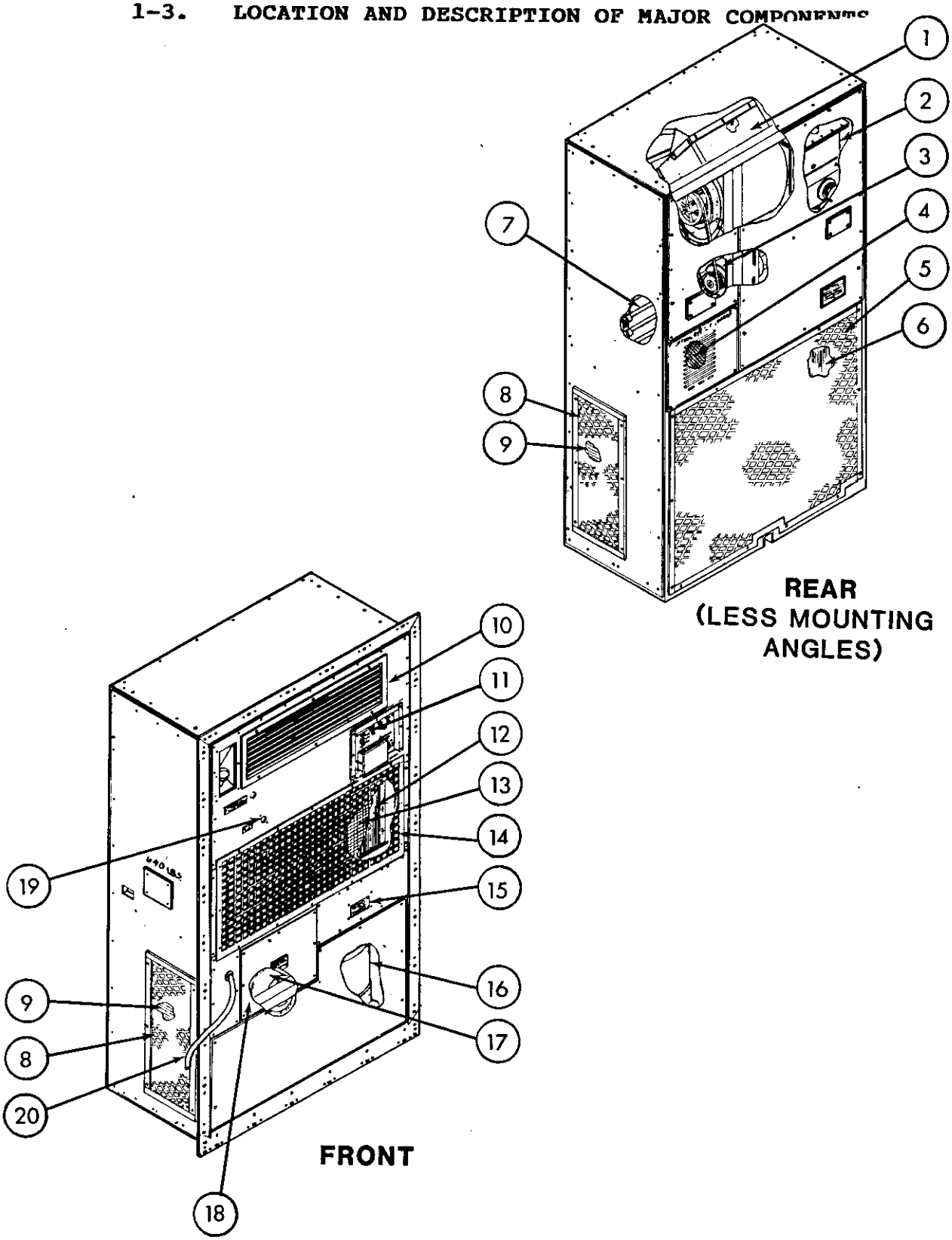


Figure 1-2. Location of Major Components

1. EVAPORATOR FAN - Draws air over evaporator coil (COOL mode), electrical heaters (HEAT mode), and humidifier and exhausts it into the shelter.

2. HUMIDIFIER TANK ASSEMBLY - Provides controlled humidity to the conditioned shelter air.

3. EVAPORATOR FAN MOTOR - Provides power to evaporator fan thru a belt and pulley drive.

4. FRESH AIR FILTER - Provides filtered outside air.

5. CONDENSER AIR OUTLET GRILLE - Protects condenser coil from damage.

6. CONDENSER COIL - Serves as a heat exchanger by transferring heat from the refrigerant passing through the tubing to the air passing over the tubing and fins.

7. HEATER ELEMENTS - Consists of two banks of three each thermostatically controlled heating elements.

8. CONDENSER AIR INLET GRILLES - Protects condenser inlet (air) damper assemblies from damage.

9. CONDENSER INLET (AIR) DAMPER ASSEMBLIES - Automatically controls airflow over coil during COOL mode operation.

10. SUPPLY AIR GRILLE(conditioned air discharge) - Contains adjustable louvers that allow directional control of conditioned air.

11. CONTROL BOX ASSEMBLY - Contains the following controls and indicators.

    MODE SELECTOR SWITCH
    TEMPERATURE CONTROL thermostat
    HUMIDISTAT CONTROLS
    CONTROL CIRCUIT BREAKER
    LOW WATER LEVEL light (For humidifier tank assembly)
    COOL READY light (Indicates compressor warm up complete)
    LAMP TEST SWITCH

12. EVAPORATOR COIL - Serves as a heat exchanger by transferring heat from the air passing over the tubing and fins to the refrigerant passing through the tubing.

13. RETURN AIR FILTERS - Provides filtered recycled shelter air.

14. RETURN AIR GRILLE (conditioned air intake from shelter to air conditioner) - Protects and covers return air filters and evaporator coil.

15. PRESSURE SWITCH BOX ASSEMBLY - Contains the following safety switches.

    HIGH PRESSURE CUT-OUT refrigerant pressure switch (S4)
    LOW PRESSURE CUT-OUT refrigerant pressure switch (S5)
    Fan pressure (refrigerant cut-out) switch (S6)

16. COMPRESSOR - Pumps refrigerant through the system during cooling operations.

17. CONDENSER FAN AND MOTOR - Draws outside air in thru the two side air inlet grilles and discharges it thru the condenser coil during COOL mode operation.

18. JUNCTION BOX ASSEMBLY - Contains and protects electrical system control devices.

19. REFRIGERANT SIGHT GLASS (liquid sight indicator) - Allows visual inspection and indicates condition of liquid refrigerant when the unit is operating in the cool mode.

20. POWER CABLE - Provides incoming electrical power.

1-4. WARRANTY

Keco products are guaranteed against defective workmanship for a period of one year from date of shipment when properly installed and operated. Defective material returned to our factory, transportation charges prepaid, will be replaced or repaired without charge if found defective within the guarantee period. Our warranty does not include any labor or other charges made outside our factory.

1-5. DIFFERENCES BETWEEN MODELS

There are no model differences in effect on the Keco Industries, Inc. Model F36-GE air conditioner.

1-6. PERFORMANCE DATA

TEMPERATURE	
OPERATING	
LOW	-40°F(-40°C)
HIGH	+125°F(+51.7°C)
DERATE MAXIMUM OPERATING TEMPERATURE AT A RATE OF 3.5°F(1.9°C) PER 1000 FEET ABOVE SEA LEVEL	
NONOPERATING	
LOW	-65°F(53.9°C)
HIGH	+160°F(71°C)
RELATIVE HUMIDITY	UP TO 100 PERCENT INCLUDING CONDENSATION
BAROMETRIC PRESSURE	
OPERATING	31.35 TO 23.98 INCHES OF MERCURY SEA LEVEL TO 6000 FT ABOVE SEA LEVEL
NONOPERATING	31.35 TO 5.5 INCHES OF MERCURY SEA LEVEL TO 40,000 FT ABOVE SEA LEVEL
PERFORMANCE	
COOLING CAPACITY	36,000 BTU/HR
HEATING CAPACITY	28,000 BTU/HR
POWER REQUIRED	
VOLTAGE	120/208
PHASE	3
HERTZ	50/60
AMPERAGE	37 FULL LOAD AMPS AT 60 HERTZ 22 FULL LOAD AMPS AT 50 HERTZ

DIMENSIONS

AIR CONDITIONER ONLY	
WIDTH	42.00 in. (106.7 cm)
DEPTH	21.50 in. (54.6 cm)
HEIGHT	72.62 in. (184.5 cm)
AIR CONDITIONER WITH MOUNTING FRAME	
WIDTH	45.50 in. (115.6 cm)
DEPTH	21.50 in. (54.6 cm)
HEIGHT	75.53 in. (191.8 cm)
WEIGHT	640 lb. (290.3 kg) *
CENTER OF GRAVITY - SEE FIGURE 1-3	

REFRIGERANT

TYPE	R22
CHARGE	14.5 lb.(6.6 kg)

* Weight listed above is without humidifier tank water. For weight with water add 37 lbs.

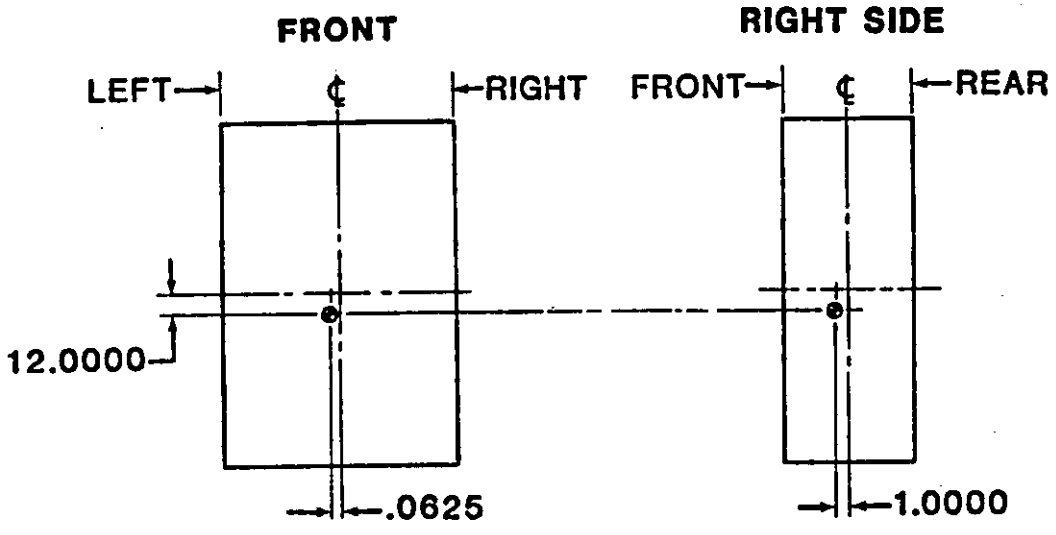


Figure 1-3. Center of Gravity

1-7. LIST OF ITEMS FURNISHED

ITEM	PART NUMBER
AIR CONDITIONER	12712700-1

1-8. LIST OF ITEMS REQUIRED

a. Thirty-four sets of 0.3125 inch diameter attaching hardware to secure air conditioner mounting frame to shelter.

b. Terminal lugs or connector for attaching power cable to power source.

c. Condensate drain (water disposal) hose, tubing or pipe (if desired).

1-9. TOOLS AND TEST EQUIPMENT

a. There are no special tools required to service and maintain this air conditioner. The test, maintenance, diagnostic and support equipment and tools required to service this equipment would be standard equipment and tools available to any competent refrigeration/air conditioning repair shop.

(1) The following list reflects common tools and equipment normally available for servicing air conditioners by trained military maintenance personnel at designated military service shops.

ITEM	PART NO.	FSCM	NSN
TOOL KIT, SERVICE REFRIGERATION UNIT	SC5180-90-CL-N18	50980 or 19099	5180-00-596-1474
SMALL VACUUM PUMP	14008	64484	4130-00-289-5967
SOLDERING GUN KIT	450K4	11103	3439-00-930-1638
LEAK DETECTOR	200	16734	4940-00-531-0362

(2) A water jug or container is required for filling the humidifier tank. The following is a suggested source for the water jug.

ITEM	PART NO.	FSCM
JUG, DISPENSING, SAFETY NALGENE	67002	27901

Section III SAFETY PRECAUTIONS

1-10. GENERAL

a. Read and understand all instructions in this manual relating to the specific function you are to perform prior to starting task.

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

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

d. Never operate the air conditioner with any cover, screen, panel, etc., removed unless the instructions specifically instruct you to. Then do so with extreme caution.

e. Carefully plan all maintenance and servicing tasks, never take unnecessary risks.

1-11. WARNINGS

The following is a condensed list of WARNINGS that are noted throughout this manual. All personnel who operate, service, and maintain this air conditioner should read and understand these WARNINGS.

WARNING

Acetone and methyl-ethyl ketone (MEK) are flammable, and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well-ventilated area, and keep away from sparks or flame. Use goggles, gloves, and apron when appropriate.

WARNING

Do not use steam to clean coil.

WARNING

Do not use steam, open flame, heat gun, or any other high-temperature heat source to thaw an iced coil. Thaw an iced coil by lamp bulb (75-watt maximum), operating unit in high heat mode, with a hair drier, electric fan, or by leaving the unit shut down until ice melts.

WARNING

Compressed air used for cleaning purposes will not exceed 30 psi (2.1 kg/cm²). Do not direct compressed air against the skin. Use goggles or full face shield.

WARNING

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

WARNING

Avoid injury by using adequate equipment and personnel to remove compressor from frame.

WARNING

Clean parts in a well ventilated area. Avoid inhalation of solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly.

Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerous to personnel and property.

Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

Wear eye protection when blowing solvent from parts. Air pressure should not exceed 30 psig (2.1 kg/cm²).

Assure the industrial process has been evaluated by the Medical Service Bioenvironmental Engineer.

Waste treatment/disposal must be approved by the Medical Service Bioenvironmental Engineer and Civil Engineer.

WARNING

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

WARNING

HIGH VOLTAGE
is used in the operation of this equipment.

DEATH ON CONTACT
may result if personnel fail to observe safety precautions.

Never work on electrical equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

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

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

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

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

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

WARNING

When possible, disconnect input power to the air conditioner before performing any maintenance to the electrical system. Voltages used can be deadly. Shutting the unit off at the control panel does not disconnect power to the various components of the air conditioner.

WARNING

Allow heaters to cool before touching. Severe burns can result from touching hot heaters.

WARNING

Do not allow anyone under equipment suspended from a lifting device.

Do not allow the unit to swing while suspended from a lifting device.

Failure to observe this warning may result in injury to personnel and damage to the equipment.

WARNING

- The covers, grilles, and screens installed on this unit are there for a purpose.
- Do not operate this unit with them off or open unless the instructions tell you to. When this is necessary, do so with care.

WARNING

DANGEROUS CHEMICAL
(Refrigerant 22)
is used in this equipment.

DEATH
or serious injury may result if personnel fail to observe proper safety precautions. Great care must be exercised to prevent contact of liquid refrigerant, or refrigerant gas discharged under pressure, with any part of the body. The extremely low temperature resulting from the rapid expansion of liquid refrigerant, or refrigerant gas released under pressure, can cause sudden and irreversible tissue damage through freezing. As a minimum, all personnel must wear thermal protective gloves and face shield or goggles when working in any situation where refrigerant contact with the skin or eyes is possible. Application of excessive heat to any component in a charged system will cause extreme pressure that may result in a rupture, possibly explosive in nature. Exposure of refrigerant 22 to an open flame or a very hot surface will cause a chemical reaction in the gas to form carbonyl chloride (phosgene), a highly poisonous and corrosive gas. In its natural state, refrigerant 22 is a colorless odorless vapor with no toxic characteristics. It is heavier than air and in a well ventilated area will disperse rapidly. However, in an unventilated area it presents danger as a suffocant.

WARNING

Be sure the refrigeration system is fully discharged and purged and that dry nitrogen is flowing through the system at the rate of less than 1-2 cfm (0.028-0.057 m^3/minute) before all brazing or debrazing operations.

CHAPTER 2

PREPARATION FOR USE AND INSTALLATION INSTRUCTIONS

Section I SERVICE UPON RECEIPT

2-1. UNLOADING

The model F36-GE air conditioner is packaged in a container designed for shipment and handling with the cabinet in an upright position. The base of the container is constructed as a shipping pallet with provisions for the insertion of the tongs of a fork on materials handling equipment.

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

b. Use a forklift truck or other suitable material handling equipment to remove the unit from the carrier.

CAUTION

Use care in handling to avoid damage to the air conditioner. If an overhead lifting device must be used, use an appropriate sling so that the weight of the unit is supported by the base of the shipping container.

WARNING

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

2-2. UNPACKING

a. General. Normally, the packaged air conditioner should be moved into the immediate area in which it is to be installed before it is unpacked.

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

c. Remove packaging. Remove the cushioning around the top of the cabinet. Remove the preservation barrier by tearing around the bottom of the cabinet.

NOTE

It is recommended that the cabinet be left bolted to the shipping pallet until time to place it in the installation position. All receiving inspection actions can be conducted without removal from the pallet.

d. Remove pallet. Attach an overhead hoist with an appropriate sling to the lifting fittings provided at top corners of the cabinet. Raise the cabinet and remove the pallet. Be sure to remove all remaining packing material from underside of base.

2-3. RECEIVING INSPECTION

Perform receiving inspection of the air conditioner in the following manner.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report damage to appropriate authority.

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies to appropriate authority.

Section II INSTALLATION SITE PREPARATION

2-4. GENERAL

The following general requirements should be considered:

(1) An unobstructed flow of air from outside the conditioned area to the two inlets and the outlet of the condenser air.

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

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

(4) Access to the front and back of the cabinet for routine operation and servicing and for necessary maintenance actions.

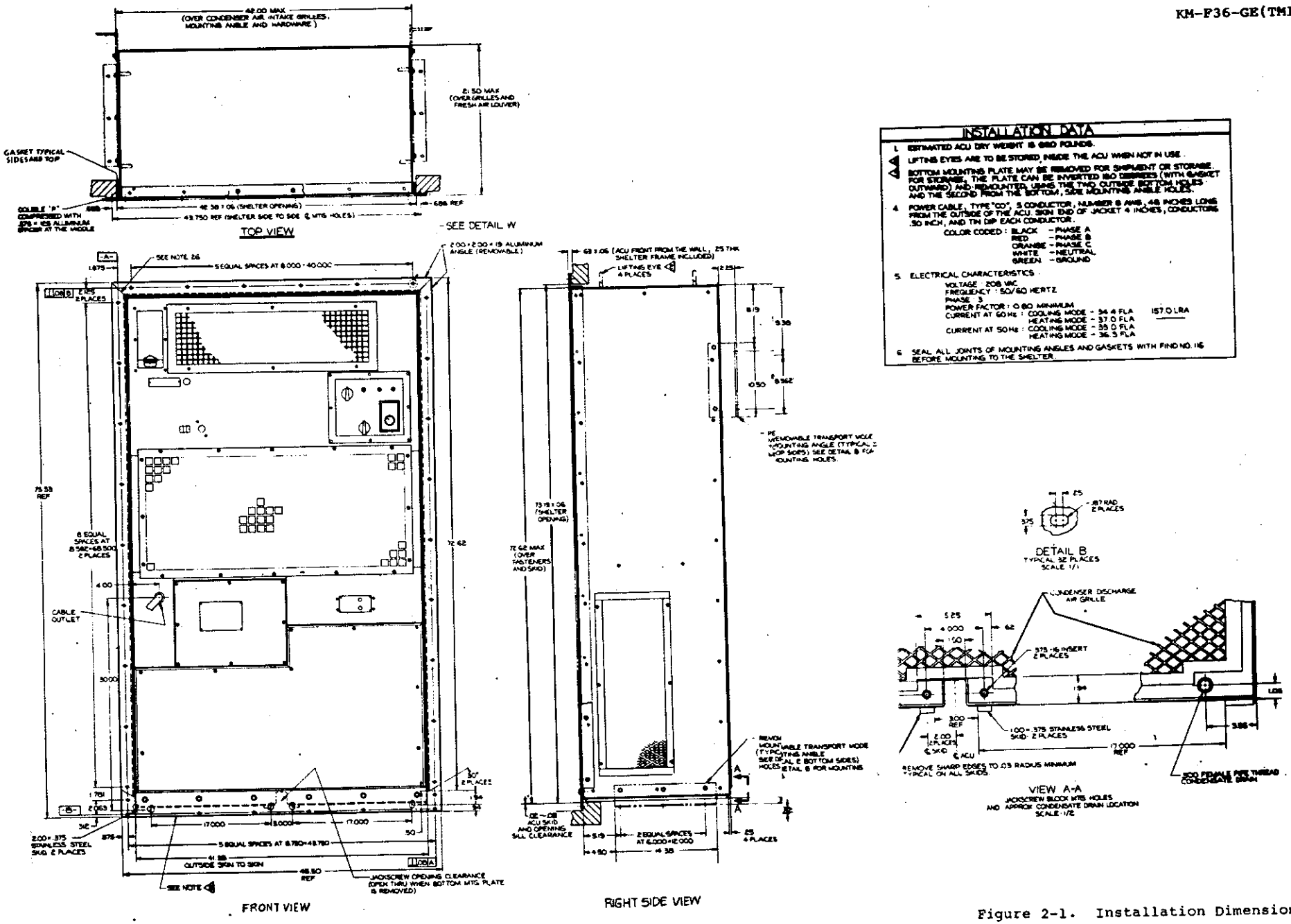
(5) A source of 208 volt, 3 phase, 50 or 60 hertz input power. The 60 hertz power requires 37 full load amps and 50 hertz power requires 22 full load amps. The power source outlet should be located as near as possible to the installed location of the air conditioner. The power source wiring must include a disconnect switch. However, provisions should be made to ensure that power is not disconnected during normal operation and that the disconnect is not used to turn off the air conditioner for normal shut-down.

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

(7) 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.

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

(9) See figure 2-1 (Installation Dimensions), figure 2-2 (Wiring Diagram), and figure 2-3 (Wiring Schematic) for general air conditioner information.



INSTALLATION DATA

1. ESTIMATED ACU DRY WEIGHT IS 680 POUNDS.
2. LIFTING EYES ARE TO BE STORED INSIDE THE ACU WHEN NOT IN USE.
3. BOTTOM MOUNTING PLATE MAY BE REMOVED FOR SHIPMENT OR STORAGE. FOR STORAGE, THE PLATE CAN BE INVERTED (180 DEGREES (WITH GASKET OUTWARD) AND REMOUNTED, USING THE TWO OUTSIDE BOTTOM HOLES AND THE SECOND FROM THE BOTTOM, SIDE MOUNTING ANGLE HOLES.
4. POWER CABLE, TYPE "SO", 5 CONDUCTOR, NUMBER 8 AWG, 48 INCHES LONG FROM THE OUTSIDE OF THE ACU SKIN END OF JACKET 4 INCHES, CONDUCTORS .50 INCH, AND TIN DIP EACH CONDUCTOR.
   COLOR CODED: BLACK – PHASE A
   RED – PHASE B
   ORANGE – PHASE C
   WHITE – NEUTRAL
   GREEN – GROUND
5. ELECTRICAL CHARACTERISTICS:
   VOLTAGE: 208 VAC
   FREQUENCY: 50/60 HERTZ
   PHASE: 3
   POWER FACTOR: 0.80 MINIMUM
   CURRENT AT 60 Hz: COOLING MODE – 34.4 FLA, 157.0 LRA
   HEATING MODE – 37.0 FLA
   CURRENT AT 50 Hz: COOLING MODE – 33.0 FLA
   HEATING MODE – 36.3 FLA
6. SEAL ALL JOINTS OF MOUNTING ANGLES AND GASKETS WITH FIND NO. 116 BEFORE MOUNTING TO THE SHELTER.

Figure 2-1. Installation Dimensions

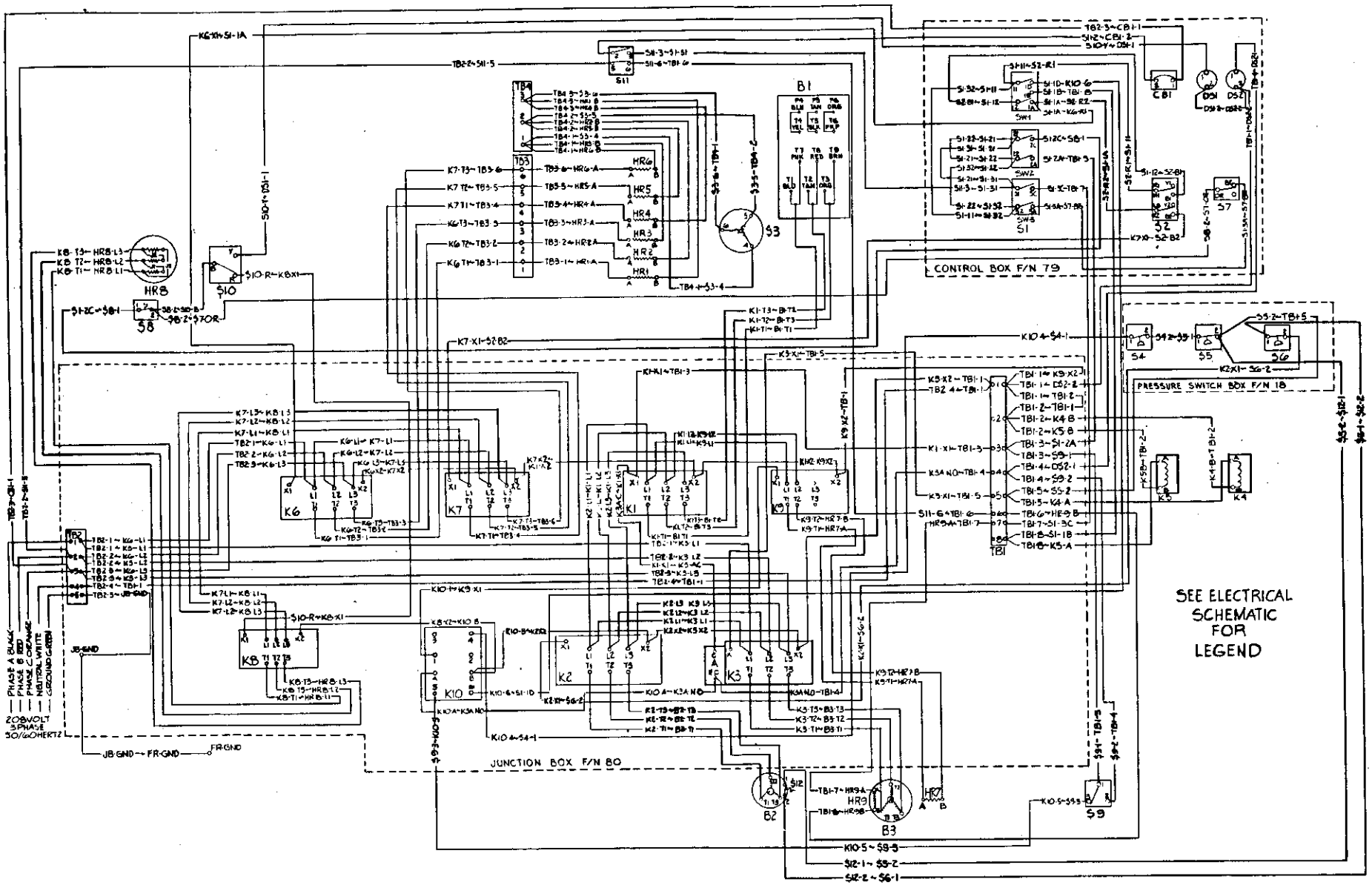


Figure 2-2. Wiring Diagram

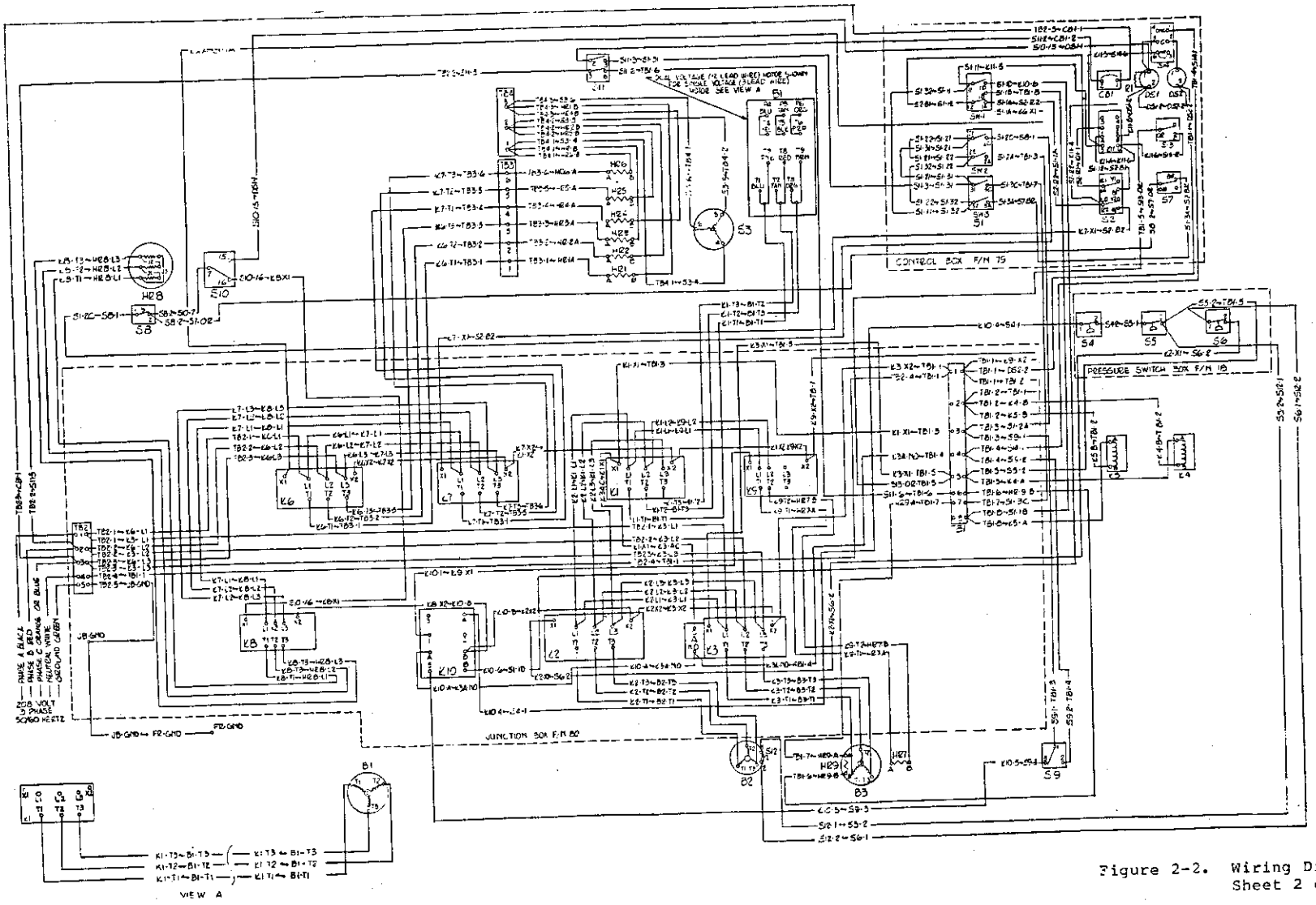
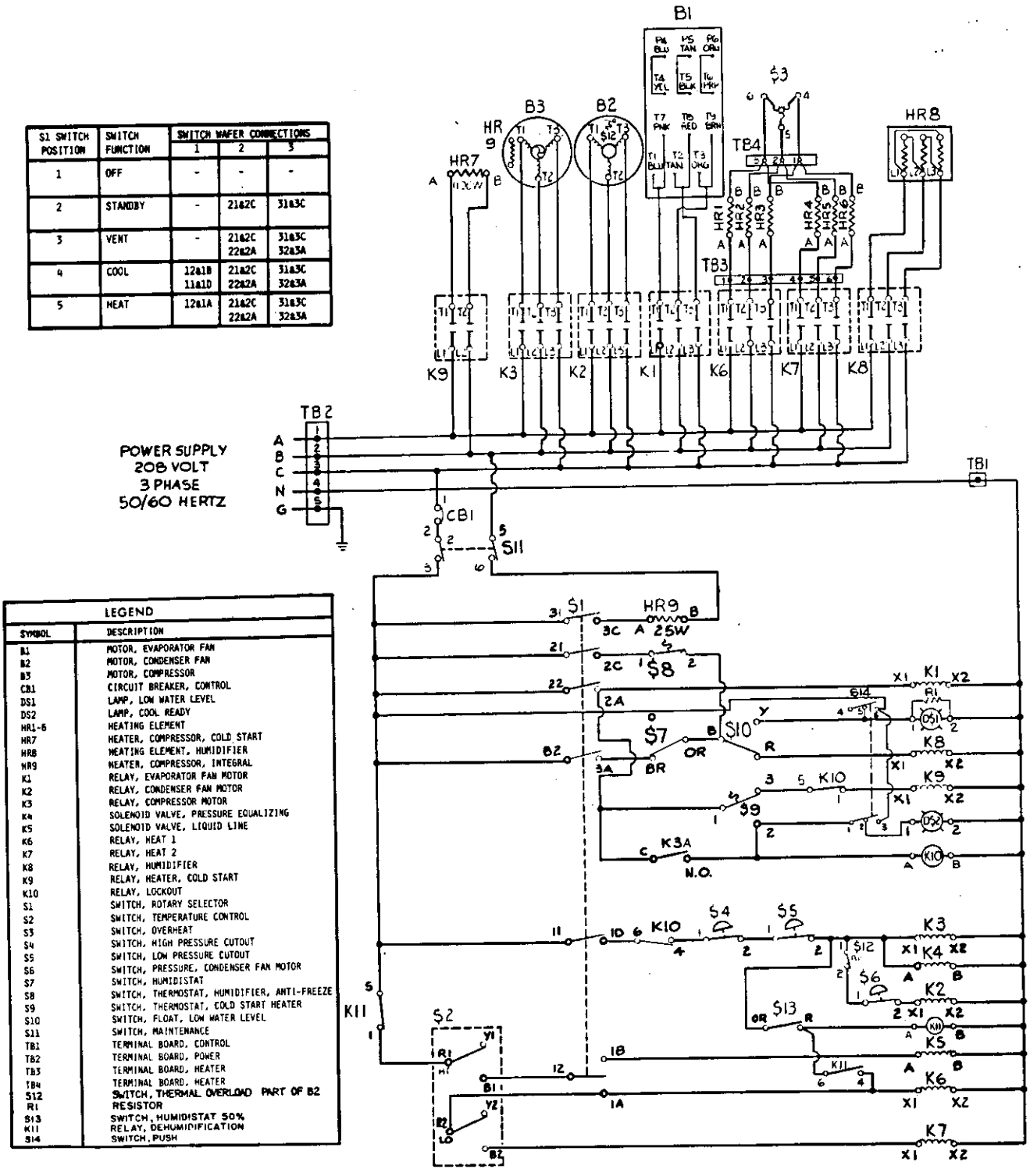


Figure 2-2. Wiring Diagram
Sheet 2 of 2

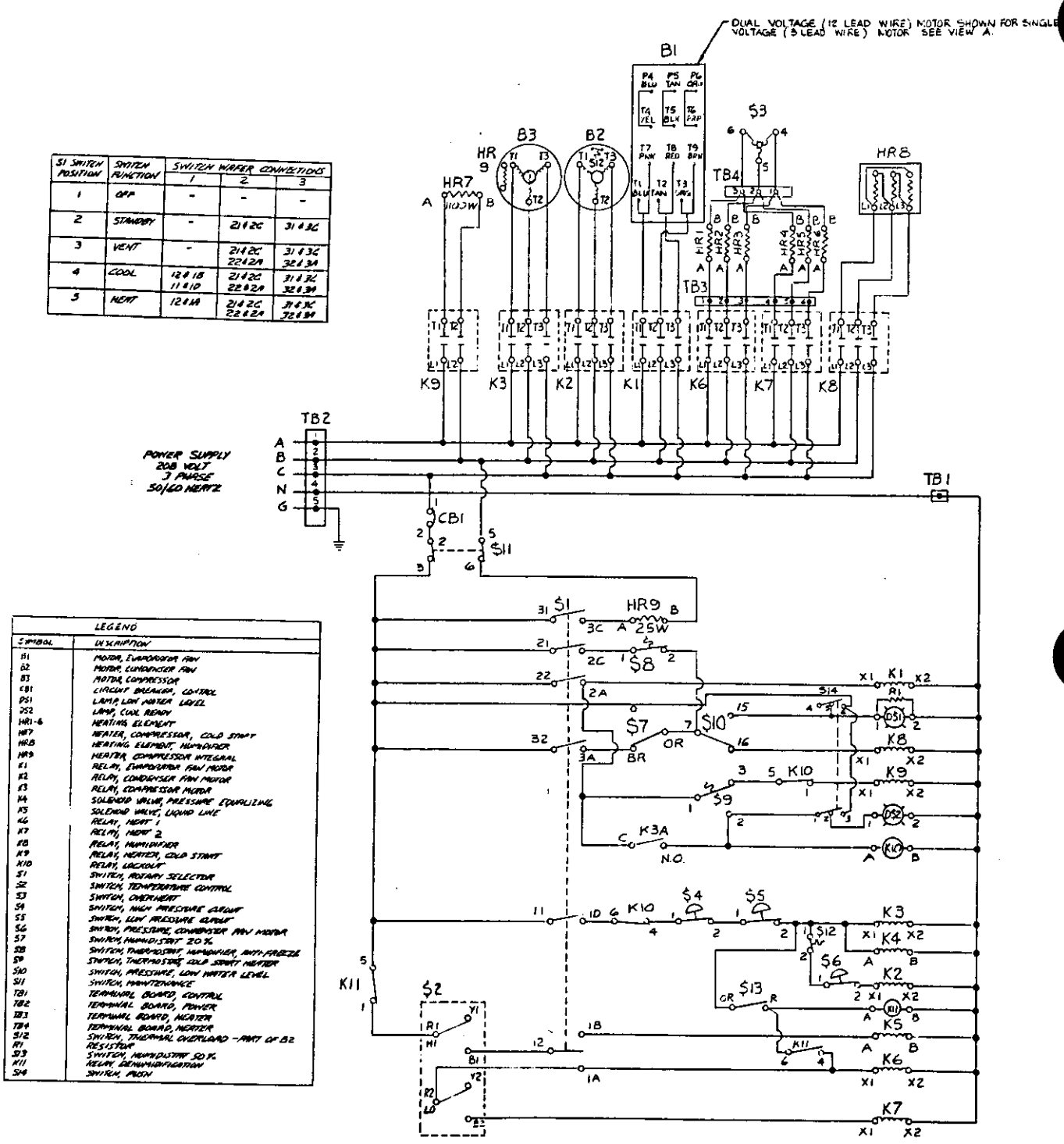
S1 SWITCH POSITION	SWITCH FUNCTION	SWITCH WAFER CONNECTIONS 1	2	3
1	OFF	-	-	-
2	STANDBY	-	21&2C	31&3C
3	VENT	-	21&2C 22&2A	31&3C 32&3A
4	COOL	12&1B 11&1D	21&2C 22&2A	31&3C 32&3A
5	HEAT	12&1A	21&2C 22&2A	31&3C 32&3A



LEGEND	
SYMBOL	DESCRIPTION
B1	MOTOR, EVAPORATOR FAN
B2	MOTOR, CONDENSER FAN
B3	MOTOR, COMPRESSOR
CB1	CIRCUIT BREAKER, CONTROL
DS1	LAMP, LOW WATER LEVEL
DS2	LAMP, COOL READY
HR1-6	HEATING ELEMENT
HR7	HEATER, COMPRESSOR, COLD START
HR8	HEATING ELEMENT, HUMIDIFIER
HR9	HEATER, COMPRESSOR, INTEGRAL
K1	RELAY, EVAPORATOR FAN MOTOR
K2	RELAY, CONDENSER FAN MOTOR
K3	RELAY, COMPRESSOR MOTOR
K4	SOLENOID VALVE, PRESSURE EQUALIZING
K5	SOLENOID VALVE, LIQUID LINE
K6	RELAY, HEAT 1
K7	RELAY, HEAT 2
K8	RELAY, HUMIDIFIER
K9	RELAY, HEATER, COLD START
K10	RELAY, LOCKOUT
S1	SWITCH, ROTARY SELECTOR
S2	SWITCH, TEMPERATURE CONTROL
S3	SWITCH, OVERHEAT
S4	SWITCH, HIGH PRESSURE CUTOUT
S5	SWITCH, LOW PRESSURE CUTOUT
S6	SWITCH, PRESSURE, CONDENSER FAN MOTOR
S7	SWITCH, HUMIDISTAT
S8	SWITCH, THERMOSTAT, HUMIDIFIER, ANTI-FREEZE
S9	SWITCH, THERMOSTAT, COLD START HEATER
S10	SWITCH, FLOAT, LOW WATER LEVEL
S11	SWITCH, MAINTENANCE
TB1	TERMINAL BOARD, CONTROL
TB2	TERMINAL BOARD, POWER
TB3	TERMINAL BOARD, HEATER
TB4	TERMINAL BOARD, HEATER
S12	SWITCH, THERMAL OVERLOAD PART OF B2 RESISTOR
R1	
S13	SWITCH, HUMIDISTAT 50%
K11	RELAY, DEHUMIDIFICATION
S14	SWITCH, PUSH

APPLICABLE TO UNITS PRIOR TO SERIAL NO. 86448

Figure 2-3. Electrical Schematic



S1 SWITCH POSITION	SWITCH FUNCTION	SWITCH WAFER CONNECTIONS		
		1	2	3
1	OFF	-	-	-
2	STANDBY	-	2 & 2C	3 & 3C
3	VENT	-	2 & 2C 2 & 2A	3 & 3C 3 & 3A
4	COOL	12 & 1B 11 & 1D	2 & 2C 2 & 2A	3 & 3C 3 & 3A
5	HEAT	12 & 1B	2 & 2C 2 & 2A	3 & 3C 3 & 3A

LEGEND	
SYMBOL	DESCRIPTION
B1	MOTOR, EVAPORATOR FAN
B2	MOTOR, CONDENSER FAN
B3	MOTOR, COMPRESSOR
CB1	CIRCUIT BREAKER, CONTROL
DS1	LAMP, LOW WATER LEVEL
DS2	LAMP, CYCLE READY
HR1-6	HEATING ELEMENT
HR7	HEATER, COMPRESSOR, COLD START
HR8	HEATING ELEMENT, HUMIDIFIER
HR9	HEATER, COMPRESSOR INTEGRAL
K1	RELAY, EVAPORATOR FAN MOTOR
K2	RELAY, CONDENSER FAN MOTOR
K3	RELAY, COMPRESSOR MOTOR
K4	SOLENOID VALVE, PRESSURE EQUALIZING
K5	SOLENOID VALVE, LIQUID LINE
K6	RELAY, HEAT 1
K7	RELAY, HEAT 2
K8	RELAY, HUMIDIFIER
K9	RELAY, HEATER, COLD START
K10	RELAY, LOCKOUT
S1	SWITCH, ROTARY SELECTOR
S2	SWITCH, TEMPERATURE CONTROL
S3	SWITCH, OVERHEAT
S4	SWITCH, HIGH PRESSURE CUTOUT
S5	SWITCH, LOW PRESSURE CUTOUT
S6	SWITCH, PRESSURE, CONDENSER FAN MOTOR
S7	SWITCH, HUMIDISTAT 20%
S8	SWITCH, THERMOSTAT, HUMIDIFIER, ANTI-FREEZE
S9	SWITCH, THERMOSTAT, COLD START HEATER
S10	SWITCH, PRESSURE, LOW WATER LEVEL
S11	SWITCH, MAINTENANCE
TB1	TERMINAL BOARD, CONTROL
TB2	TERMINAL BOARD, POWER
TB3	TERMINAL BOARD, HEATER
TB4	TERMINAL BOARD, HEATER
S12	SWITCH, THERMAL OVERLOAD - PART OF B2
R1	RESISTOR
S13	SWITCH, HUMIDISTAT 50%
K11	RELAY, DEHUMIDIFICATION
S14	SWITCH, FROST

APPLICABLE TO UNITS SERIAL NO. 86448 AND THEREAFTER.

Figure 2-3. Electrical Schematic

Section III AIR CONDITIONER PREPARATION

2-5. INSTALLATION

a. Remove the following items: (See figure 2-1.)

(1) Bottom mounting plate. (Shipped in stowed position - Inverted and bolted to side angles.) **WILL BE REINSTALLED AFTER POSITIONING OF AIR CONDITIONER.**

(2) Two each bottom removable transport mode mounting angles. **STORE ANGLES AND HARDWARE IN A SAFE PLACE FOR USE IN TRANSPORT MODE.**

(3) Two each upper rear side removable transport mode mounting angles. **STORE ANGLES AND HARDWARE IN A SAFE PLACE FOR USE IN TRANSPORT MODE.**

(4) Two vertical side mounting angles and one horizontal top mounting angle. **ANGLES AND HARDWARE WILL BE REINSTALLED AFTER POSITIONING OF AIR CONDITIONER.**

b. Attach an overhead hoist with an appropriate sling to the lifting fittings provided at each top corner of the air conditioner.

WARNING

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

c. Move air conditioner into position and aline skids and jack screw provisions on shelter with those on air conditioner.

d. Remove overhead hoist and sling.

e. Remove four eye bolts and store them in tapped holes in frame angle on inside of fresh air filter access panel. (See figure 2-4.)

NOTE

Due to fan motor RPM (speed) change between 50 and 60 Hertz power this unit is supplied with two different diameter fan motor sheaves. Original units supplied from Keco will be equipped for 60 HZ operation. If unit has been in service or if new unit is to be operated at 50 HZ, remove left-hand top rear panel assembly (See para 5-26) and check sheave on motor shaft and sheave in storage position (inside left fact of discharge duct behind fan sheave) to be sure proper sheave is installed.

50 HZ - USE 3.45 INCH O.D. SHEAVE MARKED AK34
60 HZ - USE 3.05 INCH O.D. SHEAVE MARKED AK30

See paragraph 5-26 for sheave removal/installation/alinement/adjustment instructions.

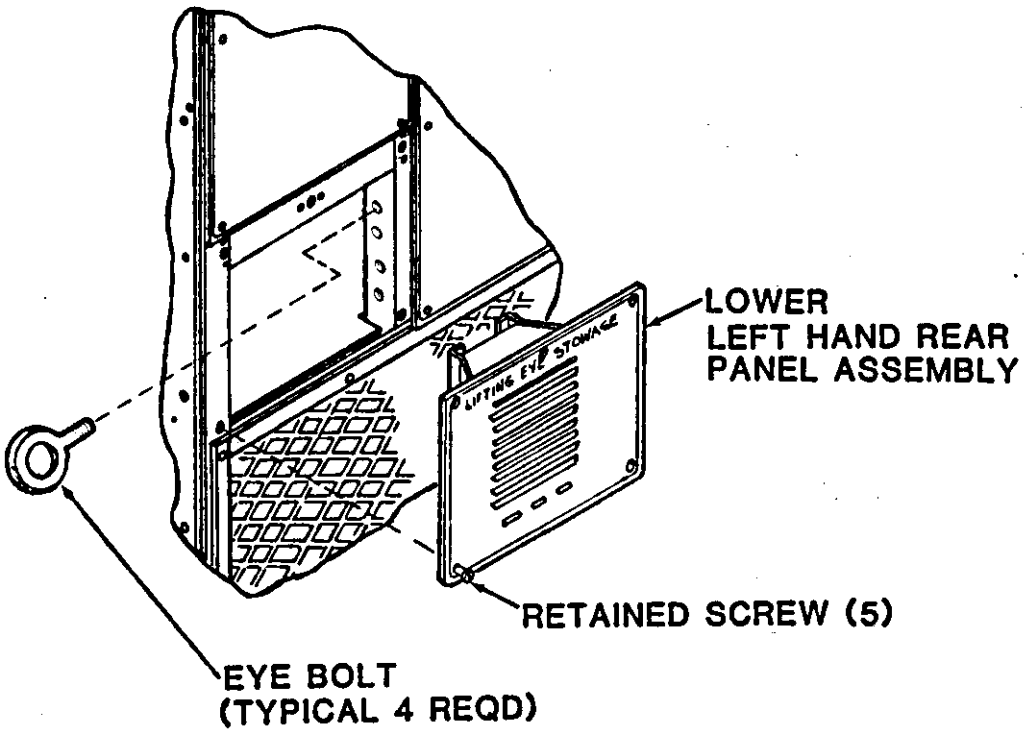


Figure 2-4. Eye Bolt Storage

f. Use shelter jack screws to move air conditioner into shelter far enough to allow reinstallation of side and top gasketed mounting angle assemblies.

g. Reinstall side and top gasketed mounting angle assemblies with hardware removed in step a (4) above.

h. Install bottom mounting plate assembly.

(1) If air conditioner is to be installed in shipping position, reinstall in same inverted position as it was received.

(2) If air conditioner is to be installed in operating position, remove the six hex head cap screws and flat washers from the bottom front face and install the bottom mounting plate assembly using this hardware as shown on figure 2-1.

i. Connect power cable. See para 2-4,(5).

j. If air conditioner is to be installed in operating position:

(1) Check seams of mounting angles and bottom mounting plate at four corners. Seal all joints water tight with JOHNS-MANVILLE "DUXSEAL" or equal. Note that seams will be sealed on units at factory and that this material will remain pliable. It should only be necessary to work this material back into seams on original installation.

(2) Move air conditioner into position so that gasketed face makes even contact all around.

(3) Secure the air conditioner to the shelter with thirty-two sets of 0.3125 diameter attaching hardware. Tighten hardware evenly to be sure gaskets make good contact all around.

(4) See operating instructions for initial adjustments and control settings.

(5) See appropriate TM 9-6920-XXX-10 series operator's manual for Unit-Conduct Of Fire Trainer (U-COFT) for further instructions.

k. If air conditioner is to be installed in the stowed (transport mode) position:

(1) Reinstall transport mode mounting angles removed in steps a (2) and (3) above.

(2) See appropriate TMX-XXXX-XXX-XX Transportability Guide for Unit-Control Of Fire Trainer (U-COFT) for complete transport mode preparation instructions.

CHAPTER 3

GENERAL THEORY OF OPERATION

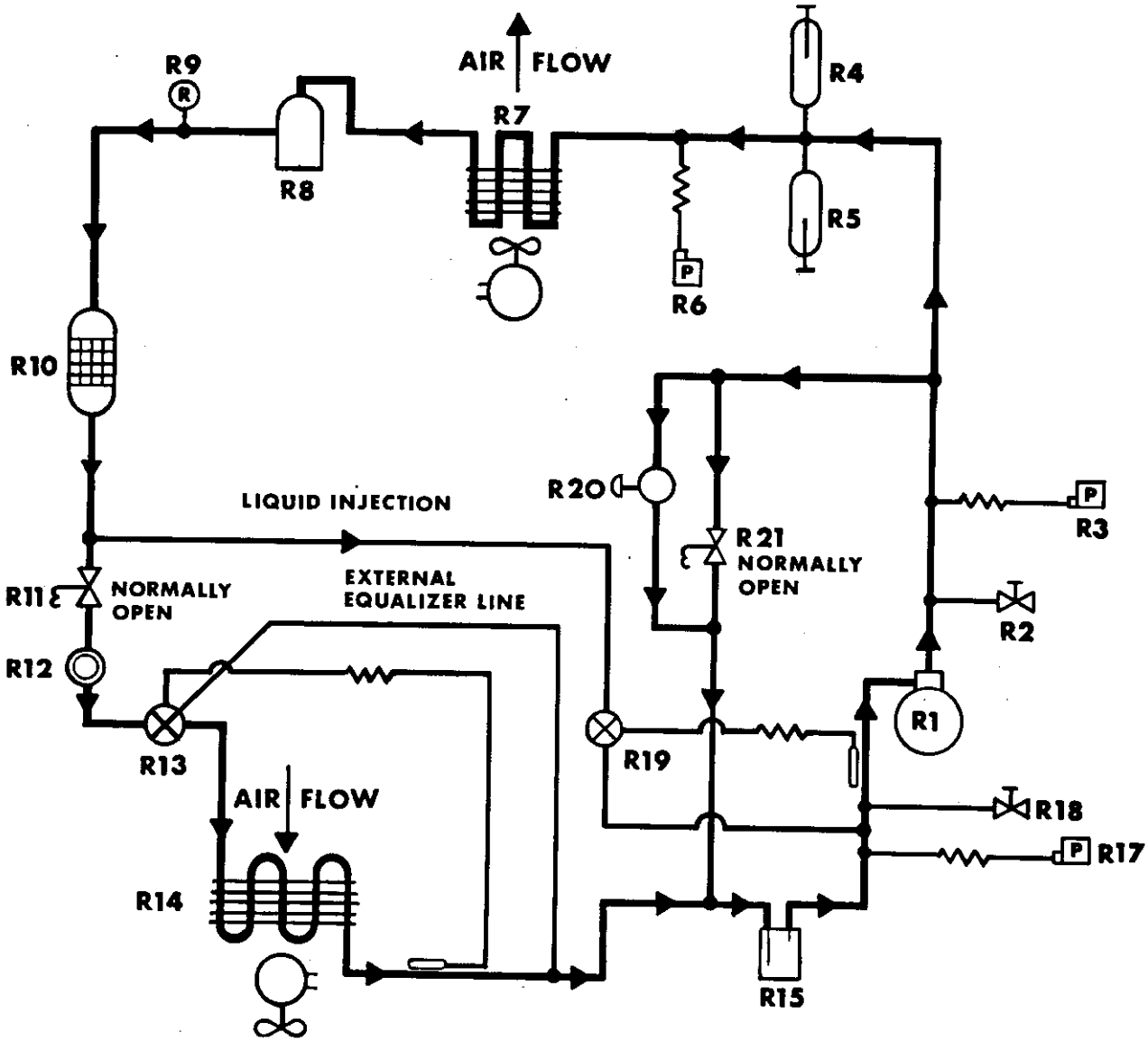
Section I COOLING

3-1. REFRIGERATION CYCLE (See figure 3-1.)

Unit operation with MODE SELECTOR SWITCH set on COOL position and TEMPERATURE CONTROL thermostat set on a lower temperature than inside shelter air temperature.

NOTE

This air conditioner is equipped with a protective thermostat and heater to avoid compressor damage when air conditioner is operated at low outside temperatures in COOL mode. If outside temperatures are cool and power has been disconnected from air conditioner or MODE SELECTOR SWITCH has been in OFF position, a short warm-up period (90 minutes maximum) may be required before refrigeration system will operate in COOL mode. If MODE SELECTOR SWITCH is placed in COOL mode in these conditions, the ventilation fan will operate until compressor warm up is complete. The COOL READY light on control panel will then come on and the refrigeration system will start cooling operation. If this delay is objectionable, power should remain connected to air conditioner and MODE SELECTOR SWITCH should be placed in STANDBY position instead of OFF during periods of cool outside temperatures.



LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
R1	COMPRESSOR, HERMETIC	R12	INDICATOR, SIGHT LIQUID
R2	SERVICE VALVE, WRENCH OPERATED	R13	VALVE, EXPANSION
R3	SWITCH, HIGH PRESSURE CUT-OUT	R14	COIL, EVAPORATOR
R4	CYLINDER ACUTATING, LINEAR	R15	ACCUMULATOR, SUCTION
R5	CYLINDER ACTUATING, LINEAR	R17	SWITCH, PRESSURE LOW
R6	SWITCH, PRESSURE, FAN	R18	SERVICE VALVE, WRENCH OPERATED
R7	COIL, CONDENSER	R19	VALVE, QUENCH
R8	RECEIVER	R20	VALVE, PRESSURE REGULATING
R9	VALVE, PRESSURE RELIEF	R21	VALVE, SOLENOID
R10	DEHYDRATOR DESICCANT REFRIGERANT		
R11	VALVE, SOLENOID		

Figure 3-1. Refrigeration Schematic

BASIC SYSTEM

a. Compressor (R1) starts.

b. To prevent compressor overload and damage during startup, solenoid valve (R21) is open at start of cooling cycle to equalize pressure on both sides on the compressor.

c. The compressor (R1) takes cold, low pressure refrigerant gas and compresses it to a high temperature, high pressure gas. This gas flows through the metal tubing to the condenser coil (R7) and receiver (R8).

d. The condenser fan draws outside ambient air in and blows it over and through the condenser coil (R7). The high temperature, high pressure gas from the compressor (R1) is cooled by the flow of air and is changed into a high pressure liquid.

e. The refrigerant desiccant dehydrator (filter drier) (R10) removes any moisture (water vapor) or dirt that may be carried by the liquid refrigerant.

f. The solenoid valve (R11) is controlled by the TEMPERATURE CONTROL thermostat on the control panel. This valve will shut off the flow of refrigerant to the evaporator coil when the temperature in the conditioned area reaches the thermostat set point.

g. The liquid indicator (sight glass) (R12) indicates the presence of moisture and quantity of refrigerant in the system.

h. The expansion valve (R13) controls the amount and pressure of liquid refrigerant to the evaporator coil (R14). The expansion valve (R13) senses the temperature and pressure of the refrigerant as it leaves the evaporator coil. By use of a sensing bulb and "external equalizer line" the valve constantly adjusts the flow of liquid refrigerant to the evaporator coil (R14).

i. As the liquid refrigerant leaves the expansion valve (R13) it passes thru a distributor and enters the evaporator coil (R14). As the liquid enters the coil at a reduced pressure, the reduction in pressure and the warmer air being forced across the tubes of the coil cause the refrigerant to boil and change to a gas (vapor). The evaporator fan draws the warm air from the conditioned space over and through the evaporator coil. Refrigerant absorbs heat when it changes from a liquid to a gas. As the air from the conditioned spaces comes in contact with evaporator coil (R14), the air is cooled.

j. The refrigerant gas is then drawn back to the compressor (R1) and the cycle is repeated.

SYSTEM CONTROL COMPONENTS

k. This unit has a bypass cycle which allows cooling operation at low cooling loads without cycling the compressor (R1) on and off. In bypass, the refrigerant is piped from the discharge (high side) to the suction (low side) of the compressor, bypassing the evaporator coil (R14).

l. When the TEMPERATURE CONTROL thermostat on the control panel senses that cooling conditions have reached the set point, it closes the solenoid valve (R11) to shut off refrigerant flow to the evaporator coil (R14).

m. As the compressor suction pressure starts to drop, the pressure regulating valve (R20) opens to allow flow of hot gas from the compressor.

n. The liquid quench expansion valve (R19) senses the temperature of the gas at the suction side of the compressor. To prevent excessively hot gas from reaching the compressor, the liquid quench expansion valve (R19) opens to allow liquid refrigerant to mix with the hot gas.

o. The linear actuating cylinders (R4 and R5) that automatically controls the two side condenser air inlet dampers and the fan pressure switch (R6) that automatically controls the condenser fan motor maintain proper compressor discharge pressure during periods of cold outside air temperatures.

SYSTEM SAFETY COMPONENTS

p. The high pressure cut-out switch (R3), low pressure switch (R17), pressure relief valve (R9), and fusible plug (R16) are provided to protect the unit from damage due to pressure extremes.

SYSTEM SERVICING COMPONENTS

q. The wrench operated service valves (R2 and R18) are provided for charging, testing, and general servicing of the refrigerant system.

Section II AIRFLOW/HEATING

3-2. AIRFLOW-GENERAL (See figure 3-2.)

a. Condenser air. (COOL mode only)

(1) Outside air is drawn in thru two side condenser air inlet dampers (A1 and A2) and protective screens by the axial condenser fan and motor (A3 and A4).

(2) This air is discharged to the outside thru the condenser coil (A5) and protective grille (A6).

b. Conditioned air (portions operate in VENT, COOL, and HEAT modes).

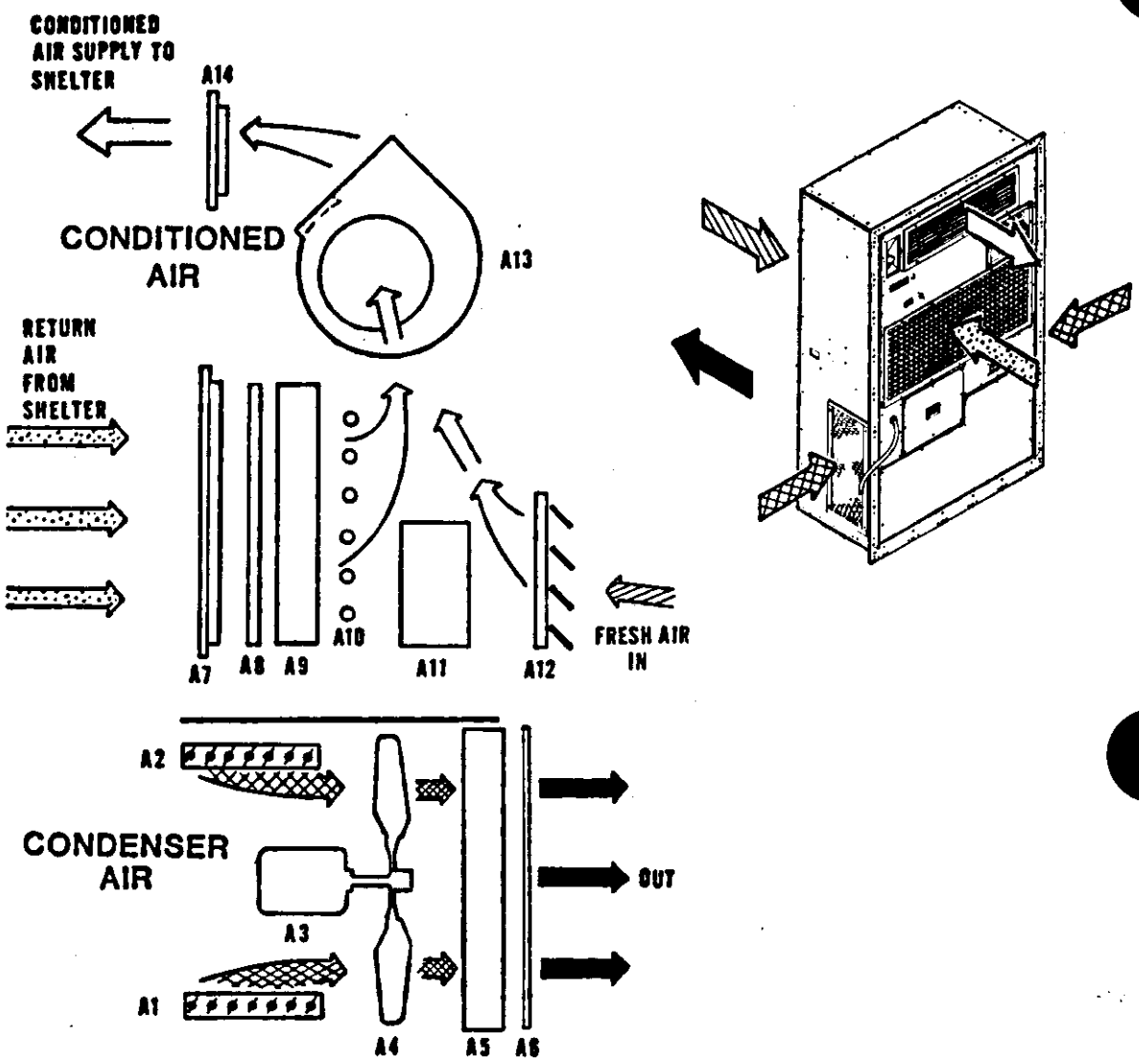
(1) The air is drawn in by the centrifugal evaporator fan assembly (A13).

(2) A limited amount of fresh outside air is introduced thru the fresh air filter (A12) during all operational modes.

(3) Return air from shelter enters thru the return air grille (A7) and air filter (A8).

(4) It then passes over the evaporator coil (A9). The evaporator coil is operational only during COOL mode operation.

(5) The air then passes over the heating elements (A10). The heating elements are operational only during HEAT mode operation. The heaters consist of two banks of three each heaters that are controlled by the TEMPERATURE CONTROL thermostat. One or both sets of heaters are operational depending on the temperature differential.



LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A1	DAMPER, CONDENSER INLET	A8	FILTER, AIR
A2	DAMPER, CONDENSER INLET	A9	COIL, EVAPORATOR
A3	MOTOR, CONDENSER FAN	A10	ELEMENT, HEATING (6 REQD)
A4	FAN, AXIAL-CONDENSER	A11	HUMIDIFIER TANK ASSEMBLY
A5	COIL, CONDENSER	A12	FILTER, FRESH AIR
A6	GRILLE, CONDENSER	A13	FAN ASSEMBLY, CENTRIFUAL EVAPORATOR
A7	GRILLE, RETURN AIR	A14	GRILLE, SUPPLY AIR

Figure 3-2. Airflow

(6) The humidifier tank assembly (A11) is located in the air stream just before the fan. It is controlled by the humidistat controls located on the control panel and is operational during COOL and HEAT modes.

(7) The conditioned air is then discharged thru the supply air grille (A14). This grille contains adjustable directional louvers.

CHAPTER 4

OPERATING INSTRUCTIONS

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

4-1. GENERAL

This air conditioner is designed to operate under a wide range of climatic conditions. It is designed to operate with minimum adjustments. Operation is automatic with the following exceptions:

a. MODE SELECTOR SWITCH must be set to the desired operating mode.

b. TEMPERATURE CONTROL thermostat must be set to the desired temperature (degrees fahrenheit).

c. Humidifier tank must be periodically filled with water.

NOTE

The humidistat controls are factory set.

See figures 4-1 and 4-2 for locations and brief definition of operator's controls, indicators, and service items.

See Section II and III for complete operating instructions.

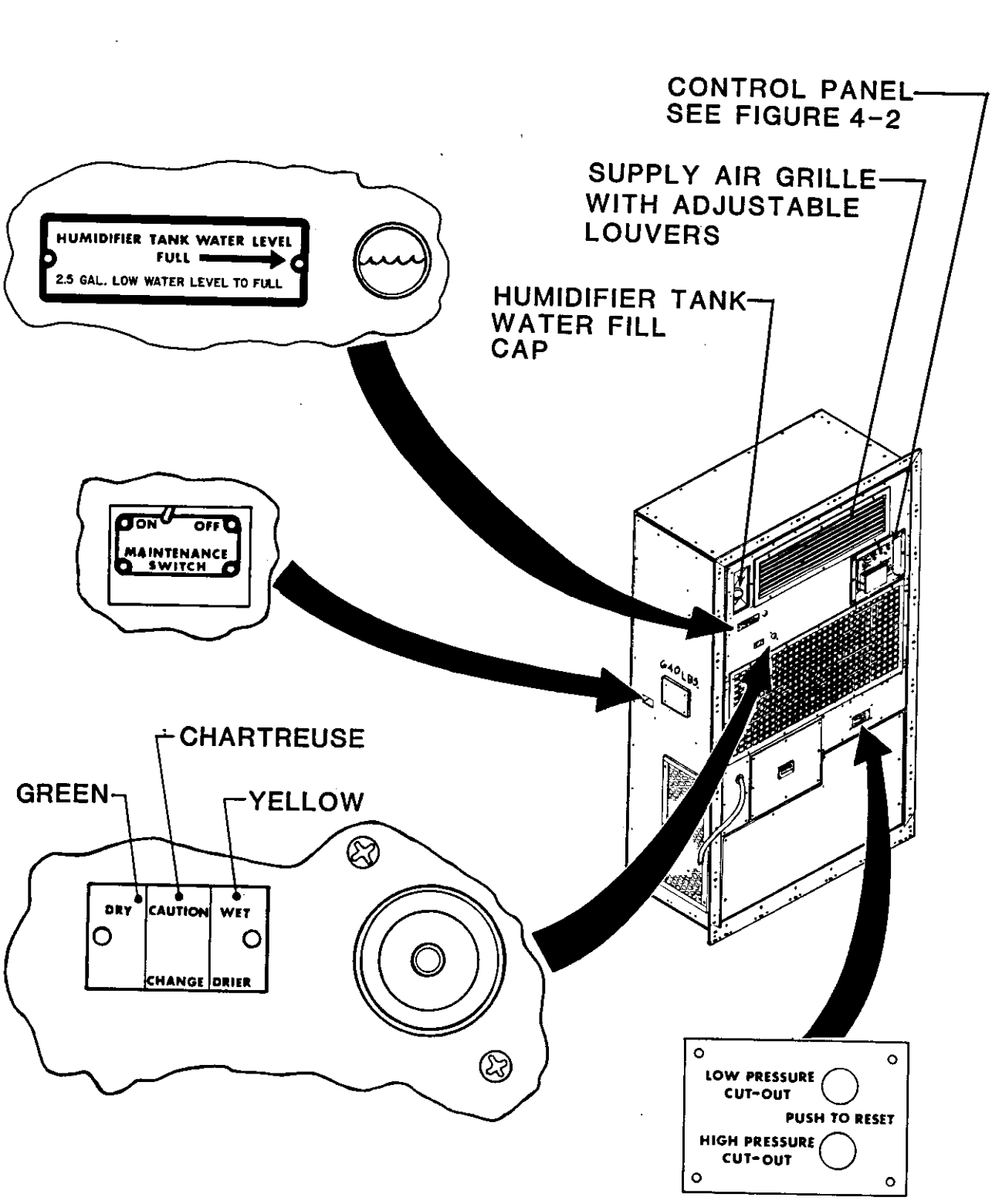


Figure 4-1. Operator's Controls, Indicators, and Service Items-Front and Left Side

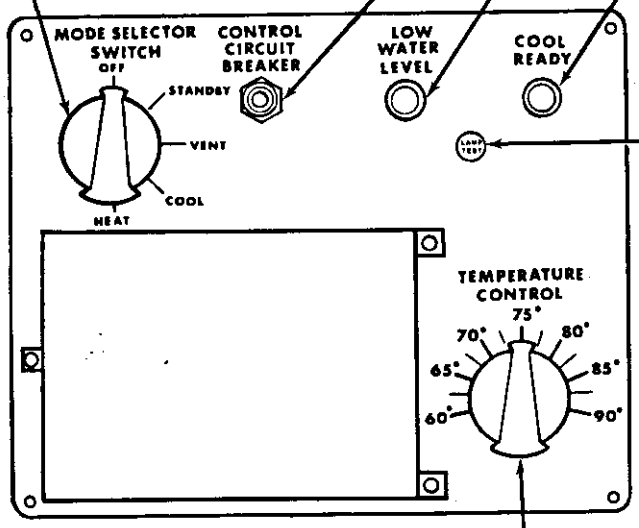
MODE SELECTOR SWITCH
TURN KNOB TO DESIRED MODE

- **OFF** - TO SHUT UNIT DOWN
- **STANDBY** - KEEPS POWER ON TO COMPRESSOR AND HUMIDIFIER TANK HEATERS
- **VENT** - FAN ONLY OPERATION
- **COOL** - FOR COOLING
- **HEAT** - FOR HEATING

CONTROL CIRCUIT BREAKER
PUSH TO RESET

LOW WATER LEVEL
LIGHT INDICATES REFILL OF HUMIDIFIER TANK

COOL READY
LIGHT INDICATES REFRIGERANT COMPRESSOR IS AT SAFE OPERATING TEMPERATURE



LAMP TEST
PRESS TO TEST LIGHTS

TEMPERATURE CONTROL
TURN KNOB TO DESIRED TEMPERATURE SETTING

Figure 4-2. Control Panel, Controls, and Indicators

Section II OPERATION UNDER USUAL CONDITIONS

4-2. INITIAL ADJUSTMENTS AND CHECKS

a. Check that all covers, grilles, panels, and screens are in place and secure.

b. Check that air inlet and outlet openings are not blocked or restricted.

c. Inspect unit for visible damage that would interfer with operation or create operating hazard.

d. Check that unit power cable is connected to an active 120/208 volt, 3 phase, 50/60 hertz power source.

e. If unit is to be operated in COOL or HEAT mode, fill humidifier tank with water. (See para 4-4.)

CAUTION

When outside temperatures below 32°F (0°C) are possible, power must remain connected to air conditioner and MODE SELECTOR SWITCH must be placed in STANDBY mode during nonoperating periods. The humidifier tank assembly must be drained prior to disconnecting power or turning MODE SELECTOR SWITCH to OFF for any period of time that would allow water in humidifier tank assembly to freeze.

4-3. GENERAL

a. Read and understand all instructions, cautions, and warnings contained in this chapter prior to operating the air conditioner.

b. The following table lists general operating settings for all operating modes. See specific paragraph references for complete instructions.

Table 4-1. Operating Settings

CONDITION	MODE SELECTOR SWITCH SETTING	TEMPERATURE CONTROL SETTING	SUPPLY AIR GRILLE LOUVERS
HEATING	HEAT (PARA 4-5)	DESIRED TEMPERATURE	SLIGHTLY DOWN FOR BEST RESULTS
COOLING	COOL (PARA 4-6)	DESIRED TEMPERATURE	SLIGHTLY UP FOR BEST RESULTS
VENTILATION ONLY	VENT (PARA 4-7)	DOES NOT OPERATE	ADJUST TO SUIT
SHUT	STANDBY (PARA 4-8)	DOES NOT OPERATE	
DOWN	OFF (PARA 4-9)	DOES NOT OPERATE	

c. During periods of very low or high outside temperatures limit traffic in and out of conditioned space as much as possible. Keep doors tightly closed.

d. DO NOT ADJUST CONTROLS UNNECESSARY. Properly set the controls and the air conditioner will control the temperature automatically.

4-4. HUMIDIFIER TANK ASSEMBLY FILLING INSTRUCTIONS

Supplies: 1) Water jug with nozzle (safety dispensing jug, part no. 67002, FSCM 27901 or equal).

NOTE

To reduce the frequency of cleaning and increase performance of humidifier, the best source of pure mineral free water should be used.

2) Source of clean pure water.

WARNING

Take care that water is not spilled or carelessly handled around electrical items or in other areas that would create a hazard to personnel or do damage to equipment.

a. Remove humidifier tank fill cap.

b. Carefully pour clean fresh water into humidifier tank filler neck while observing humidifier tank water level sight glass.

c. Stop filling when water level reaches approximate center of sight glass. DO NOT OVERFILL or fill so fast that water spills on surrounding areas.

d. Screw humidifier tank fill cap in place.

4-5. OPERATION IN HEAT MODE

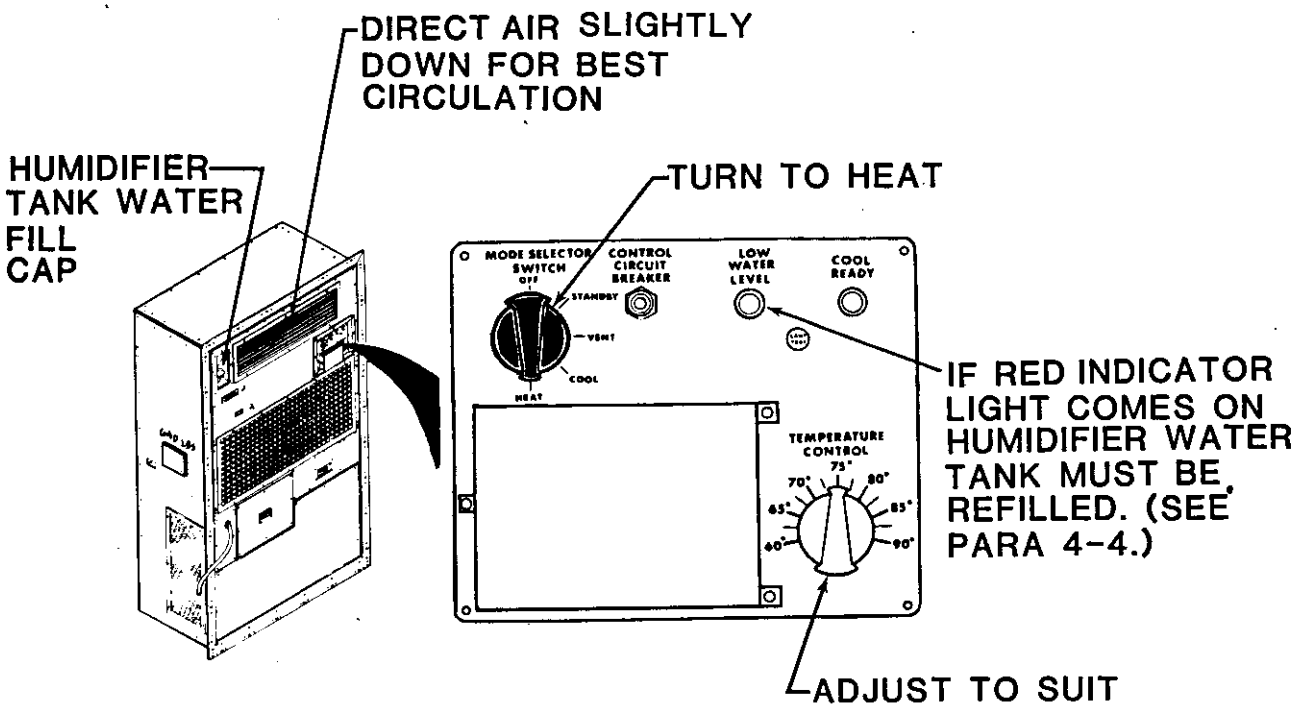


Figure 4-3. Heat Mode

In the HEAT mode two banks of three each thermostatically controlled electrical heaters are used to warm the air to the desired temperature. One or both banks of heaters may be active depending on the temperature demand.

a. Fill humidifier tank. (See para 4-4.)

NOTE

Periodic refill of humidifier water tank will be necessary. The frequency will depend on local conditions and the % Relative Humidity setting of the humidistat control. A refill schedule should be established based on these conditions. DO NOT ALLOW UNIT TO OPERATE FOR EXTENDED PERIODS WITH RED "LOW WATER LEVEL" indicator light on.

b. Turn MODE SELECTOR SWITCH to HEAT.

c. Adjust TEMPERATURE CONTROL thermostat to the desired temperature.

d. Adjust supply air grille louvers slightly down for best circulation of air during HEAT mode. **Take care that louvers are not turned so far that they block airflow.**

NOTE

An overheat thermostat located near the heating elements will turn them off if the temperature in the heater compartment reaches an excessive level.

CAUTION

When outside temperatures below 32°F (0°C) are possible, power must remain connected to air conditioner and MODE SELECTOR SWITCH must be placed in STANDBY mode during nonoperating periods. The humidifier tank assembly must be drained prior to disconnecting power or turning MODE SELECTOR SWITCH to OFF for any period of time that would allow water in humidifier tank assembly to freeze.

4-6. OPERATION IN COOL MODE

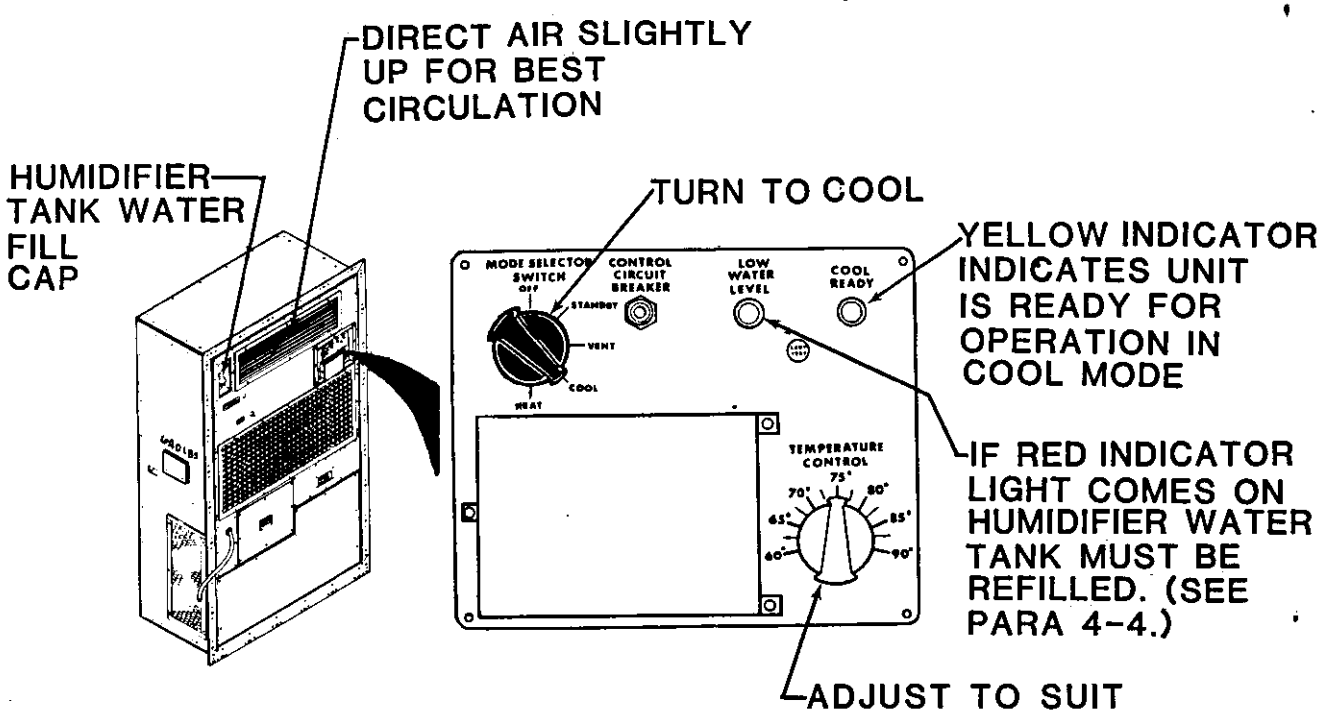


Figure 4-4. Cool Mode

In the COOL mode the refrigeration system is operational. This air conditioner is equipped with a compressor heater that allows unit to be safely operated in COOL mode during cold outside temperatures. If power has been disconnected or if MODE SELECTOR SWITCH has been in the OFF position, a short warmup period (90 minutes maximum) may be necessary. Turn MODE SELECTOR SWITCH to COOL. The conditioned air (ventilation) fan will operate. When the compressor reaches a safe operating temperature the yellow indicator COOL READY light will come on and cooling cycle will operate as controlled by the TEMPERATURE CONTROL thermostat setting.

a. Fill humidifier tank. (See para 4-4.)

NOTE

Periodic refill of humidifier water tank will be necessary. The frequency will depend on local conditions and the % Relative Humidity setting of the humidistat control. A refill schedule should be established based on these conditions. DO NOT ALLOW UNIT TO OPERATE FOR EXTENDED PERIODS WITH RED "LOW WATER LEVEL" indicator light on.

b. Turn MODE SELECTOR SWITCH to COOL.

c. Adjust TEMPERATURE CONTROL thermostat to the desired temperature.

d. Adjust supply air grille louvers slightly up for best circulation of air during COOL mode. **Take care that louvers are not turned so far that they block airflow.**

CAUTION

When outside temperatures below 32°F (0°C) are possible, power must remain connected to air conditioner and MODE SELECTOR SWITCH must be placed in STANDBY mode during nonoperating periods. The humidifier tank assembly must be drained prior to disconnecting power or turning MODE SELECTOR SWITCH to OFF for any period of time that would allow water in humidifier tank assembly to freeze.

4-7. OPERATION IN VENT MODE

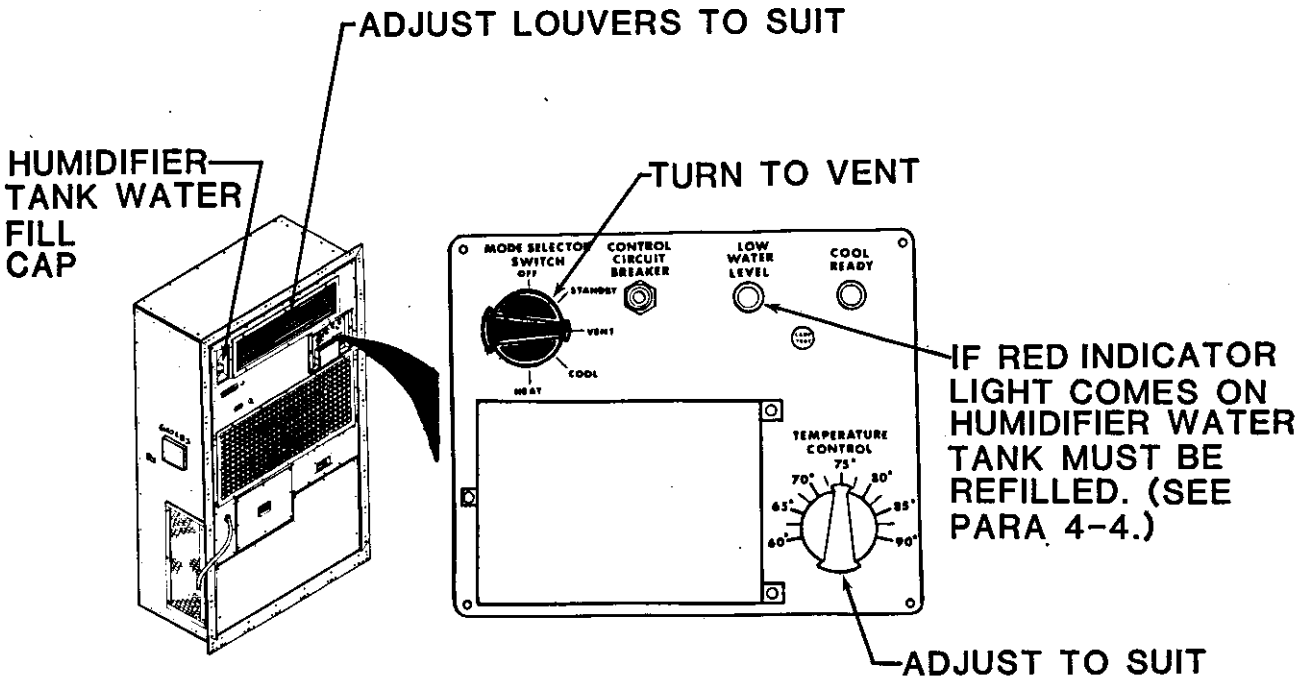


Figure 4-5. Vent Mode

In the VENT mode, only the evaporator (conditioned air) fan, humidifier and the heaters that maintain safe operational temperatures of the compressor are operational.

a. Fill humidifier tank. (See para 4-4.)

NOTE

Periodic refill of humidifier water tank will be necessary. The frequency will depend on local conditions and the % Relative Humidity setting of the humidistat control. A refill schedule should be established based on these conditions. DO NOT ALLOW UNIT TO OPERATE FOR EXTENDED PERIODS WITH RED "LOW WATER LEVEL" indicator light on.

b. Turn MODE SELECTOR SWITCH to VENT.

c. Adjust supply air grille louvers to suit. Take care tha the louvers are not turned so far that they block airflow.

CAUTION

When outside temperatures below 32°F (0°C) are possible, power must remain connected to air conditioner and MODE SELECTOR SWITCH must be placed in STANDBY mode during nonoperating periods. The humidifier tank assembly must be drained prior to disconnecting power or turning MODE SELECTOR SWITCH to OFF for any period of time that would allow water in humidifier tank assembly to freeze.

4-8. SHUTDOWN (STANDBY MODE)

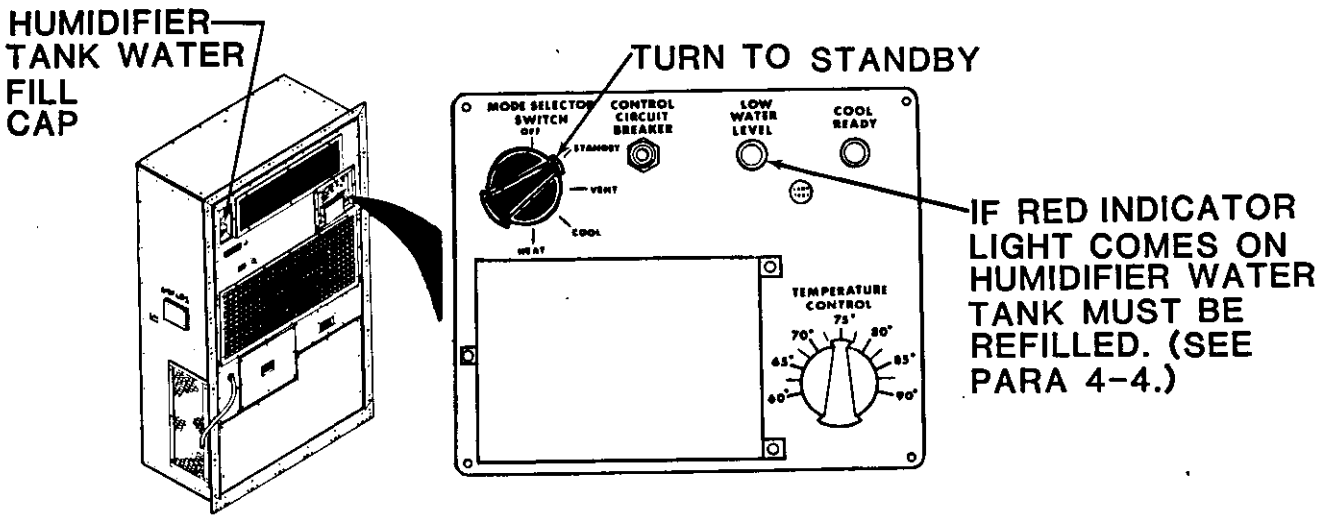


Figure 4-6. Standby Mode

The STANDBY mode should only be used when temperatures of 32°F (0°C) or lower are possible or when immediate cooling will be required at outside temperatures of below 70°F (21.1°C). During normal shutdown when there is no chance of temperatures lower than freezing 32°F (0°C) or when immediate cooling will not be required the OFF mode should be used to avoid the periodic refill of the humidifier tank and to conserve energy.

NOTE

If power has been disconnected from air conditioner or if unit has been in the OFF mode a short (90 minute maximum) warm-up period is required before air conditioner will operate in the COOL mode at cooler outside temperatures.

In the STANDBY mode, power will remain connected to the heaters that maintain safe operational temperatures of the humidifier and compressor.

CAUTION

When outside temperatures below 32°F (0°C) are possible, power must remain connected to air conditioner and MODE SELECTOR SWITCH must be placed in STANDBY mode during nonoperating periods. The humidifier tank assembly must be drained prior to disconnecting power or turning MODE SELECTOR SWITCH to OFF for any period of time that would allow water in humidifier tank assembly to freeze.

CAUTION

If the air conditioner is to be left unattended for a period of longer than 48 hours when temperatures below freezing 32°F (0°C) are possible, the humidifier tank should be drained and the MODE SELECTOR SWITCH turned to OFF. The air conditioner may remain in the STANDBY mode if the humidifier tank is refilled every 48 hours.

a. Prior to placing the mode selector switch in STANDBY mode, fill the humidifier tank. (See para 4-4.)

b. Turn MODE SELECTOR SWITCH to STANDBY.

4-9. SHUTDOWN (OFF)

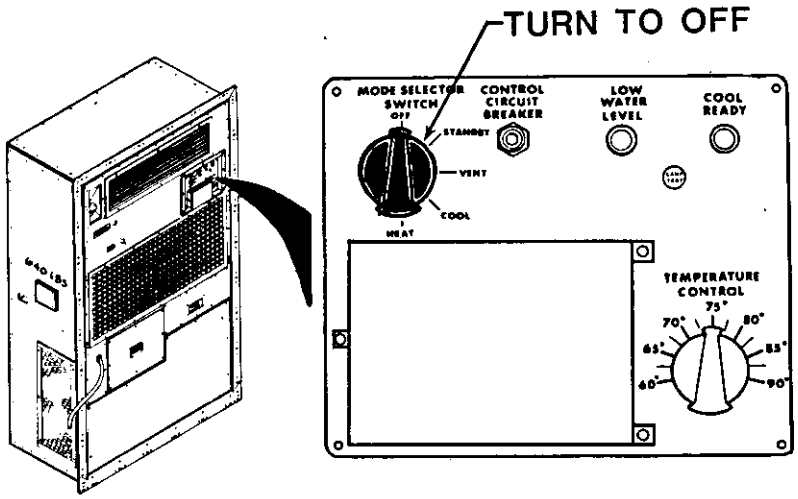


Figure 4-7. Off Mode

In the OFF position, power will remain connected to some portions of the air conditioner but all functions will stop including protective low temperature heaters.

CAUTION

When outside temperatures below 32°F (0°C) are possible, power must remain connected to air conditioner and MODE SELECTOR SWITCH must be placed in STANDBY mode during nonoperating periods. The humidifier tank assembly must be drained prior to disconnecting power or turning MODE SELECTOR SWITCH to OFF for any period of time that would allow water in humidifier tank assembly to freeze.

a. Turn MODE SELECTOR SWITCH to OFF.

Section III OPERATION UNDER UNUSUAL CONDITIONS

4-10. GENERAL

The model F36-GE air conditioner is designed to operate normally within a wide range of climatic conditions. However, some extreme conditions require special operating and servicing procedures to prevent undue loading and excessive wear on the equipment.

4-11. OPERATION IN EXTREME HEAT

The air conditioner is designed to operate in temperatures up to 125°F (51.7°C). Extra care should be taken to minimize the cooling load when operating in extremely high temperatures. Some of the steps that may be taken are:

a. Check doors to be sure they are tightly closed.

b. Limit in and out traffic, when possible.

c. When possible, limit the use of electric lights and other heat producing equipment.

4-12. OPERATION IN EXTREME COLD

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.

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

a. Check all doors to be sure they are tightly closed.

b. Limit in and out traffic, when possible.

4-13. OPERATION IN DUSTY OR SANDY CONDITIONS

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

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

b. Increase frequency of inspection and cleaning of all serviceable items.

4-14. OPERATION IN UNUSUALLY WET CONDITIONS

The air conditioner is designed for normal exposure to the elements. Some of the steps that should be taken in an extremely wet climate are:

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

b. More frequent inspection of air conditioner to shelter seal area to be sure that water is not entering shelter area.

4-15. OPERATION IN SALT AIR OR SEA SPRAY

Salt air or sea spray may cause many of the same clogging problems as encountered when operating in a dusty or sandy environment. In addition, the nature of salt presents serious corrosion problems. Increased frequency of cleaning is necessary during which all exposed surfaces should be thoroughly spray rinsed or sponged with fresh water to remove salt.

4-16. OPERATION UNDER EMERGENCY CONDITIONS

During periods when full 120/208 volt, 3 phase, 50/60 hertz power is in critically short supply the following steps may be taken to reduce power usage.

a. Reduce in and out traffic thru doors as much as possible to avoid loss of conditioned air.

b. Keep doors tightly closed.

c. When possible use VENT mode instead of COOL or HEAT.

d. Adjust TEMPERATURE CONTROL thermostat to the most practical setting.

When in COOL mode, use a higher temperature setting.

When in HEAT mode, use a lower temperature setting.

Section IV OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-17. GENERAL

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 table 4-1.

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

b. While You Operate. Always keep in mind and observe the WARNINGS and CAUTIONS. Perform your during (D) PMCS.

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

d. If Your Equipment Fails to Operate, troubleshoot with proper equipment. Record and report any deficiencies using proper forms.

e. Perform weekly as well as before operations PMCS if:

(1) You are the assigned operator and have not operated the item since the last weekly.

(2) You are operating the item for the first time.

NOTE

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

Table 4-2.
OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B-Before D-During A-After W-Weekly M-Monthly

Item No.	B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE	Equipment is Not Ready/Available If:
1	●	●				Check that humidifier tank is properly filled. See operating instructions and para 4-4.	
2	●					**Outside Covers and Panels** Check that panels are in place. Check panels for cracks, dents, and missing hardware.	Panels missing or damage that would cause operating hazard.
3	●					**Conditioned Air Grille and Screen** Check for obstructions, damage, proper adjustment, loose, or missing hardware.	
				●		Check louvers for freedom of operation.	
						Lubricate as required.	
4	●					**Protective Grilles, Guards, and Screens** Check that grilles, guards, and screens are in place.	Missing parts or damage that would cause operating hazards.
	●			●		Check them for obstructions, damage, and loose or missing hardware.	

Table 4-2.
OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)

B-Before D-During A-After W-Weekly M-Monthly

Item No.	B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE	Equipment is Not Ready/Available If:
5		•				**Information Plates** Check for legibility and loose or missing hardware.	
6	•					**Control Panel** Check for obvious damage and missing knobs.	Control panel damaged.
		•				Check for proper operation.	Unit not operating properly.
	•	•				Lamp Test - Press lamp test button and check that LOW WATER LEVEL and COOL READY lights come on.	Indicator lights are not operating.

CHAPTER 5

MAINTENANCE INSTRUCTIONS

Section I PREVENTIVE MAINTENANCE CHECKS AND SERVICES

5-1. GENERAL

a. See para 1-9 for tools and test equipment.

b. Repair parts are listed and illustrated in Chapter 7 of this manual.

5-2. INTRODUCTION, INSPECTION, AND SERVICE

a. Systematic, periodic, Preventive Maintenance Checks and Services(PMCS) are essential to ensure that the air conditioner is ready for operation at all times. The purpose of a preventive maintenance program is to discover and correct defects and deficiencies before they can cause serious damage or complete failure of the equipment. Any effective preventive maintenance program must begin with the indoctrination of operators to report all unusual conditions noted during daily checks or actual operation to the appropriate maintenance personnel.

b. A system should be established to record all problems, defects, and deficiencies noted by operators and discovered during maintenance inspections together with the corrective actions taken.

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

5-3. LUBRICATION

a. The refrigerant compressor and its drive motor are hermetically sealed in a canister. The compressor crankcase has a lifetime supply of oil which lubricates the compressor and drive motor bearings. The conditioned air (evaporator) and condenser fan motors also have permanently lubricated, sealed bearings. No lubrication of these items is required.

b. The only mechanical items which may require lubrication are the louvers in the conditioned air discharge grille and condenser inlet damper assemblies. These points should be checked and lubricated, as necessary, during preventive maintenance service. A few drops of light oil should be applied to pivot points, bearing surfaces, and linkages to prevent or eliminate stiffness or binding. Be sure to wipe off all excess oil with a cloth or paper towel. These items are in areas of high volume airflow and excess oil will tend to attract and accumulate dust particles from the passing air. Graphite may be used as an alternate lubricant during extreme cold weather operation.

5-4. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

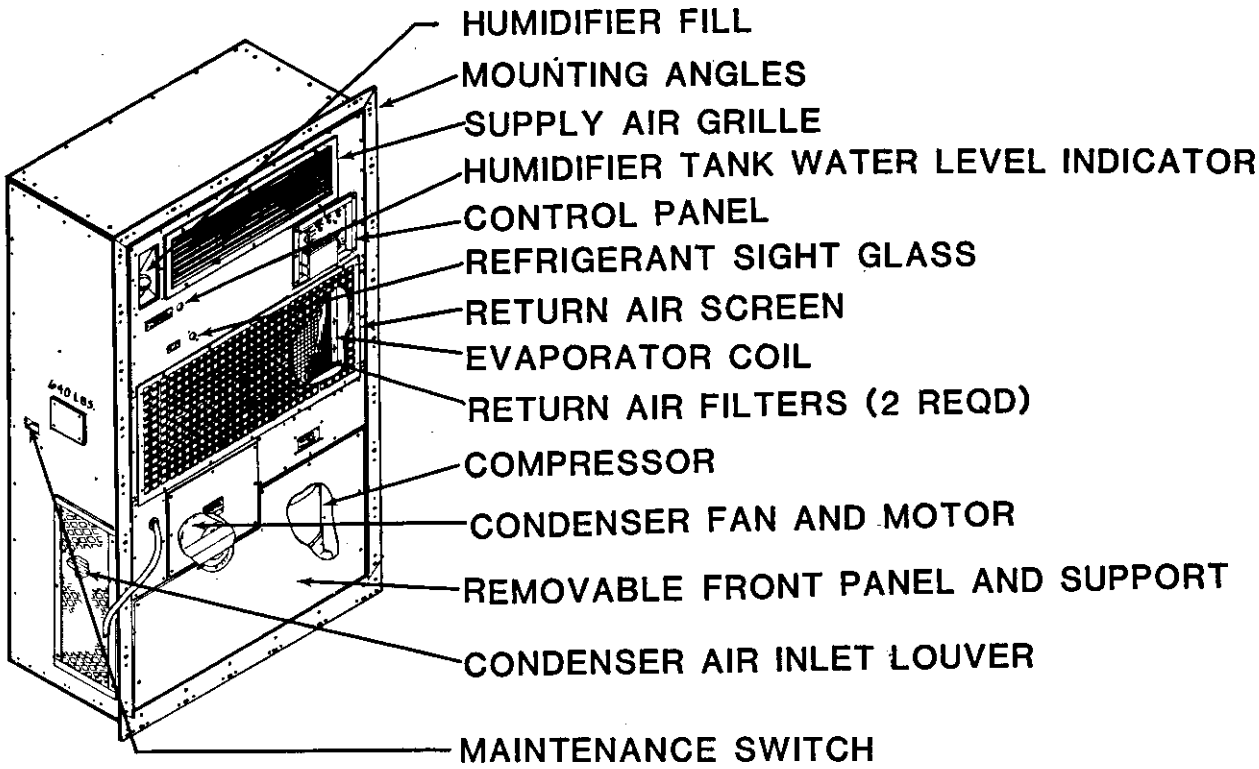
a. Table 5-1 lists the preventive maintenance checks and services that should be performed at quarterly (or otherwise established) intervals. The PMCS items in the table have been arranged and numbered in a logical sequence to provide for greater personnel efficiency and least amount of required maintenance downtime.

b. See Chapter 4, Section IV for Operator's Preventive Maintenance Checks and Services.

WARNING

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

c. See Section III of this chapter for specific instructions for inspection, testing, removal, cleaning, disassembly, repair reassembly, installation and checkout after reassembly or installation.



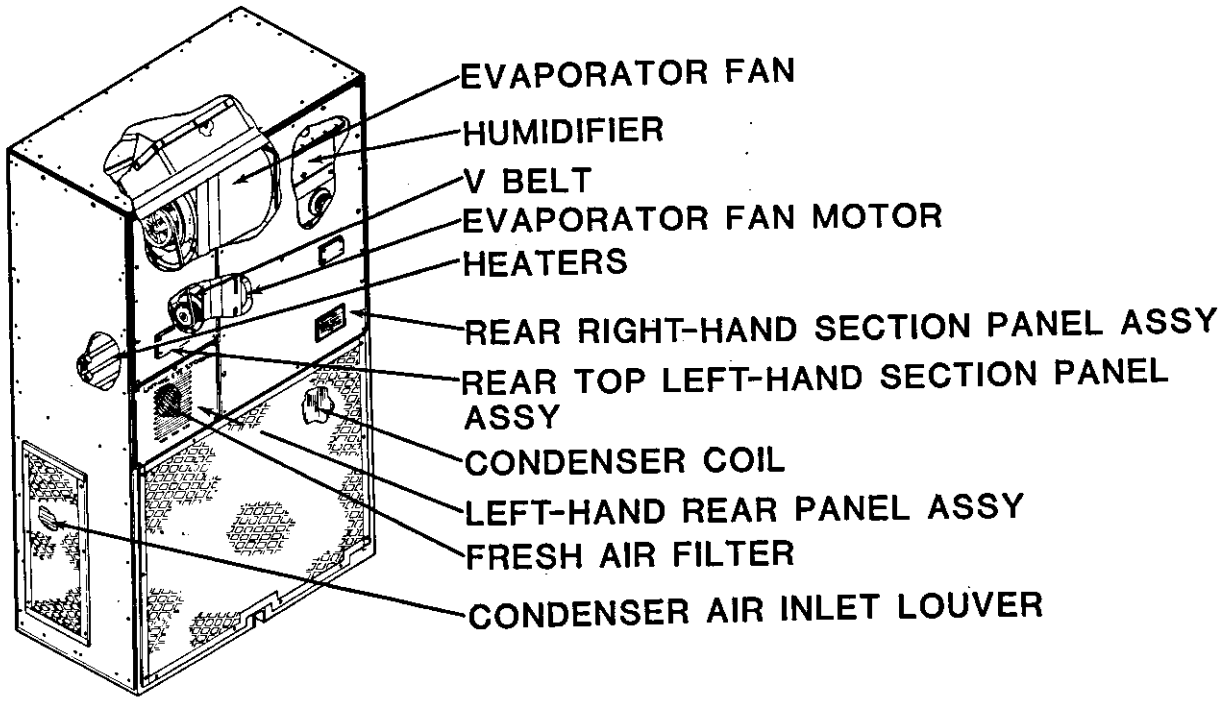


Figure 5-1. Location of Preventive Maintenance Items

d. Remove the following:

(1) Return air screen assembly
(2) Removable front panel and support
(3) Left-hand rear panel assembly
(4) Rear top left-hand section panel assembly
(5) Rear right-hand section panel assembly

Table 5-1. GENERAL MAINTENANCE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Item No.	Item to be Inspected/Serviced	Procedures	See Para
		FRONT SECTIONS	
1	Mounting Angles and Seals	a. Check area around air conditioner mounting angles for evidence of water leakage. b. If leaks are indicated, determine cause and repair.	5-7
2	Supply Air Grille	a. Check operation of louvers for stiffness or binding. b. Remove, clean, inspect, repair, and lubricate grille as necessary.	5-10
3	Return Air Filters	a. Remove, clean, inspect, and service filters. b. Discard filters and obtain replacements, if damaged.	5-8
4	Evaporator Coil	a. Examine for accumulated dust and dirt. b. Use a soft brush or vacuum sweeper (if available) to remove dirt from face areas and surrounding areas of coil.	5-47

Table 5-1. GENERAL MAINTENANCE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (cont)

Item No.	Item to be Inspected/Serviced	Procedures	See Para
4	Evaporator Coil (cont)	c. See para 5-47 for complete instructions.	
5	Front Lower Section	a. Examine the following components in the lower front section for accumulated dust and dirt. 1. Condenser fan 2. Condenser coil 3. Condenser air inlet louvers 4. Surrounding areas b. Use a soft brush, damp cloth, or vacuum sweeper (if available) as appropriate to clean dirt from components in lower front section. NOTE Use a clean, dry cloth (or one slightly moistened with water) for all wiping operations. NEVER use an oily or greasy cloth. Any oily residue left on any surface will attract and accumulate much more dust and dirt than dry surfaces.	
		REAR SECTIONS	
6	Fresh Air Filter	a. Remove, clean, inspect, and service filter. b. Discard filter and obtain replacement, if damaged.	5-9

Table 5-1. GENERAL MAINTENANCE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (cont)

Item No.	Item to be Inspected/Serviced	Procedures	See Para
7	V Belt	a. Examine for tightness and general condition. b. Tighten or replace as indicated.	5-26
8	Humidifier	a. Examine for accumulated scale and sludge. b. Drain and clean. c. Refill.	5-27
9	Upper Rear Section	a. Examine the following components in the upper rear section for accumulated dust and dirt. 1. Rear face of evaporator coil 2. Heaters 3. Evaporator fan motor 4. Surrounding areas b. Use a soft brush, damp cloth or vacuum sweeper (if available) as appropriate to clean dirt from components in upper rear section. NOTE Use a clean, dry cloth (or one slightly moistened with water) for all wiping operations. NEVER use an oily or greasy cloth. Any oily residue left on any surface will attract and accumulate much more dust and dirt than dry surfaces.	

Table 5-1. GENERAL MAINTENANCE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (cont)

Item No.	Item to be Inspected/Serviced	Procedures	See Para
10	Condensate Drain Pan and Hoses	a. Pour about one quart of clean water into the condensate drain pan (recessed pan under the evaporator coil) and watch for it to flow thru the drain hole in lower rear right corner of unit. b. If water does not flow out of unit check pan and hoses for blockages. c. Clean pan and hoses as necessary.	
		GENERAL	
11	Wiring	a. Examine for evidence of chafing, loose connections or other obvious damage. b. Repair as indicated.	5-11
12	Brackets, Mounts etc.	Examine for loose or missing attaching hardware or other obvious damage.	
13	Outside Surfaces	a. Check outside surfaces for accumulations of dust or salt (if applicable). b. Clean as required.	
14	Reassemble	Install all components, panels, and grilles removed during PMCS. Check to be sure that all items are back in place and secure.	

Table 5-1. GENERAL MAINTENANCE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (cont)

Item No.	Item to be Inspected/Serviced	Procedures	See Para
15	Operational Checks	a. Turn MODE SELECTOR SWITCH to OFF and reconnect input power. NOTE If power has just been connected to unit, a short (30 minute maximum during very cold weather) warm up period is required for COOL mode operation. When compressor reaches a safe operating temperature, it will come on automatically if the mode selector is in the COOL mode. b. Turn MODE SELECTOR SWITCH to STANDBY. 1. If LOW WATER LEVEL light comes on, refill humidifier tank. NOTE In STANDBY mode the LOW WATER LEVEL light will only come on when water level is low and the "freeze protection" thermostat calls for humidifier heating. 2. No other air conditioner functions should be indicated.	4-4

Table 5-1. GENERAL MAINTENANCE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (cont)

Item No.	Item to be Inspected/Serviced	Procedures	See Para
15	Operational Checks (cont)	c. Turn MODE SELECTOR SWITCH to VENT. 1. COOL READY light will come on. During periods of very cold outside temperatures a short (30 minutes maximum) warm up period is required. 2. Evaporator (conditioned air) fan should start. NOTE Air being discharged from supply air grille may feel slightly warmer or cooler than that being returned depending on temperature of outside (fresh) air. 3. No heating or cooling should be noted other than outside (fresh) air differential.	

Table 5-1. GENERAL MAINTENANCE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (cont)

Item No.	Item to be Inspected/Serviced	Procedures	See Para
15	Operational Checks (cont)	d. Turn TEMPERATURE CONTROL knob to highest (90°F) setting and MODE SELECTOR SWITCH to COOL. The condenser fan and compressor should start. Assuming that the temperature is lower than 90°F, no additional cooling should be noted. e. Adjust the TEMPERATURE CONTROL knob to a temperature setting slightly lower than the room temperature. A drop in the temperature of the air being discharged from the supply air grille should be noted. f. Turn the TEMPERATURE CONTROL knob to the lowest (60°F) setting. Check condition of refrigerant at sight glass on rear of air conditioner. See para 5-42 for instructions. g. Turn the MODE SELECTOR SWITCH to HEAT. The compressor and condenser fan should stop.	

Table 5-1. GENERAL MAINTENANCE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (cont)

Item No.	Item to be Inspected/Serviced	Procedures	See Para
15	Operational Checks (cont)	Note that there are two stages of heat. Assuming that the TEMPERATURE CONTROL thermostat knob is still set at 60°F and that room temperature is above 60°F, slowly turn knob toward room temperature. When the knob reaches a temperature slightly above room temperature an increase in the temperature of the air being discharged from the supply air grille should be noted. As the TEMPERATURE CONTROL thermostat reaches each stage of heat a "click" should also be heard at the junction box as the contactors are energized. Slowly turn knob to a higher setting, another increase in the air temperature should be noted. h. Turn mode selector switch to OFF and observe that all air conditioner functions cease. i. Set-up the air conditioner for the desired operational mode. j. Record performance of quarterly PMCS, including all corrective actions taken.	

Section II TROUBLESHOOTING

5-5. GENERAL

a. This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the air conditioner. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

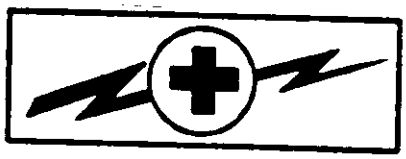
b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed, or is not corrected by listed corrective actions, notify your supervisor.

c. Table 5-2 lists the common malfunctions which you may find during the operation or maintenance of this air conditioner or its components. You should perform the test/inspections and corrective actions in the order listed.

NOTE

Before you use this table, be sure you have performed all applicable operating checks.

WARNING



HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

Never work on electrical equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible the input power supply to the equipment must be shut off before beginning work on the equipment. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

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

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

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

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

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

Table 5-2. TROUBLESHOOTING

MAINTENANCE TEST OR INSPECTION	CORRECTIVE ACTION
1. AIR CONDITIONER DOES NOT START IN ANY MODE.	
Step 1. Check to see if input power has been disconnected.	Connect input power.
Step 2. Check to see if CONTROL CIRCUIT BREAKER has tripped.	Reset circuit breaker.
Step 3. Check for loose or damaged electrical connections or damaged wires in wiring harnesses.	Tighten terminals, replace or repair damaged wires.
Step 4. Check all terminals and internal wiring within junction box for tightness and damage.	Tighten terminals, or repair wiring as necessary. (See para 5-11.)
Step 5. Check operation of mode selector switch (S1).	Test switch. (See para 5-14.) Replace switch, if defective.
Step 6. Check that maintenance switch is ON.	Turn switch ON.
2. CONDITIONED AIR (EVAPORATOR) FAN STARTS IN COOL MODE, BUT CONDENSER FAN AND COMPRESSOR DO NOT START.	
NOTE If power has just been connected to unit, a short (30 minute maximum during very cold weather) warm up period is required. When compressor reaches a safe operating temperature, it will come on automatically if mode selector switch is in the COOL mode.	
Step 1. Check to see if high-or-low pressure cutout switches (S4 and S5) are tripped.	Press, then release reset buttons.

Table 5-2. TROUBLESHOOTING (cont)

MAINTENANCE	TEST OR INSPECTION	CORRECTIVE ACTION

WARNING

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

Step 2. Check for loose or damaged electrical connections, or damaged wires in wiring harnesses.
Tighten terminals, replace or repair damaged wires.

NOTE

The condenser fan can operate in some conditions when compressor is inoperative.

Step 3. Check operation of compressor motor thermal overload, overcurrent protector.
Test protector. (See para 5-38, b.(3)
Replace compressor if protector is open.

Step 4. Check operation of mode selector switch (S1).
Test switch. (See para 5-14.)
Replace switch if defective.

Step 5. Check control relay (K10).
Test relay and socket. (See para 5-22.)
Replace switch if defective.

Table 5-2. TROUBLESHOOTING (cont)

MAINTENANCE TEST OR INSPECTION	CORRECTIVE ACTION
3. CONDITIONED AIR (EVAPORATOR) AND CONDENSER FANS BOTH RUN, BUT COMPRESSOR DOES NOT START.	
WARNING Disconnect input power before performing internal electrical troubleshooting. Voltages used can be deadly.	
Step 1. Check for loose or damaged electrical connections or damaged wires in wiring harnesses.	Tighten terminals. Replace or repair damaged wires in wiring harnesses.
Step 2. Check operation of compressor motor contactor (K3).	Test contactor. (See para 5-21.) Replace contactor if defective.
Step 3. Check operation of compressor (B1).	Replace compressor if defective.
4. AIR CONDITIONER STOPS COMPLETELY DURING COOL MODE OPERATION.	
Step 1. Check to see if maintenance switch has been turned OFF.	Turn maintenance switch ON.
Step 2. Check to see if circuit breaker (CB1) is tripped.	Reset circuit breaker.

Table 5-2. TROUBLESHOOTING (cont)

MAINTENANCE TEST OR INSPECTION	CORRECTIVE ACTION
	CAUTION If circuit breaker trips again soon after restart in COOL mode, do not attempt another restart. Troubleshoot electrical system.
Step 3. Check to be sure there is no restriction to airflow through condenser section.	Clean all obstructions from condenser inlets, outlet, and condenser coil.
Step 4. Check selector switch (S1). (See para 5-14.)	Replace if defective.
5. COMPRESSOR AND CONDENSER FAN STOP DURING COOL MODE OPERATION, BUT CONDITIONED AIR (EVAPORATOR) FAN CONTINUES TO RUN.	
Step 1. Check to see if high-or-low pressure cutout switches (S4 and S5) are tripped.	Press, then release tripped reset buttons.
	CAUTION Wait at least two minutes before restarting in COOL mode. If either pressure cutout switch trips soon after a restart is made, do not attempt another restart. Troubleshoot the airflow and refrigeration systems.
6. CONDITIONED AIR (EVAPORATOR) FAN DOES NOT START, OR STOPS DURING OPERATION, IN ANY OPERATION MODE.	
Step 1. Check for broken or loose drive belt. (See para 5-26.)	Repair or replace as indicated.

Table 5-2. TROUBLESHOOTING (cont)

MAINTENANCE	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. Check operation of conditioned air (evaporator) fan motor contactor (K1).	**WARNING** Disconnect input power before performing internal electrical troubleshooting. Voltages used can be deadly. Test contactor. (See para 5-20.) Replace contactor if defective.
	Step 3. Check operation of conditioned air (evaporator) fan motor (B1).	Test motor. (See para 5-26.) Replace if defective.
	Step 4. Check operation of mode selector switch (S1).	Test switch. (See para 5-14.) Replace switch if defective.
7. EXCESSIVE NOISE WHEN COMPRESSOR STARTS.		**CAUTION** If a knocking or hammering sound is heard when compressor starts, turn mode selector switch to OFF, immediately. Such noise is usually caused by liquid refrigerant in compressor, which can seriously damage or destroy compressor. Determine cause.

Table 5-2. TROUBLESHOOTING (cont)

MAINTENANCE	TEST OR INSPECTION	CORRECTIVE ACTION

WARNING

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

Step 1. Check for a defective compressor.
Replace if defective.

8. EXCESSIVELY NOISY OPERATION.

Step 1. Isolate source of noise as near as possible, both by ear and touch.
Listen and feel at both front and back of cabinet.

Step 2. Check belt tension and sheave alinement. (See para 5-26.)
Adjust belt tension, aline sheave or replace parts if damaged.

Step 3. Check fans for looseness or damage, and for rotational clearance.
Tighten loose fans, adjust for rotational clearance, or replace if damaged.

Step 4. Check all internal components for looseness, vibration, and security.
Tighten, adjust, and secure as necessary.

Table 5-2. TROUBLESHOOTING (cont)

MAINTENANCE TEST OR INSPECTION	CORRECTIVE ACTION
9. NO HEAT IN HEAT MODE.	
Step 1. Check for loose or damaged electrical connections, or damaged wires in wiring harnesses.	
WARNING Disconnect input power before performing internal electrical troubleshooting. Voltages used can be deadly.	Tighten terminals, replace or repair damaged wires.
Step 2. Check operation of overheat thermostat (S3).	Test thermostat. (See para 5-24.) Replace thermostat if defective.
Step 3. Check operation of mode selector switch (S1).	Test switch. (See para 5-14.) Replace switch if defective.
Step 4. Check temperature control (S2). (See para 5-15.)	Replace if defective.
10. REDUCED HEATING CAPACITY.	
Step 1. Check airflow out of conditioned air (evaporator) discharge grille. If airflow volume is low:	a. Clean and service, or replace, conditioned air filter element. (See para 4-31.) b. Clean evaporator coil, and entire evaporator section. (See para 4-67.)

Table 5-2. TROUBLESHOOTING (cont)

MAINTENANCE	TEST OR INSPECTION	CORRECTIVE ACTION

Step 2. Check operation of overheat thermostat (S3).

WARNING

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

Test thermostat (S3). (See para 5-24.) Replace thermostat if defective.

Step 3. Check operation of TEMPERATURE CONTROL thermostat (S2).

a. Inspect sensing bulb and capillary for damage or leakage. Replace entire control if bulb is damaged or leaking.

b. Test TEMPERATURE CONTROL thermostat. (See para 5-15.) Replace entire control if defective.

Step 4. Check operation of individual heater elements (HR1, 2, 3, 4, 5, and 6).

Test each element. (See para 5-24.) Replace defective elements.

11. REDUCED COOLING CAPACITY.

Step 1. Check condition of refrigerant displayed in sight glass. (See para 5-42.)

a. If indicator (bull's eye) color is yellow or a light hue of chartreuse, or if numerous bubbles appear, go to step 4.

Table 5-2. TROUBLESHOOTING (cont)

MAINTENANCE	TEST OR INSPECTION	CORRECTIVE ACTION
		b. If indicator (bull's eye) color is green or a dark hue of chartreuse, or if refrigerant has a milky appearance, or more than an occasional bubble appears, thoroughly clean the condenser intake screens, condenser fan guard, condenser coil, and entire condenser section to remove all obstructions.
	Step 2. Check airflow out of conditioned air (evaporator) supply air grille. If airflow volume is low:	a. Adjust supply air grille louvers. b. Clean and service, or replace conditioned air filter element. (See para 5-8.) c. Clean evaporator coil and entire evaporator system. (See para 5-47.)
	Step 3. Check operation of TEMPERATURE CONTROL thermostat (S2).	a. Inspect sensing bulb and capillary for damage or leakage. Replace entire control if bulb is damaged or leaking. b. Test TEMPERATURE CONTROL thermostat. (See para 5-15.) Replace entire control.
	Step 4. Troubleshoot refrigeration system.	

Section III MAINTENANCE PROCEDURES

5-6. GENERAL

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination (e.g. by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place.

i. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

WARNING

The panels, covers, screens, grilles, and guards installed on this unit are there for a purpose.

Do not operate this unit with them off or open unless the instructions tell you to. When this is necessary, do so with care.

5-7. MOUNTING ANGLES AND PLATE

See figure 5-2.

a. Inspection

(1) Check that mounting angles and bottom mounting plate hardware is in place and secure.

(2) Examine gaskets for general condition. Replace gaskets if they are cracked, missing or damaged in any manner that would allow water to leak into conditioned area.

b. Removal

(1) Top mounting angle assembly - remove six flat head screws.

(2) Side mounting angle assembly - remove nine flat head screws from each assembly.

(3) Bottom mounting plate assembly - remove six hex head cap screws and lock washers.

c. Gasket replacement

(1) "P" and double "P" type gasket removal:

- Use a drill bit slightly smaller than the rivet diameter to drill out old rivets.

- Remove gasket stiffener plates and carefully pull gasket away from angle or plate surface.

(2) Flat gasket removal:

- Remove as much old gasket material as possible by pulling or scraping it away from the metal surface.

WARNING

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

- Soften and remove old adhesive and gasket residue, using acetone or methyl-ethyl ketone (MEK) and a stiff brush.

(3) Flat gasket installation:

- Check to be sure that all surfaces are clean and free of old gasket material.

- If mounting angles or plate are bent or otherwise damaged so that they would not allow a good seal, replace the total assembly.

- Coat the mating surfaces of the metal and gasket with adhesive (81348) MMM-A-1617, Type II or equal. Let both surfaces dry until the adhesive is tacky but will not stick to fingers.

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

(4) "P" and double "P" gasket installation:

- Position new gasket material on mounting angles. The end of the gasket should extend slightly (approx. 1/32 of an inch) beyond the end of the angle. Secure the gasket with gasket stiffener plates and new rivets.

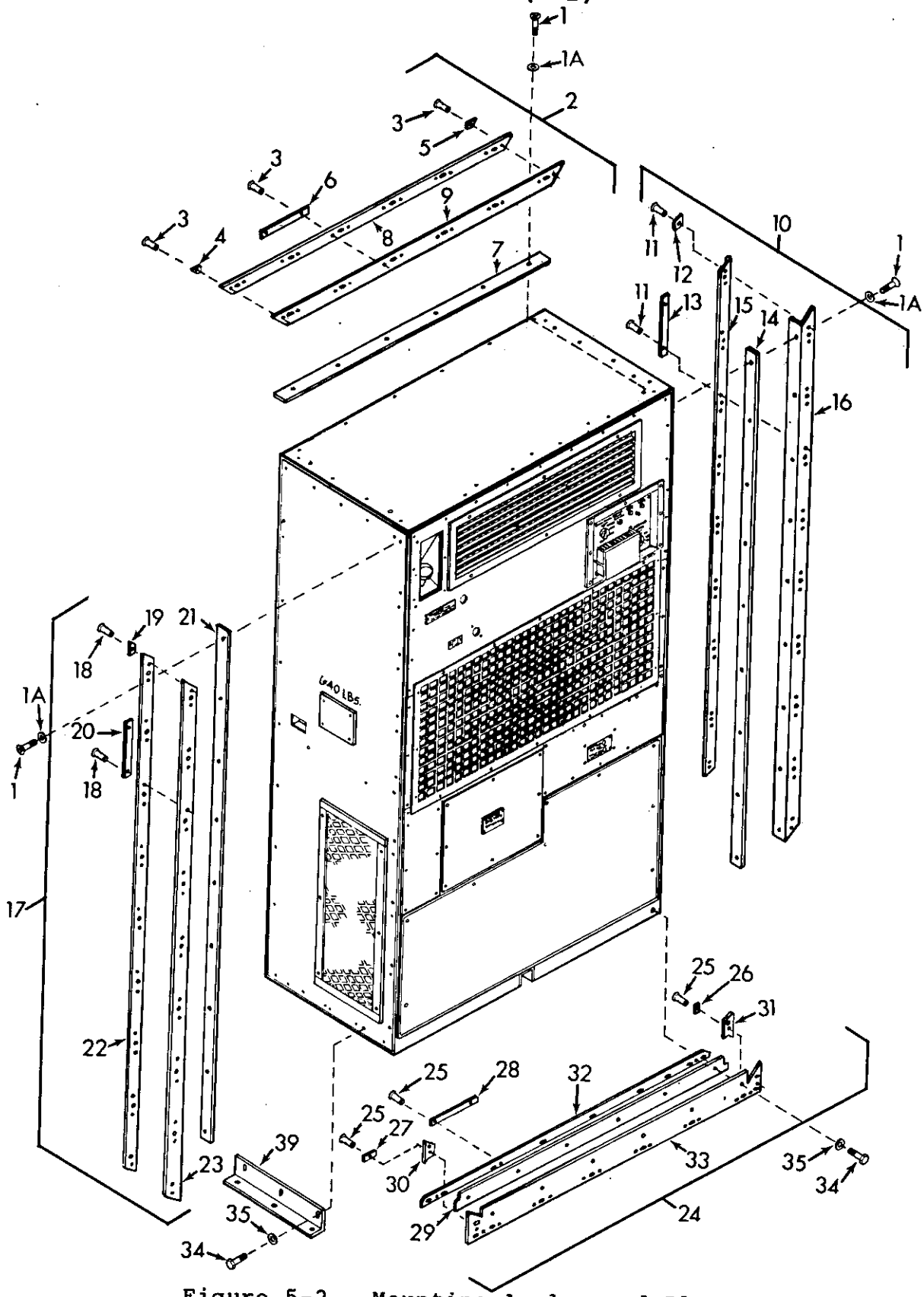


Figure 5-2. Mounting Angles and Plates

Legend for figure 5-2

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	SCREW	18	RIVET
1A	WASHER	19	PLATE
2	ANGLE ASSY,MOUNTING TOP	20	PLATE
3	RIVET	21	GASKET
4	PLATE	22	GASKET
5	PLATE	23	ANGLE
6	PLATE	24	PLATE ASSEMBLY MTG BOTTOM
7	GASKET	25	RIVET
8	GASKET	26	PLATE
9	ANGLE	27	PLATE
10	ANGLE ASSY,MOUNTING SIDE	28	PLATE
11	RIVET	29	GASKET
12	PLATE	30	GASKET
13	PLATE	31	GASKET
14	GASKET	32	GASKET
15	GASKET	33	PLATE
16	ANGLE	34	SCREW,HEX HEAD
17	ANGLE ASSY,MOUNTING SIDE	35	WASHER,FLAT

e. Installation

(1) Secure the mounting angles and bottom mounting plates with hardware removed in step b above.

(2) Reseal seams between air conditioner, mounting angles and bottom mounting plate with sealer, JOHNS-MANVILLE-"DUXSEAL", or equal.

5-8. RETURN AIR FILTERS

See figure 5-3.

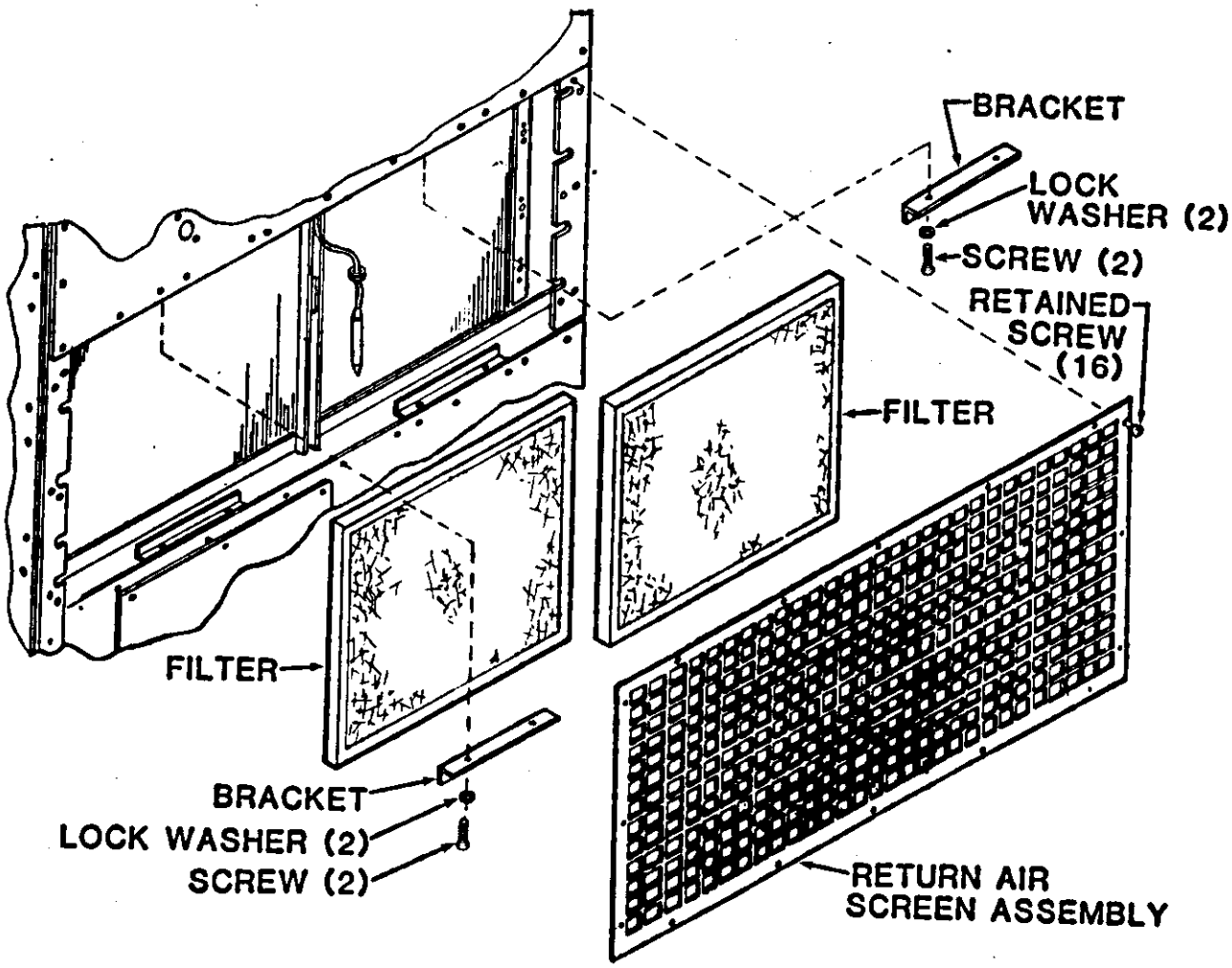


Figure 5-3. Return Air Filters

a. Removal

(1) Loosen 16 retained screws and remove the return air screen assembly.

(2) Remove two each screws and lock washers from each of the two upper filter holder brackets.

(3) Remove the brackets and filters from the air conditioner.

b. Clean filters

(1) Use a soft brush to remove as much dirt from filters as possible.

(2) WHEN FACILITIES ARE AVAILABLE:

- Wash filters in a mild detergent and water solution.
- Rinse thoroughly in clear water.
- Shake out excess water prior to installation.

(3) Use a soft brush and clean rag to clean filter openings and return air screen assembly.

c. Inspection

(1) Check filters for punctures, cuts, and damaged edges that would allow passage of unfiltered air.

(2) Check filters for packed or mashed areas that would block airflow.

(3) Replace filters if found bad.

d. Installation

(1) Slip filters and brackets into place and secure brackets with two each screws and lock washers.

(2) Place return air screen assembly on unit and tighten 16 retained screws.

5-9. FRESH AIR FILTER

See figure 5-4.

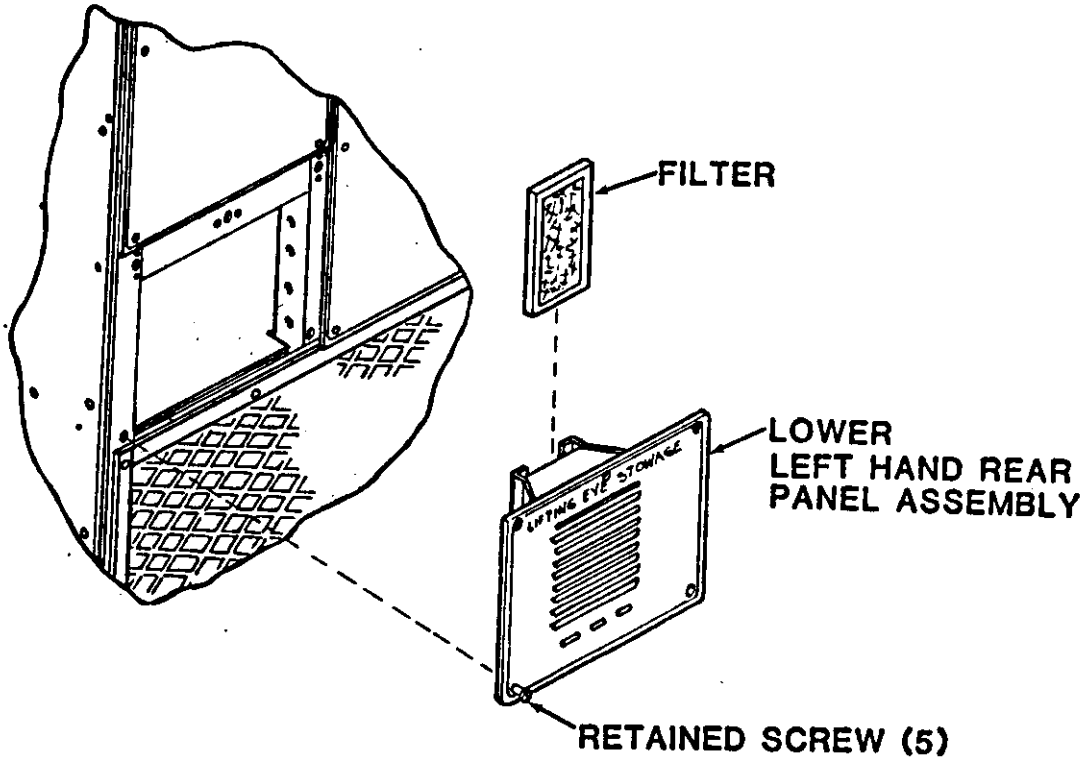


Figure 5-4. Fresh Air Filter

a. Removal

(1) Loosen five retained screws.

(2) Remove lower left-hand rear panel assembly.

(3) Slip filter up and out of panel assembly.

b. Clean filter

(1) Use a soft brush to remove as much dirt from filter as possible.

(2) WHEN FACILITIES ARE AVAILABLE:

- o Wash filter in a mild detergent and water solution.
- o Rinse thoroughly in clear water.
- o Shake out excess water prior to installation.

(3) Use a soft brush and clean rag to clean filter opening and panel assembly.

c. Inspection

(1) Check filter for punctures, cuts, and damaged edges that would allow passage of unfiltered air.

(2) Check filter for packed or mashed areas that would block airflow.

(3) Replace filter if found bad.

d. Installation

(1) Slip filter into panel assembly opening.

(2) Place panel assembly on unit and tighten five retained screws.

5-10. OUTSIDE PANELS, GRILLES, AND SCREENS

See figures 5-5 and 5-6.

WARNING

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

a. Removal

(1) Turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Frequently removed panels and grilles are equipped with retained quick removable type screws. Loosen screws and remove panel or grille.

(3) Panels and grilles not normally removed for maintenance are attached with machine type screws. When it is necessary to remove them, take care that the hardware is not lost.

b. Inspection

(1) Check that attaching hardware is in place and secure.

(2) Check that panels, guards, grilles, and screens are in place and not damaged to the extent that they would create a hazard or interfer with operation.

(3) Check that gaskets and insulation are in place and attached firmly to mating surface. Replace or repair if torn, loose, or missing.

(4) Check that caution plates and instruction plates are in place and legible. Replace them if they are hard to read or missing.

(5) Check that supply air grille louvers are in proper position. (See operating instructions) and that they are not damaged so that they block airflow. Replace if damaged.

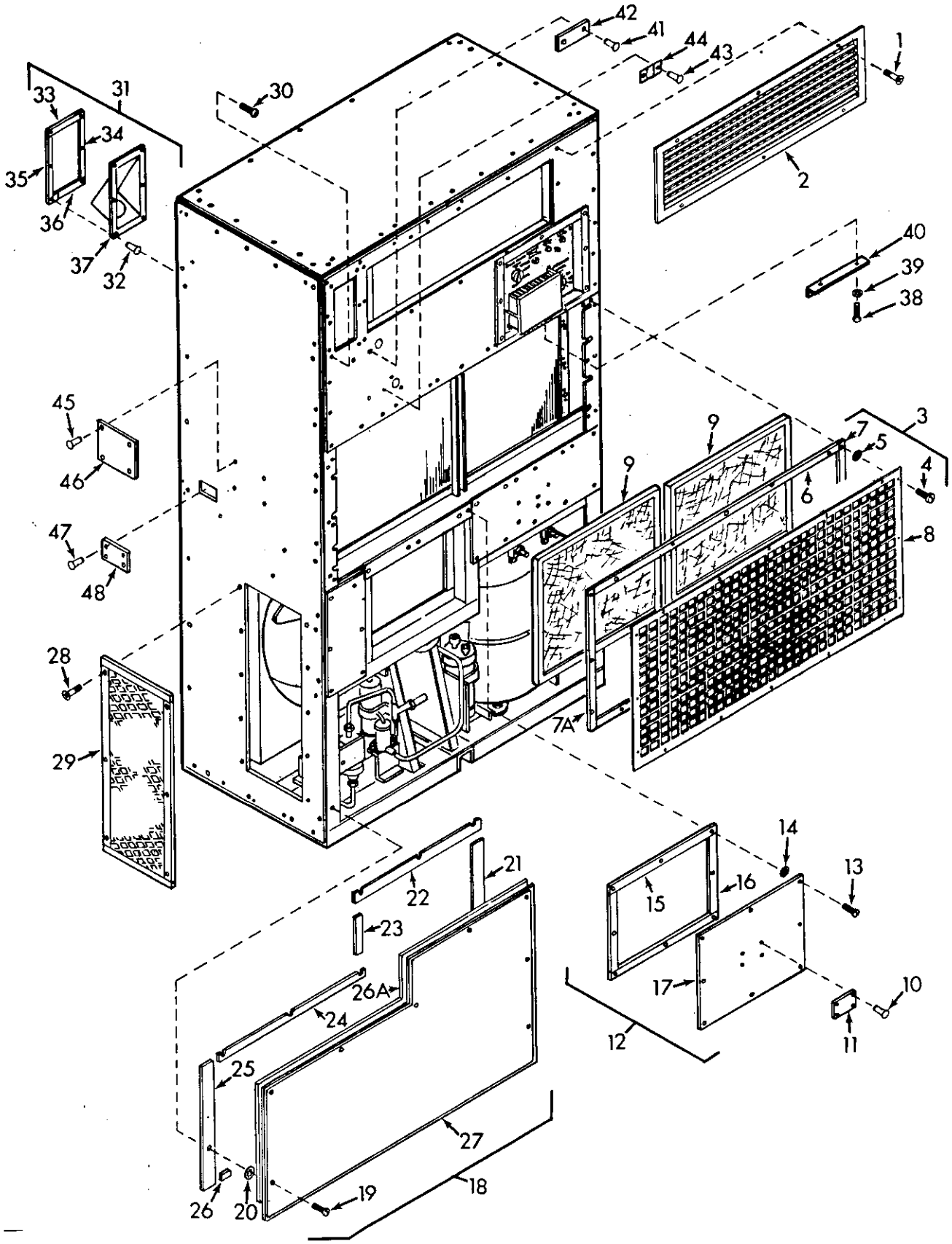


Figure 5-5. Outside Panels, Front

Legend for figure 5-5

ITEM NO.	DESCRIPTION
1	SCREW,MACH-FLAT CTSK HD
2	GRILLE,SUPPLY AIR
3	SCREEN ASSEMBLY,RETURN AIR
4	SCREW,PANEL FASTENER
5	RETAINING WASHER
6	GASKET
7	GASKET
7A	GASKET
8	RETURN AIR SCREEN
9	FILTER,AIR
10	RIVET,BLIND
11	CAUTION PLATE,208 VOLTS
12	COVER ASSY,JUNCTION BOX
13	SCREW,PANEL FASTENER
14	RETAINING WASHER
15	GASKET
16	GASKET
17	COVER JUNCTION BOX
18	PANEL AND SUPPORT,FRONT REMOVABLE
19	SCREW,PANEL FASTENER
20	RETAINING WASHER
21	GASKET
22	GASKET
23	GASKET
24	GASKET
25	GASKET
26	GASKET
26A	INSULATION
27	PANEL AND SUPPORT,FRONT REMOVABLE
28	SCREW,MACH-FLAT CTSK HD
29	GRILLE ASSY CONDENSER DAMPER
30	SCREW,MACH-PAN HD
31	FILLER NECK ENCLOSURE ASSY
32	NUT,BLIND RIVET
33	GASKET
34	GASKET
35	GASKET
36	GASKET
37	ENCLOSURE,FILLER NECK
38	SCREW,MACH-PAN HD
39	WASHER,LOCK-SPRING-HELICAL
40	BRACKET,FILTER HOLDER
41	RIVET,BLIND
42	INSTRUCTION PLATE,HUMIDIF
43	RIVET,BLIND
44	PLATE,MOISTURE INDICATOR
45	RIVET,BLIND
46	IDENTIFICATION PLATE
47	RIVET,BLIND
48	INSTRUCTION PLATE, MAINTENANCE SWITCH

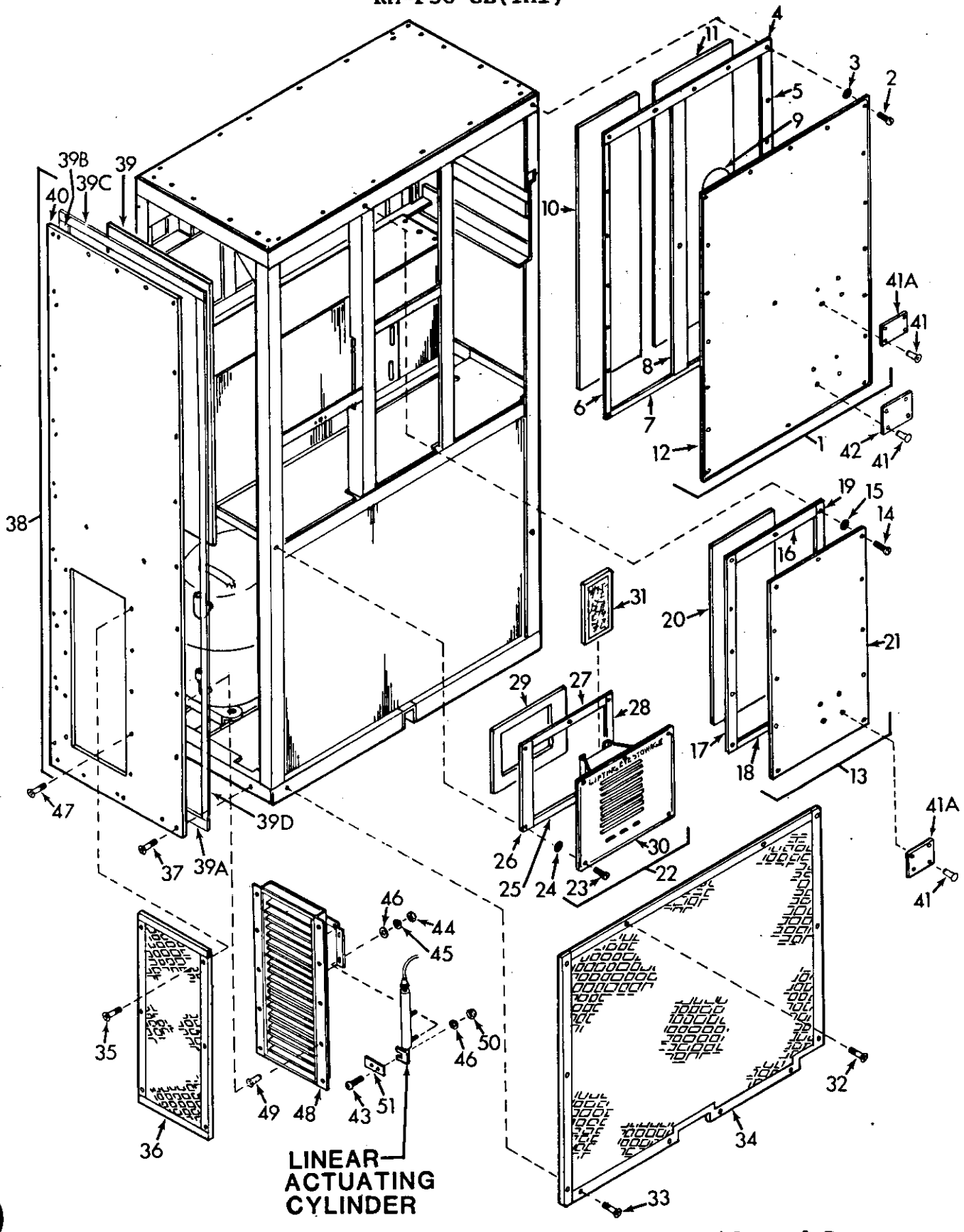


Figure 5-6. Outside Panels, Right Side and Rear

Legend for figure 5-6

ITEM NO.	DESCRIPTION
1	PANEL ASSY,REAR RIGHT-HAND SECTION
2	SCREW,PANEL FASTENER
3	RETAINING WASHER
4	GASKET
5	GASKET
6	GASKET
7	GASKET
8	GASKET
9	GASKET
10	INSULATION
11	INSULATION
12	PANEL,REAR RIGHT-HAND SECTION
13	PANEL ASSY,REAR TOP LEFT-HAND SECTION
14	SCREW,PANEL FASTENER
15	RETAINING WASHER
16	GASKET
17	GASKET
18	GASKET
19	GASKET
20	INSULATION
21	PANEL,REAR TOP LEFT-HAND SECTION
22	PANEL ASSY,LEFT-HAND REAR
23	SCREW,PANEL FASTENER
24	RETAINING WASHER
25	GASKET
26	GASKET
27	GASKET
28	GASKET
29	INSULATION
30	PANEL,FRESH AIR
31	FILTER,FRESH AIR
32	SCREW,MACH-FLAT CTSK HD
33	SCREW,MACH-FLAT CTSK HD
34	GRILLE,CONDENSER
35	SCREW,MACH-FLAT CTSK HD
36	GRILLE ASSY CONDENSER DAMPER
37	SCREW,MACH-FLAT CTSK HD
38	PANEL ASSY,RIGHT SIDE
39	INSULATION
39A	GASKET
39B	GASKET
39C	GASKET
39D	GASKET
40	PANEL,RIGHT SIDE
41	RIVET,BLIND
41A	CAUTION PLATE, MECHANICAL AND THERMAL
42	CAUTION PLATE, MAINTENANCE
43	SCREW,MACH PAN HD
44	NUT,PLAIN HEX
45	WASHER,LOCK-SPRING, HELICAL
46	WASHER,FLAT-ROUND
47	SCREW,MACH-FLAT CTSK HD
48	DAMPER ASSY CONDENSER INLET
49	NUT,BLIND RIVET
50	NUT,SELF-LOCKING
51	ACTUATOR ARM

b. Gasket/Insulation replacement or repair

(1) Remove as much old gasket or insulation material as possible by pulling or scraping it away from the metal surface.

WARNING

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

(2) Soften and remove old adhesive and gasket and insulation residue, using acetone or methyl-ethyl ketone (MEK) and a stiff brush.

(3) Coat the mating surfaces of the metal and gasket or insulation (if applicable) with adhesive (81348) MMM-A-1617, Type II or equal. Let both surfaces dry until the adhesive is tacky but will not stick to fingers.

(4) Starting with an end, carefully attach the gasket to the metal. Press into firm contact all over.

c. To replace damaged or missing caution, instruction or identification plates:

(1) Drill rivets out using a drill bit slightly smaller than the diameter of the rivet body.

(2) Secure new nameplate with replacement rivets.

d. Installation

(1) Place panel, grille, or screen on unit and secure hardware.

(2) Turn power on.

5-11. ELECTRICAL WIRING REPAIR GENERAL

Preferred repair methods consist of replacing wires, terminals, connectors, etc., rather than splicing wires, bending end to form terminals, and other make-shift procedures; although the latter may be appropriate for emergency field repairs. Determine the proper size and length of wire, or the terminal, or connector to be used for replacement by referring to table 5-3, "Wire List", and to the wiring diagram, figure 2-2.

a. Soldering connections. Wire connections must be made mechanically sound before they are soldered; solder alone does not provide sufficient strength to prevent breakage. Joining surfaces of connections to be soldered must be clean and bright. If a separate flux is used, it should conform to Specification MIL-F-14256 rosin base flux, (NSN3439-045-7940 or equal) and should be brushed onto the joint before soldering. If a flux-core solder is used, it should always be rosin-core electrical solder. If an uncored solder is used, it should be a lead-tin solder, conforming to Specification QQ-S-571. Wires should always be heated to the point at which the solder will melt completely and flow into all parts of the joint. Excessive build-up of solder "gobs" on the joint should be avoided or removed.

b. Insulating joints. The preferred method of insulating electrical joints is by the use of heat-shrink tubing. To apply, cut a piece of heat-shrink tubing of suitable diameter to a one-inch length for covering joints at terminals or connectors, or to a length about 1/2 inch (1.3 cm) longer than the joint to be insulated, and slide the tubing over the wire before making the joint. After the joint is made, slide the tubing so that it covers the joint and shrink in place with moderate heat.

c. Splicing wires. To repair broken or cut wires that are otherwise sound, the mating ends can be stripped and spliced. A commercial butt splice can be crimped onto the end to join them, or a "Western Union" wire splice can be made. The latter is made by stripping 1/4 - 1/2 inch (0.6 - 1.3 cm) of insulation from the wire ends, holding the ends parallel and facing opposite directions, then twisting each end around the other wire at least three turns. Solder and apply insulation as described above.

d. 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, apply a one-inch piece of heat-shrink tubing (if the terminals are of the uninsulated type), and insert wire end into the shank of the terminal. Crimp the shank, and install heat-shrink tubing, if necessary.

Table 5-3. WIRE LIST

TERMINATION		TERMINATION		AWG WIRE SIZE
FROM	TERMINAL TYPE	FROM	TERMINAL TYPE	
TB2-1	MS25036-112	K3-L1	MS25036-157	10
TB2-2	MS25036-112	K3-L2	MS25036-157	10
TB2-3	MS25036-112	K3-L3	MS25036-157	10
TB2-4	MS25036-112	TB1-1	MS25036-101	18
TB2-5	MS25036-112	JB-GND	MS25036-112	10
TB2-1	MS25036-112	K6-L1	MS25036-112	10
TB2-2	MS25036-112	K6-L2	MS25036-112	10
TB2-3	MS25036-112	K6-L3	MS25036-112	10
K6-L1	MS25036-112	K7-L1	MS25036-112	12
K6-L2	MS25036-112	K7-L2	MS25036-112	12
K6-L3	MS25036-112	K7-L3	MS25036-112	12
K7-L1	MS25036-112	K8-L1	MS25036-112	12
K7-L2	MS25036-112	K8-L2	MS25036-112	12
K7-L3	MS25036-112	K8-L3	MS25036-112	12
K2-L1	MS25036-112	K3-L1	MS25036-157	12
K2-L2	MS25036-112	K3-L2	MS25036-157	12
K2-L3	MS25036-112	K3-L3	MS25036-157	12
K2-L1	MS25036-112	K1-L1	MS25036-112	12
K2-L2	MS25036-112	K1-L2	MS25036-112	12
K2-L3	MS25036-112	K1-L3	MS25036-112	12
K1-L1	MS25036-112	K9-L1	MS25036-112	12
K1-L2	MS25036-112	K9-L2	MS25036-112	12
K1-T1	MS25036-112	CONNECTOR	12712937-1 12712936	12
CONNECTOR	12712938-2 12712935	B1-T1	----	PART OF B1
K1-T2	MS25036-112	CONNECTOR	12712937-1 12712936	
CONNECTOR	12712938-2 12712935	B1-T3	----	PART OF B1
K1-T3	MS25036-112	CONNECTOR	12712937-1 12712936	
CONNECTOR	12712938-2 12712935	B1-T2	----	PART OF B1
P4 BLU	12712947	T4 YEL	----	PART OF B1
P5 TAN	12712947	T5 BLK	----	PART OF B1
P6 ORG	12712947	T6 PRP	----	PART OF B1
K2-T1	MS25036-112	CONNECTOR	12712937-1 12712936	12

Table 5-3. WIRE LIST (cont)

TERMINATION		TERMINATION		AWG WIRE SIZE
FROM	TERMINAL TYPE	FROM	TERMINAL TYPE	
CONNECTOR	12712938-1 12712935	B2-T1	——	PART OF B2
K2-T2	MS25036-112	CONNECTOR	12712937-1 12712936	12
CONNECTOR	12712938-1 12712935	B2-T2	——	PART OF B2
K2-T3	MS25036-112	CONNECTOR	12712937-1 12712936	12
CONNECTOR	12712938-1 12712935	B2-T3	MS25036-112	PART OF B2
K3-T1	MS25036-157	B3-T1	MS25036-112	10
K3-T2	MS25036-157	B3-T2	MS25036-112	10
K3-T3	MS25036-157	B3-T3	MS25036-156	10
K6-T1	MS25036-112	TB3-1	MS25036-156	12
K6-T2	MS25036-112	TB3-2	MS25036-156	12
K6-T3	MS25036-112	TB3-3	MS25036-156	12
K7-T1	MS25036-112	TB3-4	MS25036-156	12
K7-T2	MS25036-112	TB3-5	MS25036-156	12
K7-T3	MS25036-112	TB3-6	MS25036-156	12
K8-T1	MS25036-112	HR8-L1	MS25036-112	12
K8-T2	MS25036-112	HR8-L2	MS25036-112	12
K8-T3	MS25036-112	HR8-L3	MS25036-112	12
K9-T1	MS25036-112	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	HR7-A	——	PART OF HR7
K9-T2	MS25036-112	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	HR7-B	——	PART OF HR7
TB2-3	MS25036-103	CB1-1	13211E8288	18
S11-2	MS25036-101	CB1-2	13211E8288	18
S11-3	MS25036-101	S1-31	13211E8288	18
S1-31	13211E8288	S1-21	13211E8288	18
S1-21	13211E8288	S1-22	13211E8288	18
S1-22	13211E8288	S1-32	13211E8288	18
S1-32	13211E8288	S1-11	13211E8288	18
S1-11	13211E8288	K11-5	MS25036-101	18
S2-B1	MS25036-149	S1-12	13211E8288	18
S1-1A	13211E8288	S2-R2	MS25036-149	18
K7-X1	MS25036-101	S2-B2	MS25036-149	18
TB2-2	MS25036-103	S11-5	MS25036-101	18

Table 5-3. WIRE LIST (cont)

TERMINATION		TERMINATION		AWG WIRE SIZE
FROM	TERMINAL TYPE	FROM	TERMINAL TYPE	
S11-6	MS25036-101	TB1-6	MS25036-101	18
TB1-6	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	HR9-B	——	PART OF HR9
S1-3C	13211E8288	TB1-7	MS25036-101	18
TB1-7	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	HR9-A	——	PART OF HR9
S1-2C	13211E8288	S8-1	MS25036-149	18
S8-2	MS25036-149	S10-B	——	PART OF S10
S1-2A	13211E8288	TB1-3	MS25036-101	18
K1-X1	MS25036-101	TB1-3	MS25036-101	18
TB1-3	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	S9-1	——	PART OF S9
K1-X1	MS25036-101	K3A-C	13211E8288	18
K10-A	MS25036-101	K3A-NO	13211E8288	18
K3A-NO	13211E8288	TB1-4	MS25036-101	18
TB1-4	MS25036-101	S14-1	SOLDERED	18
TB1-4	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12812935	S9-2	——	PART OF S9
S10-Y	——	CONNECTOR	12712938-2 12712935	PART OF S10
CONNECTOR	12712937-2 12712936	DS1-1	SOLDERED	18
S10-R	——	CONNECTOR	12712938-2 12712935	PART OF S10
CONNECTOR	12712937-2 12712936	K8-X1	12712937-2 12712936	18
S1-3A	13211E8288	CONNECTOR	MS25036-101	18
CONNECTOR	12712938-2 12712935	S7-BR	——	PART OF S7
S8-2	MS25036-149	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	S7-OR	——	PART OF S7

Table 5-3. WIRE LIST (cont)

TERMINATION		TERMINATION		AWG WIRE SIZE
FROM	TERMINAL TYPE	FROM	TERMINAL TYPE	
S9-3	———	CONNECTOR	12712938-2 12712935	PART OF S9
CONNECTOR	12712937-2 12712936	K10-5	MS25036-101	18
K10-1	MS25036-101	K9-X1	MS25036-101	18
S1-1D	13211E8288	K10-6	MS25026-101	18
K10-4	MS25036-101	S4-1	MS25036-149	18
S4-2	MS25036-149	S5-1	MS25036-149	18
K2-X1	MS25036-101	S6-2	MS25036-149	18
S5-2	MS25036-149	TB1-5	MS25036-101	18
K3-X1	MS25036-149	TB1-5	MS25036-101	18
TB1-5	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	K4-A	———	PART OF K4
TB1-2	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	K4-B	———	PART OF K4
S1-1B	13211E8288	TB1-8	MS25036-101	18
TB1-8	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	K5-A	———	PART OF K5
S1-1A	13211E8288	K6-X1	MS25036-101	18
K1-X2	MS25036-101	K9-X2	MS25036-101	18
DS1-2	MS25036-101	DS2-2	SOLDERED	18
TB1-1	MS25036-101	DS2-2	SOLDERED	18
K8-X2	MS25036-101	K10-B	MS25036-101	18
K9-X2	MS25036-101	TB1-1	MS25036-101	18
TB1-1	MS25036-101	TB1-2	MS25036-101	18
K10-B	MS25036-101	K2-X2	MS25036-101	18
K3-X2	MS25036-101	TB1-1	MS25036-101	18
K2-X2	MS25036-101	K3-X2	MS25036-149	18
TB1-2	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	K5-B		PART OF K5
K6-X2	MS25036-101	K7-X2	MS25036-101	18
K7-X2	MS25036-101	K1-X2	MS25036-101	18
TB3-1	MS25036-153	HR1-A	———	PART OF HR1

Table 5-3. WIRE LIST (cont)

TERMINATION		TERMINATION		AWG WIRE SIZE
FROM	TERMINAL TYPE	FROM	TERMINAL TYPE	
TB3-2	MS25036-153	HR2-A	——	PART OF HR2
TB3-3	MS25036-153	HR3-A	——	PART OF HR3
TB3-4	MS25036-153	HR4-A	——	PART OF HR4
TB3-5	MS25036-153	HR5-A	——	PART OF HR5
TB3-6	MS25036-153	HR6-A	——	PART OF HR6
TB4-1	MS25036-153	HR3-B	——	PART OF HR3
TB4-1	MS25036-153	HR6-B	——	PART OF HR6
TB4-1	MS25036-156	S3-4	SOLDERED	12
TB4-2	MS25036-153	HR2-B	——	PART OF HR2
TB4-2	MS25036-153	HR5-B	——	PART OF HR5
TB4-2	MS25036-156	S3-5	SOLDERED	12
TB4-3	MS25036-153	HR1-B	——	PART OF HR1
TB4-3	MS25036-153	HR4-B	——	PART OF HR4
TB4-3	MS25036-156	S3-6	SOLDERED	12
S5-2	MS25036-149	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	S12-1	——	PART OF B2
S6-1	MS25036-149	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712935	S12-2	—— ——	PART OF B2
JB-GND	MS25036-112	FR-GND	MS25036-112	10
S2-R1	MS25036-149	K11-1	MS25036-101	18
K11-4	MS25036-101	S2-R2	MS25036-149	18
DS1-2	SOLDERED	K11-B	MS25036-101	18

Table 5-3. WIRE LIST (cont)

TERMINATION		TERMINATION		AWG WIRE SIZE
FROM	TERMINAL TYPE	FROM	TERMINAL TYPE	
K11-6	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712936	S13-R	——	PART OF S13
TB1-5	MS25036-101	CONNECTOR	12712937-2 12712936	18
CONNECTOR	12712938-2 12712936	S13-OR	——	PART OF S13
K11-A	MS25036-101	K11-6	MS25036-101	18
CAP	12712947	S13-BR	——	PART OF S13
CAP	12712947	S7-R	——	PART OF S13
K11-5	MS25036-101	S14-6	SOLDERED	18
DS2-1	SOLDERED	S14-2	SOLDERED	18
DS1-1	SOLDERED	S14-5	SOLDERED	18
S14-3	SOLDERED	S14-6	SOLDERED	18

5-12. MAINTENANCE SWITCH (S11)

See figure 5-7.

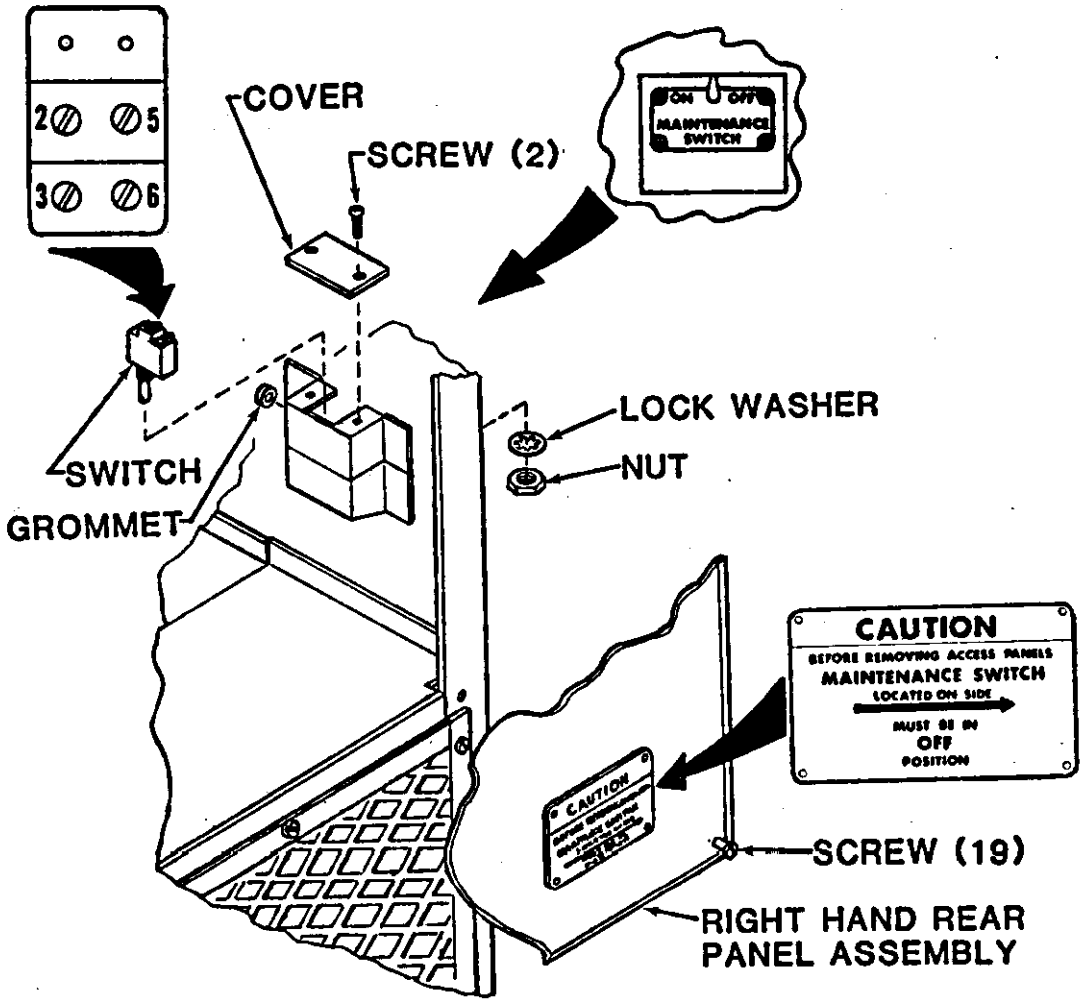


Figure 5-7. Maintenance Switch (S11)

The maintenance switch allows maintenance personnel to turn the unit off from the outside for servicing and mechanical repairs when the unit is installed.

WARNING

Turning the unit off at the maintenance switch or control panel DOES NOT disconnect power to the unit. Disconnect power to the air conditioner before making any electrical repairs.

a. Removal

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nineteen retained screws and remove right-hand rear panel.

(3) Remove two screws and maintenance cover switch from inside of left panel.

(4) Tag and disconnect wire leads.

(5) Remove nut and lock washer from switch and pull switch up and out of box.

b. Test

(1) Place switch in ON position. Using a multimeter, check continuity between terminals 2 and 3, and 5 and 6. Continuity should be indicated.

(2) Place switch in OFF position. Check continuity between terminals 2 and 3, and 5 and 6. Continuity should not be indicated.

(3) If switch is bad, replace it.

c. Installation

(1) Be sure that switch is turned so that ON position matches nameplate.

(2) Place switch in box and secure with nut and lock washer.

(3) See tags and wiring diagram, figure 2-2, and connect leads. Remove tags.

(4) Install cover with two screws.

(5) Place right-hand rear panel assembly on unit and tighten nineteen retained screws.

(6) Turn maintenance switch on.

(7) Connect power.

5-13. CONTROL PANEL (ACCESS TO COMPONENT PARTS)

WARNING

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

a. Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

b. Remove eight screws from front flange of control box. (See figure 5-8.)

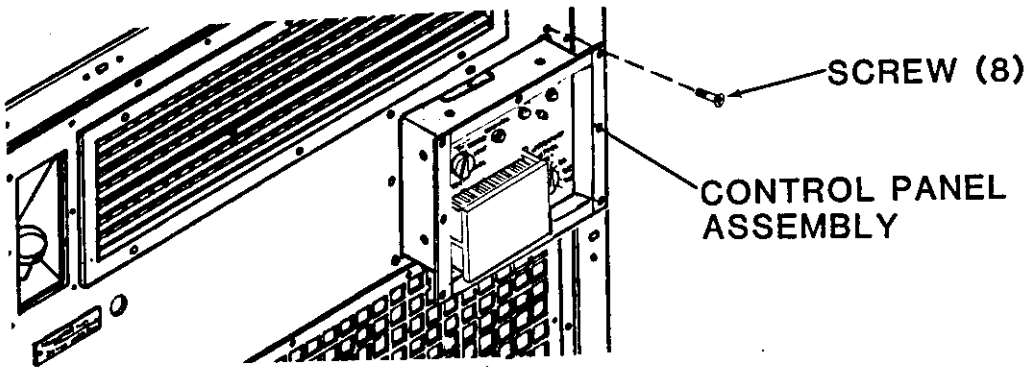


Figure 5-8. Control Panel Removal (Step 1)

c. Slip control box out far enough to gain access to control panel cover screws in top, bottom, and sides of box.

CAUTION

Take care that wiring and temperature control capilliary line are not damaged.

d. Remove eight screws and slip control panel cover assembly out of control box. (See figure 5-9.)

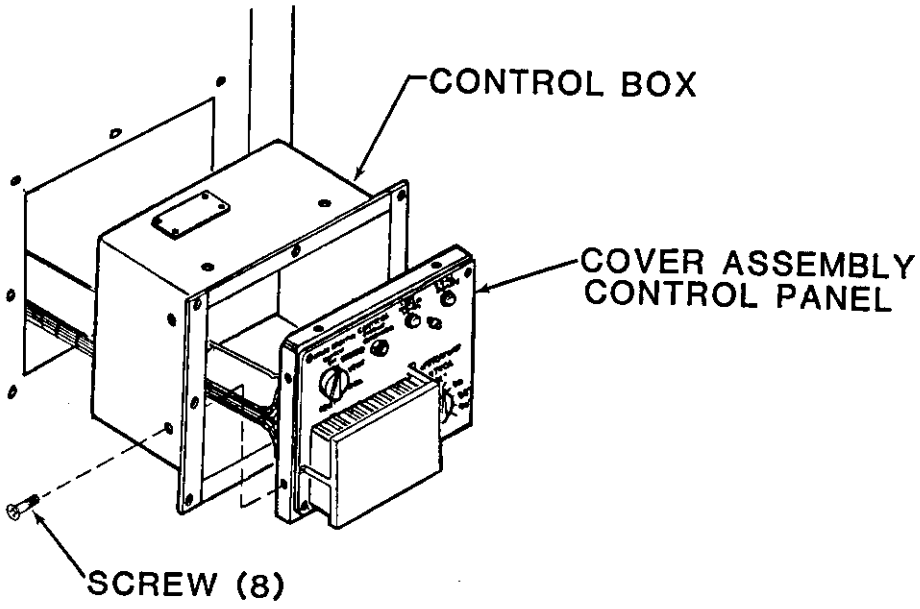


Figure 5-9. Control Panel Removal (Step 2)

e. If control panel is to be totally removed or if temperature control is to be removed:

(1) Loosen 16 retained screws in return air screen assembly and remove screen. (See figure 5-10.)

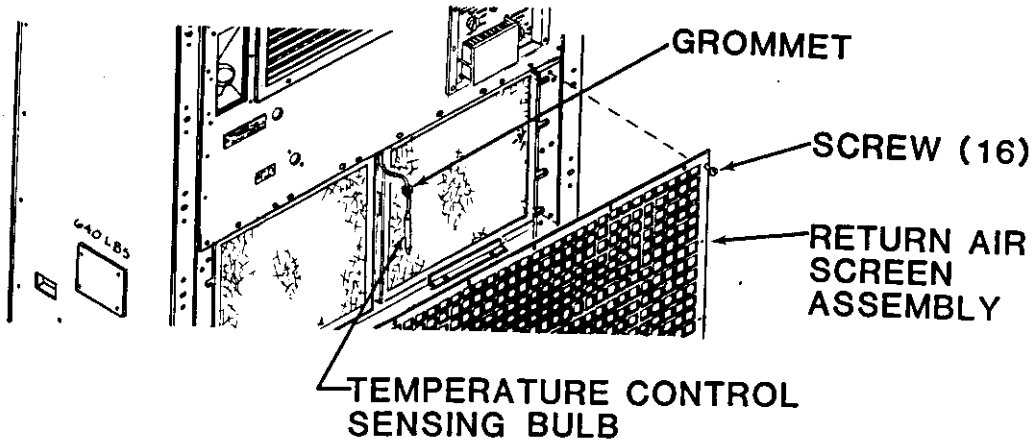


Figure 5-10. Control Panel Removal (Step 3)

(2) Carefully pull temperature control sensing bulb from spring clip located in channel between filters.

CAUTION

Take care that capillary line from temperature control to sensing bulb is not kinked, mashed, or nicked during removal. Total replacement of temperature control is required if sensing bulb or capillary are damaged.

(3) Remove grommet at top of channel between filters.

(4) Carefully slip bulb up and thru hole at top of channel.

(5) If control panel is to be totally removed, tag and disconnect wire leads and remove control panel and box from unit.

(6) If temperature control only is to be removed, see para 5-15.

f. For total control panel disassembly see figure 5-11, and individual paragraphs for specific components.

g. Control panel installation

(1) If control panel was totally removed, see tags and wiring diagram, figure 2-2, and connect leads.

(2) If control panel was totally removed or if temperature control was removed, reinstall sensing bulb in clamp and place grommet back into hole at top of channel. Install return air screen.

(3) Carefully slip control panel back into control box and secure with eight flat head screws.

(4) Carefully slip control panel assembly back into air conditioner and secure with eight flat head screws.

(5) Reconnect power to unit.

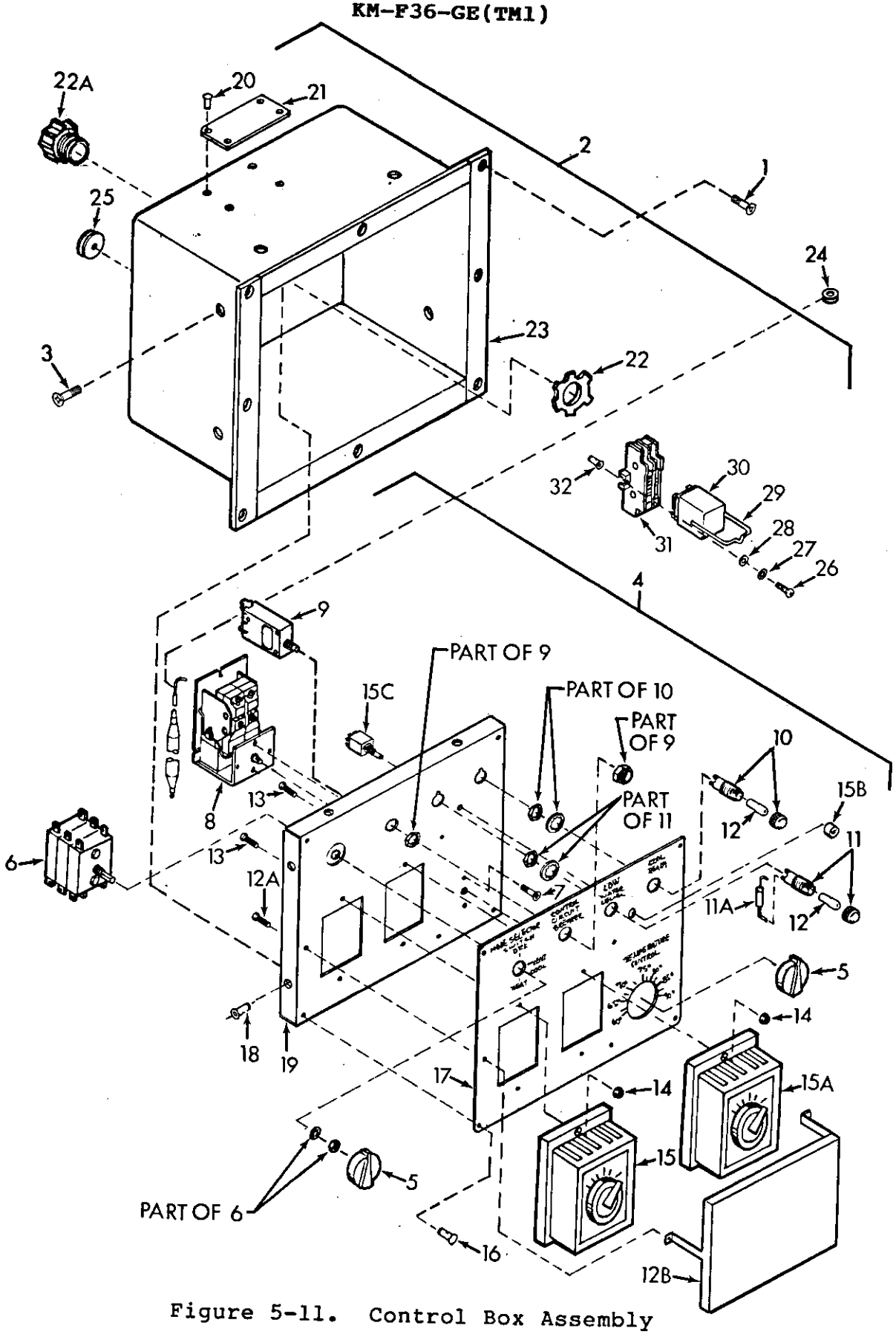


Figure 5-11. Control Box Assembly

Legend for figure 5-11

ITEM NO.	DESCRIPTION
1	SCREW,MACH-FLAT CTSK HD
2	CONTROL BOX ASSEMBLY
3	SCREW,MACH-FLAT CTSK HD
4	COVER ASSY CONTROL BOX
5	KNOB
6	SWITCH,ROTARY **S1**
7	SCREW,MACH-FLAT CTSK HD
8	CONTROL,TEMPERATURE **S2**
9	CIRCUIT BREAKER **CB1**
10	LAMPHOLDER,INDICATOR LIGHT **DS2**
11	LAMPHOLDER,INDICATOR LIGHT **DS1**
11A	RESISTOR
12	LAMP,GLOW (TYPE C7A)
12A	SCREW,MACH-PAN HD
12B	BRACKET ASSY
13	SCREW,MACH-PAN HD
14	NUT,SELF-LOCKING HEX
15	CONTROL,HUMIDISTAT **S13**
15A	CONTROL,HUMIDISTAT **S7**
15B	BUTTON,SWITCH
15C	SWITCH,PUSH
16	RIVET,BLIND
17	INSTRUCTION PLATE
18	NUT,PLAIN,BLIND RIVET
19	COVER,CONTROL BOX
20	RIVET,BLIND
21	CAUTION PLATE,208 VOLT
22	LOCKNUT
22A	CONNECTOR,STRAIN RELIEF
23	CONTROL BOX
24	GROMMET,RUBBER
25	GROMMET
26	SCREW,MACH-PAN HD
27	WASHER,LOCK
28	WASHER,FLAT
29	SPRING,HOLD DOWN
30	RELAY,CONTROL
31	SOCKET,RELAY
32	NUT,BLIND RIVET

5-14. ROTARY (MODE SELECTOR) SWITCH (S1)

Preliminary procedure: See para 5-13 to gain access to switch.

a. Inspection

(1) Check switch to see that all leads are properly connected. (See wiring diagram, figure 2-2.)

(2) Repair or replace all loose or broken leads.

(3) Check that switch terminals are not loose, broken, or corroded.

(4) Check switch for evidence of overheating or other visible damage.

(5) Replace switch if damaged.

b. Test

(1) Tag and disconnect wire leads.

(2) Using multimeter and the following switch position chart check continuity at contacts indicated for each switch position.

Example: With switch set in STANDBY mode continuity should be indicated between terminals 21 to 2C and 31 to 3C only. Continuity should not be indicated between any other terminals.

SWITCH POSITION CHART

S1 SWITCH POSITION	SWITCH FUNCTION	SWITCH WAFER-CONNECTIONS		
		1	2	3
1	OFF	—	—	—
2	STANDBY	—	21&2C	31&3C

SWITCH POSITION CHART (cont)				
S1 SWITCH POSITION	SWITCH FUNCTION	SWITCH WAFER-CONNECTIONS		
		1	2	3
3	VENT	—	21&2C 22&2A	31&3C 32&3A
4	COOL	12&1B 11&1D	21&2C 22&2A	31&3C 32&3A
5	HEAT	12&1A	21&2C 22&2A	31&3C 32&3A

(3) Replace switch if it fails above test.

c. Removal (Assuming leads have been disconnected for above test.)

(1) Loosen setscrew and remove knob.

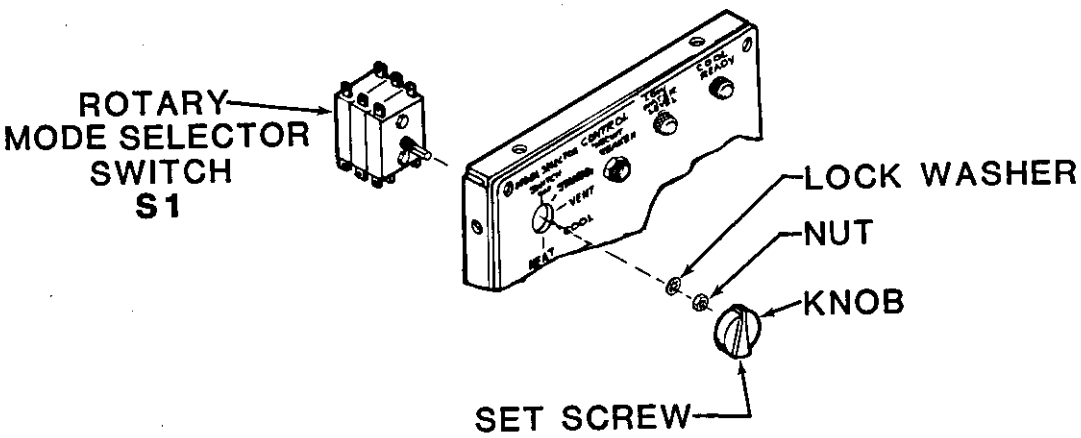


Figure 5-12. Rotary (Mode Selector) Switch (S1)

(2) Remove nut and lock washer and pull switch from control panel.

d. Installation

(1) Place switch on panel.

(2) Check to be sure that switch position aline with panel markings.

(3) Secure with lock washer and nut.

(4) Place knob on switch shaft so that setscrew matches flat on switch shaft.

(5) Tighten setscrew.

(6) See tags and wiring diagram, figure 2-2, and connect leads. Remove tags.

(7) Go to para 5-13,g, and install control panel.

5-15. TEMPERATURE CONTROL (S2)

Preliminary procedure: See para 5-13 to gain access to control.

a. Inspection

(1) Check control to see that all leads are properly connected. (See wiring diagram, figure 2-2.)

(2) Repair or replace all loose or broken leads.

(3) Check that control terminals are not loose, broken, or corroded.

(4) Check control for evidence of overheating or other visible damage.

(5) Replace control if damaged.

b. Test

(1) Tag and disconnect wire leads.

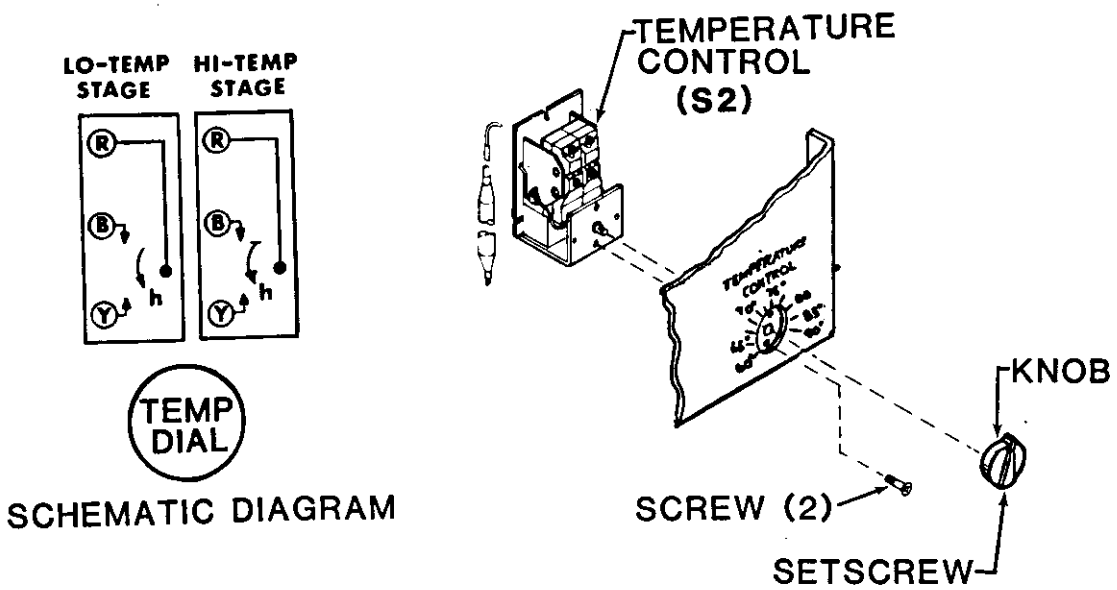


Figure 5-13. Temperature Control (S2)

(2) Using multimeter, place probes on the red and blue terminals of the low temperature stage.

(3) Turn TEMPERATURE CONTROL thermostat shaft fully clockwise (60°F on dial).

(4) Check continuity. If temperature at sensing bulb is above 60°F (15.5°C), there should be no continuity.

(5) Slowly turn shaft counterclockwise until continuity is indicated. Turn shaft back and forth slightly to check that switch contacts open and close on a very narrow band.

(6) Place multimeter probes on the red and blue terminals of the high temperature stage.

(7) Repeat steps (3), (4), and (5) above. Note that the temperature at which continuity is indicated on the high temperature stage should be slightly (2 to 5°F) lower than the low temperature stage.

(8) Replace switch if it fails above test.

c. Removal (Assuming leads have been disconnected for above test.)

(1) Loosen setscrew and remove knob.

(2) Remove two screws and pull temperature control free from panel.

(3) Go to para 5-13,e, and remove temperature control with sensing bulb from unit.

d. Installation

(1) Secure TEMPERATURE CONTROL to control panel with two flat head screws.

(2) Place knob on shaft and aline flat on shaft with setscrew.

(3) Tighten setscrew.

(4) See tags and wiring diagram, figure 2-2, and connect leads.

(5) Go to para 5-13,g, and install control panel.

5-16. CIRCUIT BREAKER (CB1)

Preliminary procedure: See para 5-13 to gain access to circuit breaker.

a. Inspection

(1) Check circuit breaker to see that all leads are properly connected. (See wiring diagram, figure 2-2.)

(2) Repair or replace all loose or broken leads.

(3) Check that circuit breaker terminals are not loose, broken, or corroded.

(4) Check circuit breaker for evidence of overheating or other visible damage.

(5) Replace circuit breaker if damaged.

b. Test

(1) Tag and disconnect wire leads.

(2) Check that circuit breaker is not tripped. Push circuit breaker button to reset.

(3) Using a multimeter check that continuity is indicated across terminals 1 and 2.

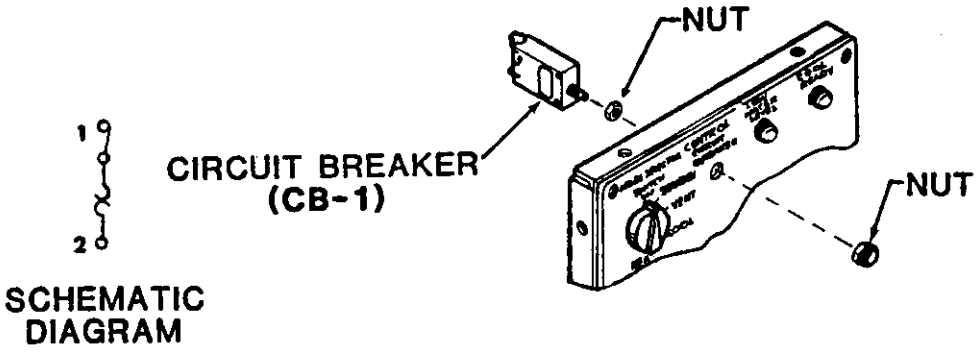


Figure 5-14. Circuit Breaker (CB1)

(4) Replace circuit breaker if it fails above test.

c. Removal (Assuming leads have been disconnected for above test.) Remove front nut and pull circuit breaker from panel.

d. Installation

(1) Place circuit breaker thru panel and secure with nut provided with circuit breaker.

(2) See tags and wiring diagram, figure 2-2, and connect leads. Remove tags.

(3) Go to para 5-13,g, and install control panel.

5-17. INDICATOR LIGHTS (DS1 AND DS2)

Lamp (bulb) may be replaced by unscrewing lens cap and removing lamp from lens cap. It may be necessary to use a thin knife blade or similar tool to pry base of lamp flange free from lens. If light body is suspected bad, see para 5-13 to gain access to inside of control panel.

a. Inspection

(1) Check that lens cap is not cracked or broken, mounting hardware is in place and secure, and terminals are not bent or broken.

(2) Replace light assembly if damaged.

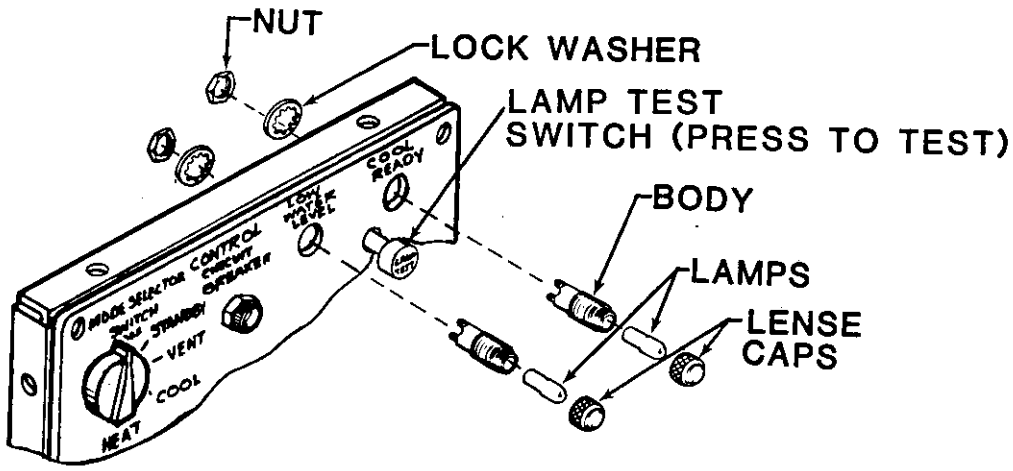


Figure 5-15. Indicator Lights (DS1 and DS2)

b. Removal

(1) Remove lens cap and lamp (bulb).

(2) Tag and unsolder wire leads.

(3) Remove nut and lock washer and pull light body from control panel.

c. Installation

(1) Place light body into control panel and secure with nut and lock washer.

(2) See tags and wiring diagram, figure 2-2, and connect leads. Remove leads.

(3) Go to paragraph 5-13,g, and install control panel.

(4) Insert lamp into lens cap and screw lens cap into place.

5-18. HUMIDISTAT CONTROLS (S7 and S13)

Preliminary procedure: See para 5-13 to gain access to leads for humidistat controls.

a. Inspection

(1) Check controls to see that all leads are properly connected. (See wiring diagram, figure 2-2.)

(2) Repair or replace all loose or broken lead connections.

(3) Replace controls if damaged.

NOTE

Humidistat controls are factory calibrated, DO NOT ATTEMPT FIELD ADJUSTMENT.

Humidistat control (S7) is set for 20 percent relative humidity actuation. Humidistat control (S13) is set for 50 percent relative humidity actuation.

The adjustment shafts have been lock sealed in place, attempted adjustment may damage controls.

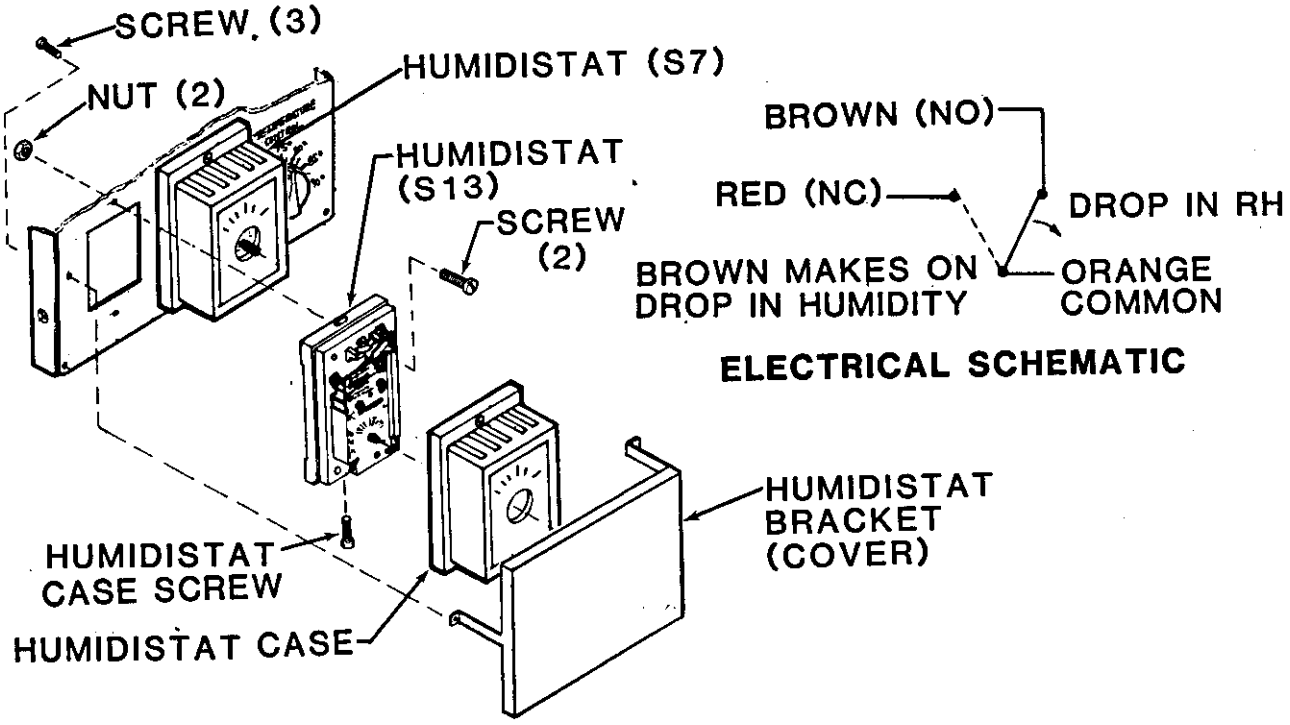


Figure 5-16. Humidistat Controls (S7 and S13)

b. Test

(1) Tag and disconnect the orange and brown leads from each humidistat.

(2) Use a known accurate humidity indicator to determine actual humidity near the humidistat control.

(3) Check continuity across the brown and orange leads from each humidistat control.

(4) Continuity should be indicated at relative humidities of below 20 percent for humidity control (S7) and 50 percent for (S13).

c. Removal.

(1) Tag and disconnect wire leads.

(2) Remove three screws and pull humidistat bracket (cover) from control panel.

(3) Loosen screw at bottom of case.

(4) Swing case out from bottom and lift up and off of top retaining tab.

(5) Remove two screws and nuts and pull humidistat from control panel.

d. Installation

(1) Insert leads thru control panel hole and secure humidistat to panel with two screws and nuts.

(2) Hook top of humidifier case over retaining tab and slip case bottom into place.

(3) Tighten screw in bottom of case.

(4) See tags and wiring diagram, figure 2-2, and connect leads.

(5) Position humidistat bracket (cover) and secure with three screws.

(6) Go to para 5-13,g, and install control panel.

5-18A. CONTROL RELAY (K11) AND SOCKET

Preliminary procedure: See para 5-13 to gain access and figure 5-11 to locate components.

a. Removal

(1) Release relay hold down spring.

(2) Pull control relay (K11) from socket.

b. Inspection (relay and socket)

(1) Check that relay and socket are not cracked or broken.

(2) Check that contacts are not corroded, loose, bent, or missing.

(3) Check that wire leads to socket are not damaged, loose, or missing and that they are properly connected. (See wiring diagram, figure 2-2.)

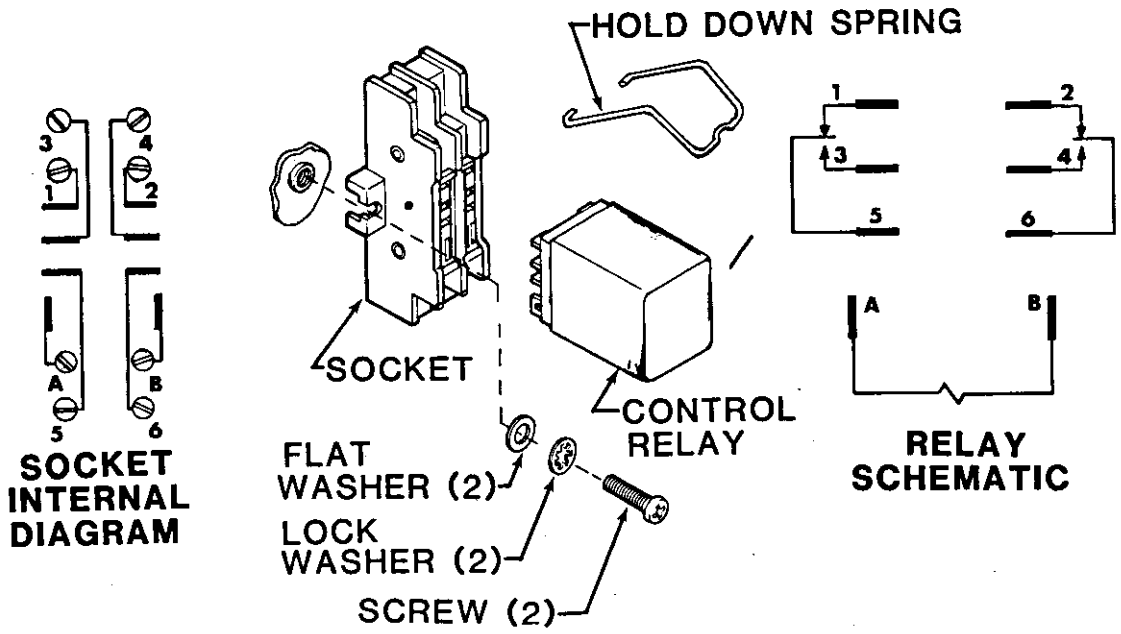


Figure 5-16A. Control Relay (K11)

c. Relay test

(1) Using a multimeter set on 20 OHMS scale, check continuity.

- Continuity should be indicated across the following contacts:

A to B

1 to 5

2 to 6

- Continuity should not be indicated across the following contacts.

3 to 5

4 to 6

(2) If relay fails above tests, replace relay.

(3) Using a multimeter and socket internal diagram shown on figure 5-16A, check continuity between contacts and terminals of control relay socket.

d. Socket removal

(1) Tag and remove leads.

(2) Remove two screws, lock washers, and flat washers.

(3) Remove socket.

e. Installation

(1) Secure relay socket with two screws, lock washers, and flat washers.

(2) See tags and wiring diagram, figure 2-2, and connect leads to socket.

(3) Aline relay and socket contacts and push relay firmly into socket and secure with hold down spring.

(4) Go to para 5-13,g, and install control panel.

5-19. JUNCTION BOX ACCESS AND IDENTIFICATION OF INTERNAL COMPONENTS

WARNING

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

a. Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

b. Loosen eight retained screws in junction box cover assembly and remove cover.

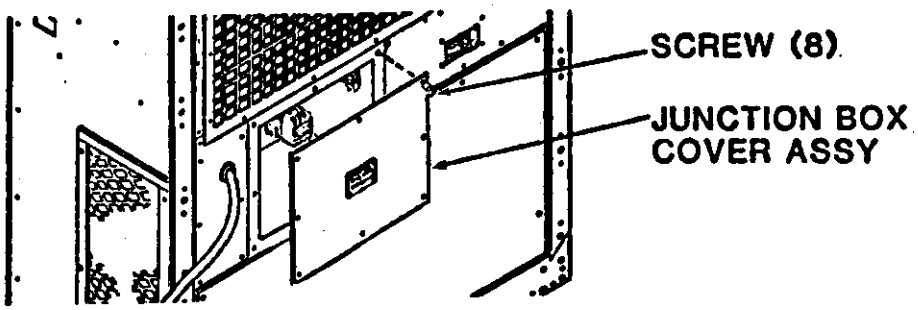


Figure 5-17. Junction Box Access

c. See figure 5-18 for identification of internal components.

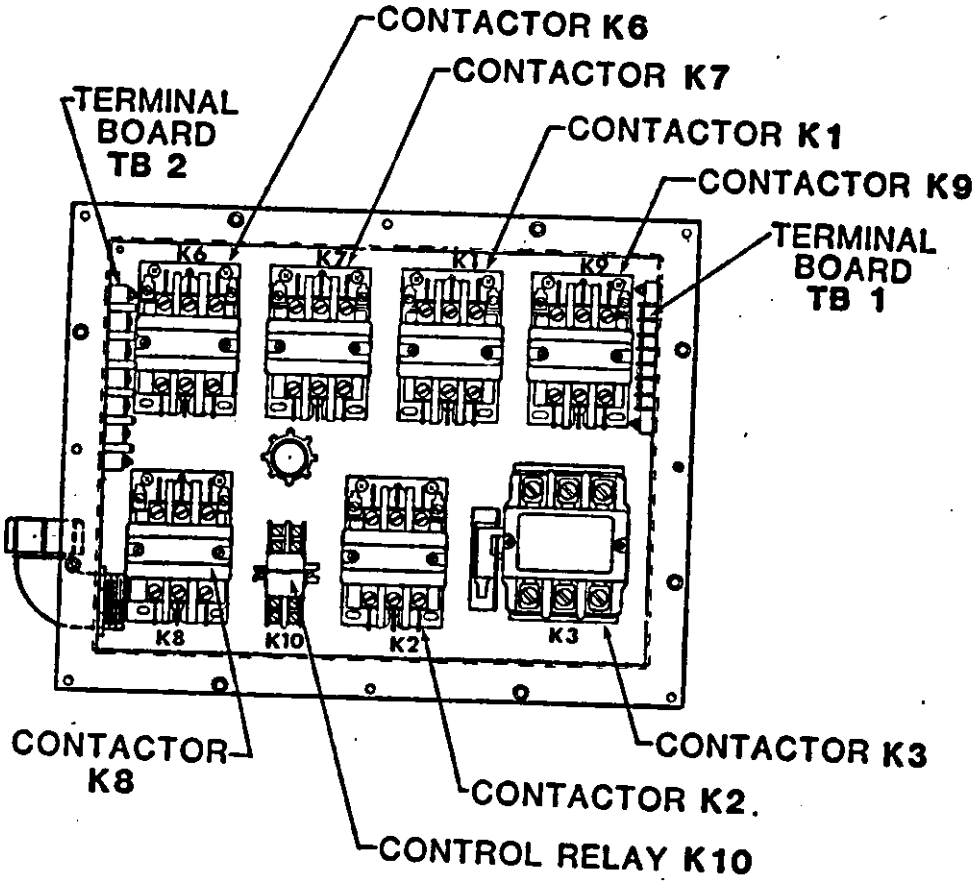


Figure 5-18. Identification of Internal Junction Box Components

d. See para 5-20 thru 5-23 for maintenance of internal components.

e. Secure junction box cover assembly with eight retained screws.

f. Reconnect power to unit.

5-20. MAGNETIC CONTACTORS (K1, K2, K6, K7, K8, AND K9)

Preliminary procedure: See para 5-19 to gain access and identify internal components of junction box.

a. Inspection

(1) Check for loose, corroded, missing, or broken contacts and terminal connections.

(2) Check for cracks, evidence of overheating, and other visible damage. Replace if damaged.

b. Test

(1) Use a continuity tester or a multimeter set on the 20 OHMS scale to check continuity between terminals L1 and T1, L2 and T2, and L3 and T3. All three contacts should be open. If there is continuity, replace the contactor.

(2) Check continuity between coil terminals X1 and X2. If there is no continuity, the coil is open, replace the contactor.

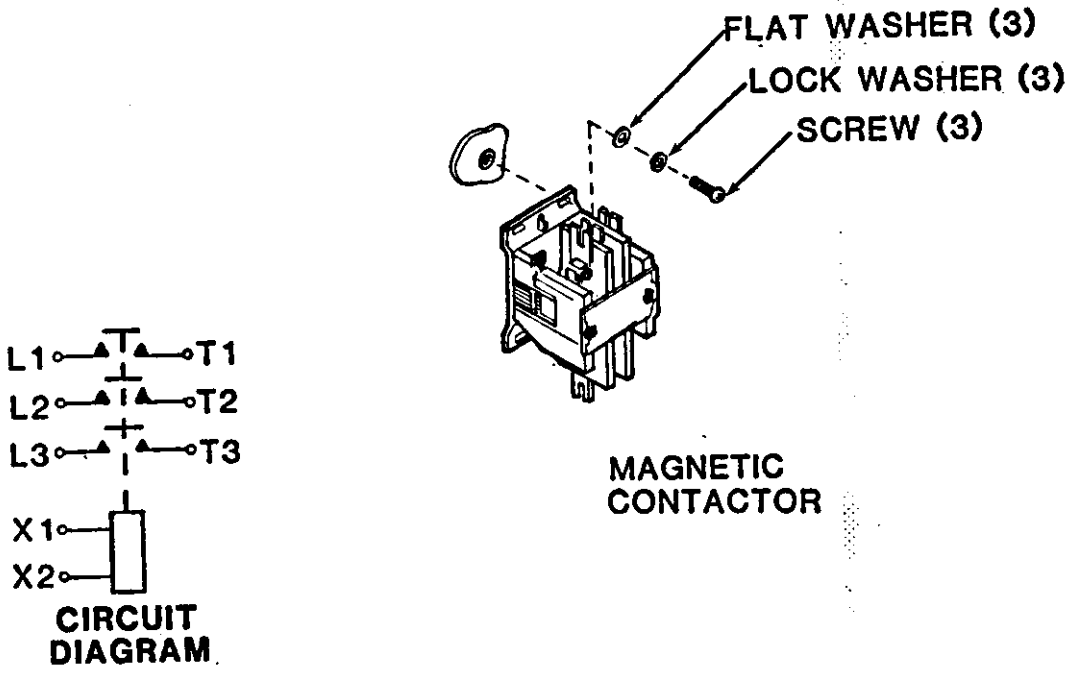


Figure 5-19. Magnetic Contactors (K1, K2, K6, K7, K8, and K9)

c. Removal

(1) Tag and remove wire leads.

(2) Remove three screws, lock washers, and flat washers and pull magnetic contactor from box.

d. Installation

(1) Secure contactor with three screws, lock washers, and flat washers.

(2) See tags and wiring diagram, figure 2-2, and connect wire leads.

(3) See para 5-19,e, and install junction box cover and connect power.

5-21. MAGNETIC CONTACTOR (K3)

Preliminary procedure: See para 5-19 to gain access and identify internal components of junction box.

a. Inspection

(1) Check for loose, corroded, missing, or broken contacts and terminal connections.

(2) Check for cracks, evidence of overheating, and other visible damage. Replace if damaged.

b. Test

(1) Use a continuity tester or a multimeter set on the 20 OHMS scale to check continuity between terminals L1 and T1, L2 and T2, and L3 and T3. All three contacts should be open. If there is continuity, replace the contactor.

(2) Check continuity between coil terminals X1 and X2. If there is no continuity, the coil is open, replace the contactor.

(3) Check continuity at auxiliary switch contacts.

COM to NO should be open
COM to NC should be closed

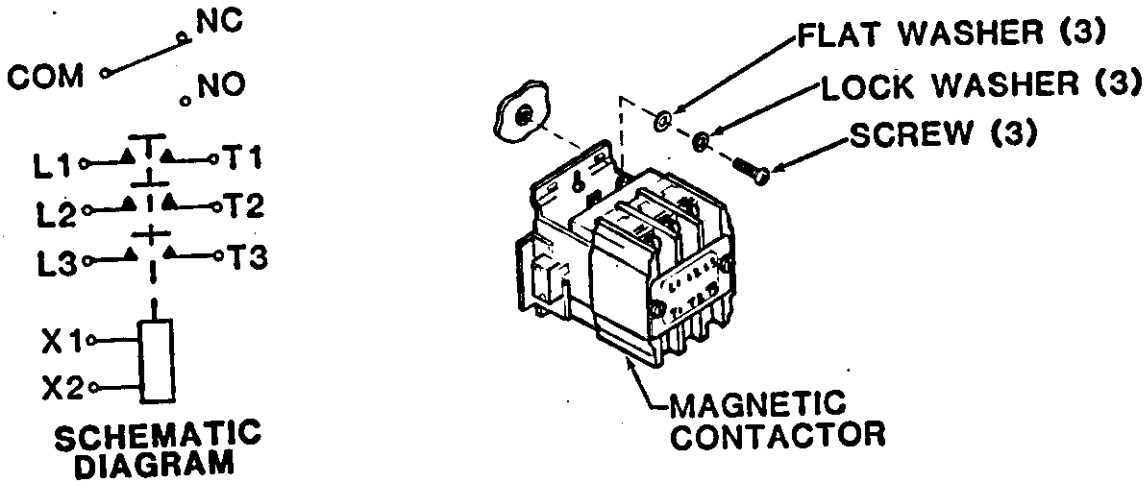


Figure 5-20. Magnetic Contactor (K3)

c. Removal

(1) Tag and remove wire leads.

(2) Remove three screws, lock washers, and flat washers and pull magnetic contactor from box.

d. Installation

(1) Secure contactor with three screws, lock washers, and flat washers.

(2) See tags and wiring diagram, figure 2-2, and connect wire leads.

(3) See para 5-19,e, and install junction box cover and connect power.

5-22. CONTROL RELAY (K10) AND SOCKET

Preliminary procedure: See para 5-19 to gain access and identify internal components of junction box.

a. Removal

(1) Release relay hold down spring.

(2) Pull control relay (K10) from socket.

b. Inspection (relay and socket)

(1) Check that relay and socket are not cracked or broken.

(2) Check that contacts are not corroded, loose, bent, or missing.

(3) Check that wire leads to socket are not damaged, loose, or missing and that they are properly connected. (See wiring diagram, figure 2-2.)

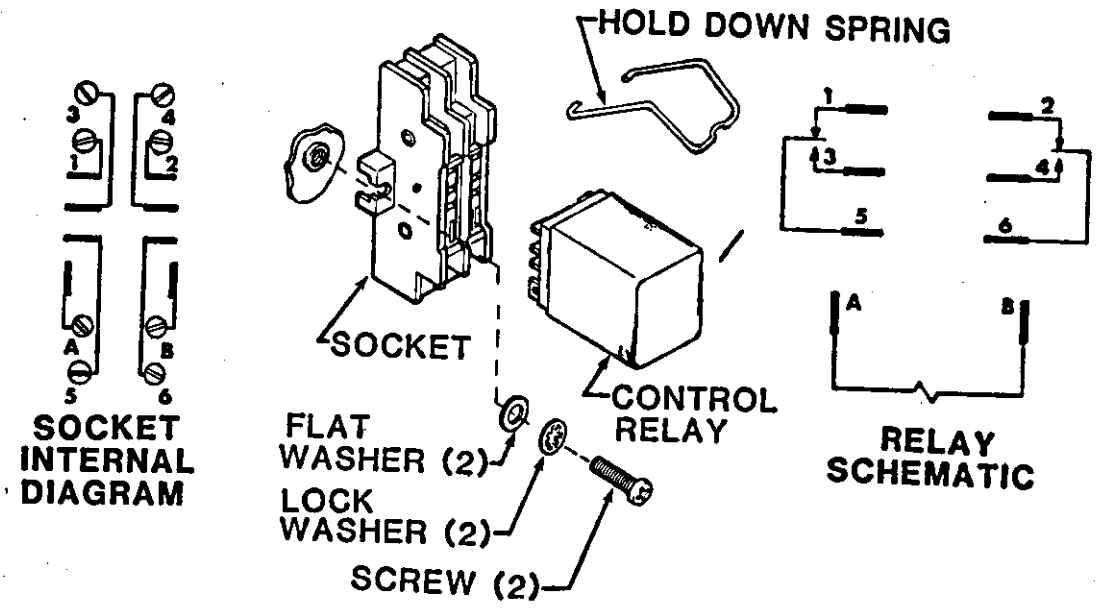


Figure 5-21. Control Relay (K10)

c. Relay test

(1) Using a multimeter set on 20 OHMS scale, check continuity.

- Continuity should be indicated across the following contacts:

A to B

1 to 5

2 to 6

- Continuity should not be indicated across the following contacts.

3 to 5

4 to 6

(2) If relay fails above tests, replace relay.

(3) Using a multimeter and socket internal diagram shown on figure 5-21, check continuity between contacts and terminals of control relay socket.

d. Socket removal

(1) Tag and remove leads.

(2) Remove two screws, lock washers, and flat washers.

(3) Remove socket.

e. Installation

(1) Secure relay socket with two screws, lock washers, and flat washers.

(2) See tags and wiring diagram, figure 2-2, and connect leads to socket.

(3) Aline relay and socket contacts and push relay firmly into socket and secure with hold down spring.

(4) See para 5-19,e, and install junction box cover and connect power.

5-23. TERMINAL BOARDS (TB1 AND TB2)

Preliminary procedure: See para 5-19 to gain access and identify internal components of junction box.

a. Inspection

(1) Check terminal boards for loose or corroded terminals, cracks, and obvious damage. Replace if cracked or broken.

(2) Check that wire leads are secure and properly located. (See wiring diagram, figure 2-2.)

b. Removal

(1) Using screwdriver, loosen nine captive screws and remove lower front panel assembly.

(2) Tag and disconnect wire leads.

(3) Remove four screws, lock washers, and nuts from each terminal board.

c. Installation

(1) Secure terminal boards to junction box with four each screws, lock washers, and nuts.

(2) See tags and wiring diagram, figure 2-2, and connect wire leads.

(3) Remove tags.

(4) Install lower front panel assembly.

(5) See para 5-19,e, and install junction box cover and connect power.

5-24. HEATING ELEMENTS (HR1 THRU HR6), THERMOSTATIC SWITCH (S3), AND TERMINAL BOARDS (TB3 AND TB4)

a. Access

W

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nineteen retained screws and remove right-hand rear panel assembly.

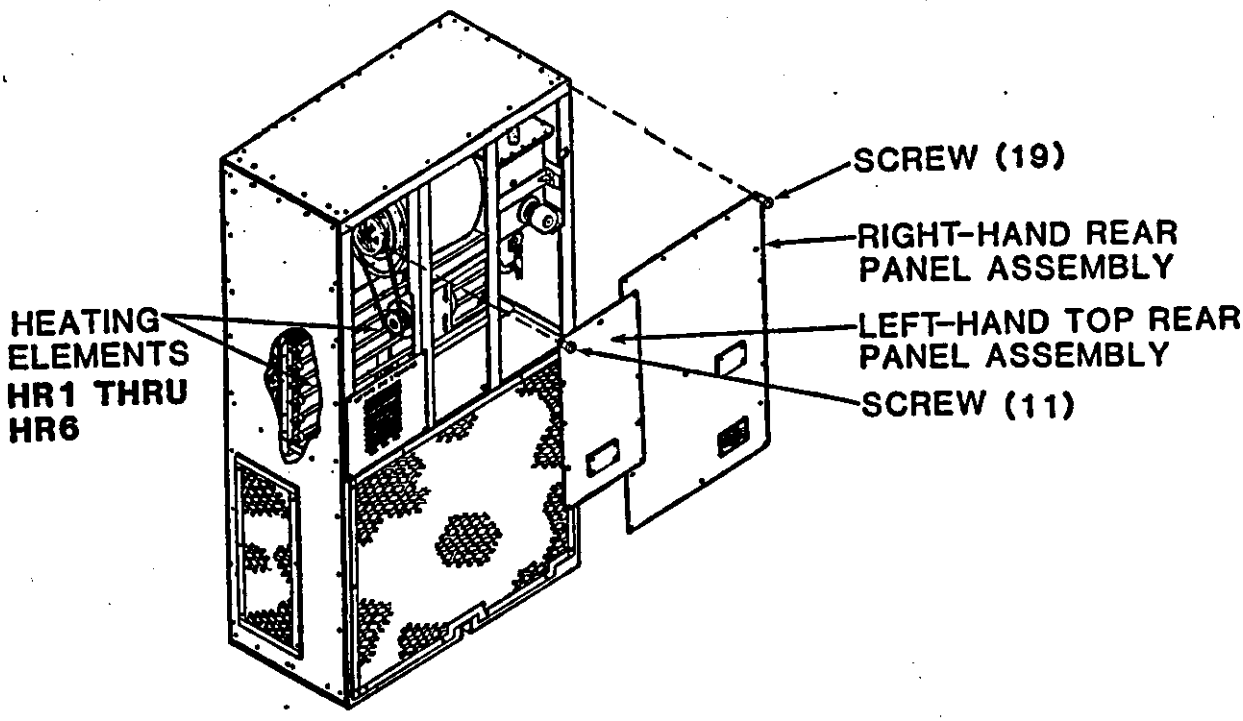


Figure 5-22. Heating Element Access

(3) Loosen eleven screws and remove left-hand top rear panel assembly.

(4) Remove four screws and pull terminal board cover from unit. (See figure 5-23.)

b. Inspection (See figure 5-23.)

(1) Check that all attaching brackets and hardware are in place and secure.

(2) Check that wires and connections at terminal boards are in good condition and secure.

(3) Inspect heating elements for deformed outside covers and other obvious damage.

(4) Check terminal boards for loose or corroded terminals, cracks, and obvious damage. Replace if cracked or broken.

c. Test

(1) Using wiring diagram, figure 2-2, as a guide disconnect heating element leads at terminal boards TB3 and TB4. Use a multimeter set on 20 OHMS scale. Check each heating element for continuity between the two wire leads. Replace heater if no continuity is indicated.

(2) With thermostatic switch at room temperature, use a multimeter set on the 20 OHMS scale to check for continuity between each pair of contacts (4 and 6, 4 and 5, and 5 and 6). If continuity is not indicated between all contacts, replace the thermostatic switch.

NOTE

For full operational test of thermostatic switch use an external heat source. Thermostatic switch should open (no continuity across contacts) at temperature increase of $194^{\circ}F \pm 9^{\circ}$ ($90^{\circ}C \pm 5^{\circ}$) and close at temperature decrease at $142^{\circ}F \pm 16^{\circ}$ ($61^{\circ}C \pm 9^{\circ}$).

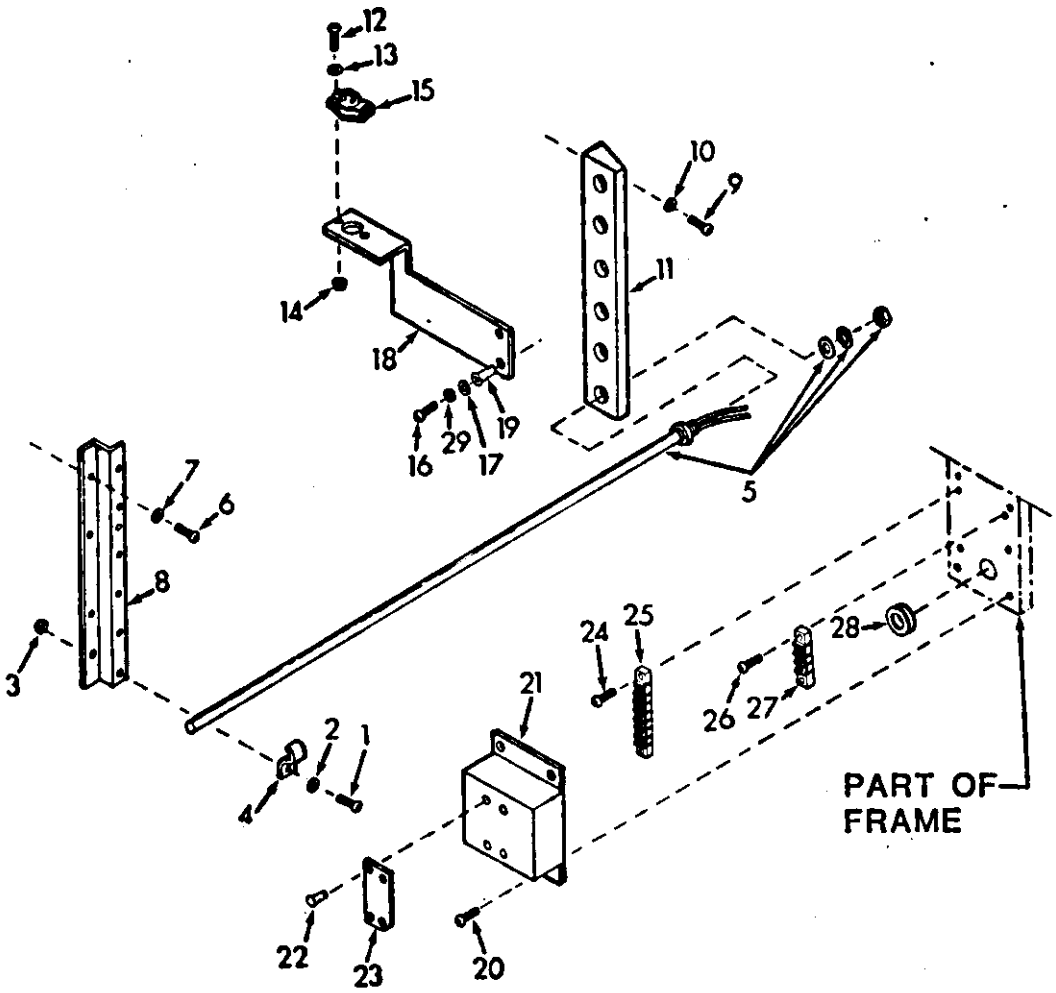


Figure 5-23. Heating Elements (HR1 thru HR6) Thermostatic Switch (S3) and Terminal Boards (TB3 and TB4)

Legend for Figure 5-23

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	SCREW,MACH-PAN HD	16	SCREW,MACH-PAN HD
2	WASHER,FLAT-ROUND	17	WASHER,FLAT ROUND
3	NUT,SELF-LOCKING	18	BRACKET ASSY,THERMOSTATIC SWITCH
4	STRAP,HEATER		
5	ELEMENT,HEATING **HR1** THRU **HR6**	19	NUT,PLAIN BLIND RIVET
6	SCREW,MACH-PAN HD	20	SCREW,MACH-PAN HD
7	WASHER,FLAT-ROUND	21	COVER,TERMINAL BOARD
8	ZEE,HEATER-END	22	RIVET,BLIND
9	SCREW,MACH-PAN HD	23	CAUTION PLATE,208 VOLT
10	WASHER,FLAT-ROUND	24	SCREW,MACH-PAN HD
11	BRACKET,HEATER	25	TERMINAL BOARD **TB-3**
12	SCREW,MACH-PAN HD	26	SCREW,MACH-PAN HD
13	WASHER,FLAT-ROUND	27	TERMINAL BOARD **TB4**
14	NUT,SELF-LOCKING	28	GROMMET,RUBBER
15	SWITCH,THERMOSTATIC **S3**	29	WASHER,LOCK-SPRING HELICAL

d. Component replacement. Use figure 5-23 as a guide to replace damaged or defective components.

e. Installation

(1) Check that all wires have been reattached.

(2) Secure terminal board cover with four screws.

(3) Secure outside panels.

(4) Connect power.

5-25. CONDENSER FAN AND MOTOR(B2)

a. Access

WARNING

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nine retained screws and remove lower front panel assembly.

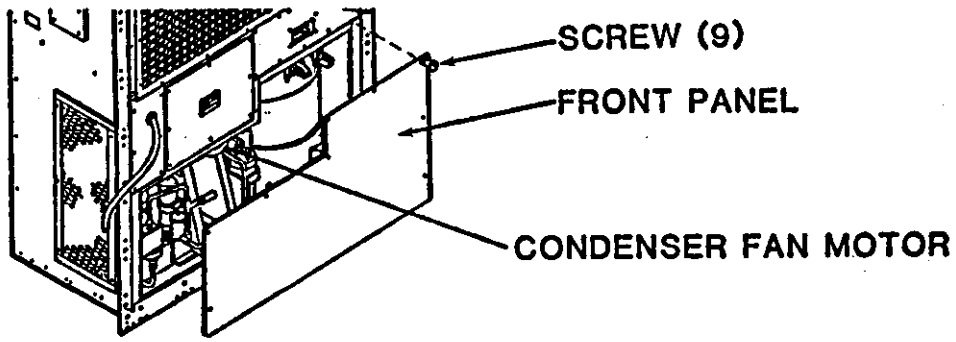


Figure 5-24. Condenser Fan and Motor Access

b. Inspection

(1) Check fan for dents, bent or loose blades, and that hub is securely attached. Replace if damaged.

(2) Check fan and motor for accumulated dirt. Clean if dirty.

(3) Check motor for rotational freedom by spinning fan. If there is any stiffness or binding, repair or replace motor. Motor repairs are normally limited to external service or service by an approved motor manufactures repair facility.

c. Clean. Use a clean dry cloth and a soft brush to remove dirt from fan, motor and surrounding area.

d. Test (See wiring diagram, figure 2-2.)

NOTE

Motor leads and thermostat (S12) leads are accessable by removing motor access cover. S12 Motor Thermostat is built into motor.

(1) Use a multimeter set on 20 OHMS scale to check continuity between all three motor leads. If there is no continuity between any pair of leads, the motor winding is open. Replace motor.

(2) Use a multimeter set on 20 OHMS scale to check for continuity between each lead and the motor housing. If there is continuity between any lead and motor housing, the motor winding is shorted. Replace the motor.

(3) Use a multimeter to test stator insulation by checking between each lead and motor housing. A reading of less than 500,000 ohms indicates insulation failure. Replace motor.

(4) Check continuity between S12 (motor thermostat) leads. If there is no continuity, this indicates an open thermostat. Replace motor.

e. Removal (See figure 5-25.)

(1) Tag and disconnect leads.

(2) Loosen two setscrews in fan hub.

(3) Carefully remove fan from motor shaft. Take care that shaft key is not lost.

(4) Remove four cap screws, flat washers, lock washers, and nuts from motor mounting feet.

(5) Slip motor out of unit.

(6) Remove fan from unit.

f. Installation (See figure 5-25.)

(1) Place fan in unit and slip motor into place.

(2) Place fan onto motor shaft and insert shaft key into fan hub and motor shaft keyway. Tighten setscrews.

(3) Center fan in fan shroud opening and secure motor with four cap screws, flat washers, lock washers, and nuts.

(4) See tags and wiring diagram, figure 2-2, and connect leads. Remove tags.

(5) Install front panel and connect power.

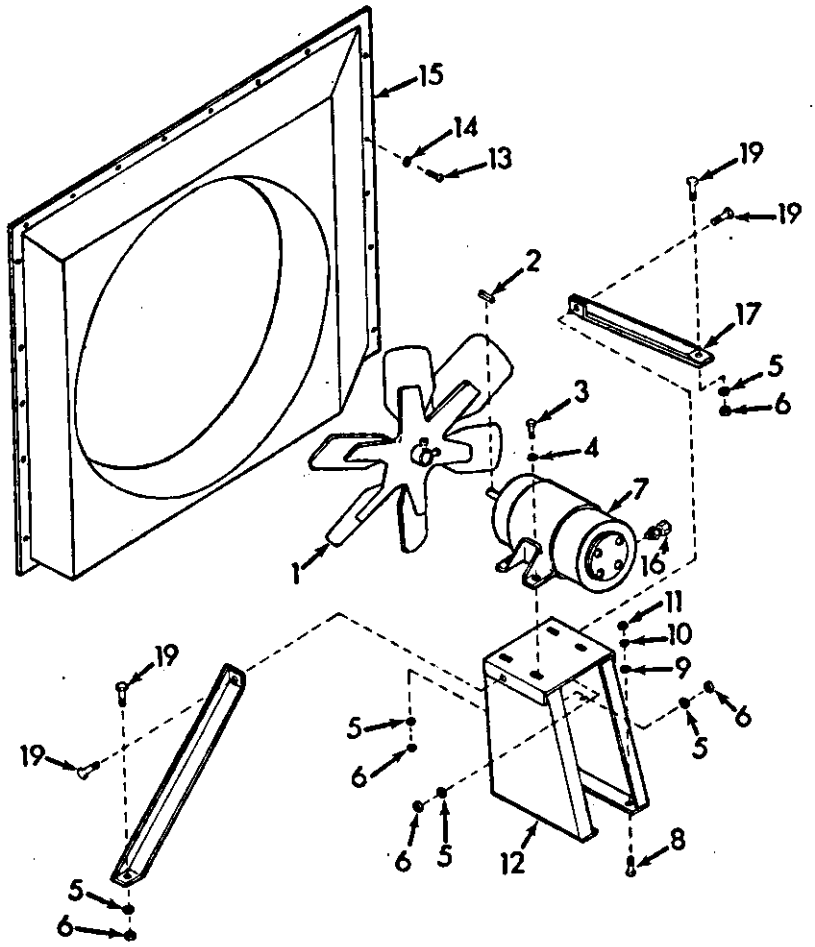


Figure 5-25. Condenser Fan and Motor (B2)

Legend for figure 5-2

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	FAN,AXIAL-CONDENSER	11	NUT,PLAIN HEX
2	KEY,MACH-SQUARE	12	MOUNT,CONDENSER FAN
3	SCREW,CAP,HEX HD	13	SCREW,MACH-PAN HD
4	WASHER,FLAT-ROUND	14	WASHER,FLAT-ROUND
5	WASHER,LOCK-SPRING	15	VENTURI ASSY
6	NUT,PLAIN HEX	16	CONNECTOR,STRAIN RELIEF
7	MOTOR,CONDENSER FAN B2	17	BRACE,RIGHT
8	SCREW,CAP HEX HD	18	BRACE,LEFT
9	WASHER,FLAT-ROUND	19	SCREW CAP,HEX HD
10	WASHER,LOCK-SPRING		

5-26. CONDITIONED AIR FAN, MOTOR (B1) AND BELT DRIVE

a. Belt only examination/adjustment/replacement.

(1) Turn air conditioner **OFF** at maintenance switch.

WARNING

Shutting the unit off at the maintenance switch does not disconnect power to the unit. Do not attempt electrical repairs.

(2) To examine belt, loosen eleven retained screws and remove left-hand top rear panel assembly.

(3) To replace, adjust, or aline belt also remove right-hand rear panel assembly.

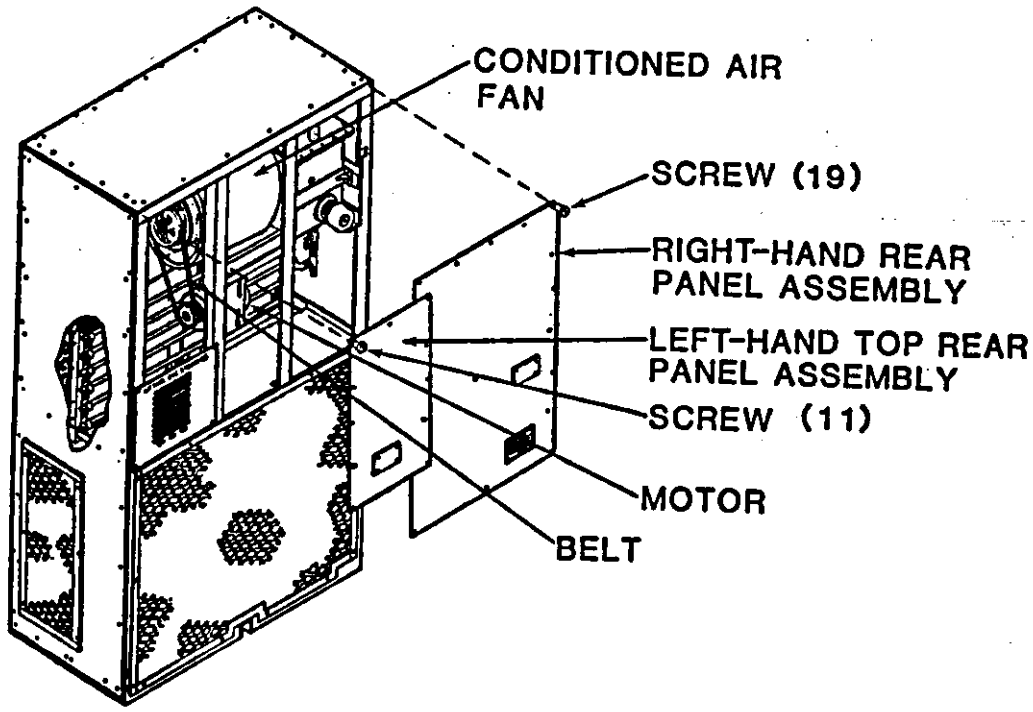


Figure 5-26. Conditioned Air Fan, Motor(B1) and Belt Access

(4) Check that belt is not missing, loose, or damaged.

(5) If belt is showing excessive wear, check motor to fan alinement. Loosen setscrews in pulleys or motor mounting hardware as appropriate and adjust to true alinement. Tighten setscrews.

(6) If belt is to be replaced or adjusted, loosen motor mounting hardware.

(7) Adjust belt tension to approximately .18 inch defection using approximately three pound force at the center of the belt span.

(8) Tighten motor mounting hardware.

(9) If maintenance action is complete, install panels and turn maintenance switch .

b. Inspection - motor, fan, and pulleys.

(1) Check motor, fan, and pulleys for accumulated dirt. Clean with a dry rag and soft brush.

(2) See para a,(5), above for pulley alinement.

(3) Check motor rotational freedom with belt removed. (See para a above.) Spin motor shaft. If there is any stiffness or binding, repair or replace motor. Motor repairs are normally limited to external service or service by an approved motor manufacturers repair facility.

*USE 3.05 INCH O.D. SHEAVE (AK30) FOR 60 HZ POWER AND 3.45 INCH O.D. SHEAVE FOR 50 HZ POWER

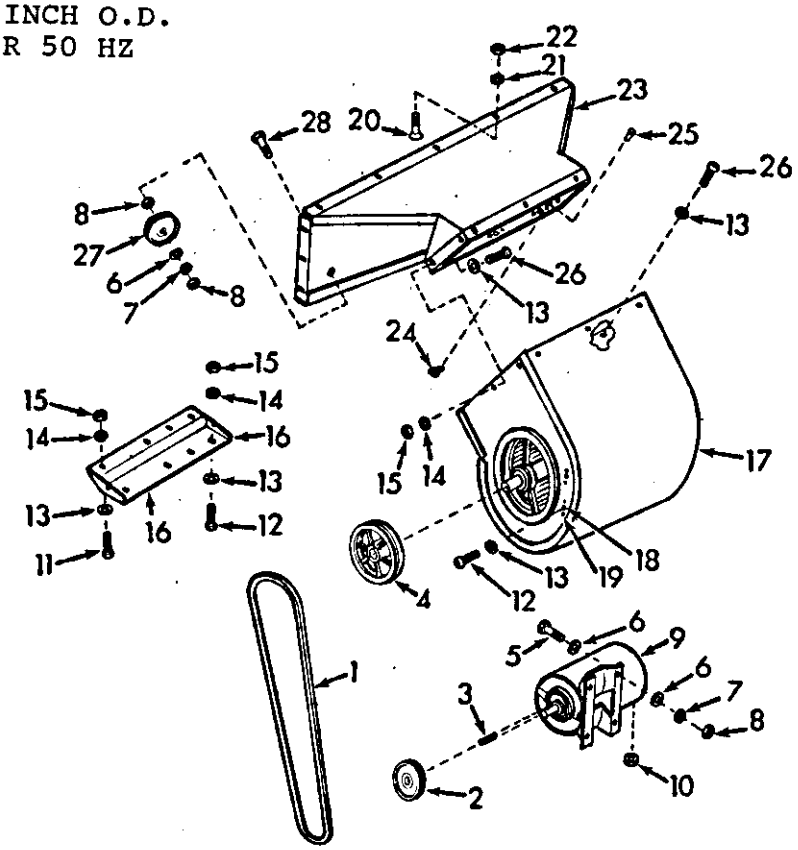


Figure 5-27. Conditioned Air Fan, Motor (B1) and Belt Drive

Legend for figure 5-27

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	BELT,V INDUSTRIAL	15	NUT,PLAIN-HEX
*2	SHEAVE(AK 30),MOTOR SHAFT (60 HZ)	16	SUPPORT,BLOWER
3	KEY,MACH-SQUARE	17	MODIFICATION,CENTRIFUGAL FAN
4	SHEAVE,FAN SHAFT	18	NUT,PLATE SELF-LOCKING
5	SCREW,CAP,HEX HD	19	RIVET,FLUSH HEAD
6	WASHER	20	SCREW,MACH-FLAT CTSK HD
7	WASHER,LOCK-SPRING	21	WASHER,LOCK-SPRING
8	NUT,PLAIN-HEX,CRES	22	NUT,PLAIN-HEX
9	MOTOR EVAPORATOR FAN B1	23	DUCT,SUPPLY
10	GROMMET,RUBBER	24	NUT,PLATE SELF-LOCKING
11	SCREW,MACH-PAN HD	25	RIVET,SOLID
12	SCREW,MACH-PAN HD	26	SCREW,MACH-PAN HD
13	WASHER,FLAT ROUND	*27	SHEAVE (AK 34),MOTOR SHAFT (50 HZ)
14	WASHER,LOCK-SPRING	28	ROD,SUPPORTING SHEAVE

(4) Check fan for rotational freedom with belt removed. Repair or replace as indicated.

c. Test (See wiring diagram, figure 2-2.)

WARNING

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

NOTE

Remove motor junction access cover to gain access to motor leads.

(2) Use a multimeter set on 20 OHMS scale to check continuity between all three motor leads. If there is no continuity between any pair of leads, the motor winding is open. Replace motor.

(3) Use a multimeter set on 20 OHMS scale to check for continuity between each lead and the motor housing. If there is continuity between any lead and motor housing, the motor winding is shorted. Replace the motor.

(4) Use a multimeter set on 1 MEG OHMS scale to test stator insulation by checking between each lead and motor housing. A reading of less than 500,000 ohms indicates insulation failure. Replace motor.

d. Removal (See figure 5-27.)

(1) Loosen motor mounting hardware and remove belt.

(2) Loosen setscrews and pull pulleys from motor and fan.

NOTE

Fan motor removal requires two people.

(3) While holding motor, remove four cap screws, lock washers and nuts, and eight flat washers and pull motor from unit.

NOTE

Fan removal requires two people.

(4) Fan removal:

- Remove the supply air grille on front of unit.
- Remove seven screws, flat washers, lock washers and nuts from top and side flanges of fan outlet.
- Remove three screws and flat washers from bottom flange of fan outlet.
- See paragraph 5-13 and slide control box out of unit far enough to allow fan passage. (Total removal is not required.)
- Remove right side panel assembly. This will require unit to be moved into shelter similar to storage position. (See para G-3 steps a thru e)
- Remove two screws, lock washers, and flat washers from thermostatic switch bracket located at the lower right rear of the fan. Pull bracket down slightly.
- Remove capillary clamp hardware from pulley side of fan.
- Remove four screws and flat washers from rear frame angles.
- Rotate fan down and away from outlet duct and carefully remove blower from unit.

c. Installation (See figure 5-27.) Requires two people.

(1) Slip fan thru side of unit and into position under the outlet duct.

(2) Rotate fan up and into position on the outlet duct.

(3) Secure the fan with the following hardware: (Do not tighten hardware until all hardware is in place.)

- Four screws and flat washers at rear frame angles.
- Three screws and flat washers at bottom flange of fan outlet.
- Seven screws, flat washers, lock washers and nuts at top and side flanges of fan outlet.

- Tighten all hardware.

(4) Secure capillary clamp to pulley side of fan.

(5) Position thermostatic switch bracket and secure with two screws, lock washers, and flat washers.

(6) Install the right side panel assembly and move the unit back into position in the shelter. (See para 2-5.j)

(7) Carefully slip control panel back into position and secure with eight flat head screws.

(8) Seal seams around fan to outlet duct with RTV type sealant.

(9) Install supply air grille.

NOTE

Motor installation requires two people.

(10) Place motor into position and loosly secure with four cap screws, lock washers and nuts, and eight flat washers.

(11) Slip pulleys into place on fan and motor shafts. Larger pulley goes on fan.

(12) See tags and wiring diagram, figure 2-2, and connect motor leads.

(13) See para 5-7,a, and install, aline, and adjust belts and pulleys.

(14) Check that pulley setscrews and motor mounting hardware is tight.

CAUTION

The following test requires unit to operate with panels off. Use extreme care.

(15) Turn unit OFF at maintenance switch and connect power to unit.

(16) Set MODE SELECTOR SWITCH to VENT.

(17) Briefly turn unit on at maintenance switch and observe fan and motor belt drive as it slows down. Rotation should be counterclockwise facing the shaft end. Check motor wiring if unit fails above test.

(18) Install remaining outside panels.

(19) Turn unit on at maintenance switch.

5-27. HUMIDIFIER TANK ASSEMBLY WITH IMMERSION HEATER (HR-8) AND LIQUID LEVEL SWITCH (S10)

SEE PARAGARPH 4-4 FOR HUMIDIFIER TANK ASSEMBLY FILLING INSTRUCTIONS.

WARNING

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

NOTE

Frequency of cleaning will depend upon use and condition of water being used. To reduce frequency of cleaning the best source of pure mineral free water should be used to fill the humidifier. Increase frequency of cleaning in areas where water contains high mineral content or other contaminants. A commerical water filter may be advisable for water source in some areas to reduce maintenance time and increase humidifier efficiency.

a. Partial cleaning - approximately every three months in normal conditions.

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

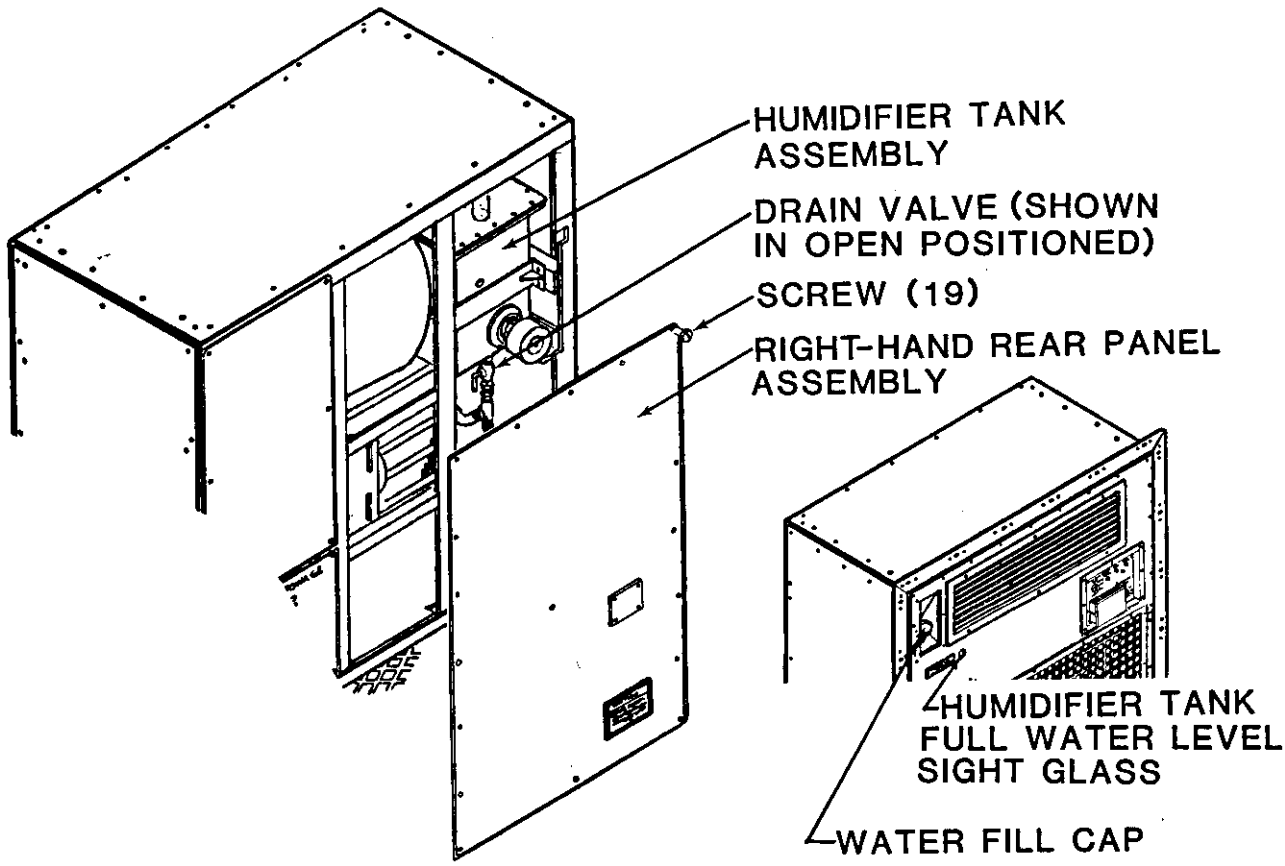


Figure 5-28. Humidifier Tank Access

WARNING

All humidifier tank parts to cool before touching. Severe burns can result from touching hot humidifier tank components including the drain valve. Use protective gloves or rag to open drain valve if it is hot.

(2) Allow humidifier to cool.

(3) Loosen nineteen screws and remove right-hand rear panel assembly.

(4) Use a stiff brush and stainless steel wire to clean steam ports in top tube of humidifier.

(5) Open drain valve and drain all accumulated sludge from tank.

(6) Pour clean water into tank at filler neck until water at drain opening is clear.

(7) Check that drain is not clogged.

(8) Close drain valve.

(9) Install right-hand rear panel assembly.

(10) Fill humidifier. (See para 4-4.)

(11) Connect power.

b. Total cleaning, removal, inspection, and test of humidifier - approximately every six months in normal conditions. (See figures 5-28 and 5-29.)

(1) Disconnect power.

(2) Allow humidifier to cool.

(3) Loosen nineteen screws and remove right-hand rear panel assembly.

(4) Open drain valve and drain humidifier.

(5) Remove screw from end of heater terminal cover and remove cover.

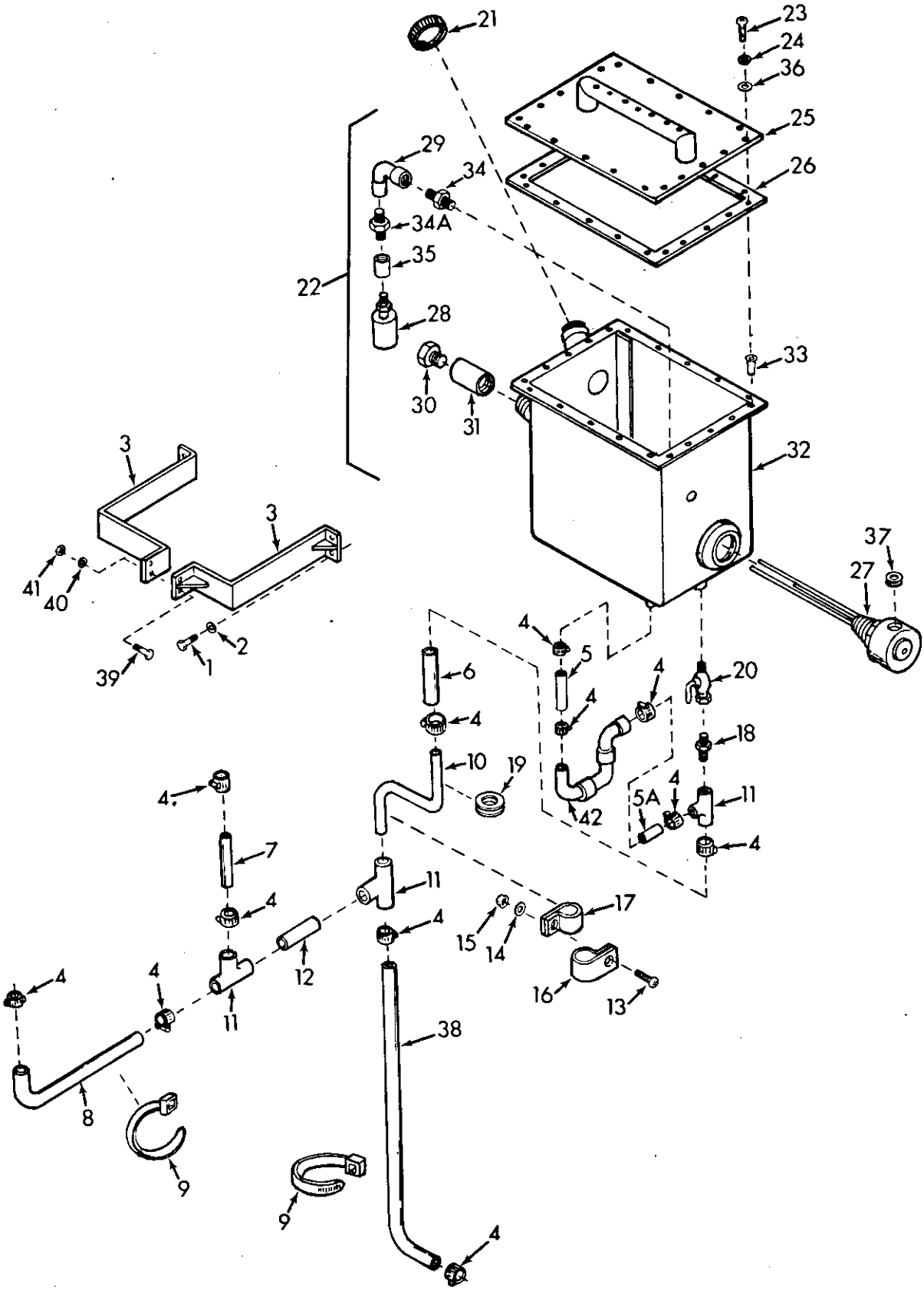


Figure 5-29. Humdifier Tank and Condensate Drain Tubing

Legend for figure 5-27

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	SCREW,CAP,HEX HD	22	HUMIDIFIER TANK ASSY
2	WASHER,FLAT-ROUND	23	SCREW,MACH-PAN HD
3	STRAP,HUMIDIFIER	24	WASHER,LOCK-SPRING
4	CLAMP,HOSE	25	HUMIDIFIER TOP
5	TUBING,PLASTIC	26	GASKET,HUMIDIFIER
5A	TUBING,PLASTIC	27	HEATER,IMMERSION HR-8
6	TUBING,PLASTIC	28	SWITCH,LIQUID LEVEL S10
7	TUBING,PLASTIC	29	ELBOW,PIPE 90° STREET
8	TUBING,PLASTIC	30	SIGHT GLASS
9	STRAP,TIEDOWN	31	COUPLING,PIPE
10	TUBE,COPPER	32	TANK,HUMIDIFIER
11	TEE,TUBE	33	NUT,BLIND RIVET
12	TUBE,COPPER	34A	NIPPLE-PIPE THREAD
13	SCREW,MACH-PAN HD	35	COUPLING,PIPE
14	WASHER,FLAT-ROUND	36	WASHER,FLAT-ROUND
15	NUT,SELF-LOCKING HEX	37	GROMMET
16	CLAMP,LOOP TYPE	38	TUBING,PLASTIC
17	CLAMP,LOOP TYPE	39	SCREW,CAP HEX HD
18	ADAPTER,STRAIGHT	40	WASHER,LOCK SPRING HELICA
19	GROMMET,RUBBER	41	NUT PLAIN HEX
20	COCK,DRAIN	42	"P" TRAP
21	CAP,TANK		

(6) Tag and disconnect wire leads from heater.

(7) Remove tank fill cap from front of unit.

(8) Loosen clamp at bottom of tee from drain valve and slip tube off.

(9) Remove two hex cap screws and flat washers from humidifier strap and spring strap enough to allow humidifier removal.

(10) Remove humidifier from unit.

(11) Remove twenty screws and lock washers and carefully remove top from humidifier.

(12) Using a stiff brush and plastic scraper, thoroughly clean all scale, sludge, and deposits from humidifier. Take care that internal parts are not damaged. Be sure that steam ports in tube on cover are clean and open and that sight glass "window" is clean.

(13) Examine internal parts and replace if damaged.

(14) Examine all fittings for evidence of leakage. Repair or replace as indicated.

(15) Using a multimeter set on 20 OHMS scale to test the liquid level switch (S10).

With float in the down position (low water) continuity should be indicated between the black and yellow leads. No continuity should be indicated between the black and red leads.

With float in the up position, continuity indications should be opposite that stated above.

Check that float is in good condition and that it moves up and down freely on shaft.

Replace switch if it fails above tests.

(16) Examine heater elements for evidence of cracks, deformities and other visible damage. Replace if defective.

(17) Check that valve, overflow and drain tubing are clean and free of obstructions.

(18) Examine cover gasket and replace if damaged.

(19) Carefully secure cover and gasket with twenty screws and lock washers. Tighten screws evenly.

(20) Place humidifier in unit and secure mounting strap with two cap screws and flat washers.

(21) Slip drain tube onto tee at bottom of drain valve and tighten clamp.

(22) With drain valve open, pour clean water into tank at filler neck and check that water drains out at rear drain opening in air conditioner base. If water does not drain freely check drain tubing for clogs. Remove and clean tubing as indicated.

(23) See tags and wiring diagram, figure 2-2, and connect leads. Remove tags.

(24) Install heater terminal cover and secure with screws.

(25) Close drain valve.

(26) Fill humidifier. (See para 4-4.)

(27) Check tank for leaks.

(28) Install right-hand rear panel assembly.

CAUTION

When outside temperatures below 32°F (0°C) are possible, power must remain connected to air conditioner and MODE SELECTOR SWITCH must be placed in STANDBY mode during nonoperating periods. The humidifier tank assembly must be drained prior to disconnecting power or turning MODE SELECTOR SWITCH to OFF for any period of time that would allow water in humidifier tank assembly to freeze.

(29) Connect power.

5-28. REFRIGERATION SYSTEM REPAIRS GENERAL

The refrigeration system must be totally discharged before any maintenance action that requires opening of the pressurized system. Leak testing and dehydrator replacement are required after any system component has been removed and replaced. The system must be evacuated before it is charged. The system must be properly charged to function properly.

WARNING

DANGEROUS CHEMICAL
(R22)
is used in this equipment.

DEATH

or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin-eye-contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly poisonous and corrosive gas.

WARNING

REFRIGERANT UNDER PRESSURE

is used in the operation of this equipment.

DEATH

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

5-29. DISCHARGING THE REFRIGERANT SYSTEM

a. Using screwdriver, loosen nine captive screws in lower front panel assembly.

b. Remove lower front panel assembly.

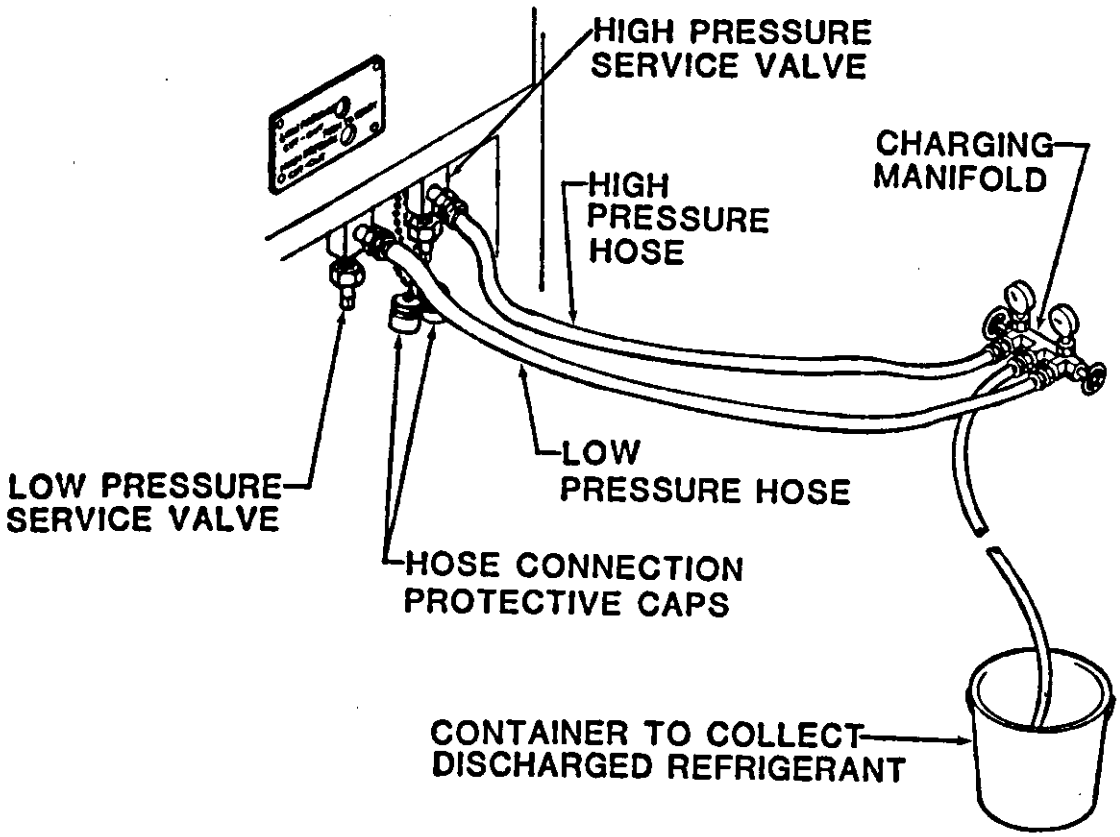


Figure 5-30. Discharging Refrigerant

c. Unscrew hose connection protective caps.

WARNING

Death or serious injury may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure.

Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin-eye-contact is possible.

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

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

e. Attach a hose assembly to the center connection of the manifold.

f. Place the open end of the center connection hose in a container that is located in a well ventilated area.

WARNING

Discharge refrigerant in an open area and **not** around an open flame.

CAUTION

Do not permit the oil to escape from the unit. If oil is escaping, close the valve(s) slightly.

Do not permit the refrigerant to escape fast enough to form ice or frost on either the lines or the valve.

g. Using a refrigeration wrench, **slowly** open the low pressure service valve to allow refrigerant gas to flow **slowly** out of the hose.

h. Using a refrigeration wrench, **slowly** open the high pressure service valve to allow refrigerant gas to flow **slowly** out of the hose.

i. Check the discharge hose for the presence of oil. Adjust (close slightly) valves if necessary to prevent oil discharge.

j. When gas stops flowing, close both service valves.

5-30. PURGING THE REFRIGERANT SYSTEM

Preliminary procedure: Discharge the refrigerant system. (See para 5-29.)

Supplies: Nitrogen cylinder NSN 6830-00-292-0732.

The refrigeration system must be purged with dry nitrogen before any brazing or debrazing is performed on any component. A flow of dry nitrogen at the rate of less than 1-2 cfm (0.028-0.057 m^3/minute) should be continued during all brazing or debrazing operations to minimize internal oxidation and scaling.

CAUTION

Nitrogen cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations.

CAUTION

Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must also be discharged in a ventilated location.

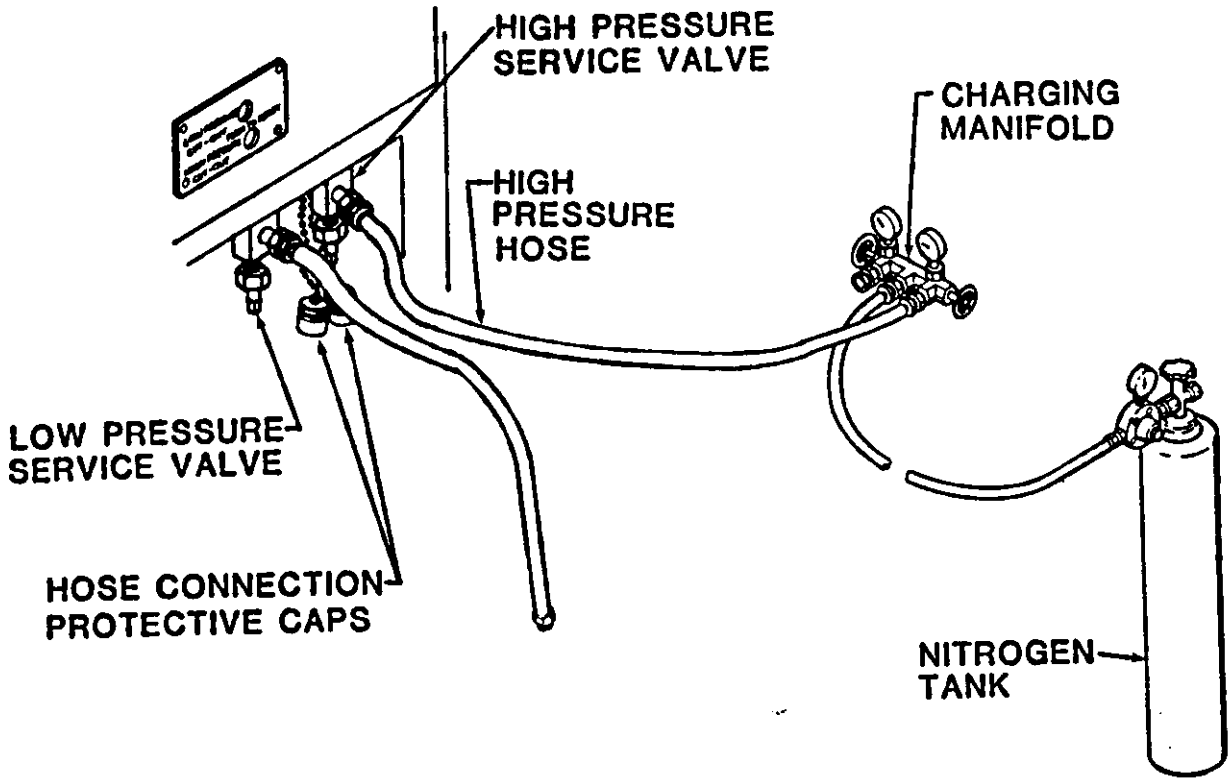


Figure 5-31. Nitrogen Purging Connection

Assuming that the system has been discharged using a manifold as described in paragraph 5-29, proceed as follows:

a. See specific component removal/repair instructions.

b. Be sure that refrigerant has been discharged. (See paragraph 5-29.)

c. Connect the center hose from the charging manifold to a nitrogen regulator and dry nitrogen tank.

d. The hose from the high pressure service valve to the charging manifold must be connected.

e. The hose from the low pressure service valve must be disconnected from the charging manifold.

f. Open both service valves on the unit.

g. Close the unused valve on the charging manifold, and open the one with the nitrogen tank hook up.

h. Open the nitrogen cylinder valve and adjust the regulator so that less than 1-2 cfm (0.028-0.057 m^3/minute) of nitrogen flows through the system.

i. Check discharge from hose attached to the low pressure charging valve to be sure that no oil is being forced out of the system.

j. Allow nitrogen to sweep through the system at the rate of less than 1-2 cfm (0.028-0.057 m^3/minute) for a minimum of 5 minutes, before starting any brazing or debrazing operation. Then allow it to continue to flow at the same rate until all brazing or debrazing operations are completed. (See para 5-31 for brazing or debrazing procedures.)

k. After installation brazing operations are completed, allow nitrogen to flow for a minimum of 5 minutes.

l. Close nitrogen cylinder valve, nitrogen regulator, charging manifold valve, and both high and low pressure service valves on the unit.

m. Disconnect the hose from the nitrogen tank.

n. Assuming that all repairs are completed, go to para 5-32.

5-31. BRAZING/DEBRAZING PROCEDURES

Supplies: Brazing alloy (silver) QQ-B-654, Grade O, I, II, or III as applicable

Nitrogen cylinder NSN 6830-00-292-0732

Brazing flux O-F-499, Type B

Abrasive cloth NSN 5350-00-192-5047

Rags NSN 7920-00-205-1711

a. General. All tubing in the refrigeration system is seamless copper with a bright internal finish that permits thorough cleaning and prevents entrapment of moisture or other impurities. Rigid grade copper is used for straight sections and soft grade for sections that must be bent. All interconnecting fittings, such as elbows, tees, etc., are also copper. The bodies of all valves and all connections on other components are brass. All joints, except those provided with flare fittings, are made by brazing in accordance with MIL-B-7883, except that radiographic examination is not required.

b. Filler Alloy. Grade IV or VI brazing alloy and Type B flux, as specified in MIL-B-7883, must be used for all copper to brass joints. Grade III brazing alloy may be substituted for Grade IV or VI for copper to copper joints; flux is not required for copper to copper joints.

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

WARNING

All refrigerant 22 must be discharged from the system and the entire system must be purged with dry nitrogen before beginning any debrazing operation. (See para 5-29 and 5-30)

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

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

WARNING

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

(3) Protect insulation, wiring harnesses, cabinet, and other surrounding components with appropriate shields.

(4) Be sure the work area is well ventilated and that dry nitrogen is flowing through the refrigeration system at a rate of less than 1-2 cfm (0.028-0.057 m^3/minute). (See para 5-30.)

(5) Apply sufficient heat uniformly around the joint to quickly melt the filler alloy. If heat is applied slowly, or only on one side, the entire component or length of tubing will be heated and filler alloy in adjacent joints may also be melted. Remove heat as soon as the joint separates.

d. Cleaning debrazed joints. All filler alloy must be cleaned from debrazed joints before reassembly. Heat each piece of the joint until the filler alloy is melted and then wipe it away with a damp cloth. Be sure no filler alloy or other debris are left inside any tubing, fitting, or component.

e. Reassembly. If tubing sections or fittings were removed with a component, debraze them from the component, clean the joints, and braze them to the new component before reinstallation.

f. Brazing. Braze joints within the air conditioner as follows:

(1) Position the component to be installed.

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

(3) Protect insulation, wiring harnesses, and surrounding components with appropriate shields.

(4) Be sure the work area is well ventilated and that dry nitrogen is flowing through the refrigeration system at a rate of less than 1-2 cfm (0.028-0.057 m^3/minute). (See para 5-30.)

(5) Apply sufficient heat uniformly around the joint to quickly raise it to a temperature that will melt the filler alloy. Remove heat as soon as brazing is completed.

5-32. LEAK TESTING THE REFRIGERANT SYSTEM

Supplies: Nitrogen cylinder NSN 6830-00-292-0732

Refrigerant 22 (Drum) NSN 6850-00-837-9927

a. The entire repaired area should be thoroughly leak tested after repair or replacement of any component, before it is recharged with refrigerant 22. Leak testing is also the method for troubleshooting when a system has lost all or part of its refrigerant charge through an undetermined cause.

b. Testing method. There are two acceptable methods for leak testing the refrigeration system.

(1) Refrigerant gas leak detector. If an electronic refrigerant gas leak detector is available, it should be used in accordance with the procedures contained in TM 9-4940-435-14, "Leak Detector, Refrigerant Gas."

NOTE

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

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

CAUTION

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

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

(1) To pressurize a system that has some refrigerant charge, for either leak testing method:

(a) Remove the hose connection protective caps from the high and low pressure service valves.

(b) Connect the hoses from a charging manifold to the service valves.

NOTE

If it is possible that the problem may not be a leak and that you may not have to replace a refrigeration system component, refrigerant 22 may be substituted for the nitrogen in the following test. If nitrogen is used, you will have to discharge, evacuate, and recharge the system after this test is completed.

(c) Connect a nitrogen pressure regulator and nitrogen bottle to the center hose connection of the charging manifold.

(d) Open the unit service valves and the charging manifold valves.

(e) Open the nitrogen tank valve and pressurize the system to 350 psi (24.7 kg/cm^2).

(f) Perform leak tests.

(g) If a leak is found, discharge and purge the system and repair leak. See specific instruction for components to be removed.

(h) If a leak is not found and refrigerant 22 was used to pressurize the system, see charging instructions. (See para 5-34.)

(2) To pressurize a system that has been discharged and purged for leak testing with an electronic detector:

(a) Remove the hose connection protective caps from the high and low pressure service valves.

(b) Connect the hoses from a charging manifold to the service valves.

(c) Connect a drum of refrigerant 22 to the center hose connection of the charging manifold.

CAUTION

Connect the refrigerant 22 drum so that only **gas** will be used for pressurization.

(d) Open both unit service valves and the charging manifold valves.

(e) Open the refrigerant drum valve slightly and adjust as necessary to prevent formation of frost, and allow system pressure to build up until the gages read 40-50 psi (2.8-3.5 kg/cm^2).

(f) Close the charging manifold valves and the refrigerant drum valve.

(g) Remove the refrigerant 22 drum from the center hose connection.

(h) Connect a nitrogen regulator and cylinder of dry nitrogen to the center hose connection.

(i) Open the charging manifold valves and the nitrogen cylinder and regulator valve. Allow system pressure to build up until gages read 350 psi (24.7 kg/cm^2).

(j) Perform leak tests, then discharge and purge the system, in accordance with paragraphs 5-30 and 5-31 before performing maintenance, or before evacuating and charging the system, as appropriate.

(3) Final leak testing. Always perform a final leak test after performing any repair or replacement of components before the air conditioner is reassembled and the refrigeration system is evacuated and charged.

5-33. EVACUATING THE REFRIGERANT SYSTEM

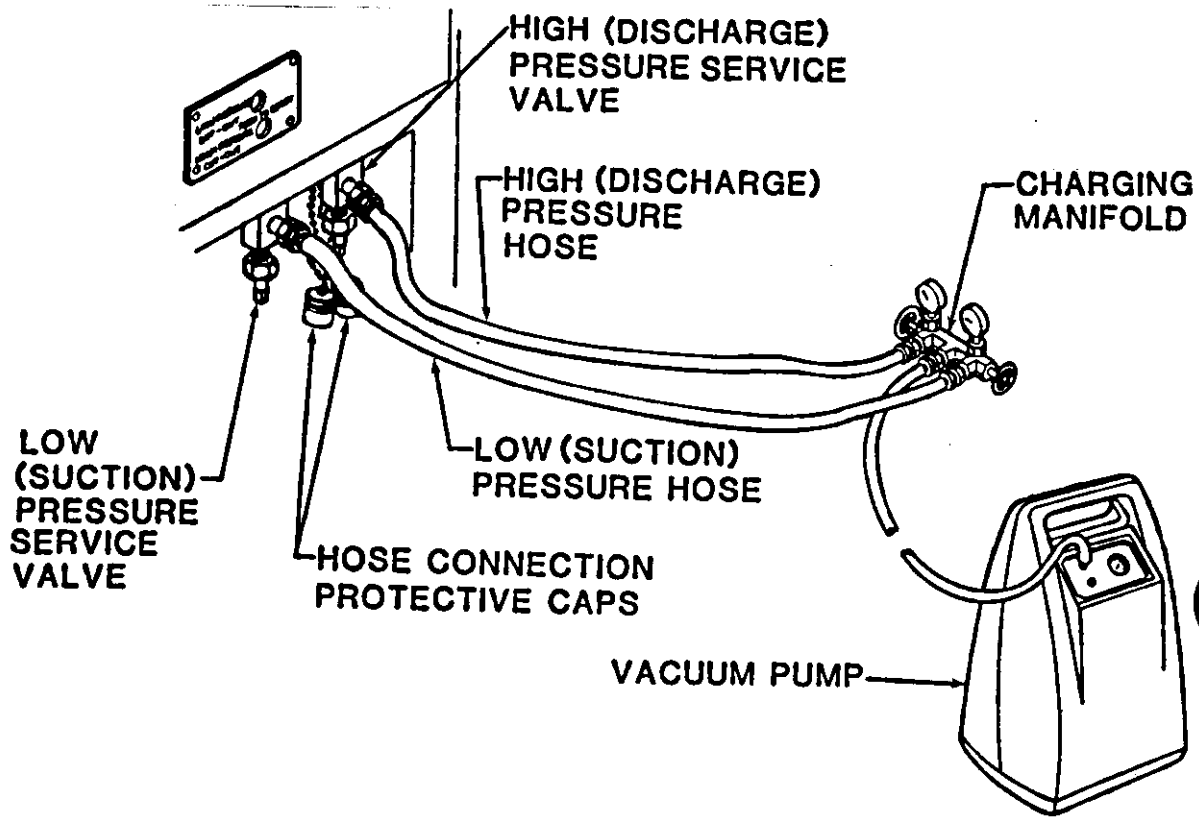


Figure 5-32. Evacuating of Refrigerant System

The refrigerant system must be evacuated to remove all moisture before it is charged with refrigerant 22.

CAUTION

Don't evacuate a leaking system. The vacuum created can cause air, moisture, and dirt to enter system.

a. Check that system was leak tested and has NO LEAKS.

NOTE

If the compressor was replaced as a result of a burn out, check that compressor burn out procedures were followed. (See para 5-38.)

b. Check that new filter-drier was installed. If not, install on. (See para 5-36.)

c. Check that both service valves and charging manifold valves are closed.

d. Attach hose assemblies to service valves and charging manifold valves.

e. Attach center hose assembly to vacuum pump.

f. Start vacuum pump.

g. Open charging manifold valves.

h. Open both unit service valves.

i. Run the vacuum pump until at least 29 inches of mercury, measured on the gage, is reached.

NOTE

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

j. Continue running the pump for one more hour, while observing the gage. If the gage needle moves back and forth, you have a leak which must be located and corrected first.

k. Close both unit service valves.

l. Close charging manifold valves.

m. Stop vacuum pump.

n. Disconnect pump from center hose connection.

o. Go to para 5-36, charging the refrigeration system.

5-34. CHARGING THE REFRIGERATION SYSTEM

Supplies: Dehydrator

Refrigerant 22 (Drum) NSN 6850-00-837-9927

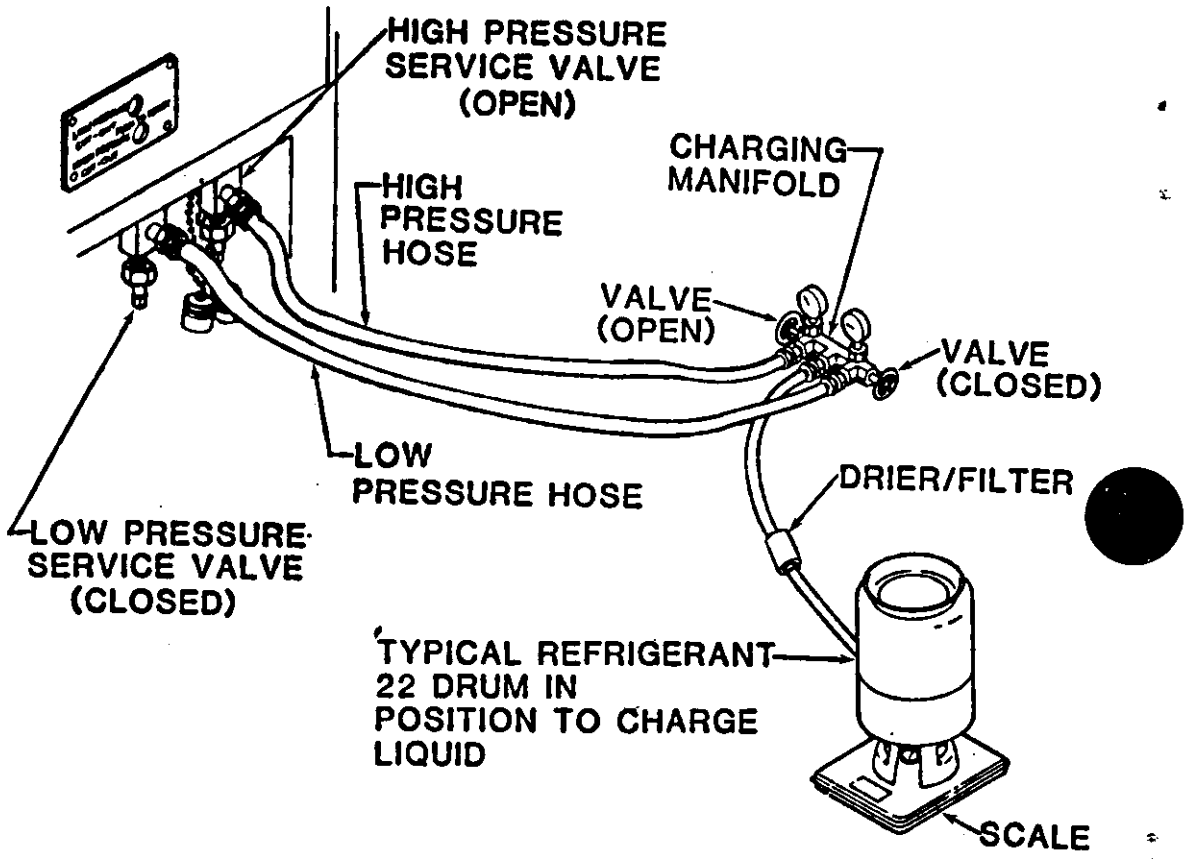


Figure 5-33. Refrigerant Charging

After the system has been satisfactorily evacuated, it must be fully charged with refrigerant 22.

CAUTION

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

NOTE

The system must be evacuated before charging.
Use only refrigerant 22 to charge the unit.

a. Check that the hose from the low pressure service valve is connected to the compound gage side of the charging manifold. The hose from the high pressure service valve should be connected to the pressure gage side of the charging manifold.

b. Connect the center hose from the charging manifold to a well charged drum of refrigerant 22.

c. Loosen the hose connections to the two air conditioner service valves slightly.

d. Open the two charging manifold valves.

e. Open the refrigerant 22 drum valve slightly to allow a small amount of refrigerant to purge air from the hoses. Tighten the hose connections at the air conditioner service valves.

f. Close the low pressure (suction) charging manifold valve. **NEVER** introduce liquid refrigerant into the low pressure (suction) service valve.

g. Position the refrigerant 22 drum so that liquid will be used for charging. (Some drums must be inverted and some are equipped with a selector valve.)

h. Using accurate scales, measure and record the weight of the refrigerant 22 drum.

i. Open the refrigerant 22 drum valve.

j. Open the high pressure service valve on the air conditioner. Allow liquid refrigerant to enter the system until the drum weight has decreased by 14.5 pounds (6.6 kg) or until system pressure has equalized.

k. Close the refrigerant drum valve and the high pressure (discharge) manifold valve.

l. Close high (discharge) pressure service valve.

m. Connect power.

n. Press and release both pressure cut-out switch reset buttons.

NOTE

If power has just been connected to unit, a short (90 minute maximum during very cold weather) warm up period is required. When compressor reaches a safe operating temperature, the COOL READY light will come on and the compressor will start automatically if the MODE SELECTOR SWITCH is in the COOL mode.

o. Turn MODE SELECTOR SWITCH to the COOL mode with the TEMPERATURE CONTROL thermostat set at 60°.

p. If the 14.5 pound (6.6) full charge was obtained, skip steps q through s. If the system pressure equalized prior to obtaining a full charge of 14.5 pounds proceed with step q.

q. Switch the refrigerant drum to the **gas** only position.

r. Be sure that the refrigerant drum has been switched to the gas position and open the refrigerant drum valve, the low (suction) pressure charging manifold valve, and the low (suction) pressure service valve on the air conditioner.

s. Monitor the weight of the refrigerant drum as the air conditioner compressor pulls additional refrigerant **gas** into the system until the full 14.5 pound (6.6 kg) charge is obtained. When the system is fully charged, immediately close the air conditioner low pressure service valve and refrigerant drum valve.

t. Run the air conditioner in COOL mode (with TEMPERATURE CONTROL thermostat set at 60°) for 15 minutes.

CAUTION

Do not skip the next step.

u. After 15 minutes, observe the sight glass on back of condenser section.

- **Green center** means the refrigerant moisture content is acceptable.
- **Yellow center** means there is too much moisture in the system. It **must be discharged, evacuated, and charged again.**

- **Milky white or bubbly** liquid means the system has a low charge.

- **Clear bubble-free** liquid around the center means the system is fully charged.

v. If charge is **low,** add **gas** refrigerant.

(1) Be sure that drum is switched to **gas** position. Open the drum valve and the air conditioner low pressure service valve.

(2) Continue to charge until sight glass is clear and bubble-free.

(3) Close the air conditioner low pressure service valve and the refrigerant drum valve.

w. Check air conditioner for proper cooling. There should be at least a 15° temperature difference between evaporator discharge air and the inlet air. Turn the mode selector switch to OFF.

x. Assure that the high and low pressure air conditioner service valves are closed, and remove the charging manifold hoses from the air conditioner service valves.

y. Install the hose connection protective caps.

z. Using screwdriver, secure lower front panel assembly with nine captive screws.

5-35. REFRIGERANT PRESSURE CHECK

Except in cases where it is obvious that the refrigerant charge has been lost, the first step in troubleshooting problems in the refrigeration system should be to check discharge and suction pressures under operating conditions. Check pressures as follows:

a. Turn the MODE SELECTOR SWITCH to STANDBY.

b. Using screwdriver, loosen nine captive screws and remove lower front panel assembly.

c. Remove hose connection protective caps from service valves.

d. Connect individual pressure gages, or a refrigeration charging manifold and hoses to the high (discharge) and low (suction) service valves.

CAUTION

Take care that only very small amount of refrigerant is allowed to escape during hose purging.

e. Loosen hose connections at gages or charging manifold.

f. Open high (discharge) pressure service valve **slightly** to purge air from hose. Tighten high pressure hose connection at gage fitting as soon as a hissing sound is heard.

g. Open low (suction) pressure service valve **slightly** to purge air from hose. Tighten low pressure hose connection at gage fitting as soon as a hissing sound is heard.

h. Open the low (suction) and high (discharge) service valves.

i. Both gages should read the same. Check the reading with the appropriate column in table 5-4. If the system is even partially charged, the pressure should be approximately equal to that shown in the table for the appropriate ambient temperature. If the pressure is considerably less than shown in the table, the system does not contain enough refrigerant to continue the pressure check; go to leak testing. (See para 5-32.)

Table 5-4. Pressure-Temperature Relationship of Saturated Refrigerant 22

Temperature		Pressure		Temperature		Pressure	
Deg F	Deg C	Psig	kg/em^2	Deg F	Deg C	Psig	kg/em^2
10	-12.3	32.93	2.315	66	18.9	114.2	8.029
12	-11.1	34.68	2.439	68	20.0	118.3	8.318
14	-10.0	36.89	2.593				
16	- 8.9	38.96	2.739	70	21.1	122.5	8.612
18	- 7.8	41.09	2.889	72	22.2	126.8	8.915
				74	23.3	131.2	9.225
20	- 6.6	43.28	3.043	76	24.4	135.7	9.541
22	- 5.5	45.23	3.180	78	25.6	140.3	9.864
24	- 4.3	47.85	3.364				
26	- 3.4	50.24	3.532	80	26.7	145.0	10.195
28	- 2.2	52.70	3.705	82	27.8	149.8	10.522
				84	28.9	154.7	10.877
30	- 1.1	55.23	3.883	86	30.0	159.8	11.236
32		57.83	4.066	88	31.1	164.9	11.594
34	1.1	60.51	4.254				
36	2.2	63.27	4.448	90	32.2	170.1	11.960
38	3.3	66.11	4.648	92	33.3	175.4	12.332
				94	34.5	180.9	12.719
40	4.4	69.02	4.853	96	35.6	186.5	13.113
42	5.5	71.99	5.062	98	36.7	192.1	13.506
44	6.6	75.04	5.276				
46	7.7	78.18	5.497	100	37.8	197.9	13.914
48	8.8	81.40	5.723	102	38.9	203.8	14.329
				104	40.0	209.9	14.758
50	10.0	84.70	5.955	106	41.1	216.0	15.187
52	11.1	88.10	6.257	108	42.2	222.3	15.630
54	12.2	91.5	6.433				
56	13.3	95.1	6.686	110	43.3	228.7	16.080
58	14.5	98.8	6.947	112	44.4	235.2	16.537
				114	45.6	241.9	17.008
60	15.6	102.5	7.206	116	46.7	248.7	17.486
62	16.7	106.3	7.474	118	47.8	255.6	17.971
64	17.8	110.2	7.748				

WARNING

The following test must be conducted with the power on. Exercise extreme caution.

j. Turn the MODE SELECTOR SWITCH to the COOL mode with the TEMPERATURE CONTROL thermostat set at 60° for a few minutes.

k. With the unit operating, allow gages to stabilize. Take readings of the two gages.

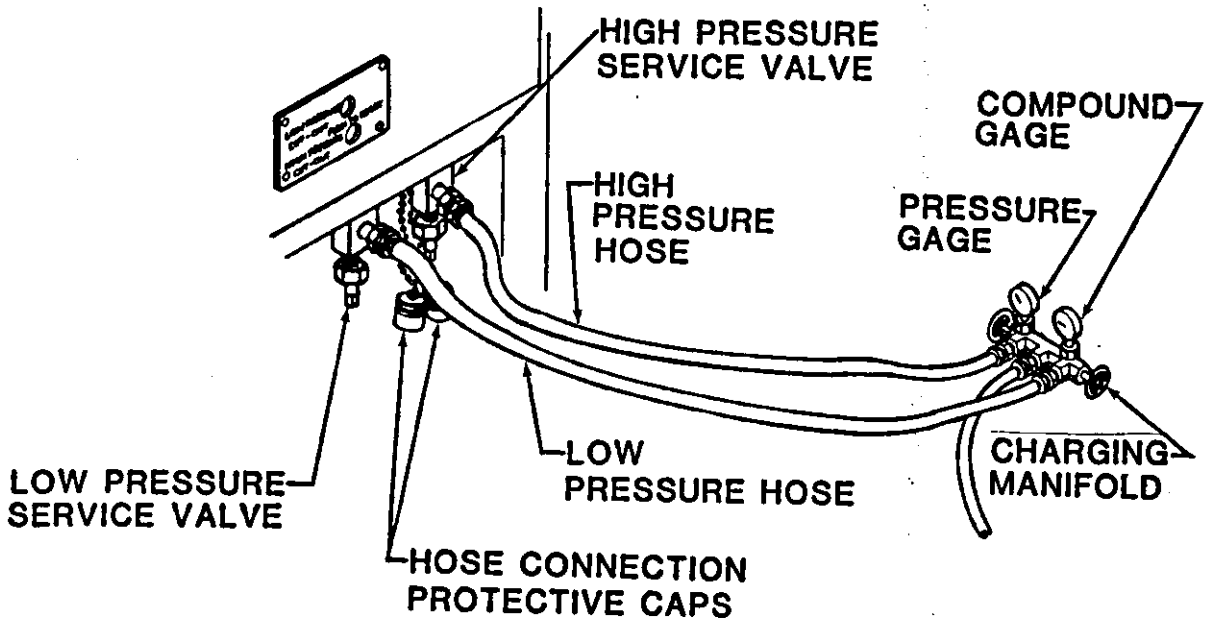


Figure 5-34. Pressure Test Connection

(1) If the discharge and suction pressure are at, or near the same value, a pressure equalizer solenoid valve malfunction or an internal compressor failure is indicated. (See para 5-38 and 5-43.)

(2) If discharge pressure is low and suction pressure is normal, (see table 5-5) a low refrigerant charge is indicated. (See para 5-34.)

(3) If discharge pressure is normal and suction pressure is either high or low, failure or maladjustment of the pressure regulator valve is indicated. (See para 5-46.)

(4) If discharge pressure is high and suction pressure is normal, a malfunction of quench valve is indicated. (See para 5-45.)

l. When pressure tests are completed, proceed with the maintenance action indicated.

m. Turn unit OFF.

n. Close both service valves on unit.

o. Remove gages or service manifold hoses from service valves.

p. Install the valve stem and hose connection protective caps.

q. Using screwdriver, secure lower front panel assembly with nine captive screws.

Table 5-5. Normal Operating Pressures (during full cooling operation) **BE SURE UNIT IS NOT IN BYPASS**

Temperatures	Pressure Range (psig)			
Outdoor ambient	50°F(10°C)	75°F(24°C)	100°F(38°C)	120°F(49°C)
90°F(32°C) Return Air to Unit (Dry Bulb)	58-65 Suction 125-160 Discharge	58-70 Suction 175-210 Discharge	69-75 Suction 255-295 Discharge	75-85 Suction 370-410 Discharge
80°F(27°C) Return Air to Unit (Dry Bulb)	58-65 Suction 125-160 Discharge	58-70 Suction 165-240 Discharge	60-75 Suction 240-320 Discharge	65-82 Suction 350-400 Discharge

5-36. DEHYDRATOR (FILTER DRIER)

Preliminary procedure: Remove lower front panel.

NOTE

The dehydrator must be replaced each time the refrigeration system has been opened. It should be installed just before unit is leak tested.

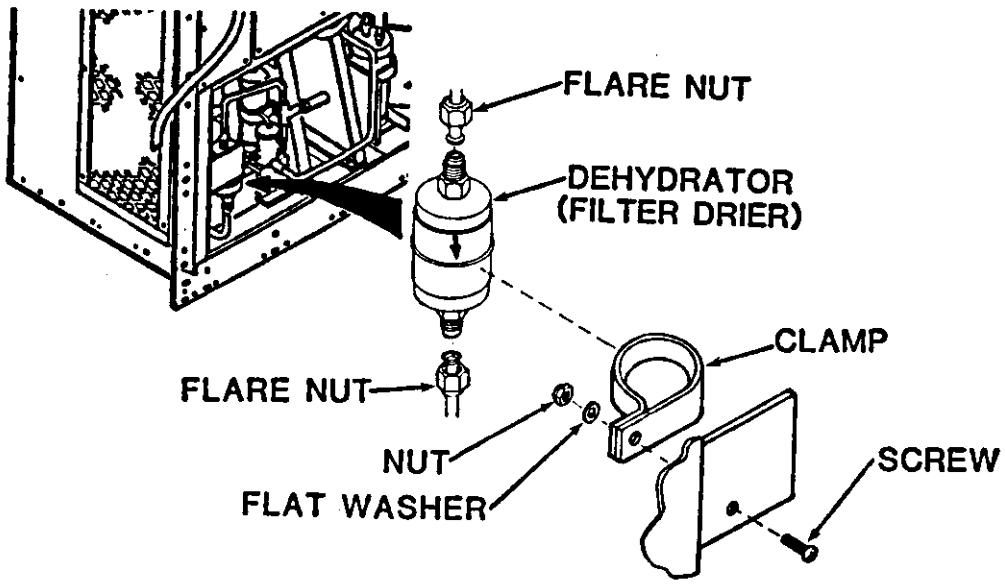


Figure 5-35. Dehydrator (Filter Drier)

a. Inspection

(1) Check for general condition and signs of leakage. If leakage is suspected, leak test per para 5-32.

(2) Check that mounting clamp is secure.

b. Removal

(1) Discharge the refrigerant system per para 5-29.

(2) Using wrench, loosen and disconnect flare nuts.

(3) Remove screw, flat washer, nut, and clamp.

(4) Remove dehydrator. Note direction of flow arrow for installation.

c. Installation

CAUTION

Replacement dehydrators are packed with sealing caps on the flare fittings to prevent moisture contamination of the desiccant filtering media. Remove these caps immediately prior to installation. Never install a dehydrator from which caps have been removed for an extended or unknown period of time.

(1) Place clamp on dehydrator.

(2) Place clamp and dehydrator in unit. Be sure that flow arrow is pointing down.

(3) Secure clamp with screw, flat washer, and nut.

(4) Using wrench tighten both flare nuts.

(5) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(6) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedure: Install lower front panel.

5-37. PRESSURE SWITCHES (S4, S5, AND S6)

a. Access

WARNING

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nine retained screws and remove lower front panel assembly.

(3) Remove four screws and carefully pull pressure switch box assembly down into open area. (See figure 5-36.)

CAUTION

Take care that pressure switch capillary tubes are not damaged.

b. Inspection/Test

(1) Check that mounting screws and terminal attachment screws are in place and secure. Tighten if loose. Replace if missing.

(2) Check that capillary lines are not kinked, mashed, or broken. Replace switch if capillary line is damaged.

NOTE

Check that refrigerant system is properly charged.

(3) Press and release reset buttons on HIGH and LOW pressure switches to be sure switches are not tripped. Note that the fan pressure switch resets automatically.

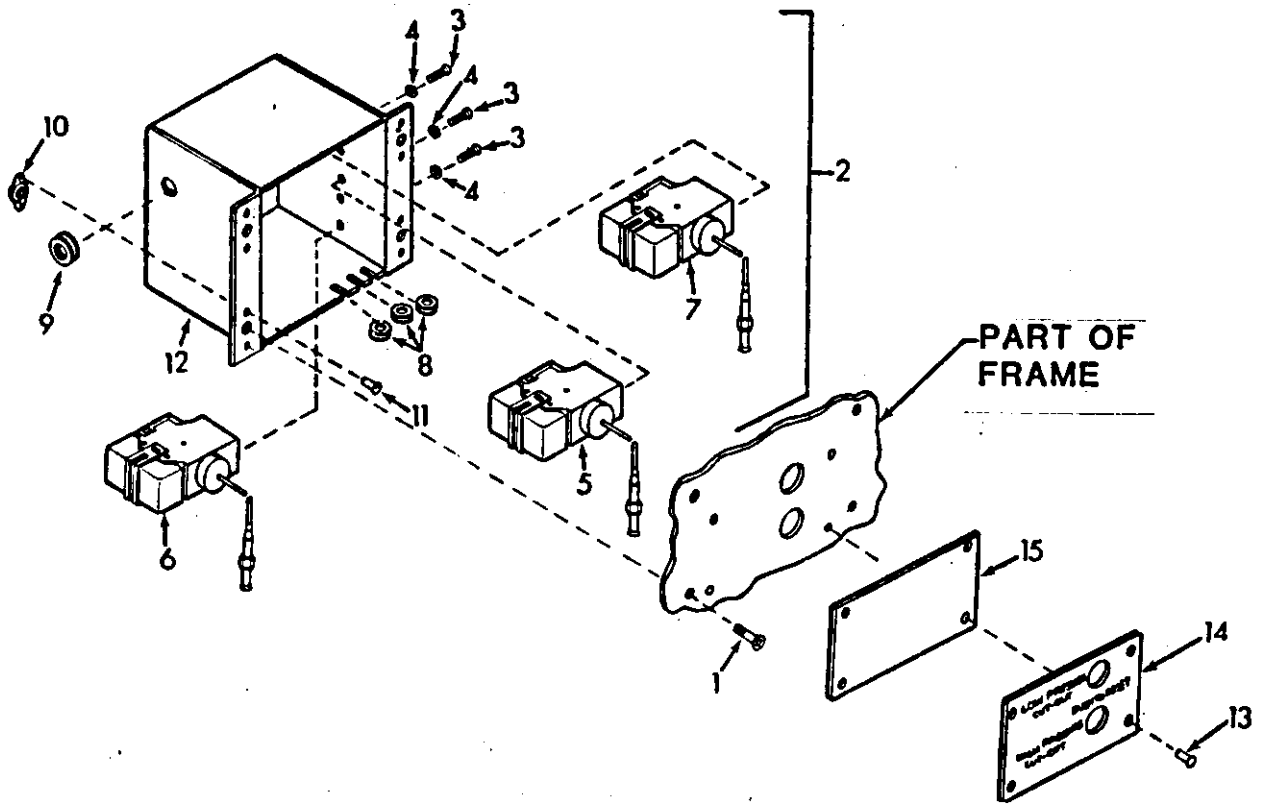


Figure 5-36. Pressure Switches (S4, S5, and S7)

Legend for figure 5-36

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	SCREW,MACH-FLAT CTSK HD	8	GROMMET,RUBBER
2	BOX ASSEMBLY,PRESSURE SWITCH	9	GROMMET,RUBBER
3	SCREW,MACH-PAN HD	10	NUT,SELF-LOCKING
4	WASHER,LOCK-SPRING	11	RIVET,SOLID CTSK HD
5	SWITCH,PRESSURE,LOW **S5**	12	ENCLOSURE,PRESSURE SWITCH
6	SWITCH,HIGH PRESSURE CUT-OUT **S4**	13	RIVET,BLIND
7	SWITCH,PRESSURE,FAN **S6**	14	INSTRUCTION PLATE,PRESSURE SWITCH
		15	GASKET

(4) Use a continuity tester or multimeter to check each switch for continuity between terminals 1 and 2 on switch. If there is continuity, the switch is properly closed. If no continuty is found, switch must be replaced.

b. Removal

(1) Discharge the refrigerant system per para 5-29.

(2) Remove two flat head screws from pressure switch.

(3) Using wrench, loosen and disconnect pressure switch capillary tubing flare and pull capillary lines free from box.

(4) Remove protective clip-on cap.

(5) Tag and disconnect wire leads with pressure switch.

(6) Remove pressure switch, split grommet, and capillary with flare nut from unit.

c. Installation

(1) Insert capillary with flare nut through hole in bottom of box and install split grommet.

(2) Secure pressure switch to box with two flat head screws.

(3) See tags and wiring diagram, figure 2-2, and connect wire leads.

(4) Remove tags and install protective clip-on cap.

(5) Carefully feed capillary tubing down to flare connection.

(6) Using wrench, connect flare nut.

(7) Carefully coil excess capillary tubing and tape in place to eliminate vibration.

(8) Replace the dehydrator. (See para 5-36.)

(9) Leak test all newly connected joints and those in the repaired area. (See para 5-32.)

(10) Secure the pressure switch box assembly to the unit with four flat head screws.

(11) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedures:

1. Connect power.
2. Install lower front panel.
3. Press and release pressure switch buttons to be sure they are not tripped.

5-38. COMPRESSOR (B3)

a. Access

WARNING

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nine retained screws and remove lower front panel assembly.

b. Inspection/Test

(1) Check to be sure power has been **disconnected** from the air conditioner. Shutting the unit off at the control panel or maintenance switch does not disconnect power to compressor heater.

(2) Allow heater to cool before touching.

(3) Check compressor (B3) and heater (HR9) as follows:

NOTE

This compressor has internal overload protectors. If compressor becomes very hot overloads will open. ALLOW COMPRESSOR TO COOL. Check continuity of (cool) compressor motor windings at leads (T1, T2 and T3). If continuity is not indicated at all three leads replace compressor.

(a) Remove compressor junction box cover. Using a multimeter set on 20 OHMS scale, check continuty between T1 to T2, T1 to T3, T2 to T3 and A to B. Continuity should be indicated.

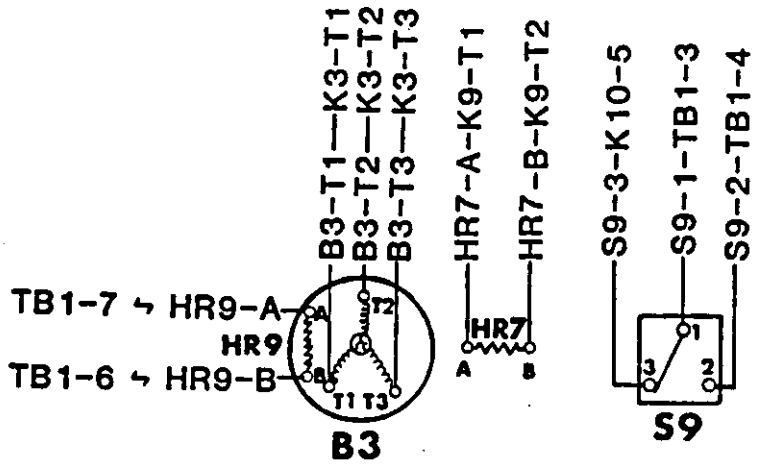


Figure 5-37. Compressor Wiring Diagram

(b) Check continuity between T1, T2, T3, A, and B and compressor canister. If continuity is indicated there is an internal short. Replace the compressor.

(4) Check temperature control (thermostat) S9 in accordance with following chart.

TEMPERATURE AT S9 THERMOSTAT	CONTINUITY SHOULD BE INDICATED		
	LEAD 1 TO 2	LEAD 2 TO 3	LEAD 1 TO 3
Above 70 $\pm 8^{\circ}$F ($21.1 \pm 4.4^{\circ}$C)	YES	NO	NO
Below 50 $\pm 5^{\circ}$F ($10 \pm 2.8^{\circ}$C)	NO	NO	NO
Thermostat actuates at 70 $\pm 8^{\circ}$F ($21.1 \pm 4.4^{\circ}$C) and resets at 50 $\pm 5^{\circ}$F ($10 \pm 2.8^{\circ}$C)			

If temperature control fails any of the above tests replace the control.

(5) Check heater HR7 as follows:

(a) Check continutiy between A and B leads. Continuity should be indicated.

(b) Check continuity between A and heater body and B and heater body. Continuity should not be indicated.

(c) Replace heater if it fails above tests.

c. Heater (HR7) replacement. (Refrigerant system discharge is not required.)

(1) Check to see that the power has been disconnected at the power source and covers have been removed during access and testing.

WARNING

Allow heater to cool before touching. Severe burns can result from touching hot heater.

(2) Tag and disconnect two heater leads.

(3) Unscrew the band clamp retainer.

(4) Remove two top locknuts and flat washers from the two left side compressor straps. Move rods enough to allow heater to pass.

(5) Work heater to the left and up and off of compressor.

(6) Install new heater as follows:

(a) Spring heater end apart and place heater down and around compressor in position on crankcase. Secure heater on crankcase with retaining band clamp.

(b) See tags on the removed heater. Connect heater leads.

d. Temperature control (thermostat) (S9) replacement. (Refrigerant system discharge is not required.)

(1) Check to see that the power has been disconnected at the power source and covers have been removed during access and testing.

(2) Tag and disconnect leads.

(3) Remove two screws and nuts that secure support to bracket.

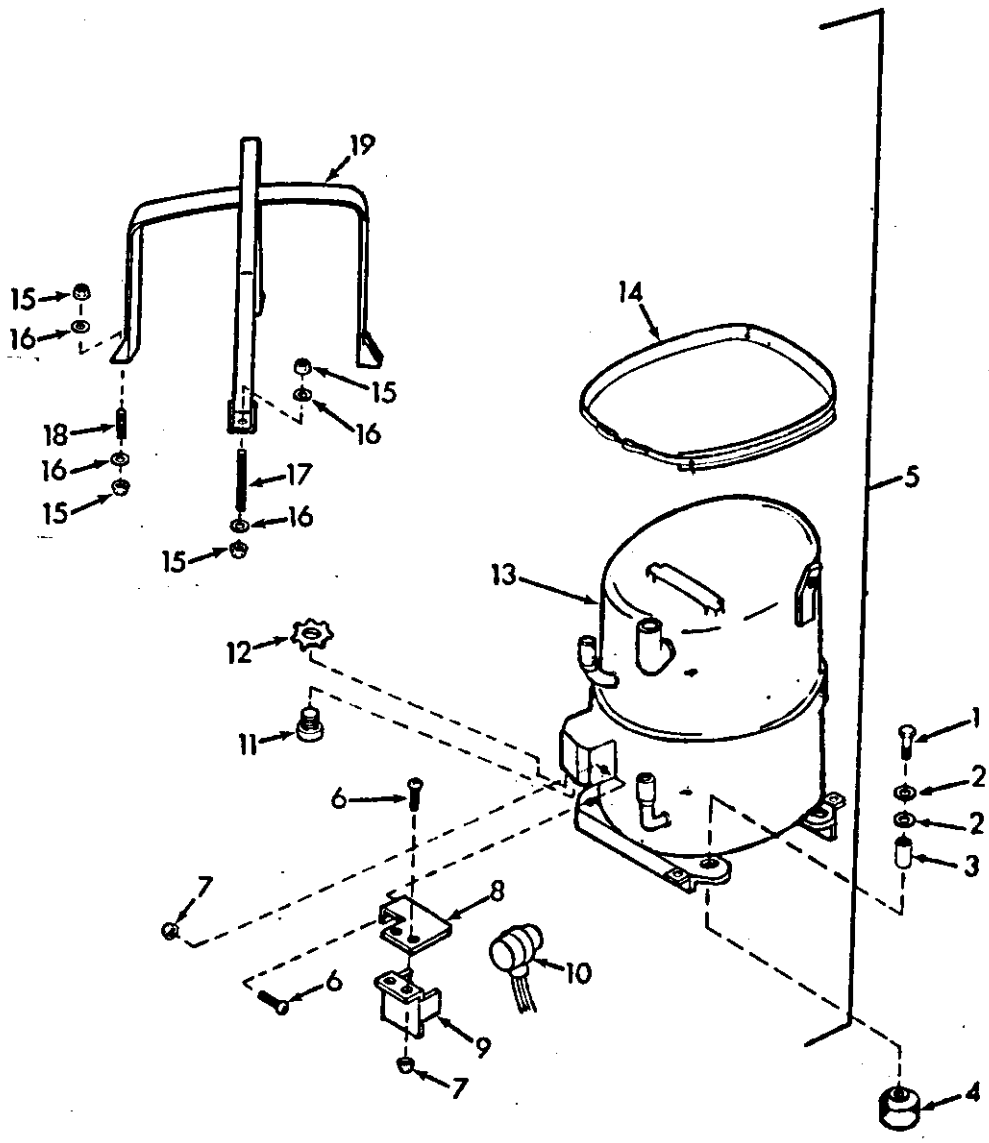


Figure 5-38. Compressor

Legend for figure 5-38

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	SCREW,CAP,HEX HD	10	CONTROL,TEMPERATURE S9
2	WASHER,COMPRESSOR	11	CONNECTOR,STRAIN RELIEF
3	SLEEVE	12	LOCK NUT
4	MOUNT,RESILIENT	13	COMPRESSOR
5	COMPRESSOR ASSEMBLY B3	14	HEATER,COMPRESSOR HR7
6	SCREW,MACH-PAN HD	15	NUT,SELF LOCKING
7	NUT,SELF-LOCKING	16	WASHER,FLAT
8	BRACKET,TEMPERATURE CONTROL	17	ROD THREADED
9	SUPPORT TEMPERATURE CONTROL	18	ROD THREADED
		19	STRAP,COMPRESSOR

(4) Remove support and temperature control (S9).

(5) Install new temperature control as follows:

(a) Install new temperature control with two screws and nuts. Be sure temperature control face is making good contact with side of compressor.

(b) See tags on old temperature control and wiring diagram, figure 2-2, and connect leads.

e. Compressor (B3) replacement

(1) Check to see that the power has been disconnected at the power source.

(2) Tag and disconnect wire leads.

(3) Discharge the refrigerant system per para 5-29.

(4) Unwrap the insulation from the suction line so that the joint on the compressor is exposed.

(5) While purging the system with nitrogen, debraze the tubing. (See para 5-30 and 5-31.)

(6) Remove four hex head cap screws and eight washers from mounting feet.

WARNING

The compressor weighs 97 pounds. Use two people to lift.

(7) Tilt compressor and remove resilient mounts and sleeves.

(8) Slide compressor forward and lift from unit using two people.

WARNING

If compressor burn out is suspected, use care when handling compressor to avoid touching compressor sludge. Acid in sludge can cause burns.

(9) Check the compressor to see if a motor burn out is indicated.

f. Compressor motor burn out.

(1) After removal of a bad compressor from the refrigeration system, remove all external tubing and tip the compressor toward the discharge port to drain sample of oil into a clear glass container.

WARNING

Avoid skin contact or inhaling fumes from any acid formed by burn out of oil and refrigerant.

(2) If the oil is clean and clear, and does not have a burnt acid smell, the compressor did not fail because of motor burn out. If a burn out is not indicated, proceed to g.

(3) If the oil is black, contains sludge, and has a burnt acid odor, the compressor failed because of motor burn out.

(4) You must clean the entire refrigeration system after a burn out has occurred, since contaminants will have been carried to many corners and restrictions in the piping and fittings. These contaminants will soon mix with new refrigerant gas and compressor oil to cause repeated burn outs.

(5) Remove the filter-drier, and blow down each leg of the refrigeration system. To do this, connect a cylinder to dry nitrogen to each filter-drier connection in turn, and open the cylinder shutoff valve for at lease 30 seconds at 50 psig (3.5 kg/cm^2) pressure.

(6) Connect the two filter-drier fittings with a jumper, locally manufactured from refrigerant tubing and fittings.

(7) Clean system by back-flushing with liquid R11 from pressured cylinder or circulating pump and reservoir with pressure of at least 100 psig.

(8) If pump is used, connect the discharge line of the refrigerant system to the discharge side of pump.

(9) Connect a line containing a filter to the suction line in the unit.

NOTE

An unused filter-drier or other suitable medium may be used as a filter.

(10) The other end of the temporary suction line should be connected to a small drum or suitable reservoir.

(11) A line should be run from the bottom of the reservoir to the inlet of the pump.

WARNING

Avoid skin contact or inhaling fumes from any acid formed by burn out of oil and refrigerant. Wear a gas mask if area is not thoroughly ventilated. Wear protective goggles or glasses to protect eyes. Wear rubber gloves to protect hands.

(12) Fill reservoir with fluorocarbon refrigerant, R11, and start the pump. Continue filling the reservoir with refrigerant, R11, until it begins to pour out of the return line. Continue flushing for at least 15 minutes.

(13) Reverse the pump connections, replace the filter with a new filtering medium, and backflush the system for an additional 15 minutes.

(14) Remove the pump, reservoir, filter, and filter-drier jumper. Place an empty container below the compressor connections, and connect a cylinder of dry nitrogen to each filter-drier connection in turn. Blow down each leg of the system at 50 psig (3.5 kg/cm^2) for at least 30 seconds.

(15) Disconnect the dry nitrogen cylinder. Cap or plug open connections if compressor and filter-drier are not to be installed immediately.

g. Compressor installation

CAUTION

The compressor is supplied with a complete charge of oil. Take care that oil is not lost when handling and installing compressor.

NOTE

If any refrigeration piping was disconnected with the compressor being replaced, transfer the piping to the replacement compressor before installing it in the air conditioner. Check to see that replacement compressor is equipped with same type heater as was on old compressor. If not, remove heater and related parts from old compressor or replace with new ones. Locate parts and mount using old compressor as a guide. Installation of the temperature control and mounting bracket will require drilling of two holes. Match drill from angle.

(1) Lift compressor through the lower front panel opening and position it on base.

(2) Lift or tilt the compressor and install the rubber resilient mount and sleeve between each of the four compressor mounting feet and the base.

(3) Secure the compressor with four hex head cap screws and eight flat washers.

(4) Wrap wet rags around compressor at connection points and while brazing direct flame away from compressor.

(5) While purging the system with nitrogen, braze the tubing points. (See para 5-30 and 5-31.)

(6) Replace the dehydrator. (See para 5-36.)

(7) See tags and wiring diagram, figure 2-2, and connect leads. Remove tags.

(8) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(9) Rewrap insulation on suction line.

(10) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedures: 1. Connect power.

2. Install lower front panel.

5-39. SERVICE VALVES

a. Access

WARNING

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nine retained screws and remove lower front panel assembly.

b. Inspection

(1) Check that caps are in place and that threaded connection ends are not damaged. Replace if missing or damaged.

(2) Check for signs of leakage. Leak test per para 5-10 if leak is suspected.

c. Removal

(1) Remove screw and lock washer.

(2) Discharge the refrigerant system. (See para 5-29.)

(3) Using wrench, loosen and disconnect flare nut.

(4) Remove the valve.

d. Installation

(1) Position valve in unit.

(2) Using wrench, tighten flare nut.

(3) Using wrench, secure valve with screw and lock washer.

(4) Replace the dehydrator. (See para 5-36.)

(5) Leak test the newly connected joints and all connections in those areas. (See para 5-32.)

(6) Evacuate and charge the system. (See para 5-33 and 5-34.)

(7) Check that valve stem and hose connection protective caps are in place on valves.

Follow-on procedures: 1. Connect power.

2. Install lower front panel.

5-40. LINEAR ACTUATING CYLINDERS

a. Access

WARNING

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nine retained screws and remove lower front panel assembly.

b. Inspection

(1) Check actuating cylinder for signs of leakage. If leakage is suspected, leak test per para 5-32.

(2) Check that attaching nuts, linkage connection, and flare nut are in place and secure. Tighten loose parts and replace if missing.

(3) Check that capillary tubing is not kinked or mashed closed. Replace if damaged.

c. Removal

(1) Discharge the refrigerant system per para 5-29.

(2) Using wrench, loosen flare nut and slip away from cylinder flare connection.

(3) Loosen and remove linkage hardware.

(4) Remove two nuts, and lock washers from mounting studs.

(5) Remove actuating cylinder.

(6) If the other actuating cylinder is to be removed, repeat steps (1) through (5).

d. Installation

(1) Position actuating cylinder and insert mounting studs through bracket.

(2) Using wrench, secure cylinder to bracket with two nuts, and lock washers.

(3) Using wrench, connect and tighten flare nut.

(4) Secure linkage hardware.

(5) If the other actuating cylinder was removed, repeat steps (1) through (4).

(6) Replace the dehydrator. (See para 5-36.)

(7) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(8) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedures. 1. Connect power.

2. Install lower front panel.

5-41. EXPANSION VALVE

a. Access. See para 5-27 and remove humidifier tank assembly.

b. Inspection

(1) Inspect for evidence of leaks, kinked or otherwise damaged capillary line, and loose or missing mounting hardware.

(2) Check thermal bulb to see that it securely clamped to the suction line.

(3) If a leak is suspected or indicated, test per para 5-32.

c. Removal

(1) Discharge the refrigerant system per para 5-29.

(2) Remove the lower front panel and unwrap insulation from suction line so that sensing bulb is exposed. Loosen screw and nut in clamp. Pull bulb out of clamp.

(3) Disconnect flare nut on external equalizer line from expansion valve.

(4) Remove the two screws, flat washers, lock washers, and spacers that attach the valve body to its mounting bracket.

(5) Remove remaining valve components except from body flange. (See figure 5-39.)

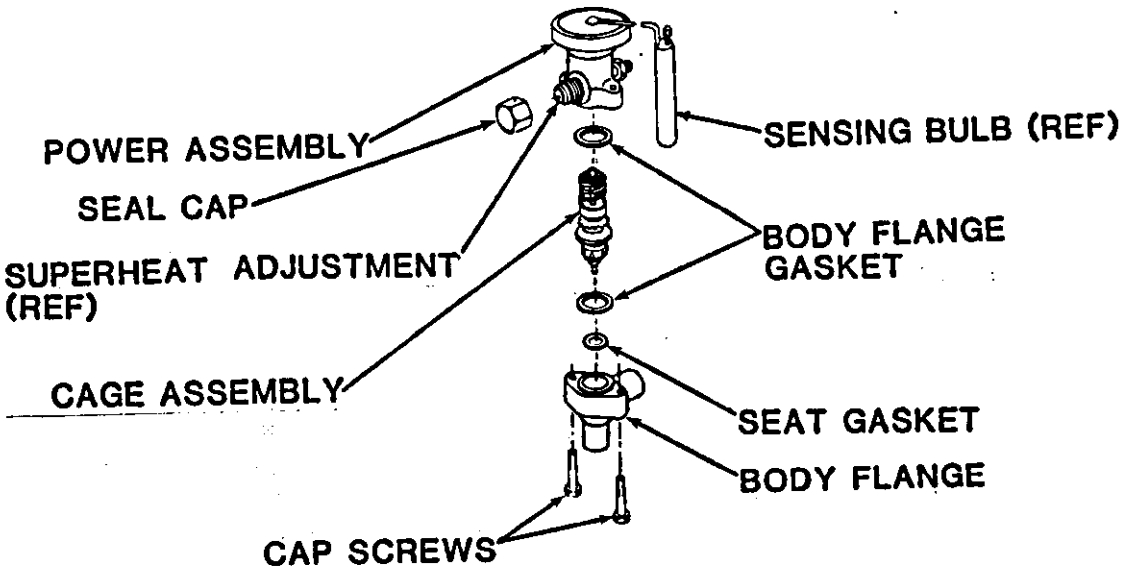


Figure 5-39. Expansion Valve Disassembly

NOTE

If valve body flange is not damaged, do not remove (debraze) it from the system.

(6) If valve body flange is to be removed, purge the system with nitrogen and debraze the two tubes. (See para 5-30 and 5-31.)

d. Installation

(1) If valve body flange was removed, purge the system with nitrogen and braze the two tubing joints. (See para 5-30 and 5-31.)

(2) See figure 5-39 for valve component arrangement.

(3) Place cap screws, lock washers, flat washers, and spacers through bracket and valve body flange.

(4) Be sure that valve components are properly assembled and alined and secure power assembly to body flange.

(5) Connect flare nut on external equalizer line to expansion valve.

(6) Insert the sensing bulb into its mounting loop clamp in its original position and tighten the screw and nut. Be sure the sensing bulb is making good metal-to-metal contact with the suction line.

(7) Cover sensing blub with insulation tape.

(8) Replace the dehydrator. (See para 5-36.)

(9) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(10) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedures:

1. Install humidifier. (See para 5-27.)
2. Install panels.
3. Connect power.

5-42. LIQUID SIGHT INDICATOR

a. Instructions for liquid sight indicator (refrigerant sight glass) usage.

(1) To obtain accurate indications at the liquid sight indicator, the temperature must be above 60°F. If temperature of the air being cooled is near or below 60°, do not attempt the following test.

NOTE

When temperature is below the TEMPERATURE CONTROL set point, the refrigerant system goes into "bypass" and refrigerant will not pass thru the sight glass or will pass thru only in limited quantities.

(2) Run the air conditioner in COOL mode (with TEMPERATURE CONTROL thermostat set at 60°) for 15 minutes to allow refrigerant system to stabilize. Be sure temperature of conditioned area is above 60° so that refrigerant system is operating under full load. After 15 minutes observe the sight glass on upper front panel.

- **Green center** means the refrigerant moisture content is acceptable.
- **Yellow center** means there is too much moisture in the system. It **must be discharged, evacuated, and charged again.**
- **Milky white or bubbly** liquid means the system has a low charge.
- **Clear bubble-free** liquid around the center means the system is fully charged.

b. Inspection

Preliminary procedures:
1. Disconnect power.
2. Remove rear right-hand panel assembly.

(1) Check that glass window is clean and not cracked or broken. Clean if dirty. Replace liquid indicator if cracked or broken.

(2) Check for evidence of leakage. Leak test if leak is suspected. Repair or replace as indicated.

c. Removal (requires two people)

(1) Remove two screws from front while holding bracket so that it does not drop down into unit.

(2) Remove bracket.

(3) Discharge the refrigerant system per para 5-29.

(4) While purging the system with nitrogen, debraze the tubing. (See para 5-30 and 3-31.)

(5) Remove liquid indicator.

d. Installation (requires two people)

(1) Position liquid indicator in unit.

(2) While purging the system with nitrogen, braze the tubing joints. (See para 5-30 and 5-31.)

(3) Replace the dehydrator. (See para 5-37.)

(4) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(5) Position bracket and secure with two screws.

(6) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedures:
1. Install rear right-hand panel.
2. Connect power.

5-43. SOLENOID VALVES (K4 AND K5)

a. Access

WARNING

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nine retained screws and remove lower front panel assembly.

b. Test

(1) Check to be sure power has been disconnected.

NOTE

The following basic instructions apply to both the equalizing solenoid valve (K4) and the liquid line solenoid valve (K5).

(2) Tag and disconnect leads.

(3) Use a multimeter set on 20 OHMS scale to check for continuity between the two lead disconnect points. If continuity is not found, coil is open and must be replaced.

(4) Use multimeter to check for continuity between each solenoid valve lead and coil casing. If continuity is found between contact and case, the coil is grounded and should be replaced.

(5) If continuity checks are satisfactory, apply 120 volts ac from an external power supply across lead disconnect points and listen for a sharp click when the valve changes position. If a click is not heard, internal valve problems are indicated and entire valve should be replaced. (Go to para 5-43,d.)

c. Coil replacement. The coil can be replaced without opening the refrigeration pressure system.

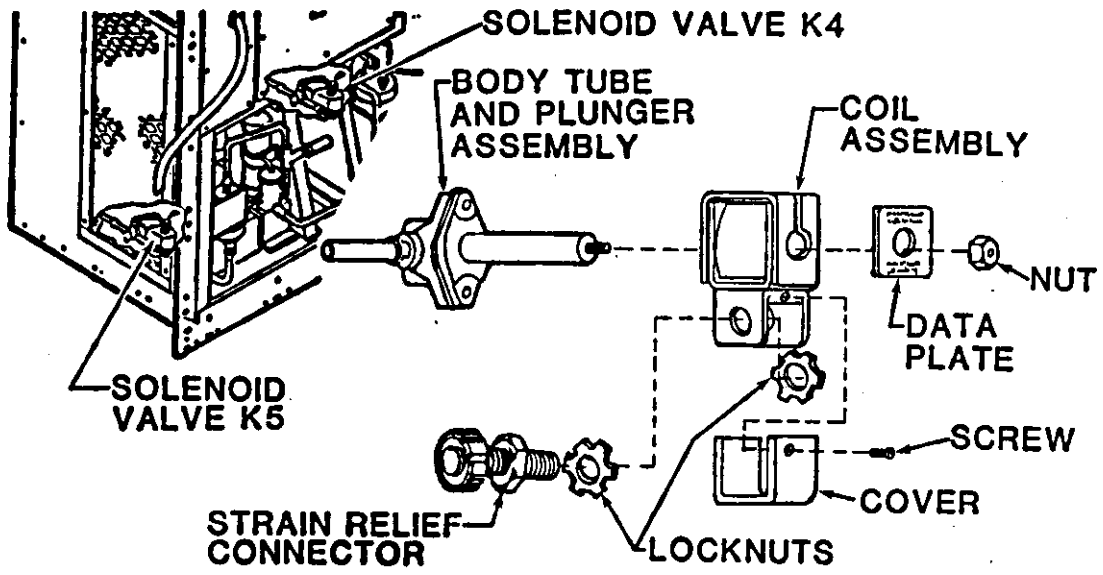


Figure 5-40. Solenoid Valve Coil Replacement

WARNING

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

(1) Tag and disconnect wire leads.

(2) Remove nut that attaches coil to valve body, and remove coil assembly and data plate.

(3) If strain relief connector is to be reused, remove lock nut from inside of box and remove strain relief connector from old coil.

(4) Remove cover from new coil terminal box.

(5) Punch knock out cover from new coil terminal box. (Use old coil to determine which knock out to be removed.)

(6) Install strain relief connector and lock nuts in new coil.

(7) Run leads thru strain relief connector.

(8) Secure coil assembly and data plate to body tube and plunger assembly with nut.

(9) See tags and wiring diagram, figure 2-2, and connect leads. Remove tags.

(10) If this completes maintenance action install lower front panel and connect power.

d. Total valve replacement. (See c above for coil only replacement)

(1) Check to be sure power has been disconnected.

(2) Discharge the refrigeration system in accordance with para 5-29.

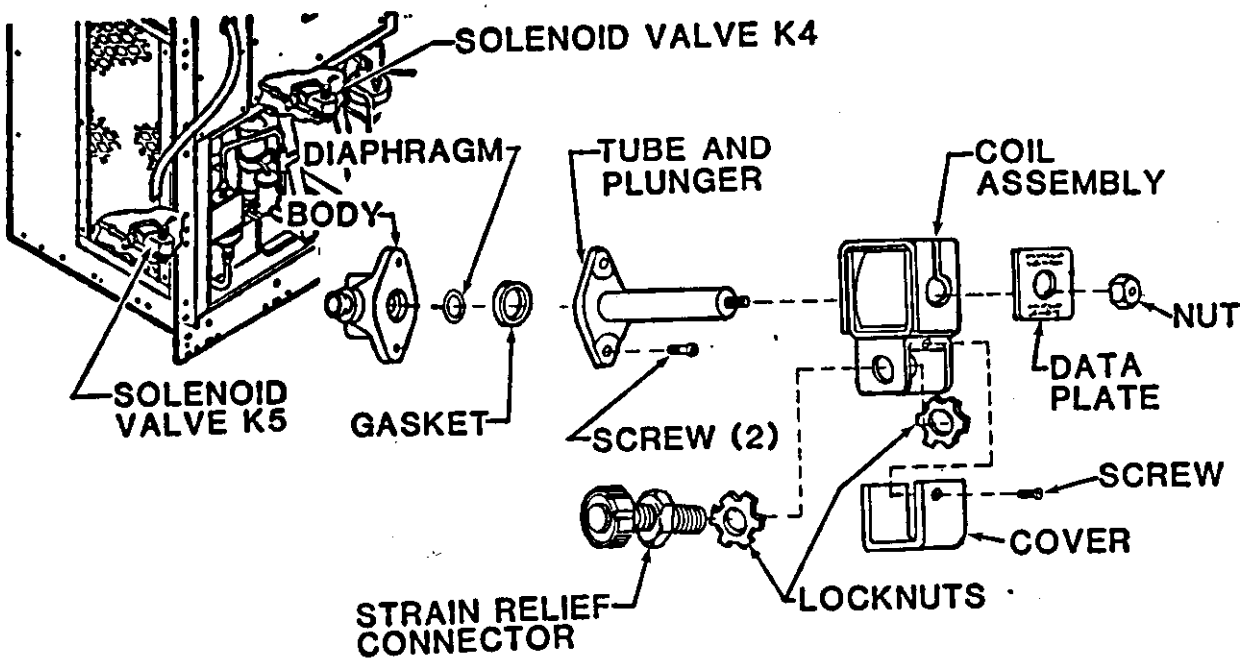


Figure 5-41. Solenoid Valves (K4 and K5)

(3) Tag and disconnect wire leads.

(4) Remove nut that attaches coil to valve body, and remove coil assembly and data plate.

(5) Remove two screws that attach tube and plunger assembly to valve body. Remove tube and plunger assembly, and all other removable internal components from valve body.

(6) Check valve body for visible damage. Normally valve body replacement is unnecessary. If valve body is in good condition, skip steps (7) through (9).

(7) Using screwdriver, remove two screws and lock washers from base of valve body.

(8) Purge the system with nitrogen and debraze the tube connections. (See para 5-30 and 5-31.)

(9) Remove the valve body.

e. Installation. If valve body was not removed, go to step (3).

(1) Place the valve body on the tube ends, purge the system with nitrogen and braze the tube joints. (See para 5-30 and 5-31.)

(2) Using a screwdriver, secure the valve body to the bracket with two screws and lock washers.

(3) Check internal surfaces of valve body to be sure it is clean.

(4) Carefully install diaphragm, gasket, and tube and plunger. Secure to valve body with two screws.

(5) If strain relief connector is to be reused, remove lock nut from inside of box and remove strain relief connector from old coil.

(6) Remove cover from new coil terminal box.

(7) Punch knock out cover from new coil terminal box.

(8) Install strain relief connector and lock nuts in new coil.

(9) Run leads thru strain relief connector.

(10) Secure coil assembly and data plate to body tube and plunger assembly with not.

(11) See tags and wiring diagram, figure 2-2, and connect leads. Remove tags.

(12) Replace the dehydrator. (See para 5-36.)

(13) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(14) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedure:
1. Install lower front panel.
2. Connect power.

5-44. PRESSURE RELIEF VALVE

a. Access

WARNING

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

(1) Disconnect or turn unit power off at power source. Take appropriate measures to be sure that it will not be turned on by others.

(2) Loosen nine retained screws and remove lower front panel assembly.

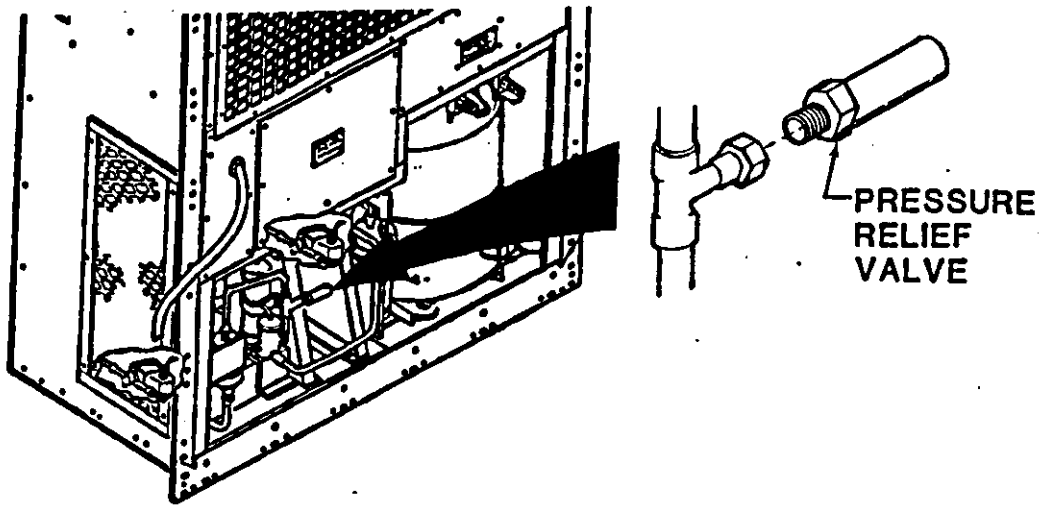


Figure 5-42. Pressure Relief Valve

b. Inspection

(1) Check for evidence of leakage. Leak test per paragraph 5-32, if leak is suspected.

(2) Check for damage. Replace if damaged.

c. Removal

(1) Discharge the refrigerant system per paragraph 5-29.

(2) Using two wrenches, hold fitting so that it is not twisted and unscrew pressure relief valve.

d. Installation

(1) Apply antisieze tape per MIL-T-27730, size 1 or equal to threads of valve.

(2) Using two wrenches, screw pressure relief valve in place while holding adapter fitting.

(3) Replace the dehydrator. (See para 5-36.)

(4) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(50 Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedures:

1. Install lower front panel.
2. Connect power.

5-45. QUENCH VALVE

Preliminary procedure: Remove the lower front panel.

a. Inspection

(1) Inspect for evidence of leaks, kinked, or otherwise damaged capillary line, and loose or missing mounting hardware.

(2) Check thermal bulb to see that it is securely clamped to the suction line.

(3) If a leak is suspected or indicated, test per para 5-32.

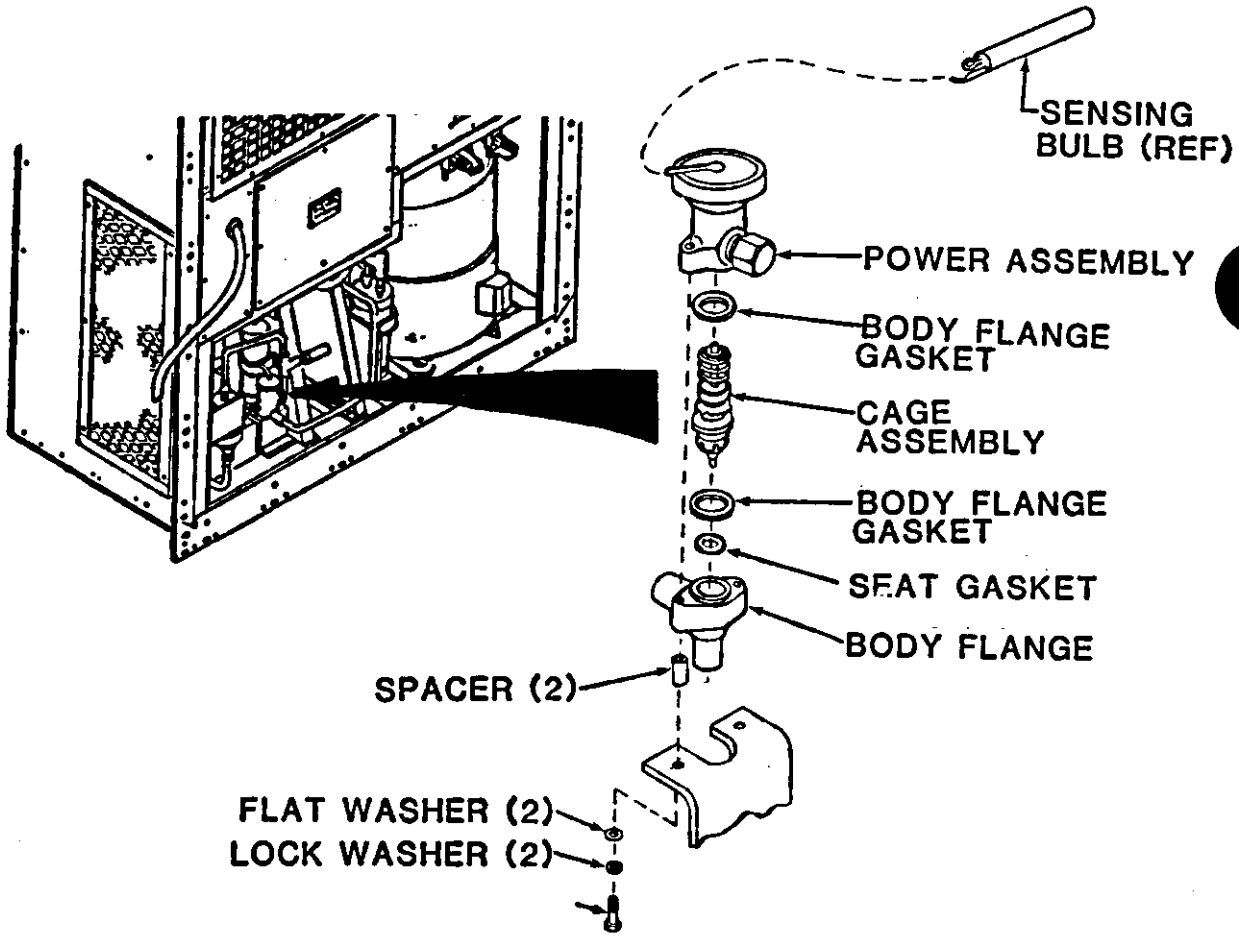


Figure 5-43. Quench Valve

b. Test

(1) Perform a refrigerant pressure check on unit in accordance with para 5-35. Leave gages or service manifold attached.

(2) Unwrap insulation from compressor suction line so that sensing bulb and an adjacent section of the line is exposed.

(3) Attach an accurate thermometer to an exposed surface of suction line adjacent to the sensing bulb, use a small gob of thermal mastic, if available, to improve conductivity.

(4) Check that service valve and gage connection to low (suction) sides are open. Note pressure indicated on gage and temperature indicated on thermometer.

(5) Set the TEMPERATURE CONTROL thermostat knob to $90^{\circ}F$. Start the air conditioner in COOL mode. Note that suction pressure drops to 58 $\pm$2 psig (4.0 $\pm$0.2 kg/cm^2). Allow compressor to run for at least 20 minutes. If pressure is not within above limits, test operation of pressure regulating valve (para 5-46) before proceeding with quench valve test.

NOTE

Except in a very hot climate, with room air temperature above $90^{\circ}F$ ($32.2^{\circ}C$), the refrigeration system will be in a bypass cycle with a maximum volume of hot discharge vapor being recirculated back to suction side of compressor through pressure valve and quench valve.

(6) Observe that temperature indicated remains stable for a minimum of two minutes, then find saturation temperature for pressure indicated on gage, using table 5-4. For example: The saturation temperature for a refrigerant pressure of 69 psig (4.85 kg/cm^2) is $40^{\circ}F$ ($4.4^{\circ}C$).

(7) Compare the saturation temperature with indicated temperature. The indicated temperature should be 25 $\pm5^{\circ}F$ (13.9 $\pm2.2^{\circ}C$) higher than the saturation temperature. If indicated temperature is not within above limits, quench valve is not functioning properly and should be replaced.

(8) Turn unit OFF.

(9) Remove thermometer.

(10) Reinsulate tubing and bulb with insulation tape.

(11) Close service valves on unit.

(12) Remove gages or service manifold from service valves.

(13) Install hose connection protective caps on service valves.

c. Removal

(1) Discharge the refrigerant system per para 5-29.

(2) Unwrap insulation from suction line so that sensing bulb is exposed. Loosen screw and nut in clamp. Pull bulb out of clamp.

(3) Using wrench, remove two cap screws, lock washers, flat washers, and spacers that attach valve body to bracket and power assembly.

(4) Carefully remove the power assembly, cage assembly, and gaskets.

NOTE

If valve body flange is not damaged, do not remove (debraze) it from the system.

(5) If valve body flange is to be removed, purge the system with nitrogen and debraze the two tubes. (See para 5-30 and 5-31.)

d. Installation

(1) If valve body flange was removed, purge the system with nitrogen and braze the two tubing joints. (See para 5-30 and 5-31.)

(2) See figure 5-43 for valve component arrangement.

(3) Place cap screws, lock washers, flat washers, and spacers through bracket and valve body flange.

(4) Be sure that valve components are properly assembled and alined. Secure power assembly to body flange.

(5) Insert sensing bulb into its mounting loop clamp in its original position, and tighten the screw and nut. Be sure sensing bulb is making good metal-to-metal contact with suction line.

(6) Insulate suction line and tubing with insulation tape.

(7) Replace the dehydrator. (See para 5-36.)

(8) Leak test all newly connected joints and those in the repaired area. (See para 5-32.)

(9) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedure: Install lower front panel.

5-46. PRESSURE REGULATOR VALVE

a. Adjustment/Test

(1) Valves are factory set to start opening when suction pressure decreases to 58 psig. **Do not adjust unless you are sure adjustment is necessary.**

(2) Preform a refrigeration pressure check on unit in accordance with para 5-36. Leave the gages or service manifold attached.

(3) Set TEMPERATURE CONTROL thermostat knob to 90°. Start air conditioner in COOL mode, and observe pressure gages. Suction pressure should drop to 58 ±2 psig (4.0 ±0.14 kg/cm^2) shortly after compressor starts, and then remain constant.

(4) To adjust suction pressure, remove right-hand condenser inlet damper assembly. Remove button plug from end of pressure regulator valve and turn adjusting stem clockwise to raise (increase) pressure, or counterclockwise to lower (decrease) pressure. If pressure is low (below 56 psi) and cannot be raised by adjustment, pressure regulator valve must be replaced. If pressure is high (above 60 psi) and cannot be lowered by adjustment, test operation of the quench valve (para 5-45) before replacing pressure regulator valve.

b. Removal

(1) Discharge the refrigerant system per para 5-29.

(2) Remove screw, flat washer, lock washer, and clamp from pressure regulator valve.

(3) Purge the system with nitrogen and debraze the tube connections. (See para 5-30 and 5-31.)

(4) Remove the pressure regulator valve.

c. Installation

(1) Place the pressure regulator valve on the tube ends, purge the system with nitrogen and braze the tube joints. (See para 5-30 and 5-31.)

(2) Using a screwdriver and wrench, secure the pressure regulator valve with a screw, flat washer, lock washer, and clamp.

(3) Replace the dehydrator. (See para 5-36.)

(4) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(5) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

Follow-on procedure: Install lower front panel.

5-47. EVAPORATOR COIL

Preliminary procedures:
1. Disconnect power.
2. Remove return air grille and filters.
3. Remove three upper rear panels.

a. Inspection of installed coil

(1) Check to be sure that power is disconnected.

(2) Check for accumulated dirt. Clean if an accumulation of dirt is evident.

(3) Check fins for dents, bent edges, or any condition that would block or distort airflow. Straighten all damaged fins with a plastic fin comb.

WARNING

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

CAUTION

Do not use steam to clean coil.

b. Cleaning. Clean coil with a soft bristle brush, vacuum cleaner and brush attachment. If in maintenance shop, use compressed air at 30 psi or less from the inside of the unit to blow the dirt out. Take care to avoid fin damage. When using compressed air, wear safety glasses or goggles. Dirt can be blown into your eyes.

c. Removal. (See preliminary procedures above)

(1) Remove right side panel assembly.

(2) Remove heater elements. (See para 5-24.)

(3) While purging the system with nitrogen, debraze the tube joints to the evaporator and expansion valve body. (See para 5-30, 5-31 and 5-41.)

WARNING

When handling coils, wear gloves to avoid cuts and reduce fin damage on the coil.

(4) Remove eight screws and lock washers while supporting the evaporator coil.

(5) Using gloves to protect your hands and coil fins, carefully lift the coil up and out of the side of the unit.

d. Repair

(1) Repairs are normally limited to replacement of distributor, rivets, plate nuts, and straightening of mashed fins.

(2) Plate nuts may be removed by drilling out old rivets using a drill bit slightly smaller than the diameter of the rivet.

(3) Install new plate nut(s) and rivets.

(4) If fins are mashed or dented so that airflow across coil would be blocked, straighten them using a plastic fin comb.

(5) To replace distributor, debraze distributor from distributor lines. Braze new distributor to the lines. Check to be sure that all lines are clean and not blocked internally with solder or flux.

e. Installation

WARNING

When handling coils, wear gloves to avoid cuts and reduce fin damage on the coil.

(1) Carefully slide evaporator coil into unit and aline mounting holes.

(2) Using screwdriver, secure evaporator coil with eight screws, and lock washers.

(3) While purging the system with nitrogen braze the evaporator and expansion valve body tube joints. (See para 5-30, 5-31 and 5-41.)

(4) Replace the dehydrator. (See para 5-36.)

(5) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(6) Install heater elements. (See para 5-24.)

(7) Install right side panel assembly.

(8) Install return air filters and grille.

(9) Evacuate and charge the refrigeration system. (See para 5-33 and 5-34.)

5-48. CONDENSER COIL

Preliminary procedures:

1. Disconnect power.
2. Remove lower front panel.
3. Remove condenser grille.

a. Inspection of installed coil

(1) Check to be sure that power is disconnected.

(2) Check for accumulated dirt. Clean if an accumulation of dirt is evident.

(3) Check fins for dents, bent edges, or any condition that would block or distort airflow. Straighten all damaged fins with a plastic fin comb.

WARNING

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

CAUTION

Do not use steam to clean coil.

b. Cleaning. Clean coil with a soft bristle brush, vacuum cleaner and brush attachment. If in maintenance shop, use compresed air at 30 psi or less from the inside of the unit to blow the dirt out. Take care to avoid fin damage. When using compressed air, wear safety glasses or goggles. Dirt can be blown into your eyes.

c. Removal

(1) Remove right side panel assembly.

(2) Remove the following items to gain access and ease coil removal.

- Condenser fan and motor
- Compressor
- Junction Box
- Left condenser air inlet damper assembly

(3) Remove all screws from fan shroud that are accessible.

(4) While purging the system with nitrogen, debraze the tube joints to the condenser. (See para 5-30 and 5-31.)

WARNING

When handling coils, wear gloves to avoid cuts and reduce fin damage on the coil.

(5) Remove fourteen screws while supporting the condenser coil.

(6) Tilt coil enough to gain access to remaining shroud screws and remove screws and shroud.

(7) Using gloves to protect your hands and coil fins, carefully lift the coil up and out of the side of unit.

d. Repair

(1) Repairs are normally limited to replacement of rivets, plate nuts, and straightening of mashed fins.

(2) Plate nuts may be removed by drilling out old rivets using a drill bit slightly smaller than the diameter of the rivet.

(3) Install new plate nut(s) and rivets.

(4) If fins are mashed or dented so that airflow across coil would be blocked, straighten them using a plastic fin comb.

e. Installation

WARNING

When handling coils, wear gloves to avoid cuts and reduce fin damage on the coil.

(1) Carefully slide condenser coil into place in unit.

(2) Install condenser fan shroud.

(3) Aline condenser coil to frame mounting holes and secure condenser coil to frame.

(4) Install compressor (See para 5-38.)

(5) While purging the system with nitrogen braze the tube joints. (See para 5-30 and 5-31.)

(6) Replace the dehydrator. (See para 5-36.)

(7) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(8) Install junction box.

(9) Install left condenser air inlet damper assembly.

(10) Install fan and motor. (See para 5-25.)

(11) Install right side panel.

(12) Install condenser grille.

(13) Evacuate and charge the refrigeration system. (See para 5-33 and 5-34.)

5-49. TUBING AND FITTINGS

The refrigeration system contains a number of pieces of copper tubing in a variety of material grades, sizes, lengths, and shapes, and a number of elbows, tees, and adapters in several sizes. Observe the following when replacing any piece of tubing or fitting in the system.

Preliminary procedure: Remove covers and panels as necessary to have access to repair area.

a. Removal

(1) Discharge the refrigeration system in accordance with para 5-29.

(2) Purge the system with nitrogen and debraze the tube connections. (See para 5-30 and 5-31.)

(3) Remove the part.

b. Installation

(1) Place the replacement part on the tube ends, purge the system with nitrogen and braze the tube joints. (See para 5-30 and 5-31.)

(2) Replace the dehydrator. (See para 5-36.)

(3) Leak test all newly connected joints and those in the repair area. (See para 5-32.)

(4) Install all covers and panels that were removed.

(5) Evacuate and charge the refrigerant system. (See para 5-33 and 5-34.)

5-50. CASING/FRAME/INSULATION REPAIRS

a. Inspection

(1) Check for broken welds, badly bent or dented parts, and cracked or broken parts.

(2) Check that plate nuts and blind nuts are in place and secure.

(3) Check that insulation is not loose, missing, burnt, or otherwise damaged. Replace if missing or damaged. Reglue if loose.

b. Insulation/Removal

NOTE

If exact replacement part is not purchased prior to removal of old insulation, cut the new replacement material to size using the old item as a sample.

(1) Remove as much old insulation material as possible, by pulling or scraping it away from the metal surface.

WARNING

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

(2) Soften and remove old adhesive and insulation residue, using acetone or methyl-ethyl ketone (MEK) and a stiff brush.

c. Insulation installation

(1) Purchase or cut to size.

(2) Be sure that the surface to which the insulation is to be applied is clean and free of paint and old adhesive material.

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

(4) Starting with an end, carefully attach the insulation to the metal. Press into firm contact all over.

d. To replace blind nuts (rivnuts) use a drill bit slightly smaller than the body of the blind nut.

(1) Carefully drill the old blind nut out.

(2) Install replacement part.

e. To replace nut plates, use a drill bit slightly smaller than the body of the rivets securing the nut plate.

(1) Carefully drill the rivets loose.

(2) Remove the old nut plate.

(3) Install new nut plate with properly sized rivets.

CHAPTER 6

PREPARATION FOR RESHIPMENT/STORAGE

6-1. GENERAL

a. Humidifier tank must be cleaned and drained prior to any storage or shipment. (See para 5-27.) Do not refill.

b. All preventive maintenance checks and services should be performed on air conditioner prior to any storage or shipment.

6-2. REMOVAL (PRIOR TO SHIPMENT, REMOTE REPAIR, OR REMOTE STORAGE) SEE PARA 6-1.

a. Disconnect power cable at power source.

b. Remove the thirty-four sets of attaching hardware that secure the air conditioner to the shelter wall.

c. Remove six hex head cap screws and flat washers and remove bottom mounting plate assembly. Cap screws and flat washers should be screwed back into place to prevent loss.

d. Use jack provided with shelter to slide air conditioner into shelter far enough to gain access to mounting angle attaching hardware.

e. Remove the two vertical and one top horizontal mounting angle assemblies.

f. Use jack provided with shelter to move the air conditioner out of shelter.

g. Remove the lower left-hand rear panel assembly and remove the four eye bolts from their storage position.

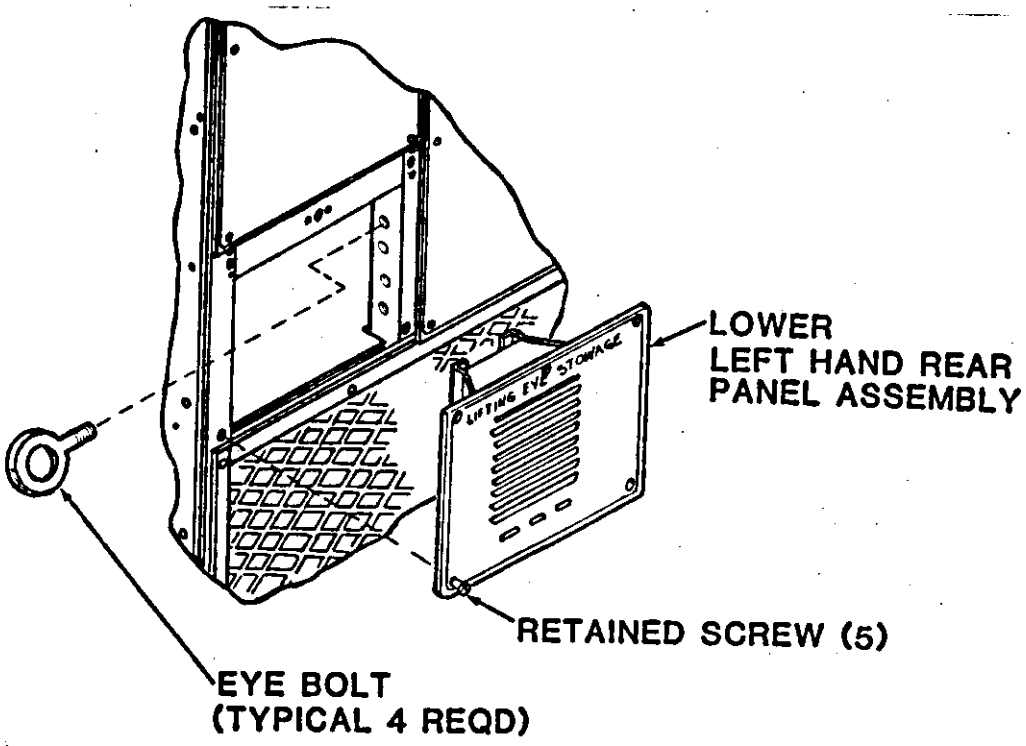


Figure 6-1. Eye Bolt Storage

h. Reinstall lower left-hand rear panel assembly.

i. Install eye bolts in the four top corner tapped holes in the top of the air conditioner. Be sure that they are fully engaged.

j. Reinstall the two vertical and one top horizontal mounting angle assemblies, removed in step c above, in their original position on the air conditioner.

k. Install the bottom mounting plate assembly (removed in step c above) in its shipment/storage position. The plate should be inverted 180° (with gaskets outward) and remounted to the air conditioner using the two outside bottom holes in the plate and the two side mounting angle holes that are second from the bottom.

l. Install two each bottom removable transport mode mounting angles. See para 2-5,(2).

m. Install two each upper rear side removable transport mode mounting angles. See para 2-5,(3).

n. Attach an overhead hoist with an appropriate sling to the lifting fittings provided at each top corner of the air conditioner.

WARNING

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

o. Lift the air conditioner from the shelter.

6-3. SHIPMENT/STORAGE AIR CONDITIONER REMAINING WITH SHELTER (SEE PARA 6-1.)

a. Remove the thirty-four sets of attaching hardware that secure the air conditioner to the shelter wall.

b. Remove six hex head cap screws and flat washers and remove bottom mounting plate assembly. Cap screws and flat washers should be screwed back into place to prevent loss.

c. Use jack provided with shelter to slide air conditioner into shelter, far enough to allow bottom mounting plate assembly to be installed in storage position (approximately six inches).

d. Install the bottom mounting plate assembly (removed in step b above) in its shipment/storage position. The plate should be inverted 180° (with gaskets outward) and remounted to the air conditioner using the two outside bottom holes in the plate and the two side mounting angle holes that are second from the bottom.

e. Use jack provided with shelter to move air conditioner remaining distance to storage position.

f. Secure unit to shelter with two each bottom removable transport mode mounting angles. See para 2-5,(2).

g. Secure unit to shelter with two each upper rear side removable transport mode mounting angles. See para 2-5,(3).

h. See appropriate TMX-XXXX-XXX-XX Transportability Guide for Unit-Conduct Of Fire Trainer (U-COFT) for complete shelter/air conditioner shipment preparation.

CHAPTER 7

ILLUSTRATED REPAIR PARTS LIST

Section I INTRODUCTION

7-1. GENERAL

The Illustrated Repair Parts List contains breakdowns for all groups, assemblies and subassemblies which can be disassembled, reassembled and replaced. All parts are listed in disassembly sequence, except where the sequence of disassembly does not apply.

7-2. EXPLANATION AND USE OF COLUMNS

a. **ITEM NO.** The number used to identify each item called out in the illustration.

b. **FSCM NO.** The Federal Supply Code for Manufacturer number is a five digit numeric code listed 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 FSCM's 19200 (U.S. Army Armament Research and Development Command, Dover, N.J.) and 97403 (U.S. Army Mobility Research and Development Center, Fort Belvoir, VA) are available for purchase from:

Keco Industries, Inc.
7375 Industrial Road
Florence, Kentucky 41042
(FSCM 94833)

c. **PART NUMBER.** The first part number listed indicates the primary control number which controls the design and characteristics of the item by means of its engineering drawing, specification, or standard. When additional part numbers are listed, this indicates that the first part number is a Specification Control drawing and that the part is available from the company whose FSCM is listed opposite that number.

d. **DESCRIPTION.** The item name and, if required, a minimum description to identify the item.

e. **U/M (Unit of Measure).** Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

f. **QTY (Quantity).** Indicates the quantity of the item used in the breakout shown on the illustration figure. A "V" appearing in this column in lieu of a quantity indicates that no specific quantity is applicable (e.g., shims, spacers, etc.).

7-3. DIFFERENCES BETWEEN UNITS

All significant differences between units will be defined by unit serial number, in footnotes on the page of the effected part listing. Should major design/model changes be made, a descriptive statement can be added following this paragraph identifying usable on codes. These usable on codes can then be added to the repair parts list following the description to reflect differences for part ordering information.

Section II REPAIR PARTS LIST WITH ILLUSTRATED PARTS BREAKDOWN

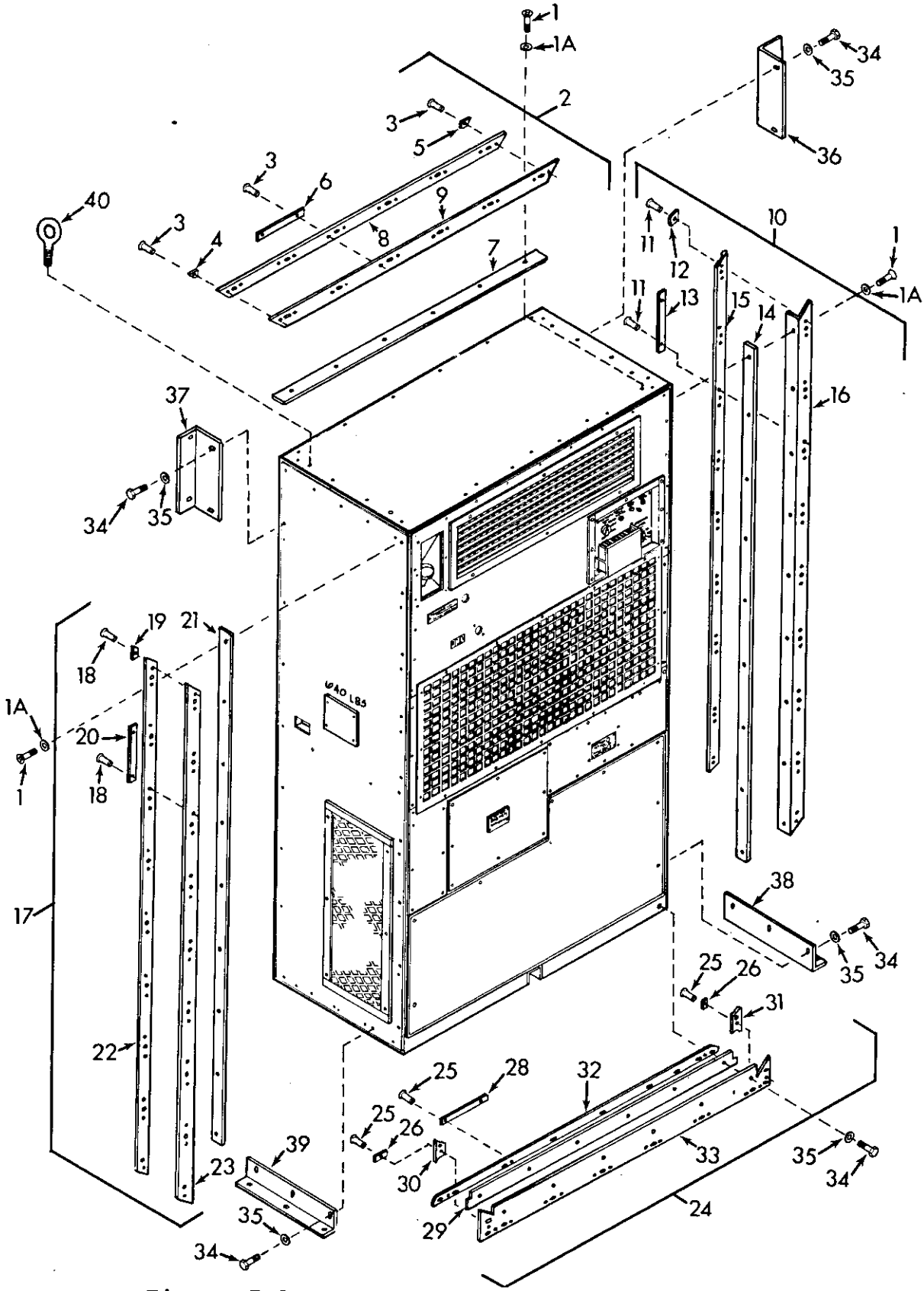


Figure 7-1. Mounting Angles and Plates

Figure 7-1. Mounting Angles and Plates

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS24693-C320	.SCREW,MACH-FLAT HD.....	EA	24
1A	19200	12713061	.WASHER.....	EA	24
2	19200	12712892-1	.ANGLE ASSY,MOUNTING TOP.....	EA	1
3	96906	MS20426A6-10-5	..RIVET,SOLID,CTSK 100° PREC HD..	EA	12
4	19200	12712890-1	..PLATE,END-GASKET STIFFENER.....	EA	1
5	19200	12712890-2	..PLATE,END-GASKET STIFFENER.....	EA	1
6	19200	12712889-2	..PLATE,GASKET STIFFENER.....	EA	5
7	19200	127130492	..GASKET.....	EA	1
8	19200	12712940	..GASKET.....	EA	1
9	19200	12712722	..ANGLE,MOUNTING-TOP.....	EA	1
10	19200	12712888-1	.ANGLE ASSY,MOUNTING-SIDE.....	EA	1
11	96906	MS20426A6-10-5	..RIVET,SOLID,CTSK 100° PREC HD..	EA	17
12	19200	12712890-2	..PLATE,END-GASKET STIFFENER.....	EA	1
13	19200	12712889-1	..PLATE,GASKET STIFFENER.....	EA	8
14	19200	12713026	..GASKET.....	EA	1
15	19200	12712944-1	..GASKET.....	EA	1
16	19200	12712723-1	..ANGLE,MOUNTING-SIDE.....	EA	1
17	19200	12712888-2	.ANGLE ASSY,MOUNTING-SIDE.....	EA	1
18	96906	MS2046A6-10-5	..RIVET,SOLID,CTSK 100° PREC HD..	EA	17
19	19200	12712890-1	..PLATE,END-GASKET STIFFENER.....	EA	1
20	19200	12712889-1	..PLATE,GASKET STIFFENER.....	EA	8

Figure 7-1. Mounting Angles and Plates (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
21	19200	12713026	..GASKET.....	EA	1
22	19200	12712944-2	..GASKET.....	EA	1
23	19200	12712723-2	..ANGLE,MOUNTING-SIDE.....	EA	1
24	19200	12712893-1	.PLATE ASSEMBLY MTG BOTTOM.....	EA	1
25	96906	MS20426A6-10-5	..RIVET,SOLID CTSK 100° PREC HD..	EA	12
26	19200	12712891-1	..PLATE,GASKET STIFFENER.....	EA	2
27					
28	19200	12712889-1	..PLATE,GASKET STIFFENER.....	EA	5
29	19200	12713027	..GASKET.....	EA	1
30	19200	12712941-1	..GASKET.....	EA	1
31	19200	12712941-2	..GASKET.....	EA	1
32	19200	12712943	..GASKET.....	EA	1
33	19200	12712730	..PLATE MOUNTING BOTTOM.....	EA	1
34	96906	MS35308-334	.SCREW,CAP HEX HD.....	EA	16
35	96906	MS15795-812	.WASHER,FLAT-ROUND.....	EA	16
36	19200	12712738-1	.ANGLE,SIDE MTG TRANSPORT MODE...	EA	1
37	19200	12712738-2	.ANGLE,SIDE MTG TRANSPORT MODE...	EA	1
38	19200	12712739-1	.ANGLE,BOTTOM MTG TRANSPORT MODE.	EA	1
39	19200	12712739-2	.ANGLE,BOTTOM MTG TRANSPORT MODE.	EA	1
40	19200	12712784	.BOLT,EYE.....	EA	4

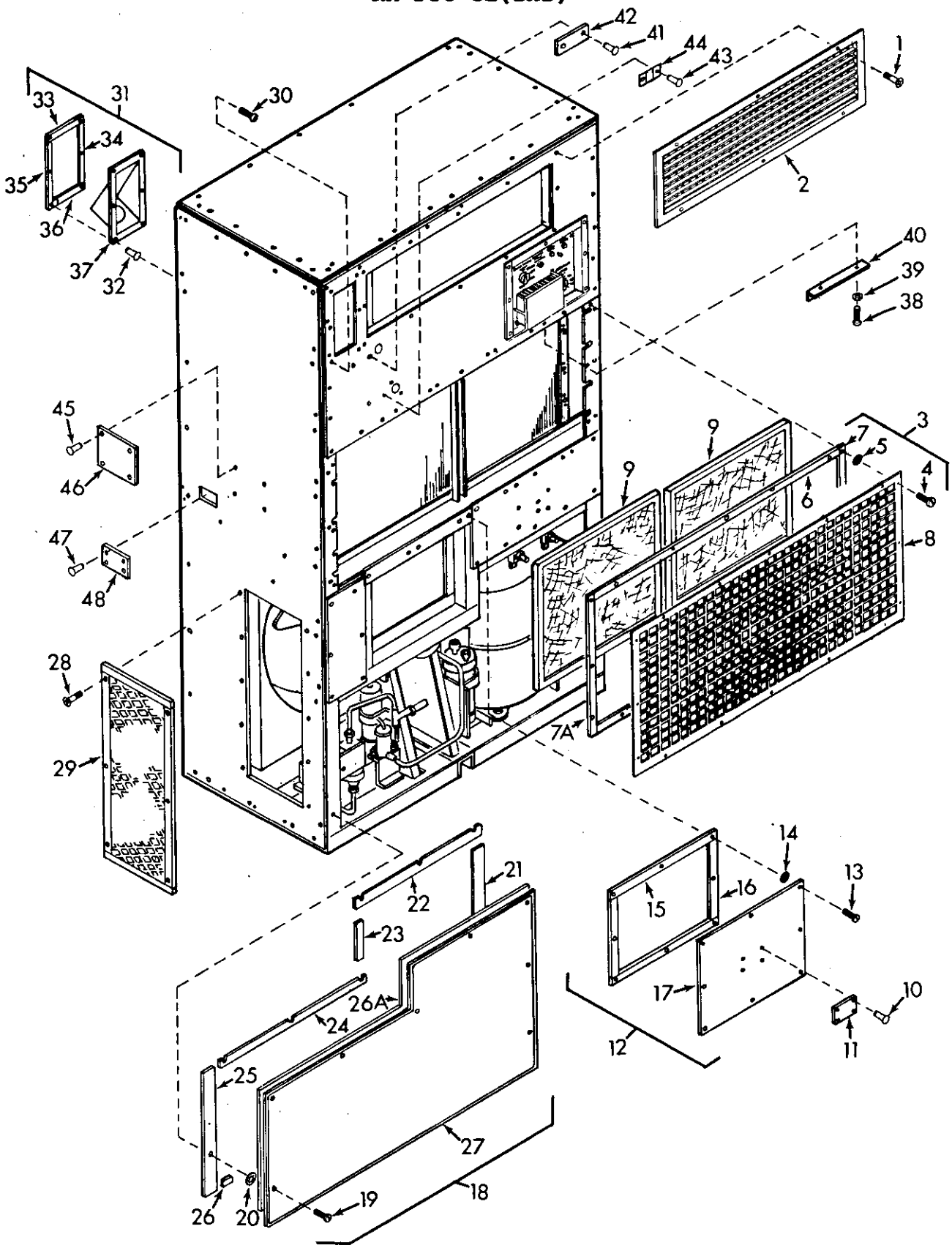


Figure 7-2. Outside Panels, Front

Figure 7-2. Outside Panels, Front and Left Side

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS24693-C50	.SCREW,MACH-FLAT CTSK HD.....	EA	6
2	19200 9U807	12712786 AL588OH	.GRILLE,SUPPLY AIR.....	EA	1
3	19200	12712817-1	.SCREEN ASSEMBLY,RETURN AIR.....	EA	1
4	97403 94222	13214E3744W13 12-11-403-12	..SCREW,PANEL FASTENER.....	EA	16
5	97403 94222	13211E8337 12-11014-12	..RETAINING WASHER.....	EA	16
6	19200	12713030	..GASKET.....	EA	2
7	19200	12713031	..GASKET.....	EA	
7A	19200	12713032	..GASKET.....	EA	1
8	19200	12712945	..RETURN AIR SCREEN.....	EA	1
9	19200	12712789	.FILTER,AIR.....	EA	2
10	97403 07707	13214E3789-2 AD42H	.RIVET,BLIND.....	EA	4
11	19200	12712876	.CAUTION PLATE,208 VOLTS.....	EA	1
12	19200	12712927-1	.COVER ASSY,JUNCTION BOX.....	EA	1
13	97403 94222	13214E3744W13 12-11-403-12	..SCREW,PANEL FASTENER.....	EA	8
14	97403 94222	13211E8337 12-11014-12	..RETAINING WASHER.....	EA	8
15	19200	12713028	..GASKET.....	EA	2
16	19200	12713029	..GASKET.....	EA	2
17	19200	12712755	..COVER,JUNCTION BOX.....	EA	

Figure 7-2. Outside Panels, Front and Left Side (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
18	19200	12712762-1	.PANEL AND SUPPORT,FRONT REMOVABLE.....	EA	1
19	97403 94222	13214E3744W13 12-11-403-12	..SCREW,PANEL FASTENER.....	EA	9
20	97403 94222	13211E8337 12-11014-12	..RETAINING WASHER.....	EA	9
21	19200	12713045	..GASKET.....	EA	1
22	19200	12713046	..GASKET.....	EA	1
23	19200	12713025-5	..GASKET.....	EA	1
24	19200	12713047	..GASKET.....	EA	1
25	19200	12713048	..GASKET.....	EA	1
26	19200	12713025-7	..GASKET.....	EA	2
26A	19200	12712975	..INSULATION.....	EA	1
27	19200	12712899-1	..PANEL AND SUPPORT FRONT REMOVABLE.....	EA	1
28	96906	MS24693-C274	.SCREW,MACH-FLAT CTSK HD.....	EA	6
29	19200	12712871-1	.GRILLE ASSY,CONDENSER DAMPER....	EA	1
30	96906	MS24693-C52	.SCREW,MACH-PAN HD.....	EA	6
31	19200	12712758-1	.FILLER NECK ENCLOSURE ASSY.....	EA	1
32	80205	NAS1330C08KB106	..NUT,BLIND RIVET.....	EA	6
33	19200	12713050	..GASKET.....	EA	1
34	19200	12713051	..GASKET.....	EA	1

Figure 7-2. Outside Panels, Front and Left Side (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
35	19200	12713052	..GASKET.....	EA	1
36	19200	12713035	..GASKET.....	EA	1
37	19200	12712853-1	..ENCLOSURE,FILLER NECK.....	EA	1
38	96906	MS51958-64	.SCREW,MACH-PAN HD.....	EA	8
39	96906	MS35338-138	.WASHER,LOCK-SPRING-HELICAL.....	EA	8
40	19200	12712873	.BRACKET,FILTER HOLDER.....	EA	4
41	97403 07707	13214E3789-2 AD42H	.RIVET,BLIND.....	EA	2
42	19200	12712932	.INSTRUCTION PLATE,HUMIDIFIER....	EA	
43	97403 07707	13214E3789-2 AD42H	.RIVET,BLIND.....	EA	2
44	97403	13211E8215	.PLATE,MOISTURE INDICATOR.....	EA	1
45	97403 07707	13214E3789-2 AD42H	.RIVET,BLIND.....	EA	4
46	19200	12712702	.IDENTIFICATION PLATE.....	EA	1
47	97403 07707	13214E3789-2 AD42H	.RIVET,BLIND.....	EA	4
48	19200	12712877	.INSTRUCTION PLATE,MAINTENANCE SWITCH.....	EA	1

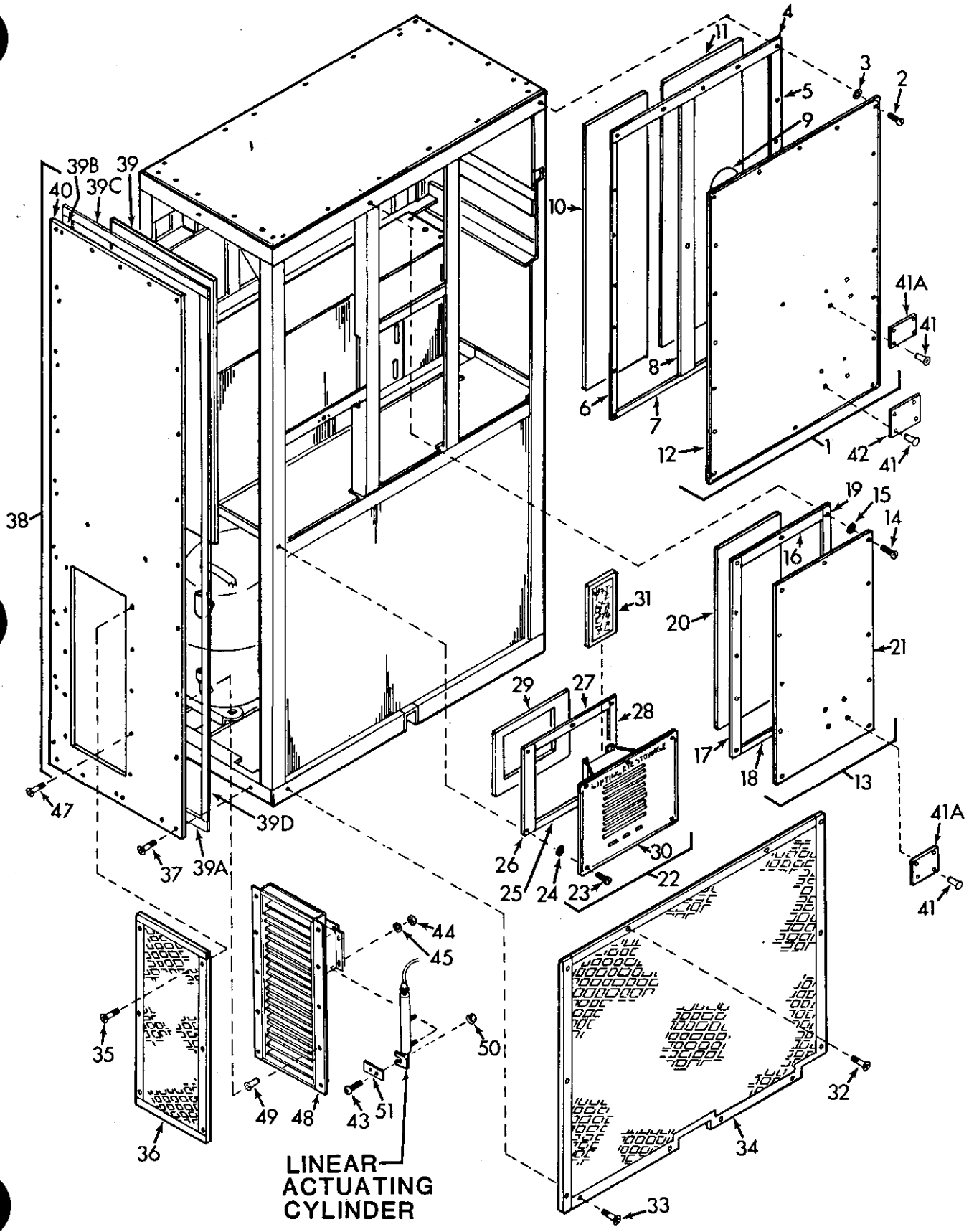


Figure 7-3. Outside Panels, Right Side and Rear

Figure 7-3. Outside Panels, Right Side and Rear

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	19200	12712924-1	.PANEL ASSY,REAR,RIGHT-HAND SECTION.....	EA	1
2	97403 94222	13214E3744W13 12-11-403-12	..SCREW,PANEL FASTENER.....	EA	19
3	97403 94222	13211E8337 12-11014-12	..RETAINING WASHER.....	EA	19
4	19200	12713033	..GASKET.....	EA	1
5	19200	12713034-1	..GASKET.....	EA	1
6	19200	12713034-3	..GASKET.....	EA	1
7	19200	12713036	..GASKET.....	EA	
8	19200	12713037	..GASKET.....	EA	1
9	19200	12713038	..GASKET.....	EA	1
10	19200	12712914-8	..INSULATION.....	EA	1
11	19200	12712930	..INSULATION.....	EA	1
12	19200	12712770	..PANEL,REAR,RIGHT-HAND SECTION..	EA	1
13	19200	12712922-1	.PANEL ASSY,REAR,TOP LEFT-HAND SECTION.....	EA	1
14	97403 94222	13214E3744W13 12-11-403-12	..SCREW,PANEL FASTENER.....	EA	11
15	97403 94222	13211E8337 12-11014-12	..RETAINING WASHER.....	EA	11
16	19200	12713039	..GASKET.....	EA	1

Figure 7-3. Outside Panels, Right Side and Rear (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
17	19200	12713040	..GASKET.....	EA	1
18	19200	12713025-1	..GASKET.....	EA	1
19	19200	12713041	..GASKET.....	EA	1
20	19200	12712914-7	..INSULATION.....	EA	1
21	19200	12712921	..PANEL,REAR TOP,LEFT-HAND SECTION.....	EA	1
22	19200	12712895-1	.PANEL ASSY,LEFT-HAND REAR.....	EA	1
23	97403 94222	13214E3744W13 12-11-403-12	..SCREW,PANEL FASTENER.....	EA	5
24	97403 94222	13211E8337 12-11014-12	..RETAINING WASHER.....	EA	5
25	19200	12713042	..GASKET.....	EA	1
26	19200	12713043	..GASKET.....	EA	1
27	19200	12713025-3	..GASKET.....	EA	1
28	19200	12713044	..GASKET.....	EA	1
29	19200	12712928	..INSULATION.....	EA	1
30	19200	12712896-1	..PANEL,FRESH AIR.....	EA	1
31	19200	12712785	.FILTER,FRESH AIR.....	EA	1
32	96906	MS24693-C276	.SCREW,MACH-FLAT CTSK HD.....	EA	2
33	96906	MS24693-C54	.SCREW,MACH-FLAT CTSK HD.....	EA	10
34	19200	12712736-1	.GRILLE,CONDENSER.....	EA	1

Figure 7-3. Outside Panels, Right Side and Rear (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
35	96906	MS24693-C274	.SCREW,MACH-FLAT CTSK HD.....	EA	6
36	19200	12712871-1	.GRILLE ASSY,CONDENSER DAMPER.....	EA	1
37	96906	MS24693-C274	.SCREW,MACH-FLAT CTSK HD.....	EA	22
38	19200	12712898-1	.PANEL ASSY,RIGHT SIDE.....	EA	1
39	19200	12712914-9	..INSULATION.....	EA	1
39A	19200	12713056	..GASKET.....	EA	1
39B	19200	12713054	..GASKET.....	EA	1
39C	19200	12713055	..GASKET.....	EA	
39D	19200	12713057	..GASKET.....	EA	1
40	19200	12712774	..PANEL,RIGHT SIDE.....	EA	1
41	97403 07707	13214E3789-2 AD42H	.RIVET,BLIND.....	EA	12
41A	19200	12712984	.CAUTION PLATE, MECHANICAL AND THERMAL.....	EA	2
42	19200	12712878	.CAUTION PLATE,MAINTENANCE .SWITCH.....	EA	1
43	96906	MS51958-64	.SCREW,MACH PAN HD.....	EA	4
44	96906	MS35649-2254	.NUT,PLAIN HEX.....	EA	4
45	96906	MS35338-139	.WASHER,LOCK-SPRING,HELICAL.....	EA	4
46			DELETED		
47	96906	MS24693-C272	.SCREW,MACH-FLAT CTSK HD.....	EA	8
48	19200	12712887-1	.DAMPER ASSY,CONDENSER INLET.....	EA	

Figure 7-3. Outside Panels, Right Side and Rear (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
49	96906	MS27130CR99K	..NUT,BLIND RIVET.....	EA	20
50	96906	MS21044C3	.NUT,SELF LOCKING.....	EA	4
51	19200	12713015	.ACTUATOR ARM.....	EA	2

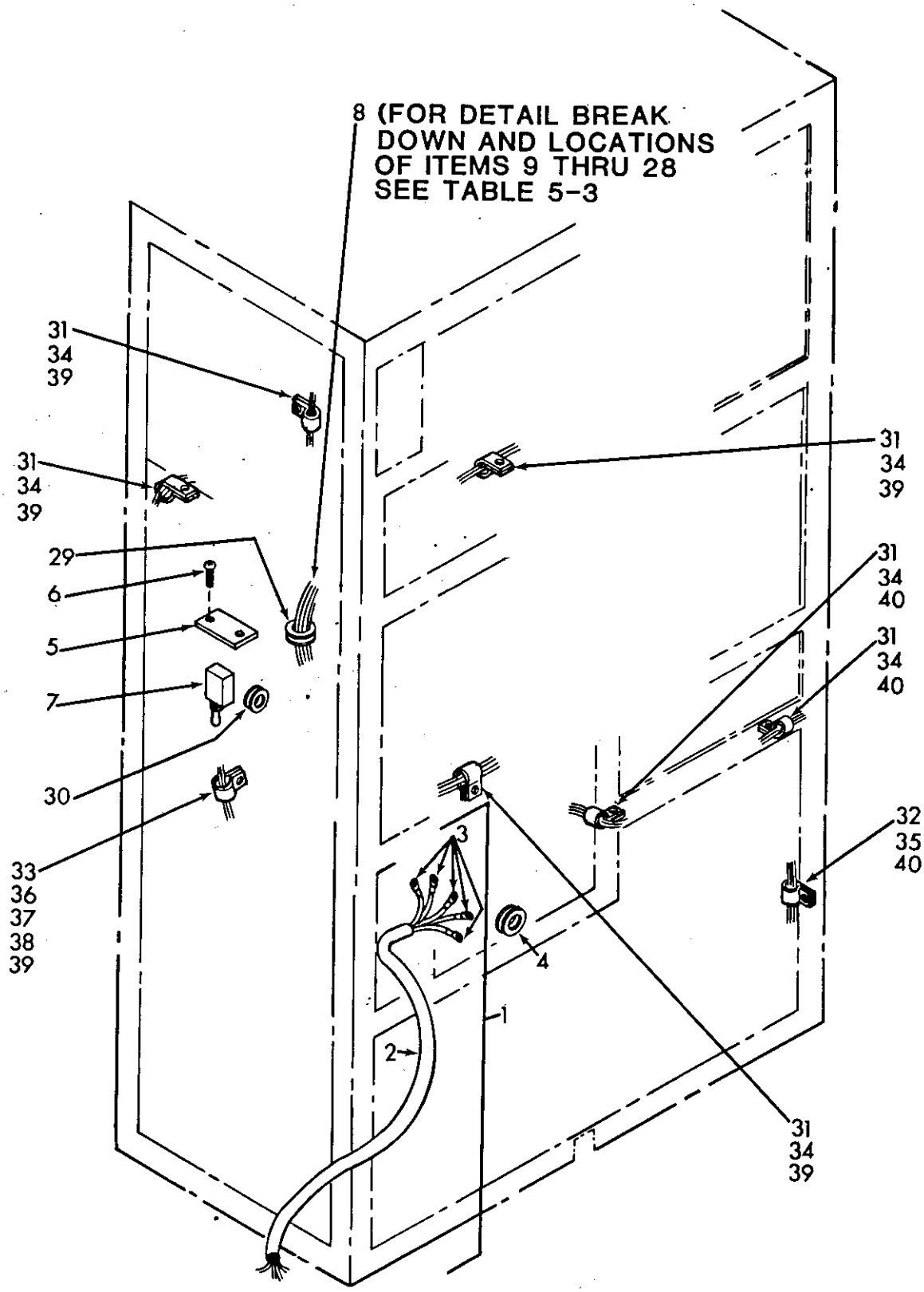


Figure 7-4. Miscellaneous Electrical

Figure 7-4. Miscellaneous Electrical

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	19200	12712790-1	.CABLE ASSY POWER.....	EA	1
2	81349	CO-05HOE5/6 MIL-C-3432	..CABLE,POWER-TYPE "CO".....	IN	68
3	19200	12713071	..TERMINAL,LUG.....	EA	5
4	96906	MS35489-25	.GROMMET,RUBBER.....	EA	1
5	19200	12712714	.COVER,MAINTENANCE SWITCH.....	EA	1
6	96906	MS51957-16	.SCREW,MACH PAN HD.....	EA	2
7	96906	MS24524-22	.SWITCH,TOGGLE S11.....	EA	1
8	19200	12712946-1	.WIRE LIST/HARNESS.....	EA	1
9	81349	M16878/4-BLE9 MIL-W-16878	..WIRE,12 AWG,WHITE.....	FT	132
10	81349	M16878/4-BHE9 MIL-W-16878	..WIRE,18 AWG,WHITE.....	FT	342
11	81349	M16878/4-BMG9 MIL-W-16878	..WIRE,10 AWG,WHITE.....	FT	34
12	96906	MS25036-157	..TERMINAL LUG.....	EA	9
13	96906	MS25036-101	..TERMINAL LUG.....	EA	60
14	96906	MS25036-149	..TERMINAL LUG.....	EA	17
15	96906	MS25036-112	..TERMINAL LUG.....	EA	61
16	96906	MS25036-103	..TERMINAL LUG.....	EA	3
17	96906	MS25036-156	..TERMINAL LUG.....	EA	9
18					

Figure 7-4. Miscellaneous Electrical (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
19	97403 00779 00779	13211E8288 41532 LP41532	..TERMINAL,WIRE,FLAG TYPE.....	EA	24
20	19200 00779	12712938-1 61553-1	..TAB,SINGLE CIRCUIT CONNECTOR...	EA	3
21	19200 00779	12712938-2 42565-2	..TAB,SINGLE CIRCUIT CONNECTOR.....	EA	19
22	19200 00779	12712937-1 60414-1	..RECEPTACLE,SINGLE CIRCUIT CONNECTOR.....	EA	6
23	19200 00779	12712937-2 42282-2	..RECEPTACLE,SINGLE CIRCUIT CONNECTOR.....	EA	19
24	19200 00779	12712935 480053-3	..HOUSING,TAB.....	EA	24
25	19200 00779	12712936 480054-3	..HOUSING,RECEPTACLE.....	EA	25
26	81349	M23053/5-105-9 MIL-I-23053	..INSULATION,SLEEVING,HEAT SHRINK.....	IN	19
27	19200 00779	12712947 35653	..CLOSED END SPLICE.....	EA	5
28	96906	MS25036-153	..TERMINAL,LUG.....	EA	12
29	96906	MS35489-46	.GROMMET,RUBBER.....	EA	1
30	96906	MS35489-6	.GROMMET,RUBBER.....	EA	1
31	96906	MS51957-46	.SCREW,MACH PAN HD.....	EA	6
32	96906	MS24693-C273	.SCREW,MACH FLAT HD.....	EA	1
33	96906	MS51957-47	.SCREW,MACH PAN HD.....	EA	1

Figure 7-4. Miscellaneous Electrical (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
34	96906	MS21044C08	.NUT,SELF LOCKING.....	EA	6
35	96906	MS21044C3	.NUT,SELF LOCKING.....	EA	1
36	96906	MS27130CR13	.NUT,BLIND RIVET.....	EA	1
37	96906	MS15795-841	.WASHER,FLAT-ROUND.....	EA	1
38	96906	MS35338-137	.WASHER,LOCK SPRING.....	EA	1
39	96906	MS21919DG8	.CLAMP,LOOP TYPE.....	EA	5
40	96906	MS21919DG6	.CLAMP,LOOP TYPE.....	EA	3

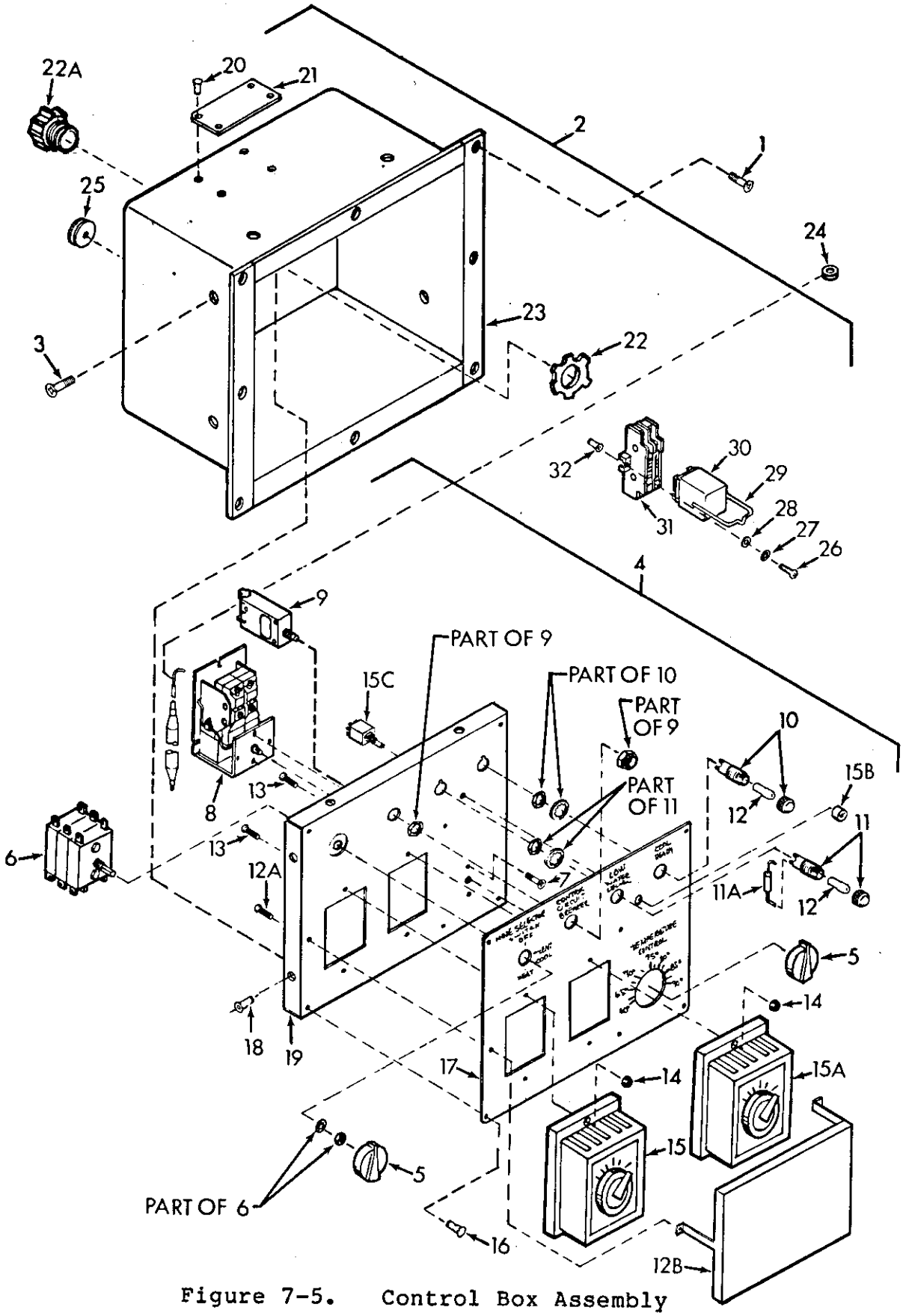


Figure 7-5. Control Box Assembly

Figure 7-5. Control Box Assembly

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS24693-C274	.SCREW,MACH-FLAT CTSK HD.....	EA	8
2	19200	12712761-1	.CONTROL BOX ASSEMBLY.....	EA	1
3	96906	MS24693-C272	..SCREW,MACH-FLAT CTSK HD.....	EA	8
4	19200	12713067-1	..COVER ASSY,CONTROL BOX.....	EA	1
5	97403	13211E8266	...KNOB.....	EA	2
	86797	RC-175			
6	19200 70611	12712795 2263A8	...SWITCH,ROTARY **S1**.....	EA	1
7	96906	MS24693-C48	...SCREW,MACH-FLAT CTSK HD.....	EA	2
8	19200 50831	12712815 A28GJ-7	...CONTROL,TEMPERATURE **S2**.....	EA	1
9	19200 06402	12712816 45-700-P10	...CIRCUIT BREAKER **CB1**.....	EA	1
10	81349	LH74/1-LC13YN2 MIL-L-3661/13A	...LAMPHOLDER,INDICATOR LIGHT **DS2**	EA	1
11	81349	LH74/1-LC13RN2 MIL-L-3661/13A	...LAMPHOLDER,INDICATOR LIGHT **DS1**	EA	1
11A	81349	RN65D4752F MIL-R-55182	...RESISTOR.....	EA	1
12	81349	M15098/11-001 MIL-L-15098	...LAMP,GLOW (TYPE C7A).....	EA	2
12A	96906	MS51957-15	...SCREW,MACH-PAN HD.....	EA	3
12B	19200	12713066-1	...BRACKET, ASSY.....	EA	1
13	96906	MS51957-34	...SCREW,MACH-PAN HD.....	EA	4

Figure 7-5. Control Box Assembly (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
14	96906	MS21044C06	...NUT,SELF-LOCKING HEX.....	EA	4
15	19200	12713069-3	...CONTROL,HUMIDISTAT S13.....	EA	1
15A	19200	12713069-1	...CONTROL,HUMIDISTAT S7.....	EA	1
15B	19200	12713074	...BUTTON,SWITCH.....	EA	1
15B	19200	12713073	...SWITCH,PUSH.....	EA	1
16	97403 07707	13214E3789-2 AD42H	...RIVET,BLIND.....	EA	4
17	19200	12713068	...INSTRUCTION PLATE	EA	1
18	96906	MS27130CR99K	...NUT,PLAIN,BLIND RIVET.....	EA	
19	19200	12713064	...COVER,CONTROL BOX.....	EA	1
20	97403	13214E3789-2	..RIVET,BLIND.....	EA	4
21	19200	12712876	..CAUTION PLATE,208 VOLT.....	EA	1
22	19200 28488	12712961-1 1002	..LOCKNUT.....	EA	1
22A	19200 28488	12712962-4 3702-2	..CONNECTOR,STRAIN RELIEF.....	EA	1
23	19200	12712756	..CONTROL BOX.....	EA	1
24	96906	MS35489-60	..GROMMET,RUBBER.....	EA	1
25	97403 75543	13211E8222 1000	..GROMMET.....	EA	1
26	96906	MS51957-31	..SCREW,MACH-PAN HD.....	EA	2
27	96906	MS35333-7	..WASHER,LOCK.....	EA	2

Figure 7-5. Control Box Assembly (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
28	96906	MS15795-805	..WASHER,FLAT.....	EA	2
29	19200	12712797	..SPRING,HOLDDOWN.....	EA	1
30	19200	12712799	..RELAY,CONTROL.....	EA	1
31	19200	12712798	..SOCKET,RELAY.....	EA	1
32	80205	NAS1330C06KB106	..NUT,BLIND RIVET.....	EA	2

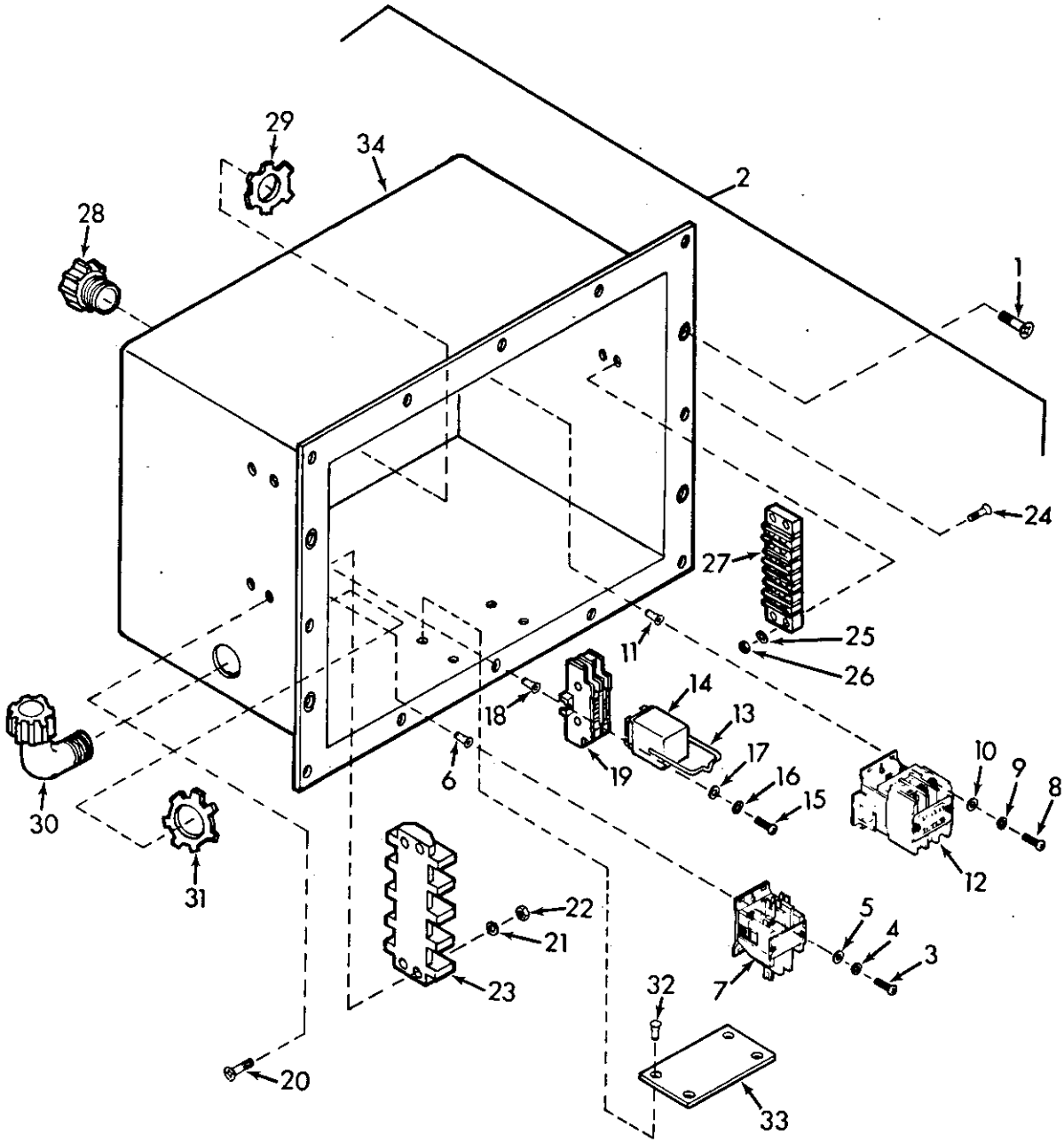


Figure 7-6. Junction Box Assembly

Figure 7-6. Junction Box Assembly

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS24693-C273	.SCREW,MACH-FLAT CTSK HD.....	EA	8
2	19200	12712879-1	.JUNCTION BOX ASSEMBLY.....	EA	1
3	96906	MS51957-45	..SCREW,MACH-PAN HD.....	EA	18
4	96906	MS35333-72	..WASHER,LOCK,FLAT.....	EA	18
5	96906	MS15795-807	..WASHER,FLAT,ROUND.....	EA	18
6	80205	NAS1330C08KB106	..NUT,BLIND RIVET.....	EA	18
7	19200 23826 14604	12712811 41NB30AFX24P 30D0-30SV	..CONTACTOR,MAGNETIC **K1,K2,K6,... K7,K8, AND K9**.....	EA	6
8	96906	MS51957-45	..SCREW,MACH-PAN HD.....	EA	3
9	96906	MS35333-72	..WASHER,LOCK,FLAT.....	EA	3
10	96906	MS15795-807	..WASHER,FLAT,ROUND.....	EA	3
11	80205	NAS1330C08KB106	..NUT,BLIND RIVET.....	EA	3
12	19200 14604 23826	12712802 30G0-301SV 42DE35AF	..CONTACTOR MAGNETIC **K3**.....	EA	1
13	19200 77342	12712797 20C297	..SPRING,HOLD DOWN.....	EA	1
14	19200 77342	12712799 K10P11A15-120	..RELAY,CONTROL **K10**.....	EA	1
15	96906	MS51957-30	..SCREW,MACH-PAN HD.....	EA	2
16	96906	MS35333-71	..WASHER,LOCK,FLAT.....	EA	2
17	96906	MS15795-805	..WASHER,FLAT ROUND.....	EA	2

Figure 7-6. Junction Box Assembly (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
18	80205	NAS1330C06KB106	..NUT,BLIND RIVET.....	EA	2
19	19200 77342	12712798 27E487	..SOCKET,RELAY.....	EA	1
20	96906	MS24693-C52	..SCREW,MACH-FAN,CTSK HD.....	EA	4
21	96906	MS35333-72	..WASHER,LOCK,FLAT.....	EA	4
22	96906	MS35649-284	..NUT,PLAIN-HEX.....	EA	4
23	19200 75382	12712792 603-5RS11A	..BOARD,TERMINAL **TB2**.....	EA	1
24	96906	MS24693-C29	..SCREW,MACH-FLAT,CTSK HD.....	EA	4
25	96906	MS35333-71	..WASHER,LOCK FLAT.....	EA	4
26	96906	MS35649-264	..NUT,PLAIN-HEX.....	EA	4
27	81349	37TB-8 MIL-T-55164/1	..TERMINAL BOARD **TB1**.....	EA	1
28	19200 28488	12712962-5 3703-5	..CONNECTOR,STRAIN RELIEF.....	EA	1
29	19200 28488	12712961-2 1003	..LOCKNUT.....	EA	1
30	19200	12713070	..CONNECTOR,STRAIN RELIEF.....	EA	1
31	19200	12712961-4	..LOCKNUT.....	EA	1
32	97403 07707	13214E3791-2 AK42H	..RIVET,BLIND.....	EA	4
33	19200	12712876	..CAUTION PLATE,208 VOLTS.....	EA	1
34	19200	12712760	..JUNCTION BOX.....	EA	1

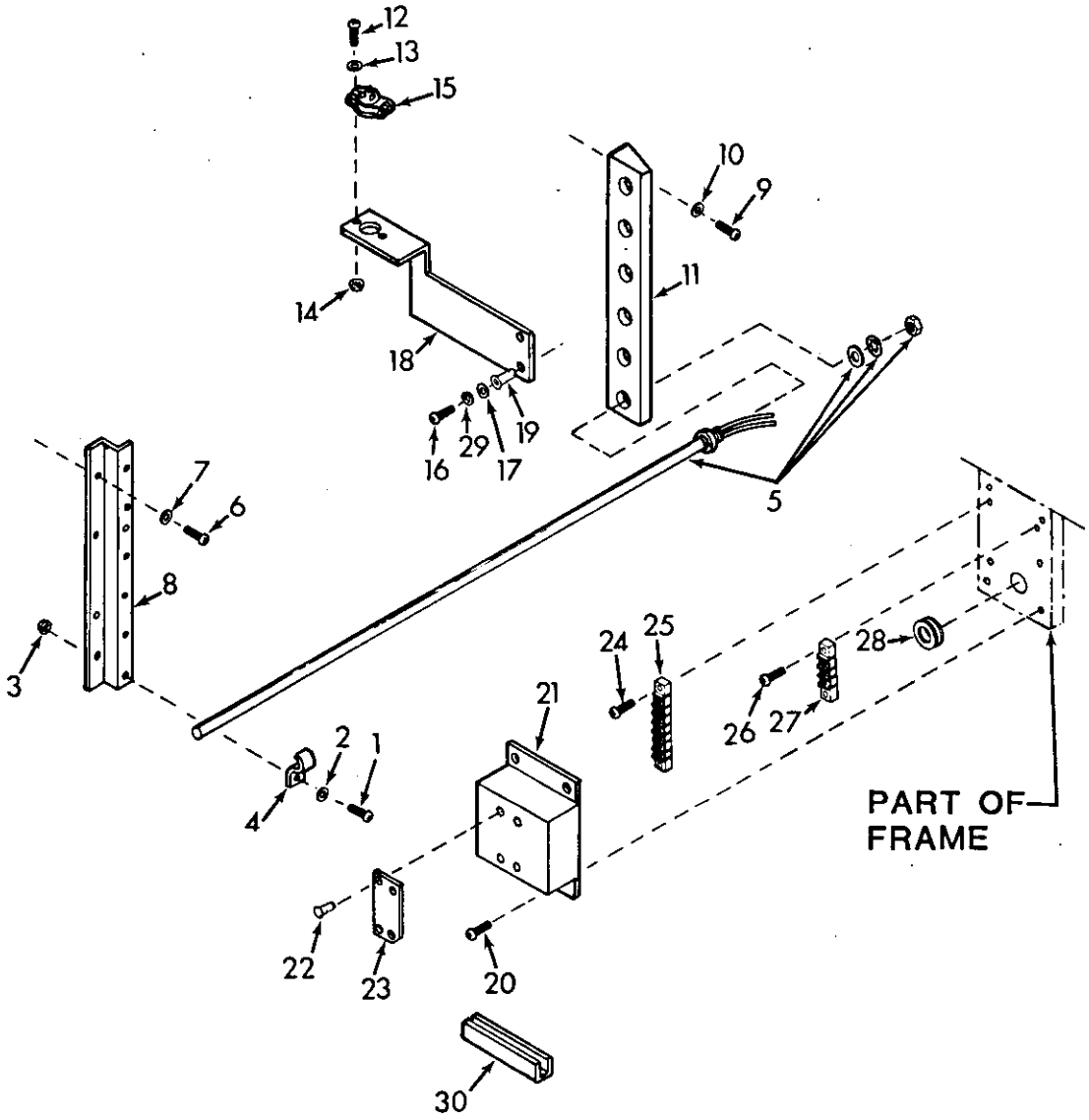


Figure 7-7. Heaters

Figure 7-7. Heaters

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS51958-63	.SCREW,MACH-PAN HD.....	EA	6
2	96906	MS15795-842	.WASHER,FLAT-ROUND.....	EA	6
3	96906	MS21044C3	.NUT,SELF LOCKING.....	EA	6
4	19200	12712744	.STRAP,HEATER.....	EA	6
5	19200	12712813	.ELEMENT,HEATING **HR1** THRU **HR6**....	EA	6
6	96906	MS51958-63	.SCREW,MACH-PAN HD.....	EA	4
7	96906	MS15795-842	.WASHER,FLAT-ROUND.....	EA	4
8	19200	12712742	.ZEE,HEATER-END.....	EA	1
9	96906	MS51958-63	.SCREW,MACH-PAN HD.....	EA	4
10	96906	MS15795-842	.WASHER,FLAT-ROUND.....	EA	4
11	19200	12712743	.BRACKET,HEATER.....	EA	1
12	96906	MS51957-46	.SCREW,MACH-PAN HD.....	EA	2
13	96906	MS15795-841	.WASHER,FLAT-ROUND.....	EA	2
14	96906	MS21044C08	.NUT,SELF LOCKING.....	EA	2
15	97403 82647	13214E4036 CWA1249	.SWITCH,THERMOSTATIC **S3**.....	EA	1
16	96906	MS51957-67	.SCREW,MACH-PAN HD.....	EA	2
17	96906	MS15795-842	.WASHER,FLAT ROUND.....	EA	2
18	19200	12712934-1	.BRACKET ASSY,THERMOSTATIC SWITCH	EA	1
19	96906	MS27130CR26K	..NUT,PLAIN BLIND RIVET.....	EA	2
20	96906	MS51957-28	.SCREW,MACH-PAN HD.....	EA	4

Figure 7-7. Heaters (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
21	19200	12712875	.COVER,TERMINAL BOARD.....	EA	1
22	97403 07707	13214E3789-2 AD42H	.RIVET,BLIND.....	EA	4
23	19200	12712876	.CAUTION PLATE,208 VOLT.....	EA	1
24	96906	MS51957-47	.SCREW,MACH-PAN HD.....	EA	2
25	97403 75382	13216E6232-6 JN042370-6	.TERMINAL BOARD **TB3**.....	EA	1
26	96906	MS51957-47	.SCREW,MACH-PAN HD.....	EA	2
27	97403 75382	13216E6232-3 JN042370-3	.TERMINAL BOARD **TB4**.....	EA	1
28	96906	MS35489-49	.GROMMET,RUBBER.....	EA	1
29	96906	MS35338-138	.WASHER,LOCK-SPRING HELICAL.....	EA	2
30	19200	12713023	.GASKET,CHANNEL.....	EA	1

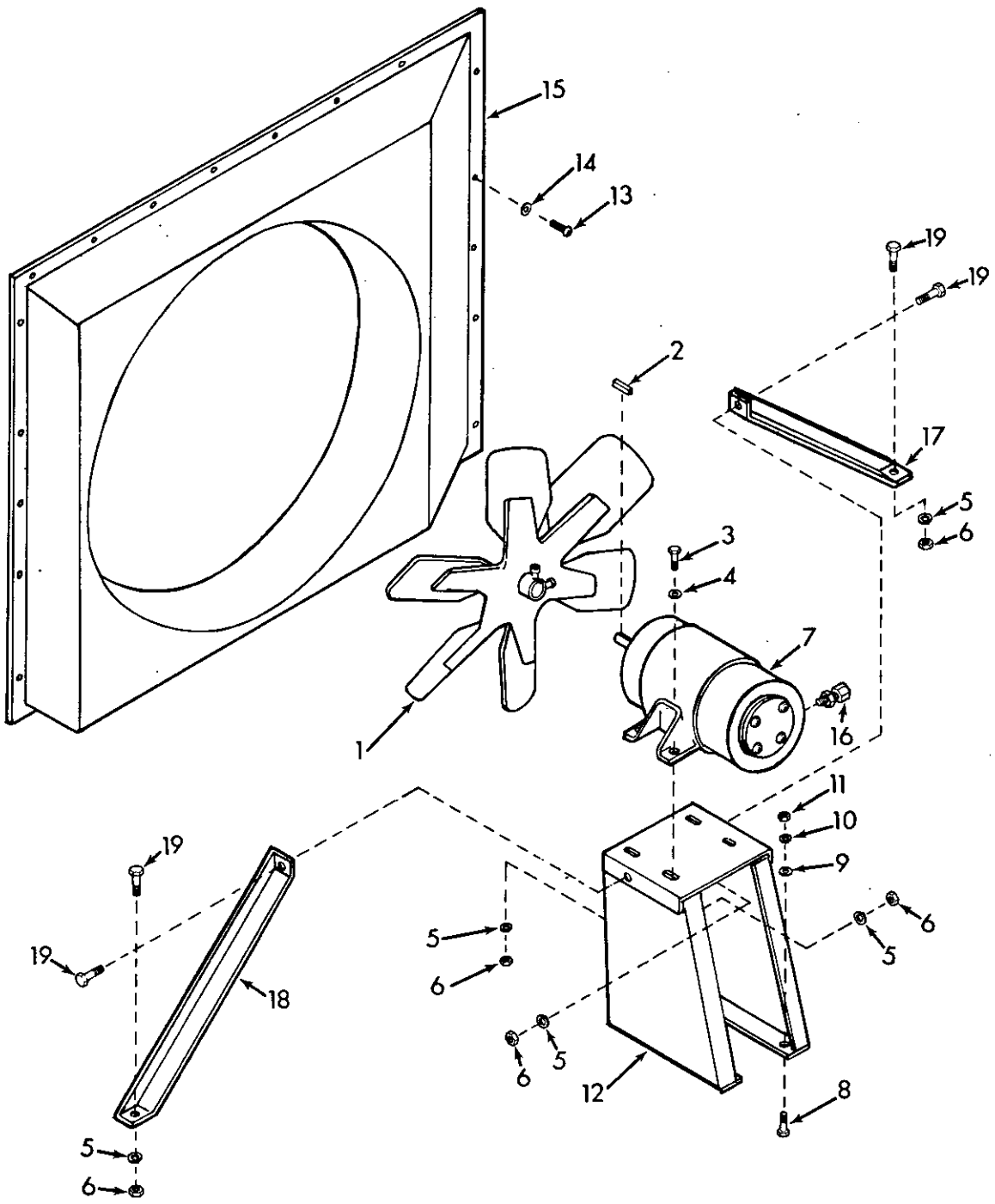


Figure 7-8. Condenser Fan Group

Figure 7-8. Condenser Fan Group

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	19200 22038	12712809 CTS6-2422-415	.FAN,AXIAL-CONDENSER.....	EA	1
2	96906	MS20066-145	.KEY,MACH-SQUARE.....	EA	1
3	96906	MS35307-333	.SCREW,CAP,HEX HD.....	EA	4
4	96906	MS15795-812	.WASHER,FLAT-ROUND.....	EA	8
5	96906	MS35338-140	.WASHER,LOCK-SPRING.....	EA	8
6	96906	MS35649-2314	.NUT,PLAIN HEX.....	EA	4
7	19200	12712801	.MOTOR,CONDENSER FAN B2.....	EA	1
8	96906	MS35307-333	.SCREW,CAP,HEX HD.....	EA	4
9	96906	MS15795-812	.WASHER,FLAT-ROUND.....	EA	4
10	96906	MS35338-140	.WASHER,LOCK-SPRING.....	EA	4
11	96906	MS35649-2314	.NUT,PLAIN HEX.....	EA	4
12	19200	12712720-1	.MOUNT,CONDENSER FAN.....	EA	1
13	96906	MS51958-63	.SCREW,MACH-PAN HD.....	EA	20
14	96906	MS15795-842	.WASHER,FLAT-ROUND.....	EA	20
15	19200	12712970-1	.VENTURI ASSY,CONDENSER FAN.....	EA	1
16	19200 28488	12712962-1 3702-1	.CONNECTOR,STRAIN RELIEF.....	EA	1
17	19200	12712979-1	.BRACE,RIGHT-CONDENSER MOTOR MOUNT.....	EA	1
18	19200	12712980-1	.BRACE,LEFT-CONDENSER MOTOR MOUNT.....	EA	1
19	96906	MS35307-334	.SCREW,CAP HEX HD.....	EA	4

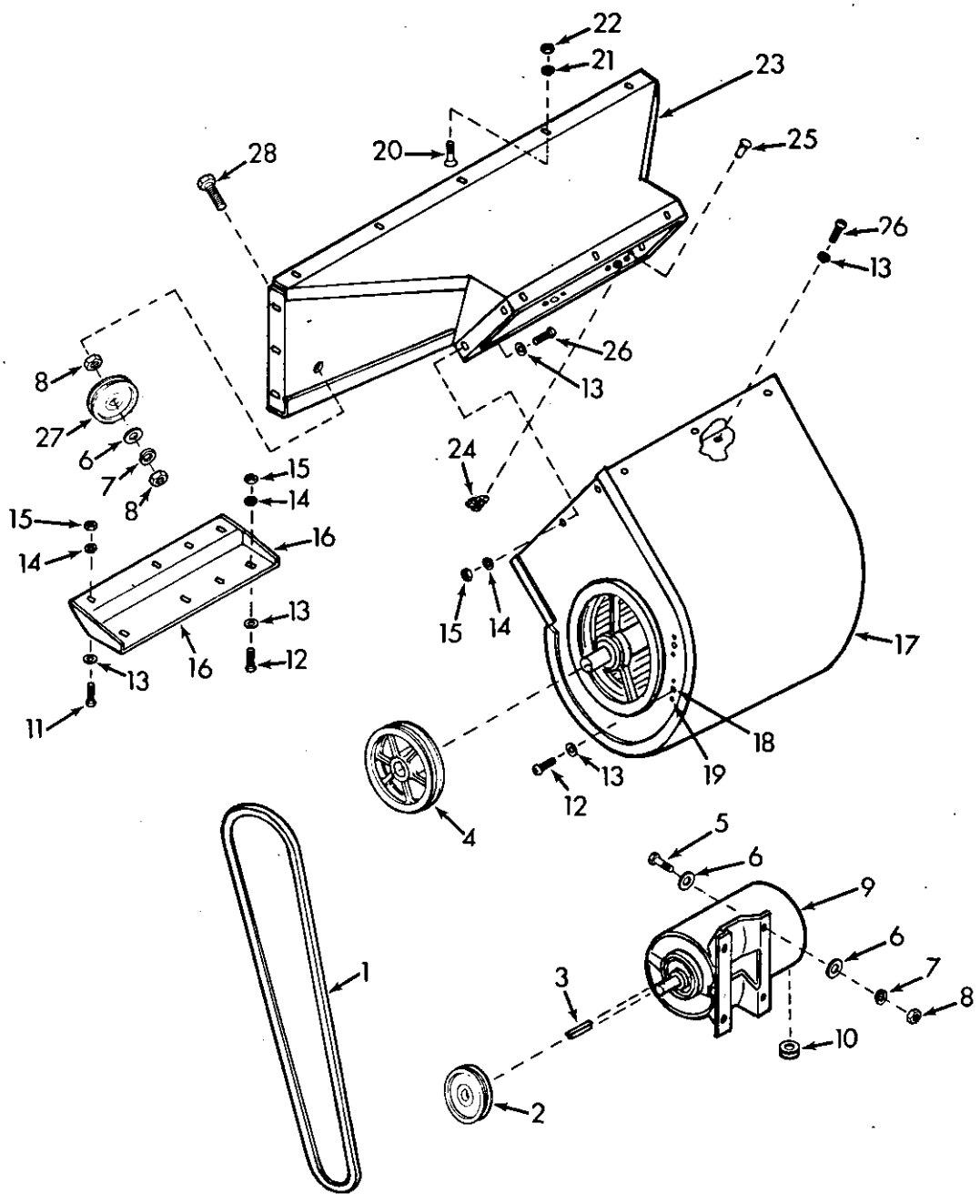


Figure 7-9. Conditioned Air Fan Group

Figure 7-9. Conditioned Air Fan Group

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS39255A35	.BELT,V INDUSTRIAL.....	EA	1
2	19200	12712987-2	.SHEAVE,MOTOR SHAFT (60 HZ).....	EA	1
3	96906	MS20066-143	.KEY,MACH-SQUARE.....	EA	1
4	19200 71176	12712819 AK56	.SHEAVE,FAN SHAFT.....	EA	1
5	96906	MS35307-333	.SCREW,CAP,HEX HD.....	EA	4
6	19200	12712942-1	.WASHER.....	EA	9
7	96906	MS35338-140	.WASHER,LOCK-SPRING.....	EA	5
8	96906	MS35649-2314	.NUT,PLAIN-HEX,CRES.....	EA	6
9	19200	12712804	.MOTOR EVAPORATOR FAN B1.....	EA	1
10	96906	MS35489-7	.GROMMET,RUBBER.....	EA	1
11	96906	MS51957-67	.SCREW,MACH-PAN HD.....	EA	4
12	96906	MS51957-64	.SCREW,MACH-PAN HD.....	EA	8
13	96906	MS15795-842	.WASHER,FLAT ROUND.....	EA	22
14	96906	MS35338-138	.WASHER,LOCK-SPRING.....	EA	15
15	96906	MS35650-304	.NUT,PLAIN-HEX.....	EA	15
16	19200	12712751-1	.SUPPORT,BLOWER.....	EA	1
17	19200	12712764-1	.MODIFICATION,CENTRIFUGAL FAN....	EA	1
18	80205	NAS1031C3	..NUT,PLATE-SELF LOCKING.....	EA	4
19	19200 11815	12712966 BSC-32	..RIVET,FLUSH HEAD.....	EA	8

Figure 7-9. Conditioned Air Fan Group (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
20	96906	MS24693-C274	.SCREW,MACH-FLAT CTSK HD.....	EA	16
21	96906	MS35338-138	.WASHER,LOCK-SPRING.....	EA	16
22	96906	MS35650-304	.NUT,PLAIN-HEX.....	EA	16
23	19200	12712729-1	.DUCT,SUPPLY.....	EA	1
24	80205	NAS1031C3	..NUT,PLATE,SELF-LOCKING.....	EA	3
25	96906	MS20426AD3-4	..RIVET,SOLID.....	EA	6
26	96906	MS51958-63	.SCREW,MACH-PAN HD.....	EA	10
27	19200	12712987-1	.SHEAVE,MOTOR SHAFT (50 HZ).....	EA	
28	19200	12713014-1	.ROD,SUPPORT SHEAVE.....	EA	1
			*USE ITEM 2 ON MOTOR SHAFT FOR 60 HZ POWER SOURCE. FOR UNITS WITH 50 HZ POWER SOURCE USE ITEM 27 ON MOTOR SHAFT AND PLACE ITEM 2 IN STORAGE POSITION.		

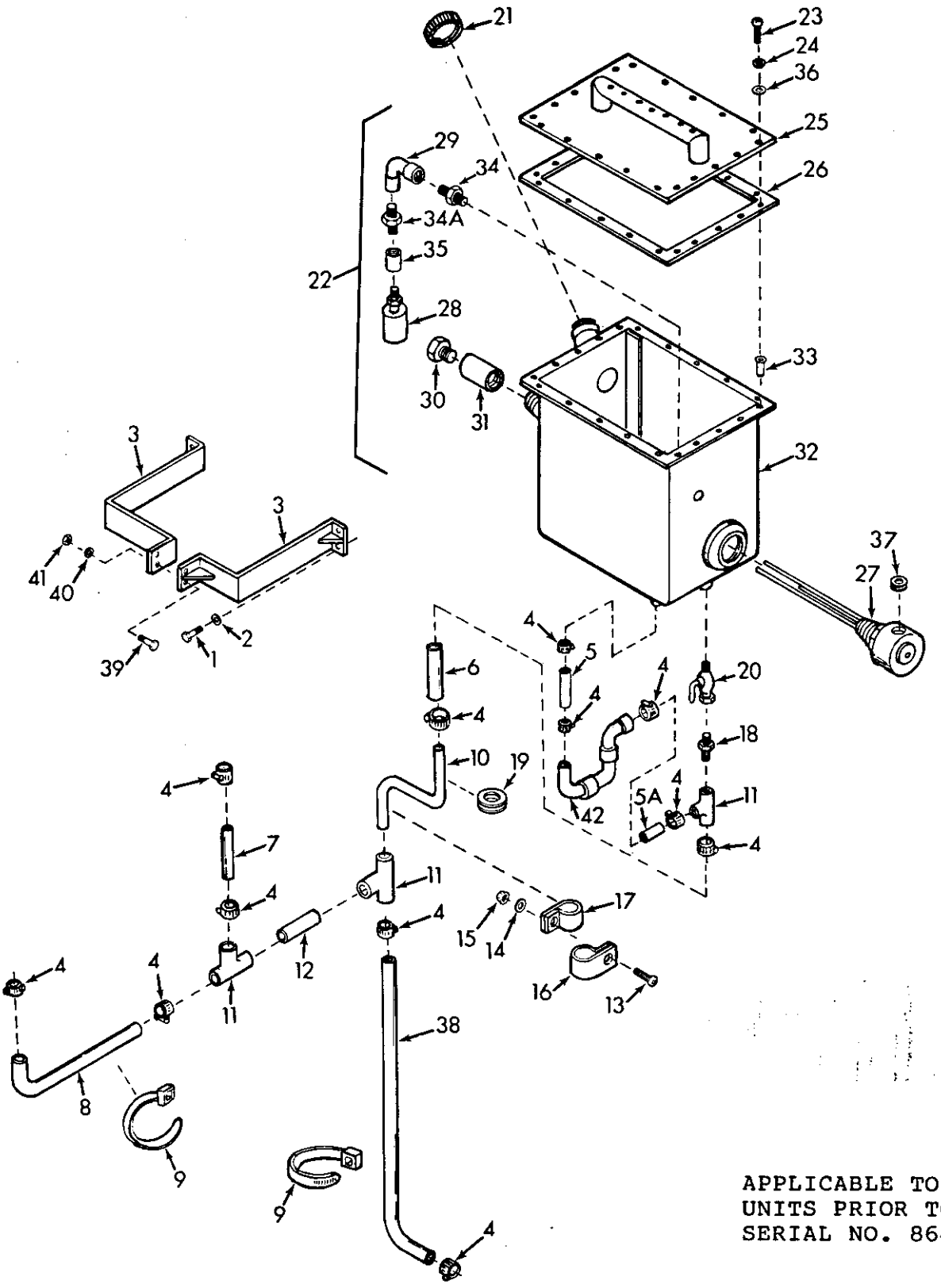


Figure 7-10. Humidifier Tank Group and Condensate Drain

Figure 7-10. Humidifier Tank Group and Condensate Drain

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS35208-306	.SCREW,CAP,HEX HD.....	EA	4
2	96906	MS15795-810	.WASHER,FLAT-ROUND.....	EA	4
3	19200	12712748-1	.STRAP,HUMIDIFIER.....	EA	2
4	96906	MS35842-11	.CLAMP,HOSE.....	EA	12
5	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
5A	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
6	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
7	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
8	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
9	96906	MS3367-1-9	.STRAP,TIEDOWN.....	EA	4
10	81346	ASTM-B280 .750 OD	.TUBE,COPPER.....	EA	1
11	96906	MS35929-6	.TEE,TUBE.....	EA	3
12	81346	ASTM-B280 .750 OD	.TUBE,COPPER.....	EA	1
13	96906	MS51957-46	.SCREW,MACH-PAN HD.....	EA	1
14	96906	MS15795-841	.WASHER,FLAT-ROUND.....	EA	1
15	96906	MS21044C08	.NUT,SELF-LOCKING HEX.....	EA	1
16	96906	MS21919DG8	.CLAMP,LOOP TYPE.....	EA	1
17	96906	MS21919DG14	.CLAMP,LOOP TYPE.....	EA	1
18	96905	MS35921-6-4	.ADAPTER,STRAIGHT.....	EA	1

Figure 7-10. Humidifier Tank Group and Condensate Drain (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
19	96906	MS35489-123	.GROMMET,RUBBER.....	EA	1
20	19200 88763	12712783 51P	.COCK,DRAIN.....	EA	1
21	19200	12713075	.CAP,TANK.....	EA	1
22	19200	12712880-1	.HUMIDIFIER TANK ASSY.....	EA	1
23	96906	MS51958-64	..SCREW,MACH-PAN HD.....	EA	20
24	96906	MS35338-138	..WASHER,LOCK-SPRING.....	EA	20
25	19200	12712705-1	..HUMIDIFIER TOP.....	EA	1
26	19200	12712710	..GASKET,HUMIDIFIER.....	EA	1
27	19200 65586	12712796 156-555223-001 REV 4	..HEATER,IMMERSION HR-8.....	EA	1
28	19200 04034	12712794 46203	..SWITCH,LIQUID LEVEL S10.....	EA	1
29	19200 34646	12712973 30015-1/4	..ELBOW,PIPE 90° STREET.....	EA	1
30	19200 80885	12712793 A2890-5	..SIGHT GLASS.....	EA	1
31	19200 34646	12712780-2 32615-1	..COUPLING,PIPE.....	EA	1
32	19200	12712881-1	..TANK,HUMIDIFIER.....	EA	1
33	80205	NAS1330C3KB116	...NUT,BLIND RIVET.....	EA	20
34	19200	12712974	..NIPPLE-PIPE THREAD.....	EA	1
34A	19200	12712974-2	..NIPPLE-PIPE THREAD.....	EA	1

Figure 7-10. Humidifier Tank Group and Condensate Drain (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
35	19200 34646	12712780-1 32615-1/4	..COUPLING,PIPE.....	EA	1
36	96906	MS15795-808	..WASHER,FLAT-ROUND.....	EA	20
37	96906	MS35489-14	..GROMMET.....	EA	1
38	97403	13218E0001-305	.TUBING,PLASTIC.....	EA	1
39	96906	MS35207-310	.SCREW,CAP,HEX HD.....	EA	2
40	96906	MS35338-139	.WASHER,LOCK SPRING,HELICAL.....	EA	2
41	96906	MS35649-2254	.NUT,PLAIN HEX.....	EA	2
42	19200	12713024	."P" TRAP.....	EA	

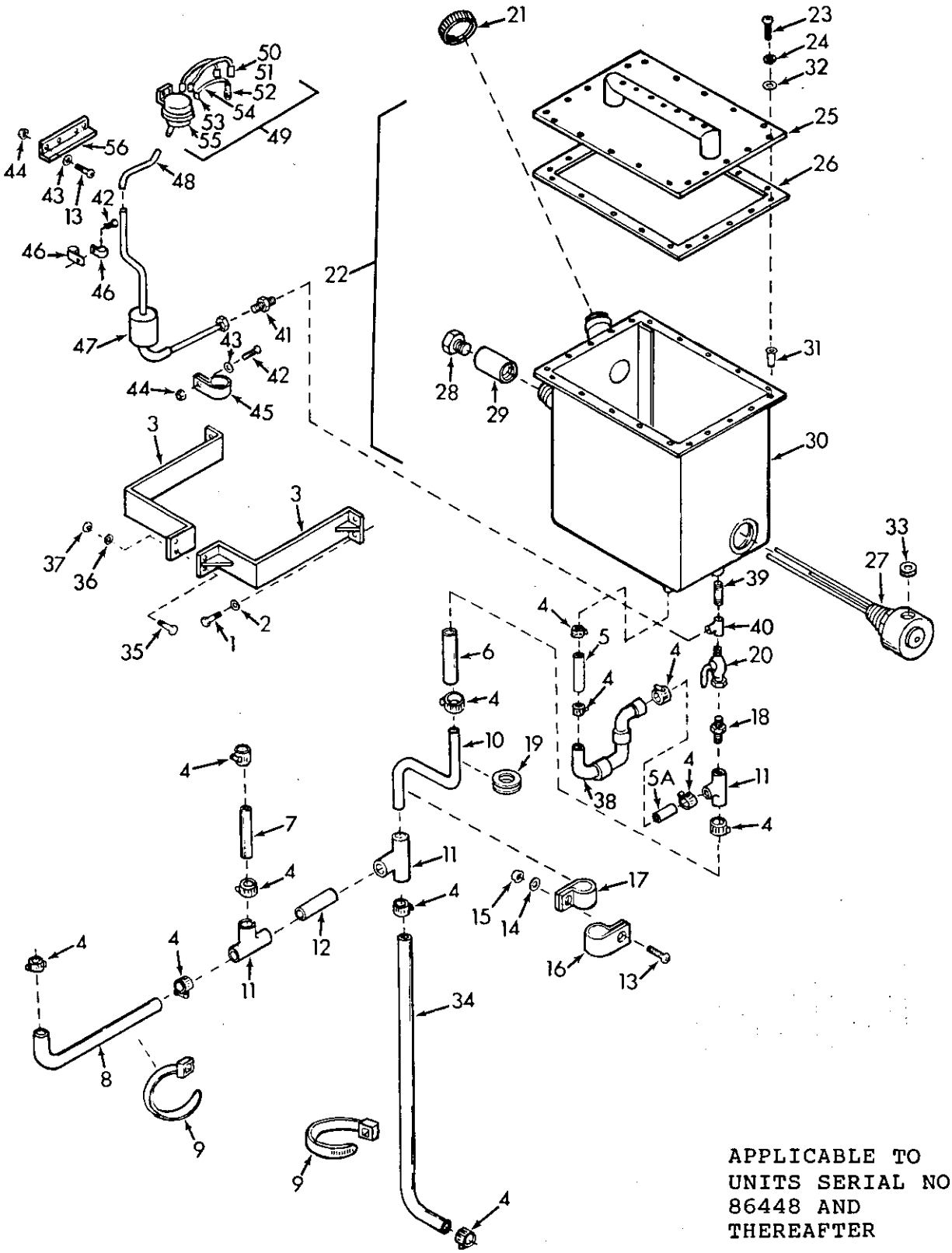


Figure 7-10A. Humidifier Tank Group and Condensate Drain

Figure 7-10A. Humidifier Tank Group and Condensate Drain

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS35208-306	.SCREW,CAP,HEX HD.....	EA	4
2	96906	MS15795-810	.WASHER,FLAT-ROUND.....	EA	4
3	19200	12712748-1	.STRAP,HUMIDIFIER.....	EA	2
4	96906	MS35842-11	.CLAMP,HOSE.....	EA	12
5	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
5A	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
6	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
7	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
8	97403	13218E0001-305	.TUBING,PLASTIC.....	IN	AR
9	96906	MS3367-1-9	.STRAP,TIEDOWN.....	EA	4
10	81346	ASTM-B280 .750 OD	.TUBE,COPPER.....	EA	1
11	96906	MS35929-6	.TEE,TUBE.....	EA	3
12	81346	ASTM-B280 .750 OD	.TUBE,COPPER.....	EA	1
13	96906	MS51957-46	.SCREW,MACH-PAN HD.....	EA	5
14	96906	MS15795-841	.WASHER,FLAT-ROUND.....	EA	1
15	96906	MS21044C08	.NUT,SELF-LOCKING HEX.....	EA	1
16	96906	MS21919DG8	.CLAMP,LOOP TYPE.....	EA	1
17	96906	MS21919DG14	.CLAMP,LOOP TYPE.....	EA	1
18	96905	MS35921-6-4	.ADAPTER,STRAIGHT.....	EA	1

Figure 7-10A. Humidifier Tank Group and Condensate Drain (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
19	96906	MS35489-123	.GROMMET,RUBBER.....	EA	1
20	19200 88763	12712783 51P	.COCK,DRAIN.....	EA	1
21	19200	12713075	.CAP,TANK.....	EA	1
22	19200	9369597-1	.HUMIDIFIER ASSY.....	EA	1
23	96906	MS51958-64	..SCREW,MACH-PAN HD.....	EA	20
24	96906	MS35338-138	..WASHER,LOCK-SPRING.....	EA	20
25	19200	12712705-1	..HUMIDIFIER TOP.....	EA	1
26	19200	12712710	..GASKET,HUMIDIFIER.....	EA	1
27	19200 65586	12712796 156-555223-001 REV 4	..HEATER,IMMERSION HR-8.....	EA	1
28	19200 80885	12712793 A2890-5	..SIGHT GLASS.....	EA	1
29	19200 34646	12712780-2 32615-1	..COUPLING,PIPE.....	EA	1
30	19200	9369598-1	..TANK,HUMIDIFIER.....	EA	1
31	80205	NAS1330C3KB116	...NUT,BLIND RIVET.....	EA	20
32	96906	MS15795-808	..WASHER,FLAT-ROUND.....	EA	20
33	96906	MS35489-14	..GROMMET.....	EA	1
34	97403	13218E0001-305	.TUBING,PLASTIC.....	EA	1
35	96906	MS35207-310	.SCREW,CAP,HEX HD.....	EA	2
36	96906	MS35338-139	.WASHER,LOCK SPRING,HELICAL.....	EA	2

Figure 7-10A. Humidifier Tank Group and Condensate Drain (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
37	96906	MS35649-2254	.NUT,PLAIN HEX.....	EA	2
38	19200	12713024-1	."P" TRAP.....	EA	1
39	19200	9369589	.NIPPLE, PIPE THREAD.....	EA	1
40	19200	9369583	.TEE, SCREWED FITTING.....	EA	1
41	19200	9369582	.CONNECTOR, MALE.....	EA	1
42	96906	MS51957-47	.SCREW,MACH PAN HD.....	EA	2
43	96906	MS15795-841	.WASHER, FLAT.....	EA	5
44	96906	MS21044C08	.NUT, SELF LOCKING.....	EA	5
45	96906	MS21919DG32	.CLAMP, LOOP TYPE, CUSHIONED.....	EA	1
46	96906	MS21919DG3	.CLAMP, LOOP TYPE, CUSHIONED.....	EA	1
47	19200	9369588-1	.AIR TRAP ASSEMBLY.....	EA	1
48	81348	ZZ-R-765,CLASS 2,GRADE 60	.TUBING, RUBBER SILICONE, 0.125 I.D. X 0.063 WALL.....	IN	AR
49	19200	9369596-1	.PRESSURE SWITCH ASSEMBLY.....	EA	1
50	19200 00779	12712936 480054-3	..HOUSING,RECEPTACLE.....	EA	2
51	19200 00779	12712937-2 42282-2	..RECEPTACLE, SINGLE CIRCUIT CONNCTOR.....	EA	2
52	96906	MS25036-149	..TERMINAL LUG.....	EA	1
53	97403 00779	13211E8288 41532	..TERMINAL, FLAG TYPE.....	EA	3

Figure 7-10A. Humidifier Tank Group and Condensate Drain (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
54	81349	M16878/4-BHE9 MIL-W-16878	..WIRE, ELECTRICAL 18 AWG.....	FT	3
55	19200 18163	9369593 738-745	..SWITCH, PRESSURE.....	EA	1
56	19200	9369591	..BRACKET, PRESSURE SWITCH.....	EA	1

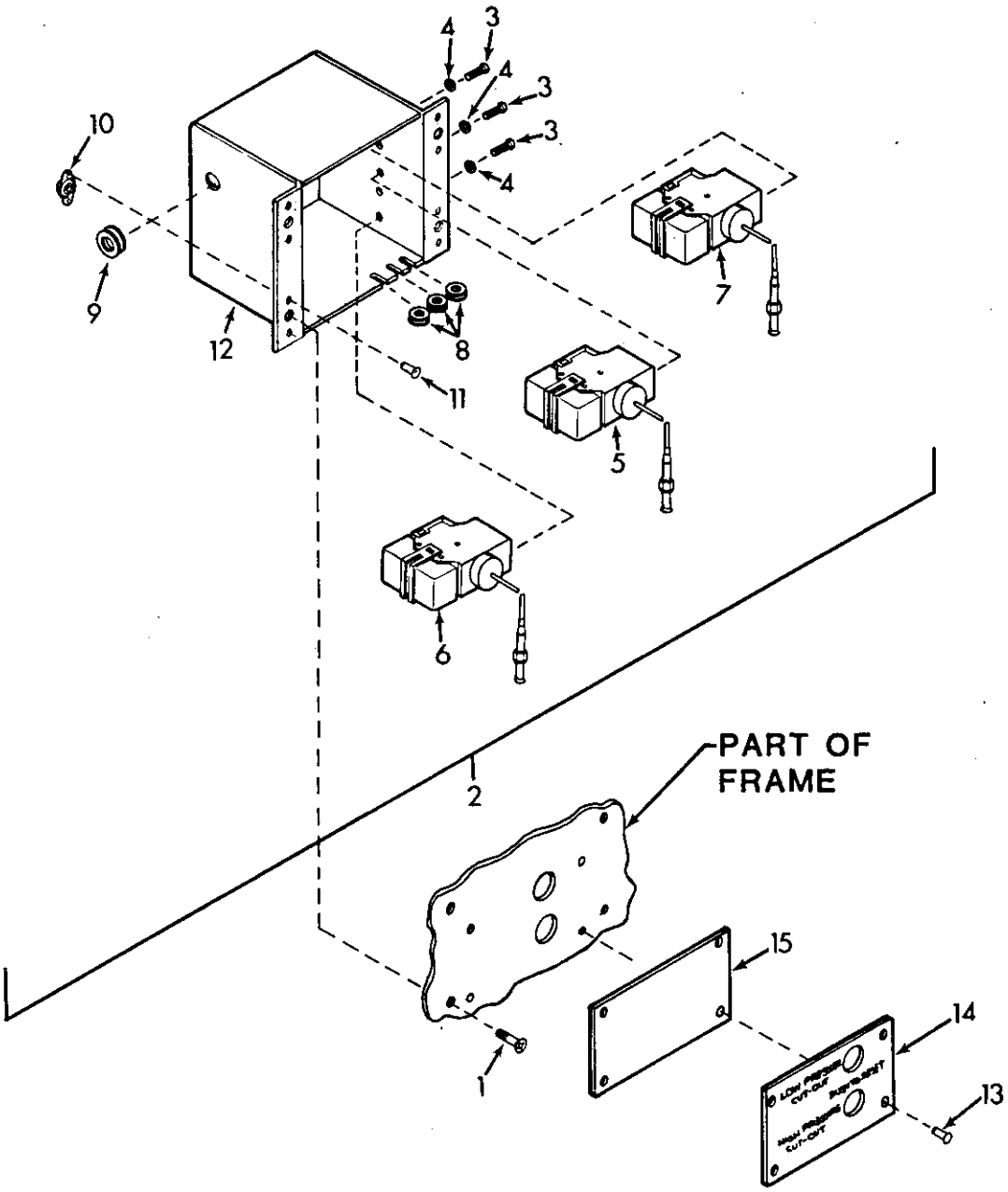


Figure 7-11. Pressure Switches

Figure 7-11. Pressure Switches

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS24693-C50	.SCREW,MACH-FLAT CTSK HD.....	EA	4
2	19200	12712769-1	.BOX ASSEMBLY,PRESSURE SWITCH....	EA	1
3	96906	MS51957-27	..SCREW,MACH-PAN HD.....	EA	6
4	96906	MS35338-136	..WASHER,LOCK-SPRING.....	EA	6
5	97403 50831	13214E4309 P20BA-22 WITH COVER 210-604	..SWITCH,PRESSURE,LOW **S5**.....	EA	1
6	97403 50831	13211E8404 P20DA-72 WITH COVER 210-604	..SWITCH,HIGH PRESSURE CUT-OUT **S4**.....	EA	1
7	19200 50831	12712812 P20AA-138	..SWITCH,PRESSURE,FAN **S6**.....	EA EA	1 1
8	96906	MS35489-1	..GROMMET,RUBBER.....	EA	3
9	96906	MS35489-6	..GROMMET,RUBBER.....	EA	1
10	80205	NAS1031C08	..NUT,SELF-LOCKING.....	EA	4
11	96906	MS20426AD3-5	..RIVET,SOLID CTSK HD.....	EA	8
12	19200	12712750	..ENCLOSURE,PRESSURE SWITCH.....	EA	1
13	97403 07707	13214E3789-2 AD42H	.RIVET,BLIND.....	EA	4
14	19200	12712882	.INSTRUCTION PLATE,PRESSURE SWITCH.....	EA	1
15	97403	13215E9852	.GASKET.....	EA	1

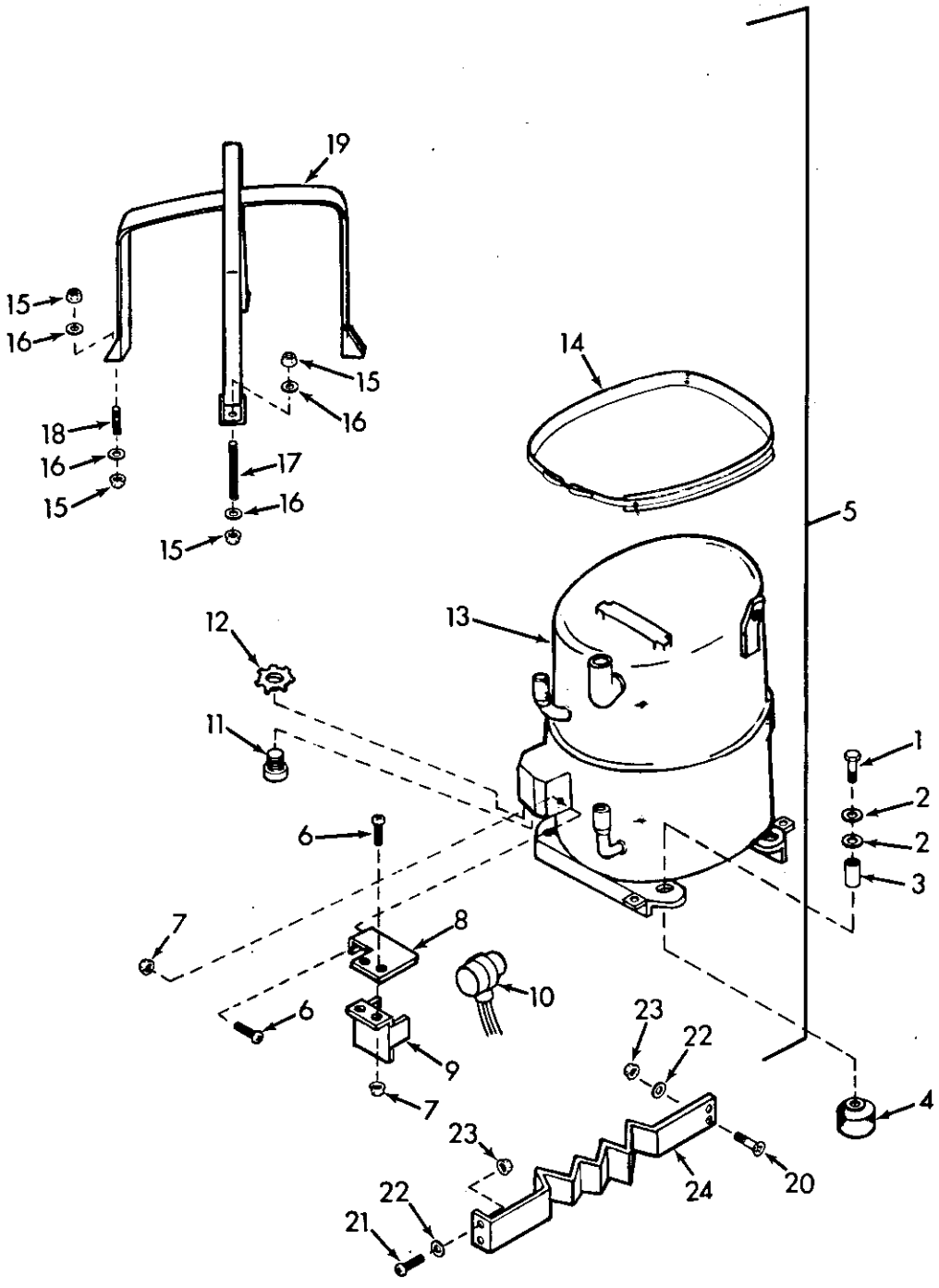


Figure 7-12. Compressor

Figure 7-12. Compressor

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS35308-341	.SCREW,CAP,HEX HD.....	EA	4
2	19200	12712942-1	.WASHER,COMPRESSOR.....	EA	8
3	19200 59431	12712959 70465	.SLEEVE.....	EA	4
4	19200 59431	12712958 70650-1	.MOUNT,RESILIENT.....	EA	4
5	19200	12712956-1	.COMPRESSOR ASSEMBLY **B3**.....	EA	1
6	96906	MS51958-64	..SCREW,MACH-PAN HD.....	EA	3
7	96906	MS21044-C3	..NUT,SELF-LOCKING.....	EA	3
8	19200	12712766	..BRACKET,TEMPERATURE CONTROL....	EA	1
9	97403	13226E1495	..SUPPORT TEMPERATURE CONTROL....	EA	1
10	97403 82647	13225E8168 C4391S5	..CONTROL,TEMPERATURE **S9**.....	EA	1
11	19200 28488	12712962-2 3702-5	..CONNECTOR,STRAIN RELIEF.....	EA	2
12	19200 28488	12712961-1 1002	..LOCK NUT.....	EA	2
13	19200	12712955-1	..COMPRESSOR.....	EA	1
14	19200	12712791	..HEATER,COMPRESSOR **HR7**.....	EA	1
15	96906	MS17829-5C	..NUT,SELF LOCKING.....	EA	7
16	96906	MS15795-812	..WASHER,FLAT.....	EA	7
17	19200	12712981-1	..ROD,THREADED.....	EA	3
18	19200	12712981-2	..ROD,THREADED.....	EA	1

Figure 7-12. Compressor (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
19	19200	12712989-1	..STRAP,COMPRESSOR.....	EA	1
20	96906	MS24693-C52	.SCREW,MACH-FLAT HEAD.....	EA	2
21	96906	MS51957-46	.SCREW, MACH PAN HEAD.....	EA	2
22	96906	MS15795-841	.WASHER, FLAT ROUND.....	EA	4
23	96906	MS21044C08	.NUT SELF LOCKING HEX.....	EA	4
24	19200	12713022	.SHIELD,COMPRESSOR HEATER.....	EA	1

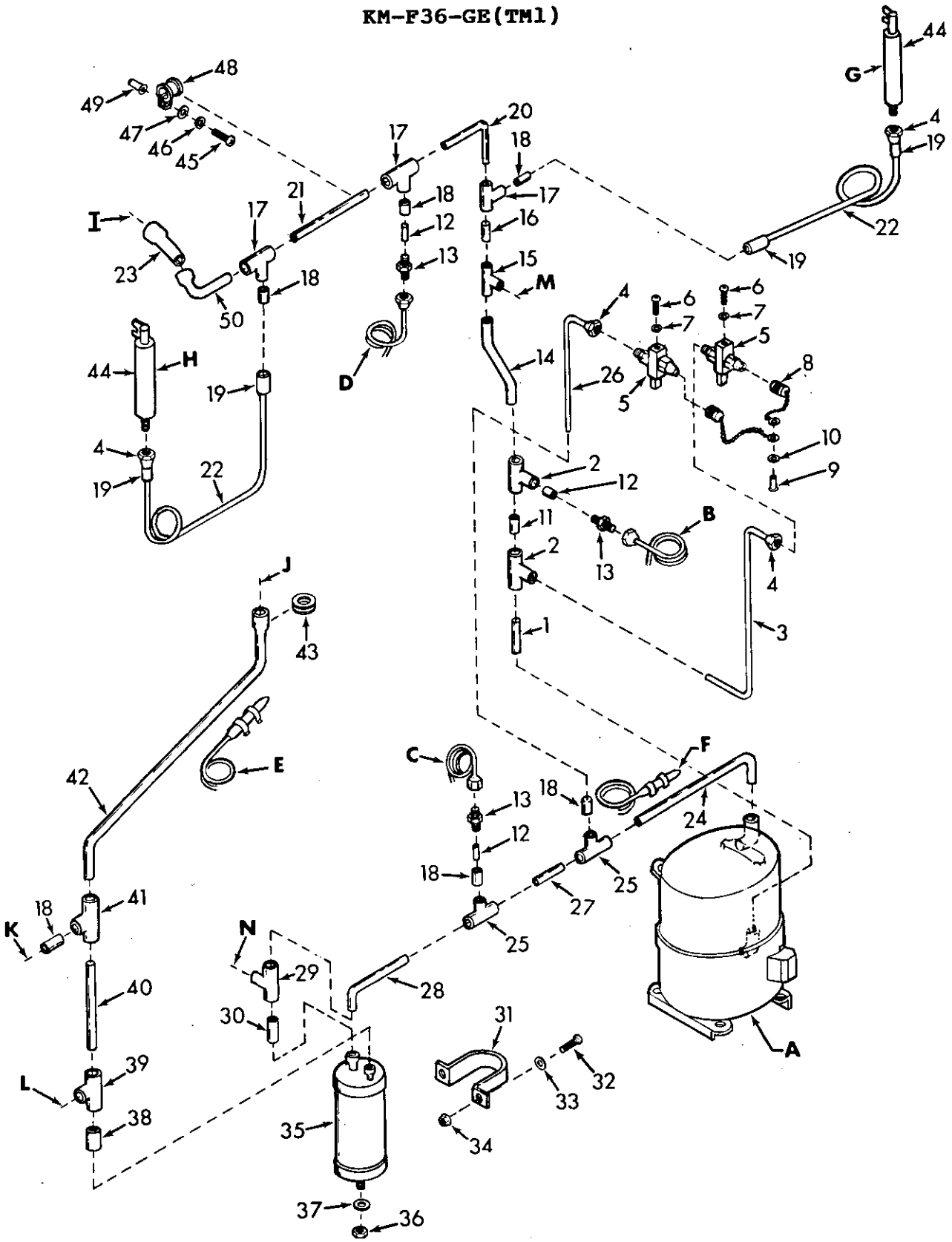


Figure 7-13. Refrigeration System-Compressor to Evaporator and Condenser Coil

A. COMPRESSOR - SEE FIGURE 7-12
B. PART OF HIGH PRESSURE CUT-OUT SWITCH-SEE FIGURE 7-11, ITEM 6
C. PART OF LOW PRESSURE CUT-OUT SWITCH-SEE FIGURE 7-11, ITEM 5
D. PART OF FAN PRESSURE SWITCH-SEE FIGURE 7-11, ITEM 7
E. BULB, CLAMPS, AND HARDWARE ARE PART OF OR ARE SUPPLIED WITH EXPANSION VALVE, FIGURE 7-14, ITEM 6
F. BULB, CLAMPS, AND HARDWARE ARE PART OF OR ARE SUPPLIED WITH QUENCH VALVE, FIGURE 7-15, ITEM 2
G. RIGHT SIDE CONDENSER AIR INLET LOUVER ACTUATOR
H. LEFT SIDE CONDENSER AIR INLET LOUVER ACTUATOR
I. TO CONDENSER COIL, FIGURE 7-17, ITEM 2
J. TO EVAPORATOR COIL, FIGURE 7-16, ITEM 3
K. TO TUBE, COPPER, FIGURE 7-14, ITEM 5
L. TO TUBE, COPPER, FIGURE 7-15, ITEM 7
M. TO TUBE, COPPER, FIGURE 7-15, ITEM 18
N. TO TUBE, COPPER, FIGURE 7-15, ITEM 6

Figure 7-13. Refrigeration System-Compressor to Evaporator and Condenser Coil

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
2	97403 41947	13211E4043-12 W-40350	.TEE.....	EA	2
3	81346	ASTM-B280 .250 OD	.TUBE,COPPER.....	EA	1
4	96906	MS35872-2	.FLARE NUT,REFRIGERATION.....	EA	4
5	19200	12712952	.SERVICE VALVE,WRENCH OPERATED...	EA	2
6	19200	12712977	.SCREW,MACH-HEX HD.....	EA	4

Figure 7-13. Refrigeration System-Compressor to Evaporator and Condenser Coil (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
7	96906	MS35338-136	.WASHER,LOCK-SPRING HELICAL.....	EA	4
8	97403 07295	13219E9540 40570	.CAP AND CHAIN.....	EA	2
9	96906	MS20600AD8W6	.RIVET.....	EA	1
10	96906	MS15795-810	.WASHER,FLAT-ROUND.....	EA	1
11	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
12	81346	ASTM-B280 .250 OD	.TUBE,COPPER.....	EA	3
13	96906	MS35919-22	.ADAPTER,STRAIGHT,PIPE TO TUBE, EXTERNAL FLARE TO FEMALE SOLDER.	EA	3
14	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
15	97403 41947	13211E4043-38 W-4026	.TEE.....	EA	1
16	81346	ASTM-B280 .750 OD	.TUBE,COPPER.....	EA	1
17	97403 41947	13211E4043-33 W-4020	.TEE.....	EA	3
18	97403 41947	13211E3799-1 W-1706	.BUSHING,FLUSH.....	EA	6
19	81346	ASTM-B280 .250 OD	.TUBE,COPPER.....	EA	4
20	81346	ASTM-B280 .750 OD	.TUBE,COPPER.....	EA	1

Figure 7-13. Refrigeration System-Compressor to Evaporator and Condenser Coil (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
21	81346	ASTM-B280 .750 OD	.TUBE,COPPER.....	EA	1
22	81346	ASTM-B280 .125 OD	.TUBE,COPPER.....	EA	2
23	81346	ASTM-B280 .750 OD	.TUBE,COPPER.....	EA	1
24	81346	ASTM-B280 .875 OD	.TUBE,COPPER.....	EA	1
25	97403 41947	13211E4043-44 W4035	.TEE	EA	2
26	81346	ASTM-B280 .250 OD	.TUBE,COPPER.....	EA	
27	81346	ASTM-B280 .875 OD	.TUBE,COPPER.....	EA	1
28	81346	ASTM-B280 .875 OD	.TUBE,COPPER.....	EA	1
29	97403 41947	13211E4043-43 W4034	.TEE.....	EA	1
30	81346	ASTM-B280 .875 OD	.TUBE,COPPER.....	EA	1
31	19200	12712721	.STRAP,ACCUMULATOR.....	EA	1
32	96906	MS51958-64	.SCREW,MACH-PAN HD.....	EA	2
33	96906	MS15795-842	.WASHER,FLAT.....	EA	2
34	96906	MS21044C3	.NUT,SELF LOCKING,HEX.....	EA	2

Figure 7-13. Refrigeration System-Compressor to Evaporator and Condenser Coil (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
35	19200	12712806	.ACCUMULATOR SUCTION.....	EA	1
36	96906	MS35649-2384	.NUT,PLAIN HEX.....	EA	1
37	96906	MS15795-814	.WASHER,FLAT,ROUND.....	EA	1
38	81346	ASTM-B280 .875 OD	.TUBE,COPPER.....	EA	1
39	97403 41947	13211E4043-42 W-4033	.TEE.....	EA	1
40	81346	ASTM-B280 .875 OD	.TUBE,COPPER.....	EA	1
41	97403 41947	13211E4043-44 W4035	.TEE.....	EA	1
42	81346	ASTM-B280 .875 OD	.TUBE,COPPER.....	EA	1
43	96906	MS35489-51	.GROMMET.....	EA	1
44	97403 80439	13220E2356 P011-22	.CYLINDER,ACTUATING,LINEAR.....	EA	2
45	96906	MS51957-47	.SCREEN,MACH-PAN HD.....	EA	1
46	96906	MS35338-137	.WASHER,LOCK-SPRING,HELICAL.....	EA	1
47	96906	MS15795-841	.WASHER,FLAT-ROUND.....	EA	1
48	96906	MS21919DG12	.CLAMP,LOOP TYPE CUSHIONED.....	EA	1
49	96906	MS27130CR13	.NUT,BLIND RIVET.....	EA	1
50	97403 41947	13225E8093-4 W2828	.ELBOW,TUBE.....	EA	1

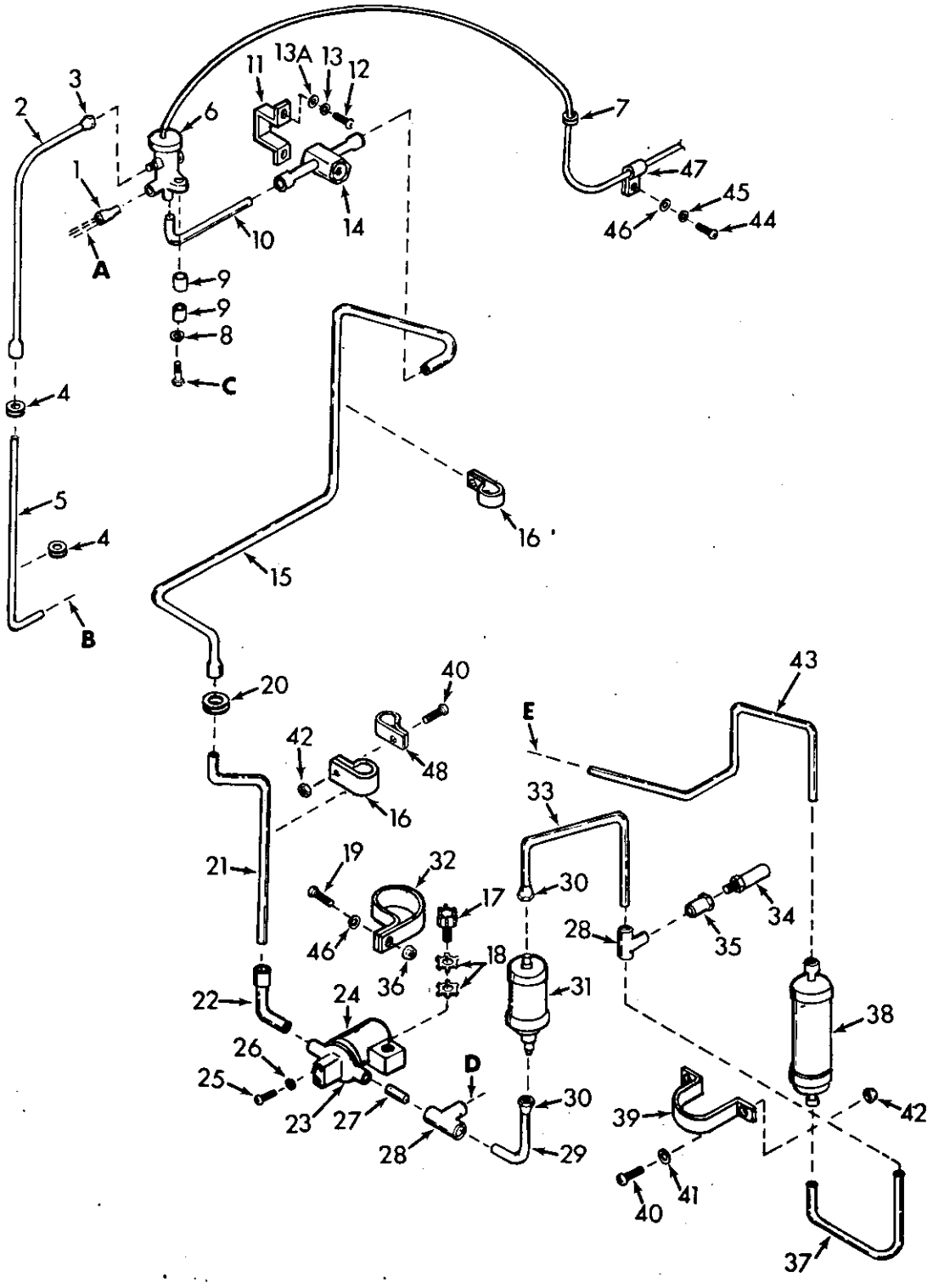


Figure 7-14. Refrigeration System-Expansion Valve to Condenser Coil

A. DISTRIBUTOR LINES - PART OF EVAPORATOR COIL, FIGURE 7-16, ITEM 3
B. TO FLUSH BUSHING, FIGURE 7-13, ITEM 18
C. SUPPLIED WITH EXPANSION VALVE ITEM 6
D. TO TUBE, COPPER, FIGURE 7-15, ITEM 1
E. TO CONDENSER COIL, FIGURE 7-17, ITEM 2

Figure 7-14. Refrigeration System-Expansion Valve to Condenser Coil

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	97403 78462 70255	13214E3986-1 1620-6-5/32-1-1/2 5-2.5-6	.DISTRIBUTOR, REFRIGERANT.....	EA	1
2	81346	ASTM-B280 .250 OD	.TUBE,COPPER.....	EA	1
3	96906	MS35872-2	.FLARE NUT,REFRIGERATION.....	EA	1
4	96906	MS35489-35	.GROMMET,RUBBER.....	EA	2
5	81346	ASTM-B280 .250 OD	.TUBE,COPPER.....	EA	1
6	97403	13214E4037	.VALVE,EXPANSION.....	EA	1
7	96906	MS35489-32	.GROMMET,RUBBER.....	EA	1
8	96906	MS35338-141	.WASHER,LOCK-SPRING HELICAL.....	EA	2
9	97403	13211E8376-3	.SPACER.....	EA	4
10	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
11	19200	12712746-1	.BRACKET,SIGHT GLASS.....	EA	1
12	96906	MS51957-46	.SCREW,MACH-PAN HEAD.....	EA	2
13	96906	MS35338-137	.WASHER,LOCK,SPRING,HELICAL.....	EA	2
13A	96906	MS15795-841	.WASHER,FLAT-ROUND.....	EA	2

Figure 7-14. Refrigeration System-Expansion Valve to Condenser Coil - (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
14	97403 78462	13216E6155-2 SA-14S	.INDICATOR,SIGHT LIQUID.....	EA	1
15	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
16	96906	MS21919DG8	.CLAMP,CUSHION,SUPPORT.....	EA	2
17	19200 28488	12712962-1 3701	.CONNECTOR,STRAIN RELIEF.....	EA	1
18	19200 28488	12712961-1 1002	.LOCKNUT.....	EA	2
19	96906	MS51957-46	.SCREW,MACH-PAN HD.....	EA	
20	96906	MS35489-43	.GROMMET,RUBBER.....	EA	1
21	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
22	96906	MS35928-4	.ELBOW,TUBE,STREET,90°.....	EA	1
23	19200 93781	12712810 TYPE ORB354	.VALVE,SOLENOID K5.....	EA	1
24	93781	OR-23MM-120V/ 50-60HZ	..COIL,SOLENOID VALVE.....	EA	1
25	96906	MS51957-45	.SCREW,MACH-PAN HD.....	EA	2
26	96906	MS35338-137	.WASHER,LOCK-SPRING HELICAL.....	EA	2
27	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
28	96906	MS35929-4	.TEE.....	EA	2
29	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1

Figure 7-14. Refrigeration System-Expansion Valve to Condenser Coil - (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
30	96906	MS35872-4	.FLARE NUT.....	EA	2
31	97403 78462 70255	13214E4209 C-164 EK-164	.DEHYDRATOR,DESICCANT REFRIG.....	EA	1
32	96906	MS21919DG46	.CLAMP.....	EA	1
33	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
34	97403 21013	13211E8369 RV5100-025	.VALVE,PRESSURE RELIEF.....	EA	1
35	19200	12712968	.ADAPTER.....	EA	1
36	96906	MS21044C08	.NUT,SELF-LOCKING,HEX.....	EA	1
37	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
38	19200 97765	12712807 5266	.RECEIVER.....	EA	1
39	19200	12712894	.STRAP,RECEIVER.....	EA	1
40	96906	MS51958-64	.SCREW,MACH-PAN HD.....	EA	3
41	96906	MS15795-842	.WASHER,FLAT.....	EA	2
42	96906	MS21044C3	.NUT,SELF LOCKING,HEX.....	EA	3
43	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
44	96906	MS51957-47	.SCREW,MACH-PAN HD.....	EA	1
45	96906	MS35338-137	.WASHER,LOCK-SPRING,HELICAL.....	EA	1
46	96906	MS15795-841	.WASHER,FLAT-ROUND.....	EA	2

Figure 7-14. Refrigeration System-Expansion Valve to Condenser Coil - (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
47	96906	MS21919DG2	.CLAMP,LOOP TYPE,CUSHIONED.....	EA	1
48	96906	MS21919DG12	.CLAMP,LOOP TYPE,CUSHIONED.....	EA	1

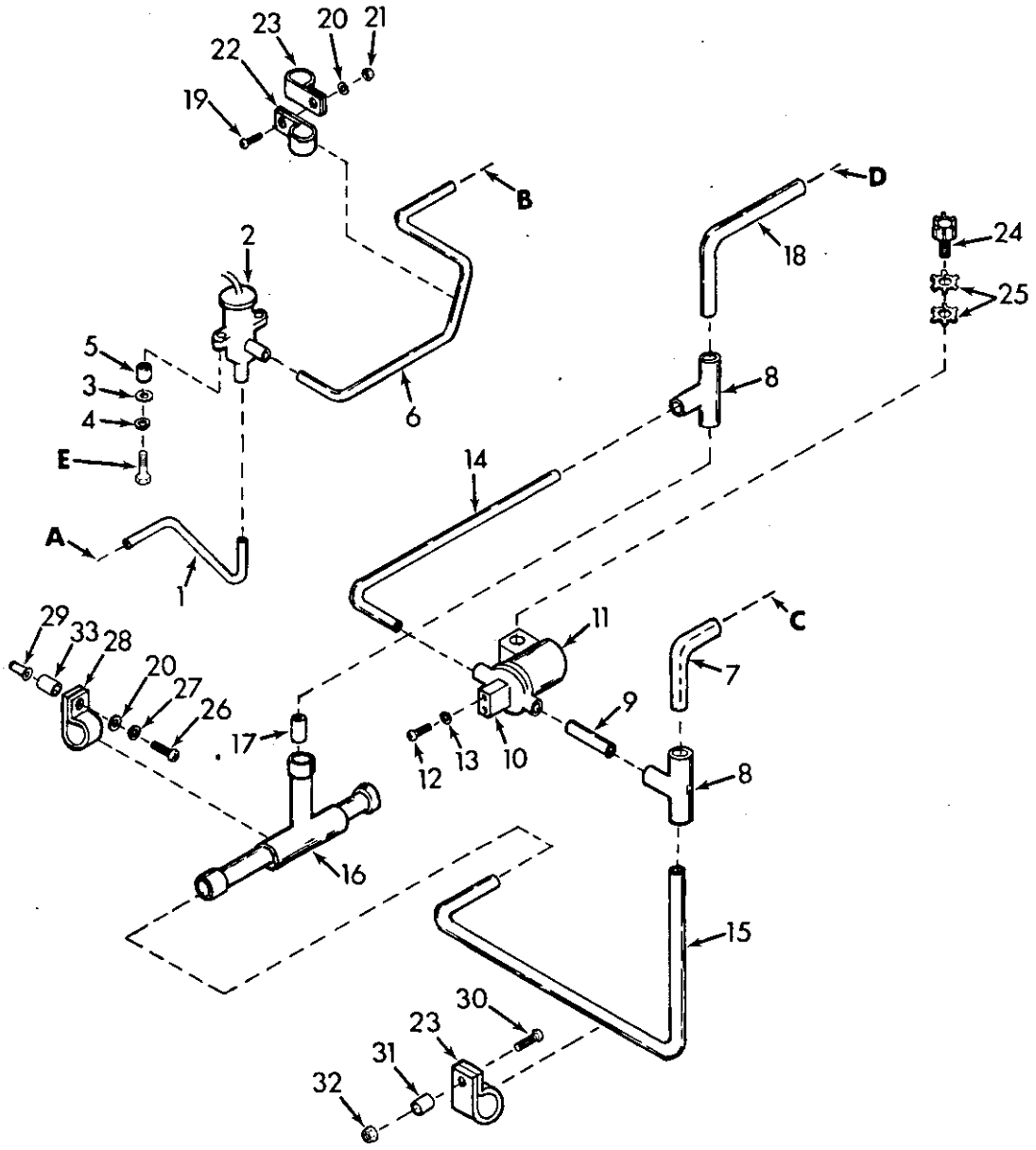


Figure 7-15. Refrigeration System-Bypass Section

A. TO TEE, FIGURE 7-14, ITEM 28
B. TO TEE, FIGURE 7-13, ITEM 29
C. TO TEE, FIGURE 7-13, ITEM 39
D. TO TEE, FIGURE 7-13, ITEM 15
E. SUPPLIED WITH QUENCH VALVE ITEM

Figure 7-15. Refrigeration System-Bypass System

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	81346	ASTM-B280 .375 OD	.TUBE,COPPER.....	EA	1
2	97403 70255	13214E3974 LCL2A	.VALVE,QUENCH.....	EA EA	1 1
3	96906	MS15795-813	.WASHER,FLAT-ROUND.....	EA	
4	96906	MS35338-141	.WASHER,LOCK-SPRING HELICAL.....	EA	
5	97403	13211E8376-3	.SPACER.....	EA	2
6	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
7	81346	ASTM-B280 .625 OD	.TUBE,COPPER.....	EA	1
8	97403 41947	13211E4043-20 W-4007	.TEE.....	EA	2
9	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
10	19200 93781	12712810 TYPE ORB354	.VALVE,SOLENOID K4.....	EA	1
11	93781	OR-23MM-120V/ 50-60HZ	..COIL,SOLENOID VALVE.....	EA	1
12	96906	MS51957-49	.SCREW ,MACH-PAN HD.....	EA	2
13	96906	MS35338-137	.WASHER,LOCK-SPRING HELICAL.....	EA	

Figure 7-15. Refrigeration System-Bypass System (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
14	81346	ASTM-B280 .500 OD	.TUBE,COPPER.....	EA	1
15	81346	ASTM-B280 .625 OD	.TUBE,COPPER.....	EA	1
16	97403 91494	13211E3800 237AW10"/ 75L5/8	.VALVE, PRESSURE REGULATOR.....	EA	1
17	81346	ASTM-B280 .625 OD	.TUBE,COPPER.....	EA	1
18	81346	ASTM-B280 .625 OD	.TUBE,COPPER.....	EA	1
19	96906	MS51957-46	.SCREW,MACH-PAN HD.....	EA	1
20	96906	MS15795-841	.WASHER,FLAT-ROUND.....	EA	2
21	96906	MS21044C08	.NUT,SELF-LOCKING HEX.....	EA	1
22	96906	MS21919DG8	.CLAMP,LOOP TYPE.....	EA	1
23	96906	MS21919DG10	.CLAMP,LOOP TYPE.....	EA	2
24	19200 28488	12712962-1 3701	.CONNECTOR,STRAIN RELIEF.....	EA	1
25	19200 28488	12712961-1 1002	.LOCKNUT.....	EA	2
26	96906	MS51957-50	.SCREW,MACH-PAN HD.....	EA	1
27	96906	MS35338-137	.WASHER,LOCK-SPRING HELICAL.....	EA	1

Figure 7-15. Refrigeration System-Bypass System (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
28	96906	MS21919DG12	.CLAMP,LOOP TYPE*.....	EA	1
	96906	MS21919DG14	.CLAMP,LOOP TYPE**.....	EA	1
29	96906	MS27130CR13	.NUT,BLIND RIVET.....	EA	1
30	96906	MS51958-65	.SCREW,MACH-PAN HEAD.....	EA	1
31	97403	13211E8376-6	.SPACER.....	EA	1
32	96906	MS21044C3	.NUT,SELF LOCKING HEX.....	EA	1
33	97403	13211E8376-1	.SPACER.....	EA	1

*Use with Singer Manufactured Valve
**Use with Alco Manufactured Valve

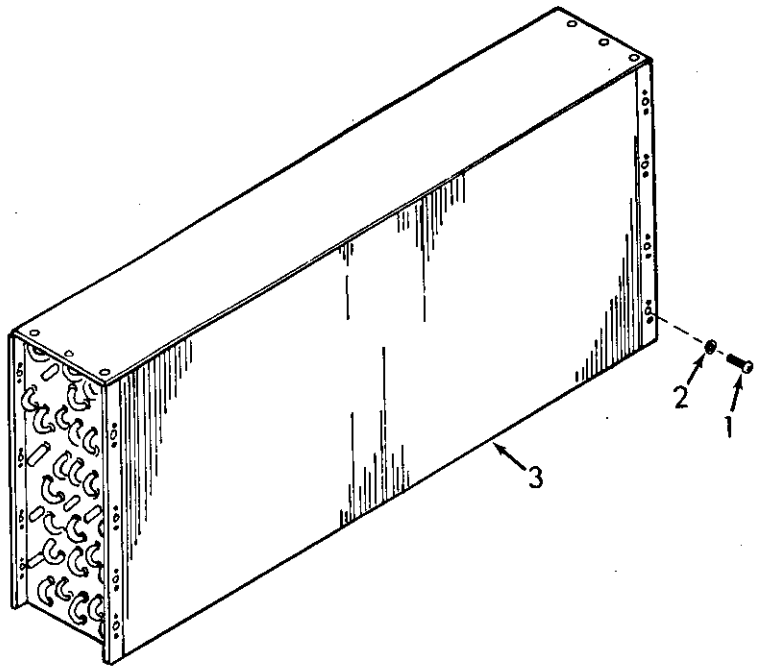


Figure 7-16. Evaporator Coil

Figure 7-16. Evaporator Coil

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS51958-64	.SCREW,MACH-PAN HD.....	EA	8
2	96906	MS35338-138	.WASHER,LOCK-SPRING.....	EA	8
3	19200	12712803	.COIL,EVAPORATOR.....	EA	1

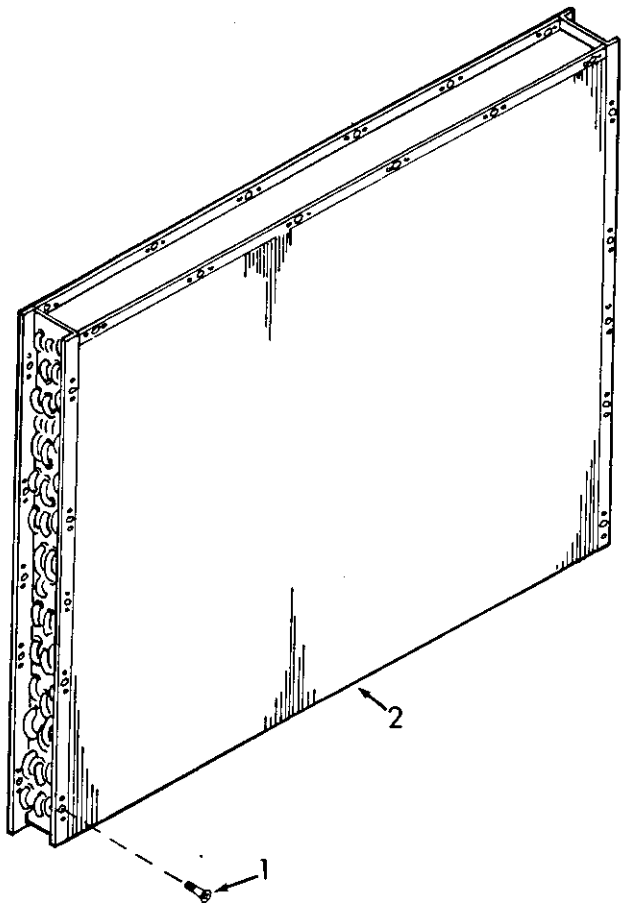


Figure 7-17. Condenser Coil

Figure 7-17. Condenser Coil					
ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	96906	MS24693-C274	.SCREW,MACH-FLAT CTSK HD.....	EA	14
2	19200	12712805	.COIL,CONDENSER.....	EA	1

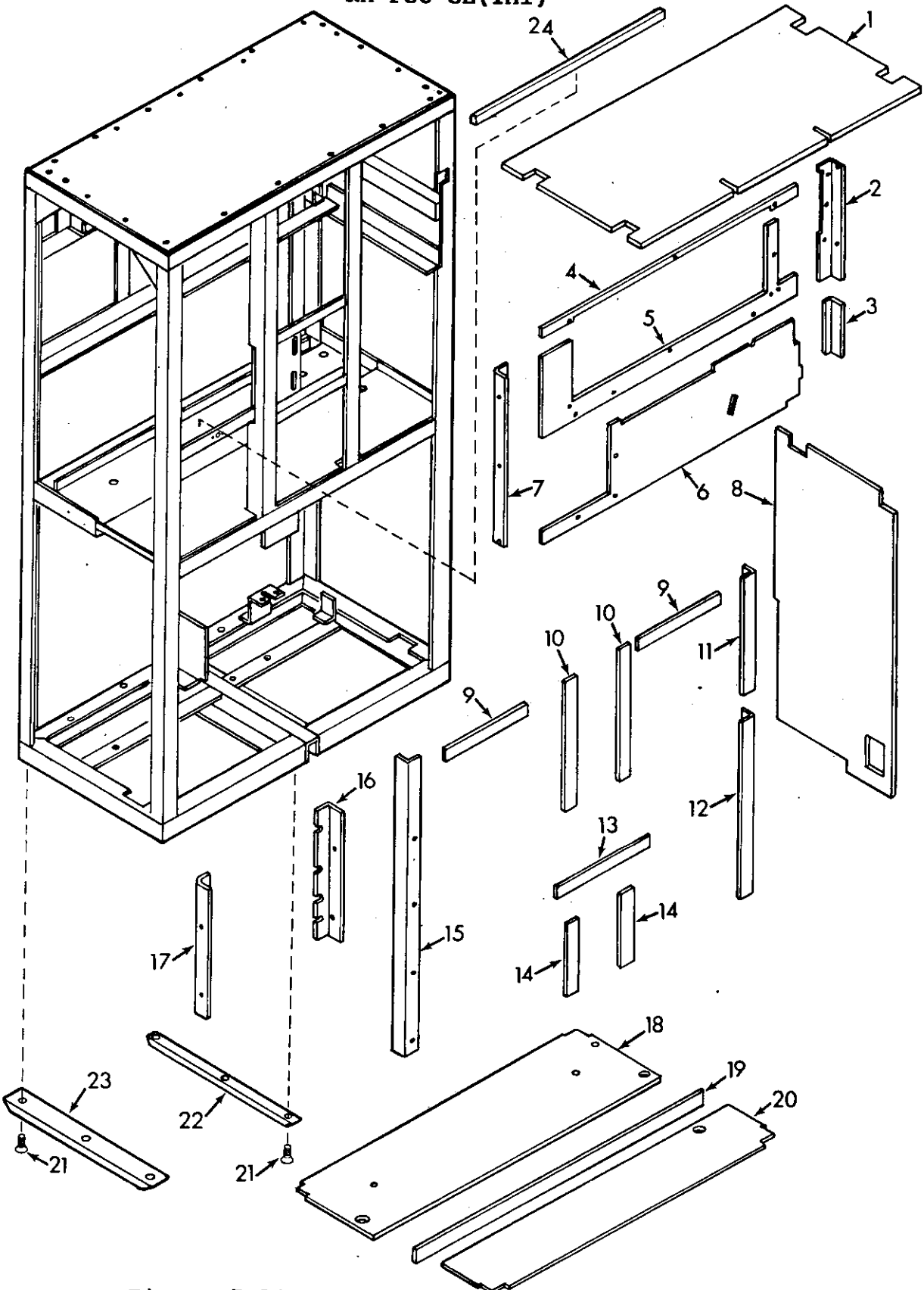


Figure 7-18. Insulation and Skids, Frame

Figure 7-18. Insulation and Skids,Frame

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	19200	12712919	.INSULATION.....	EA	1
2	19200	12712909	.INSULATION.....	EA	1
3	19200	12712914-5	.INSULATION.....	EA	1
4	19200	12712929	.INSULATION.....	EA	1
5	19200	12712910	.INSULATION.....	EA	1
6	19200	12712920	.INSULATION.....	EA	1
7	19200	12712912	.INSULATION.....	EA	1
8	19200	12712911	.INSULATION.....	EA	
9	19200	12712914-3	.INSULATION.....	EA	
10	19200	12712914-2	.INSULATION.....	EA	2
11	19200	12712917	.INSULATION.....	EA	1
12	19200	12712915	.INSULATION.....	EA	1
13	19200	12712914-4	.INSULATION.....	EA	1
14	19200	12712914-1	.INSULATION.....	EA	2
15	19200	12712918	.INSULATION.....	EA	1
16	19200	12712913	.INSULATION.....	EA	1
17	19200	12712916	.INSULATION.....	EA	1
18	19200	12712923	.INSULATION.....	EA	1
19	19200	12712914-6	.INSULATION.....	EA	1
20	19200	12712908	.INSULATION.....	EA	1

Figure 7-18. Insulation and Skids,Frame (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
21	96906	MS24693-C300	.SCREW,MACH-FLAT CTSK HD.....	EA	12
22	19200	12712731-1	.SKID,AIR CONDITIONER.....	EA	2
23	19200	12712731-2	.SKID,AIR CONDITIONER.....	EA	2
24	19200	12712972	.INSULATION.....	EA	1

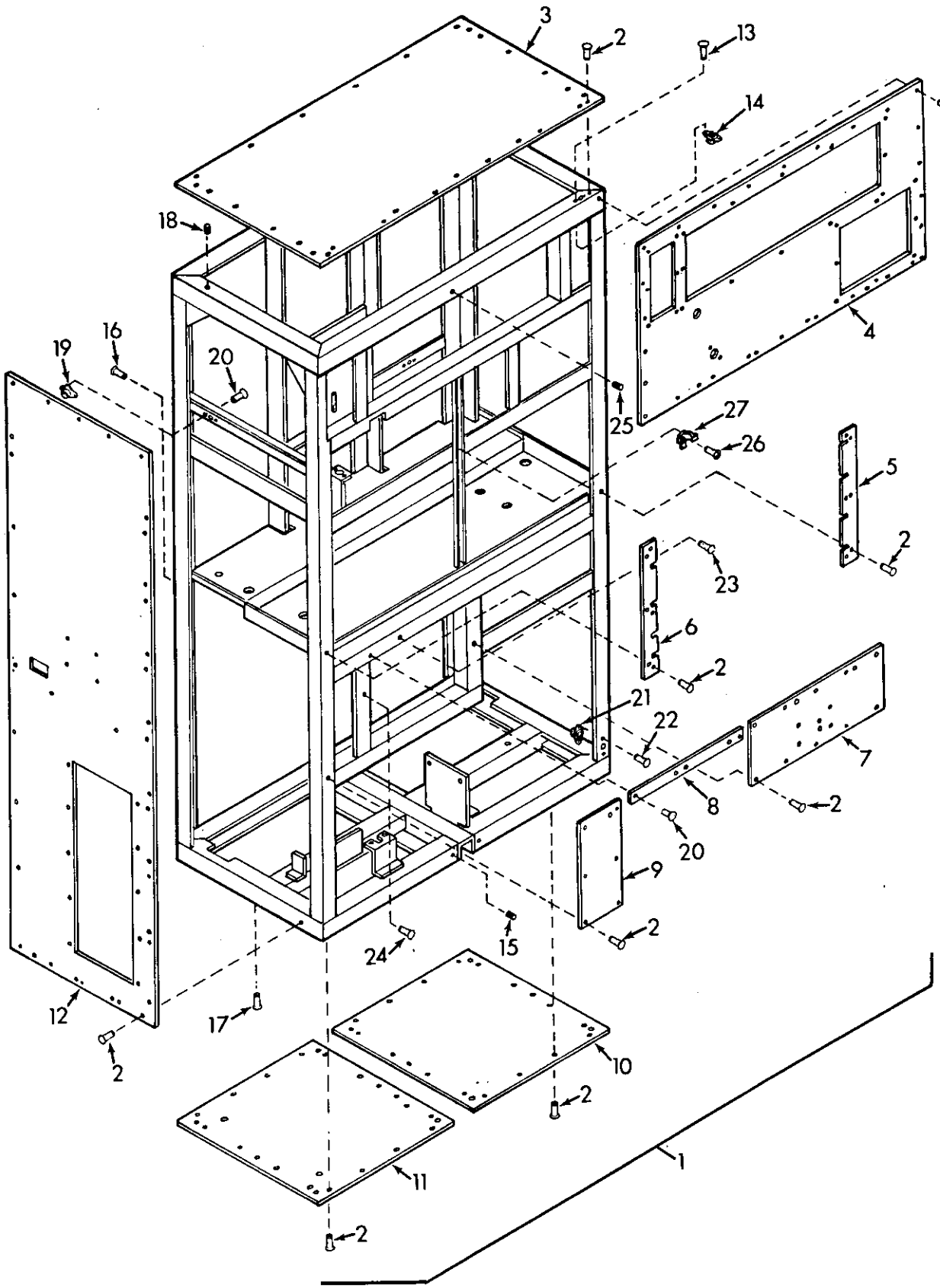


Figure 7-19. Frame

Figure 7-19. Frame

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
1	19200	12712820-1	.FRAME,AIR CONDITIONER.....	EA	1
2	96906	MS20601AD5W5	..RIVET,BLIND.....	EA	81
3	19200	12713016-1	..PANEL ASSEMBLY,TOP.....	EA	1
4	19200	12712719	..PANEL,FRONT-TOP.....	EA	1
5	19200	12712713	..PANEL,FRONT FILLER-RH.....	EA	1
6	19200	12712717	..PANEL,FRONT FILLER-LH.....	EA	1
7	19200	12712753	..PANEL,LOWER FRONT RH SECTION...	EA	1
8	19200	12712752	..PANEL,LOWER FRONT FILLER SECTION	EA	1
9	19200	12712754	..PANEL,LOWER FRONT LH SECTION...	EA	1
10	19200	12712870	..PANEL,BOTTOM-RH.....	EA	1
11	19200	12712745	..PANEL,BOTTOM-LH.....	EA	1
12	19200	12712897-1	..PANEL ASSY,LEFT SIDE.....	EA	1
13	97403 07707	13214E3791-5 AK45H	..RIVET,BLIND.....	EA	172
14	80205	NAS1031C5	..NUT,SELF-LOCKING,PLATE.....	EA	44
15	96906	MS122083	..INSERT-CRES HELICAL.....	EA	2
16	96906	MS27130CR97K	..NUT,BLIND RIVET.....	EA	10
17	96906	MS27130CR107K	..NUT,BLIND RIVET.....	EA	12
18	96906	MS122123	..INSERT-CRES HELICAL.....	EA	4
19	80205	NAS1031C4	..NUT,SELF-LOCKING,PLATE.....	EA	4
20	96906	MS20426A3-5	..RIVET,SOLID CTSK.....	EA	8

Figure 7-19. Frame (cont)

ITEM NO	FSCM NO	PART NUMBER	DESCRIPTION	U/M	QTY
21	19200 94222	12712768 12-11020-13	..SPEED NUT,RECEPTACLE.....	EA	68
22	97403 07707	13214E3791-4 AK44H	..RIVET,BLIND.....	EA	52
23	80205	NAS1330C3KB266	..NUT,BLIND RIVET.....	EA	33
24	80205	NAS1030C3KB216	..NUT,BLIND RIVET.....	EA	15
25	96906	MS21209C810	..INSERT,SCREW THREAD.....	EA	6
26	96906	MS20470AD3-4	..RIVET,SOLID UNIV HD.....	EA	3
27	80205	NAS1464-038-20C	..CLIP,SPRING TENSION.....	EA	1

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