TECHNICAL MANUAL

UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

CABINET, SOLUTION WARMING MODEL 5520

6530-01-269-1802

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

HEADQUARTERS, DEPARTMENT OF THE ARMY

1991

SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL.

IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.

IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE, OR SOME OTHER INSULATING MATERIAL.

SEND FOR HELP AS SOON AS POSSIBLE.

AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION.

Throughout this manual are WARNINGS, CAUTIONS, and NOTES. Please take time to read these. They are there to protect you and the equipment.

WARNING

Procedures which must be observed to avoid personal injury, and even loss of life.

CAUTION

Procedures which must be observed to avoid damage to equipment, destruction of equipment, or long-term health hazards.

NOTE

Essential information that should be remembered.

TECHNICAL MANUAL

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC

UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) CABINET, SOLUTION WARMING MODEL 5520

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You can help improve this manual. If you find any mistakes or if you know a way to improve procedures, please let us know. Mail your memorandum, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 (Recommended Changes to Equipment Technical Publications) located in the back of this manual, to: Commander, U.S. Army Medical Materiel Agency, ATTN: SGMMA-M, Frederick, MD 21702-5001. A reply will be furnished directly to you.

Approved for public release; distribution is unlimited.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

HOW TO USE THIS MANUAL

☐ **This manual provides all the information needed to understand the capabilities, functions, and characteristics of this equipment. It describes how to set up, operate, test, and repair the item. You must familiarize yourself with the entire manual before operating or beginning a maintenance task.**

☐ **The manual is arranged by chapters, sections, and paragraphs followed by appendixes, a glossary, an index, and DA Forms 2028-2. Use the table of contents to help locate the chapter or section for the general subject area needed. The index will help locate more specific subjects.**

☐ **Multiple figures and tables are provided for your ease in using this manual. Words that are both capitalized and in quotation marks are names of components or words that you will actually see on the equipment.**

☐ **Chapter 3 provides a systematic method of inspecting and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the unit to fail to complete its mission. Make a habit of doing the checks and services in the same order each time and anything wrong will be detected quickly.**

☐ **Specific direct support and general support maintenance instructions are included. Only perform maintenance functions specified in the maintenance allocation chart for your level of maintenance. Maintenance functions specified for higher levels of maintenance frequently require additional training; test, measurement, and diagnostic equipment; or tools.**

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Scope.

This manual describes the warming cabinet (fig 1-1); provides unit personnel with equipment technical data; and provides operational and maintenance functions, services, and actions. Additional information follows:

a. Type of manual. Unit, direct support (DS), and general support (GS) maintenance (including repair parts and special tools list).

b. Model number and equipment name. Model number 5520, Cabinet, Solution Warming.

c. Purpose of equipment. To provide for the heating and storage of solutions, blankets, drapes, towels, and other dry goods.

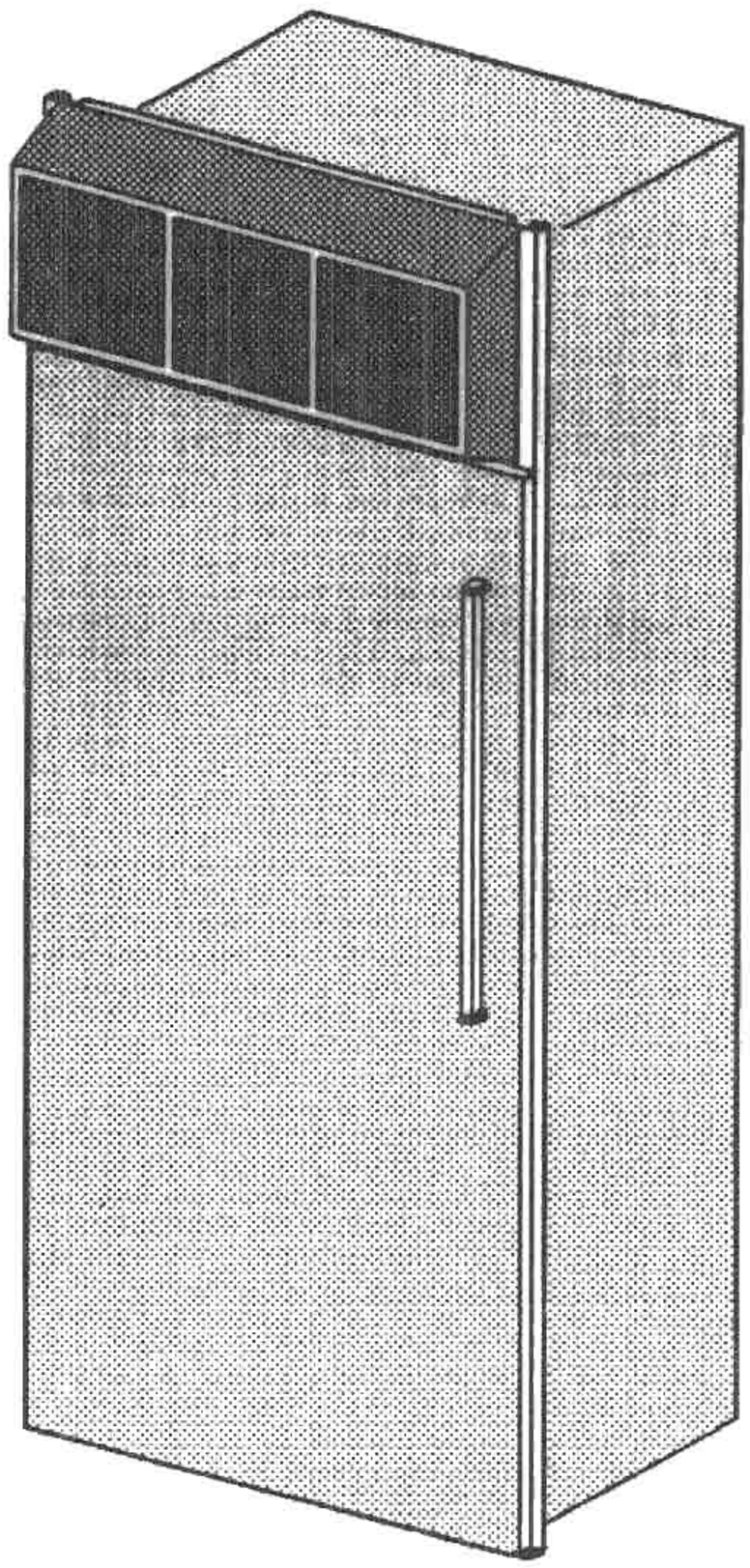


Figure 1-1. Cabinet, solution warming.

1-2. Explanation of abbreviations and terms.

Special or unique abbreviations, acronyms, and terms used within this manual are explained in the glossary.

1-3. Maintenance forms, records, and reports.

TB 38-750-2 prescribes forms, records, reports, and procedures.

1-4. Destruction of Army materiel to prevent enemy use.

AR 40-61 contains instructions for destruction and disposal of Army medical materiel. Also, the SB 8-75 series provides periodic information and/or instructions on the disposal of medical materiel.

1-5. Administrative storage.

a. Place the warming cabinet in administrative storage for only short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness condition within 24 hours or within the time factors determined by the directing authority. During the storage period, keep appropriate maintenance records.

b. Perform preventive maintenance checks and services (PMCS) listed in table 3-1 before placing Army equipment in administrative storage. When equipment is removed from storage, perform PMCS to ensure its operational readiness.

c. Inside storage is preferred for equipment selected for administrative storage.

1-6. Preparation for storage or shipment.

Procedures to prepare the warming cabinet for storage or shipment are listed in chapter 3, section IX.

1-7. Quality assurance or quality control (QA or QC).

TB 740-10/DLAM 4155.5/AFR 67-43 contains QA or QC requirements and procedures.

1-8. Nomenclature cross-reference list.

Table 1-1 identifies official versus commonly used nomenclatures.

Table 1-1. Nomenclature cross-reference list.

Common name	Official nomenclature
Control housing	Housing, control head
Control housing PCB	Board, counter PC
Control module	Control box
Control module door	Control box door
Control panel	Control panel, control head
Door, storage compartment	Door, control head
Spacer	Standoff
Warming cabinet	Cabinet, solution warming

1-9. Reporting and processing medical materiel complaints and/or quality improvement reports.

AR 40-61 prescribes procedures for submitting medical materiel complaints and/or quality improvement reports for the warming cabinet.

1-10. Warranty information.

A warranty is not applicable.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-11. Equipment characteristics, capabilities, and features.

a. The warming cabinet is a self-contained unit that contains two fixed and two adjustable shelves, and circulates heated air uniformly over solutions and dry goods.

b. The unit operates from two voltages and frequencies as specified in table 1-3.

c. The height of the three lower storage compartments may be adjusted by raising or lowering the two middle adjustable shelves.

d. The capacities and allowable weights of solutions and dry goods are specified in table 1-3.

1-12. Description of significant components.

Components described in subparagraphs 1-12a through 1-12f are illustrated in figure 1-2.

a. Control panel. The control panel includes all operator knobs, switches, and indicators.

b. Cabinet door switch. The switch provides an electrical interlock to turn off the heating circuit when the door is open.

c. Shelf filter. The fixed position upper shelf incorporates a reusable filter.

d. Adjustable shelves. The two middle shelves are adjustable to provide for variation in heights of the three lower compartments. These shelves may also be removed.

e. Cabinet door. The cabinet door may be converted to open from either the left or right side for ease of access depending upon the operating location of the unit. Instructions for reversing the door swing are provided in paragraph 3-20c.

f. Storage compartment. The storage compartment, located in the control housing of the warming cabinet, is intended as a small storage area and provides access to the screw to release or lock the control housing.

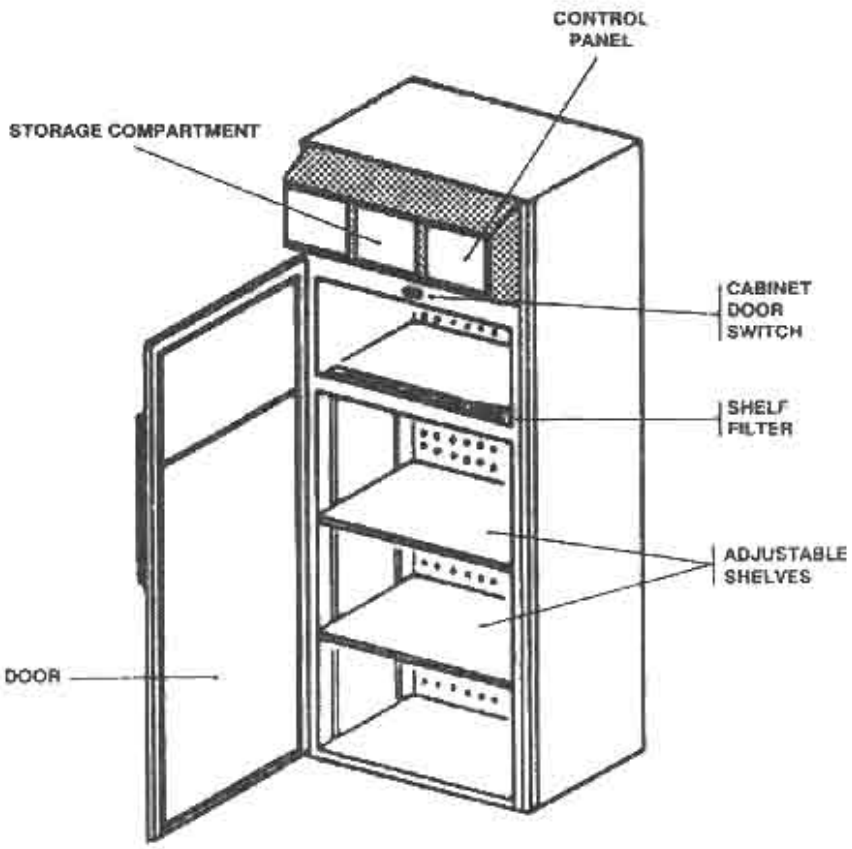


Figure 1-2. Warming cabinet components.

g. Circuit breaker. A circuit breaker is located above the control module door to provide electrical fault protection for the warming cabinet.

1-13. Tabulated data.

The tabulated data provides the dimensions, specifications, and miscellaneous data for the warming cabinet.

a. Dimensions, miscellaneous characteristics, and temperature conversions. Tables 1-2 and 1-3 provide a broad range of physical dimensions and miscellaneous characteristics.

NOTE

A Celsius/Fahrenheit temperature conversion chart is located inside the back cover.

Table 1-2. Dimensions.

Warming cabinet	
Width	30 in (76.2 cm)
Height	74 in (187.9 cm)
Depth	24 in (60.9 cm)
Upper compartment	
Width	26 in (66.0 cm)
Height	13 in (33.0 cm)
Depth	21 in (53.3 cm)
Lower compartment	
Width	26 in (66.0 cm)
Height	40 in (101.6 cm)
Depth	21 in (53.3 cm)

Table 1-3. Miscellaneous characteristics.

Electrical requirement	115 V, 50/60 Hz, 10 A or 230 V, 50/60 Hz, 5 A
Temperature range	36° C (97° F) to 71°C (160°F)
Storage capacity	79.9 cu ft (1.19 m^3)
Each shelf	20 two-liter square flasks
Storage weight	100 lbs (45 kg) per shelf
Voltage tolerances	
+2 VDC	± 0.0005 VDC
+2.5 VDC	± 0.0005 VDC
+5 VDC	± 0.01 VDC
+11.6 VDC	± 0.01 VDC
-11.6 VDC	± 0.01 VDC
18 VAC	± 4 VAC
24 VAC	± 5 VAC
Weight	285 lbs (129 kg)

b. Identification, instruction, and warning plates, decals, or markings.

(1) Two manufacturer data plates, located on the control module door and on the electrical power junction box cover, are identical and depicted in figure 1-3.

(2) A caution label providing electrical safety instructions, located on the control module door, is depicted in figure 1-4.

(3) A warning label, located inside the storage compartment, alerting personnel to the hazard of electrical shock, is depicted in figure 1-5. This label also includes German, French, and Spanish language versions.

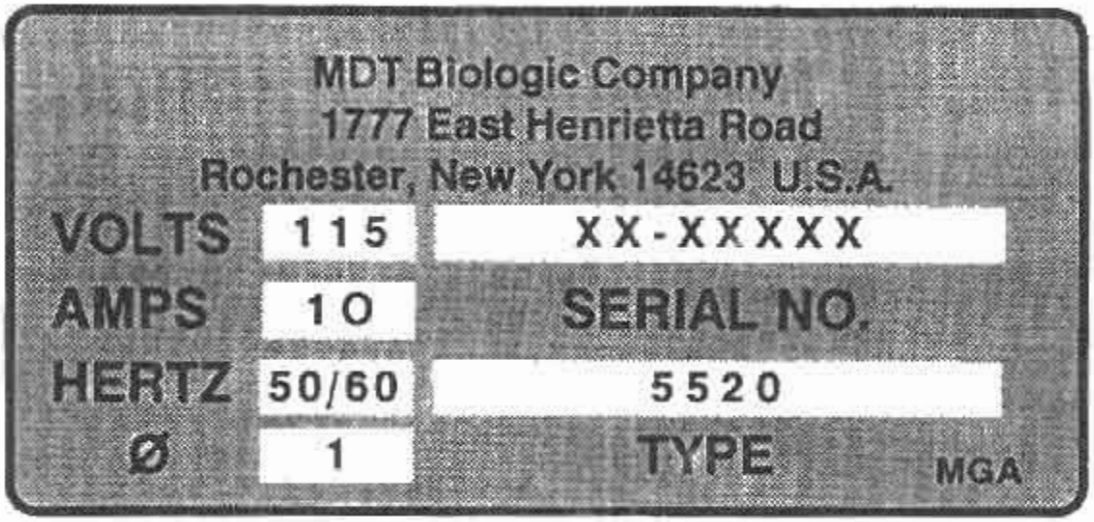


Figure 1-3. Manufacturer data plate.

Figure 1-4. Caution label.

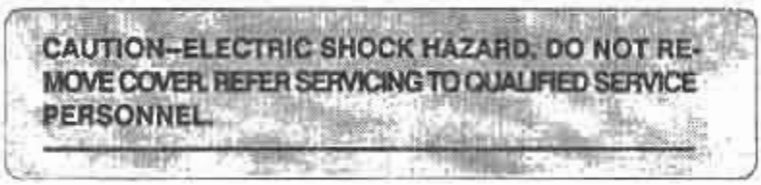


Figure 1-5. Warning label.

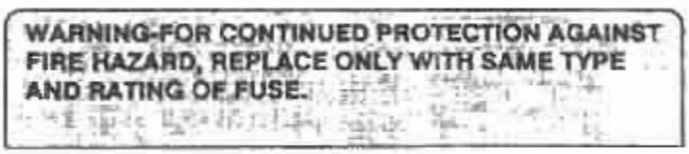


Figure 1-6. Instruction label.

(4) A label providing instructions to protect the warming cabinet, located on the inside of the control module door, is depicted in figure 1-6.

(5) A model number decal is located on the upper edge of the cabinet control chassis.

1-14. Model differences.

Model differences are not applicable since this manual covers a single model. However, design changes in assemblies, subassemblies, or components occur periodically. Information on such engineering changes will be published in supply bulletins and subsequent changes to this manual.

1-15. Safety, care, and handling.

a. Observe each WARNING, CAUTION, and NOTE in this manual. Electrical power and heated solutions, dry goods, or heated interior surfaces may be hazardous to personnel.

WARNING

Do not place flammable substances in the cabinet. This unit contains electrical components designed to heat and circulate air within the cabinet. Contact with a flammable vapor may cause an explosion or fire. This could result in serious personal injury, or damage to equipment and surrounding areas.

b. Ensure that a 2-inch (50 mm) clearance is maintained between the stored materials and shelves to permit circulation of heated air.

Section III. PRINCIPLES OF OPERATION

1-16. Basic operation.

The warming cabinet uses several basic physical principles for operation to include the circulation of heated air through the cabinet using electromechanical fans and convection currents. Electrical energy is also converted to heat for warming the air. The flow of heated air is illustrated in figure 1-7

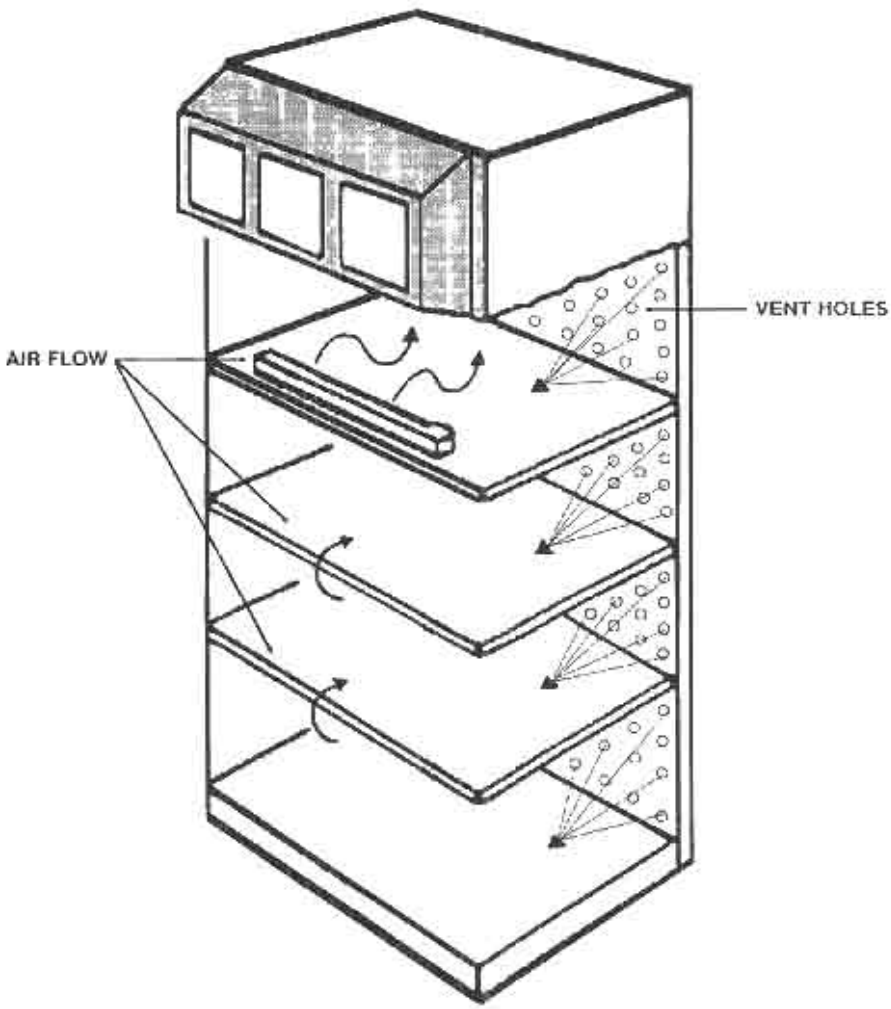


Figure 1-7. Air flow.

1-17. Controls and indicators.

The warming cabinet is controlled by electrical power switches, a temperature selection knob, and multiple indicators on the control panel. Temperature is controlled by a sensor that reacts to temperature variations. A safety thermostat is also included in the warming cabinet.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. OPERATING PROCEDURES

2-1. Controls and indicators (fig 2-1).

a. Power on switch. This pushbutton switch turns on the electrical power to the control and heating circuits. An indicator, located in the upper left corner of the switch will glow with a green tint.

b. Power off switch. This pushbutton switch turns off the electrical power to the control and heating circuits.

c. Temperature selection knob. This knob, located below the temperature display, enables the selection of the required temperature within the range of 36°C (97°F) to 71°C (160°F). The required temperature is dialed by depressing the knob and rotating it either clockwise or counterclockwise.

d. Temperature display. The temperature inside the warming cabinet is continuously displayed when the control panel is turned on. When the temperature selection knob is depressed, the interior temperature display will disappear and the selected temperature will now be displayed. The selected temperature display will also include an asterisk (*) to distinguish it from the actual interior temperature.

e. Temperature indicator. An indicator, located in the upper left-hand corner of the control panel, will glow with a green tint as long as the interior temperature of the warming cabinet is within 5.5°C (9.9°F) of the selected temperature.

f. Problem indicators. Two problem indicators (yellow and red) are provided for operator response to warming cabinet problems. The indicators operate simultaneously with a buzzer. The temperature display may also provide coded information.

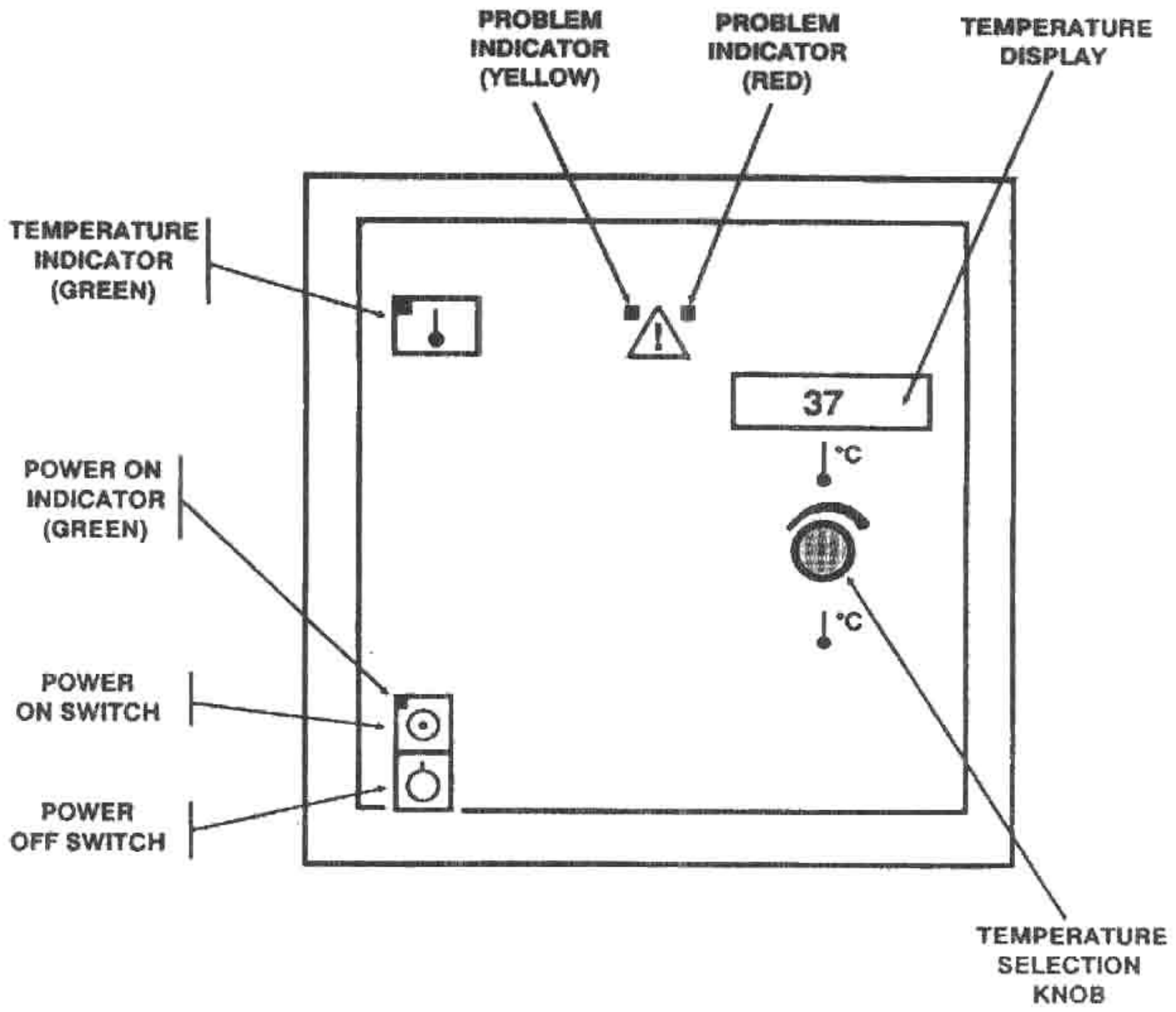


Figure 2-1. Controls and indicators.

Section II. UNIT OPERATION

2-2. Initial start-up procedures.

The initial start-up procedures are as follows:

a. Ensure that the warming cabinet is connected to a source of electrical power.

b. Remove any items stored in the warming cabinet.

c. Ensure that the adjustable shelves are correctly located or adjust their height by referring to figure 2-2 and complete the following actions.

NOTE

The height of the three lower compartments may be adjusted

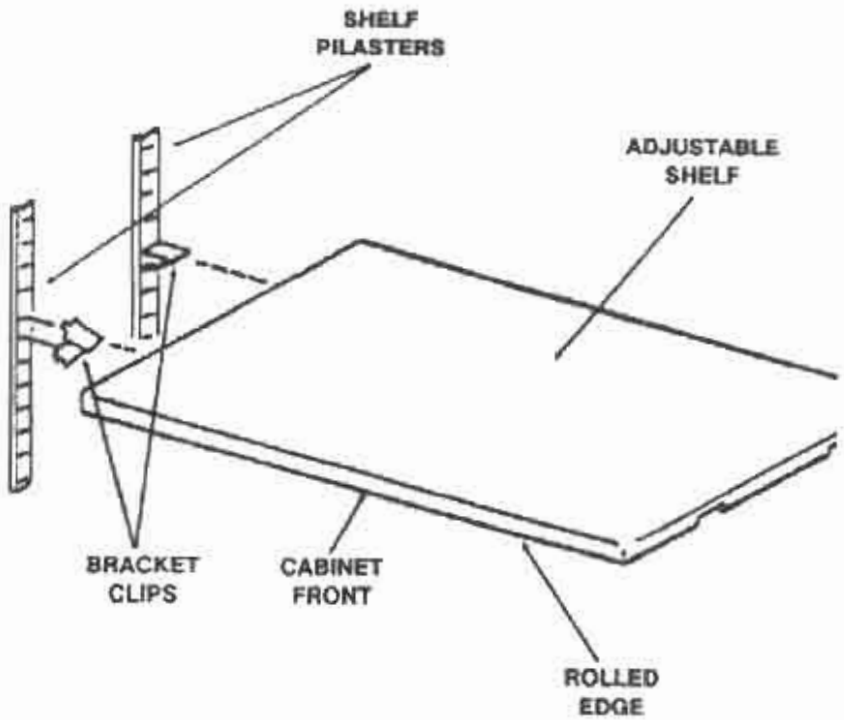


Figure 2-2. Shelf adjustments.

(1) Open the warming cabinet door and swing it wide.

(2) Lift a shelf upward off the four bracket clips and remove it from the warming cabinet. Set it aside.

(3) Squeeze the flanges of a bracket clip while tilting the clip upward to remove it from the shelf pilaster. Remove the remaining three clips as you removed the first one.

(4) Determine the new height for the shelf.

(5) Replace a bracket clip by inserting the upper flange lip into the slot in the shelf pilaster and squeezing the flanges while tilting the bracket clip downward. Replace the remaining three clips as you replaced the first one.

(6) Replace the shelf.

NOTE

Ensure that the rolled edge of each shelf is toward the front of the warming cabinet.

d. Depress the power on switch.

e. Observe the control panel for the following indicators.

(1) The green indicator in the upper left corner of the power on switch is glowing.

(2) The temperature display is indicating the existing temperature inside the warming cabinet.

NOTE

The unit will begin heating the interior compartments, unless the warming cabinet door is open.

f. Set the desired operating temperature by completing the following actions:

(1) Depress and hold down the temperature selection knob.

(2) Observe the selected temperature which is now displayed.

(3) Rotate the temperature selection knob (while still depressed) either counterclockwise to decrease or clockwise to increase the selected temperature.

(4) When the desired temperature is displayed, release the temperature selection knob. The temperature display will again indicate the existing temperature inside the warming cabinet.

CAUTION

Do not decrease the selected temperature more than 8°C (14.4°F) at a time below the actual interior temperature if the warming cabinet is in operation to prevent overheating the unit.

NOTE

The interior temperature of the warming cabinet cannot be lower than the temperature of the surrounding atmosphere.

g. Observe the temperature display periodically. The green temperature indicator will glow when the interior temperature is within 5.5°C (9.9°F) of the selected temperature.

WARNING

When the warming cabinet is at operating temperatures above 49°C (120.2°F), contact with interior surfaces may burn the skin.

2-3. Loading the warming cabinet.

Loading methods are based upon workload requirements and the following guidance.

a. Always place solutions on the upper shelves, regardless of whether they are the only items placed in the cabinet or whether solutions and dry goods are placed in the cabinet. Dry goods may be placed on the same shelf with solutions.

b. Ensure that the combined weight of shelf loads does not exceed the 100-pound maximum allowable weight.

c. Ensure that items placed in the cabinet are allowed to heat properly. Dry goods require a minimum of 6 hours to heat properly; solutions require a minimum of 8 hours.

2-4. Shut-down procedures.

Depress the power off switch to shut down the warming cabinet.

WARNING

When the warming cabinet is shut down, the temperature of heated solutions and dry goods will not decrease as rapidly as the cabinet's interior. Very hot solutions, may react violently when brought into sudden contact with lower temperature outside the cabinet.

2-5. Special operating instructions.

To prevent overheating the warming cabinet, follow one of the two procedures below to decrease the selected temperature more than 8°C (14.4°F).

a. *Procedure 1.*

(1) Observe the existing temperature.

(2) Depress and hold down the temperature selection knob.

(3) Rotate the knob counterclockwise until less than an 8°C (14.4°F) differential is displayed.

(4) Release the knob.

(5) Observe the temperature display until the new selected temperature is reached.

(6) Repeat steps 1 through 5 until the intended temperature is achieved.

b. *Procedure 2.*

(1) Observe the existing temperature.

(2) Open the warming cabinet door.

(3) Observe the temperature indicator until the temperature decreases to the desired temperature setting.

(4) Close the warming cabinet door.

(5) Depress and hold down the temperature selection knob.

(6) Rotate the knob counterclockwise until the desired operating temperature is displayed.

(7) Release the knob.

2-6. Control panel problem indicators.

A malfunction of the warming cabinet will be indicated by the glowing of either the red or yellow problem indicators (fig 2-1). An alarm buzzer will operate simultaneously. You should immediately depress the power off switch and notify your unit medical equipment repairer.

CAUTION

The power off switch should always be depressed when a malfunction occurs to preclude the warming cabinet from overheating again.

NOTE

Codes such as "00" or "OF" may also appear in the temperature display during a malfunction.

Section III. OPERATION OF AUXILIARY EQUIPMENT

2-7. Associated support items of equipment.

No associated support items of equipment are supplied with or dedicated solely for support of the warming cabinet.

2-8. Associated material.

No associated material is supplied with or dedicated solely for support of the warming cabinet.

Section IV. CLEANING PROCEDURES

2-9. General.

a. Wipe the warming cabinet exterior surfaces weekly with a soft, dry cloth.

b. Wash the warming cabinet, interior compartments, and shelves monthly with a mild cleaning agent.

WARNING

Touching the interior surfaces of the warming cabinet when it is operating at temperatures above 49°C (120.2°F) may burn your skin.

c. Wash the exterior surfaces, except for the control panel, semiannually using a mild cleaning agent.

d. Wipe the control panel weekly with a soft, dry cloth.

2-10. Door gasket.

Clean the door gasket monthly using a mild cleaning agent.

NOTE

Inspect the door gasket for loose fastening screws or damage that would prevent the door from sealing properly.

2-11. Shelf filter (fig 2-3).

Clean the shelf filter monthly by completing the following actions:

a. Depress the power off switch.

b. Open the warming compartment door.

c. Remove the two thumbscrews that fasten the filter cover.

WARNING

The filter cover may be hot. Avoid skin burns by allowing the warming cabinet to adequately cool.

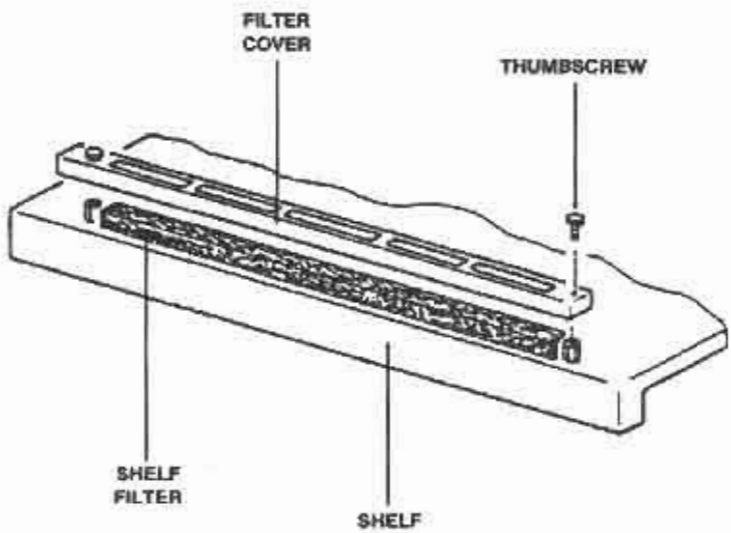


Figure 2-3. Shelf filter.

d. Remove the filter cover and the filter.

NOTE

Ensure that the warming cabinet remains off while the shelf filter is removed to prevent the circulation of unfiltered air through the compartments.

e. Wash the filter in lukewarm water using a mild detergent. Shake it dry.

CAUTION

A clogged shelf filter will prevent the proper circulation and heating of air inside the warming cabinet.

f. Reinstall the cleaned filter or install a new filter.

g. Replace the two thumbscrews.

h. Close the warming cabinet door.

i. Resume normal operations.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-12. General.

Operation of the warming cabinet outside of its International Standards Organization (ISO) shelter environment may require a voltage conversion.

WARNING

Do not place flammable substances in the cabinet. This unit contains electrical components designed to heat and circulate air within the cabinet. Contact with a flammable vapor may cause an explosion or fire. This could result in serious personal injury, or damage to equipment and surrounding areas.

2-13. Voltage conversion procedures.

Voltage conversion for the warming cabinet should not be accomplished by unit level personnel. Should a voltage conversion be required, notify your support maintenance activity.

CHAPTER 3

UNIT LEVEL MAINTENANCE

Section I. GENERAL INFORMATION

3-1. Overview.

Maintenance functions, both preventive and corrective, that are beyond the scope of the user are assigned to unit level medical equipment repairer personnel. These personnel will perform the majority of maintenance required for the equipment except for some tasks involving the printed circuit boards (PCBs), voltage conversion, or cabinet frame. This chapter provides instructions and information to aid in performing the required tasks.

3-2. Tools and test equipment.

Common tools and test equipment required for unit level maintenance of the unit are listed in appendix B, section III of this manual. Refer to your unit's modified table of organization and equipment (MTOE) for authorized items.

3-3. Components of end item and basic issue items.

Components of end item and basic issue items are listed in appendix C, sections II and III of this manual.

3-4. Expendable supplies.

Expendable and durable supplies and materials required for maintenance of the unit are listed in appendix D, section II of this manual.

3-5. Repair parts.

Repair parts required for unit level maintenance are listed in appendix E, section II of this manual.

3-6. Special tools.

Special tools required for unit level maintenance of the unit are listed in appendix E, section III of this manual.

Section II. SERVICE UPON RECEIPT OF EQUIPMENT

3-7. Unpacking, installing, and assembling the warming cabinet.

a. The warming cabinet is initially unpacked, installed, and assembled into an ISO shelter by depot personnel prior to issue to medical units. These actions include—

(1) installing the bottom cover panel,

(2) installing the four feet on each corner of the bottom cover panel,

(3) placing, leveling, and anchoring the warming cabinet in the ISO shelter,

(4) adjusting the panel mounting studs,

(5) installing the two side panels,

(6) connecting the warming cabinet to electrical power, and

(7) installing the top panel.

CAUTION

Keep the warming cabinet door closed while moving it to prevent distortion of the cabinet.

b. Remove the adjustable shelves from the bottom of the warming cabinet and place them on their bracket clips.

c. Depress the power on switch momentarily to ensure that electrical power is connected to the unit. Depress the power off switch.

Section III. LUBRICATION INSTRUCTIONS

3-8. General.

No lubrication of the warming cabinet is required.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

The PMCS table in this section contains all necessary unit level services for the warming cabinet.

3-9. General.

a. The warming cabinet must be inspected and serviced systematically to ensure that the unit is ready for operation at all times. Inspection will allow defects to be discovered and corrected before they result in serious damage or failure. Table 3-1 contains a list of PMCS items to be performed by unit level maintenance personnel.

b. Preventive maintenance is not limited to performing the checks and services listed in the PMCS table. There are things you should do any time you see they need to be done, such as checking for general cleanliness, observing for improper operational indicators, and maintaining the proper quantities of operating supplies.

c. The following is a list of the PMCS table column headings with a description of the information found in each column:

(1) *Item No.* This column shows the sequence in which to do the PMCS, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404.

(2) *Interval.* This column shows when each PMCS item is to be serviced: **B** - Before Operation, **D** - During Operation, **A** - After Operation, and **S** - Semiannually. **B**, **D**, and **A** should be performed with daily use of the unit.

NOTE

When the equipment must be kept in continuous operation, check and service only those items that will not disrupt operation. Perform the complete daily checks and services when the equipment can be shut down.

(3) *Item to be Inspected and Procedure.* This column identifies the general area or specific part to be checked or serviced.

(4) *Equipment is not Ready/Available If:.* This column lists conditions that make the equipment unavailable or unusable.

Table 3-1. Preventive maintenance checks and services.

ITEM NO	INTERVAL				ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	S		
1.	X	X	X	X	**Warming cabinet.** Inspect for damage to the panels, door, controls, indicators, cabinet control chassis, or interior components.	The unit cannot be operated.
2.	X			X	**Control module.** a. Verify its performance by following the procedures in paragraph 2-2 and paragraph 3-11.	The unit overheats or does not control the temperature.
				X	b. Inspect for an accumulation of dirt or dust on electrical/electronic components.	The dust contributes to incorrect operation of the unit.
3.	X	X	X	X	**Electrical power cable.** Inspect for damage or wear.	The cable is damaged or frayed resulting in an electrical hazard.
4.	X	X	X	X	**Shelf filter.** Ensure that the shelf filter is not clogged.	A clogged filter prevents improper air circulation or the uncontrolled warming of materials.
5.				X	**Fans and vents.** Inspect the air circulating fans and vents for an excessive accumulation of dust.	The collection of dust may result in a fire.

3-10. Reporting deficiencies.

If operator personnel discover problems with the equipment during PMCS that they are unable to correct, they must report them. Refer to TB 38-750-2 and report the deficiency using the proper forms. Consult with your unit level medical equipment repairer if you need assistance.

Section V. FUNCTIONAL TESTING

3-11. General.

a. This section contains information for testing the warming cabinet. Perform these tests after completing the initial start-up procedures and semiannually thereafter.

NOTE

The warming cabinet calibrations should be verified semiannually after completing the functional testing.

b. Perform the functional testing using the following procedures.

(1) Depress the power on switch.

(2) Set the operating temperature for several degrees above the ambient environment.

(3) Access the control housing PCB by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

NOTE

The control housing PCB is located on the underside of the control housing behind the control panel. (See fig 3-1.)

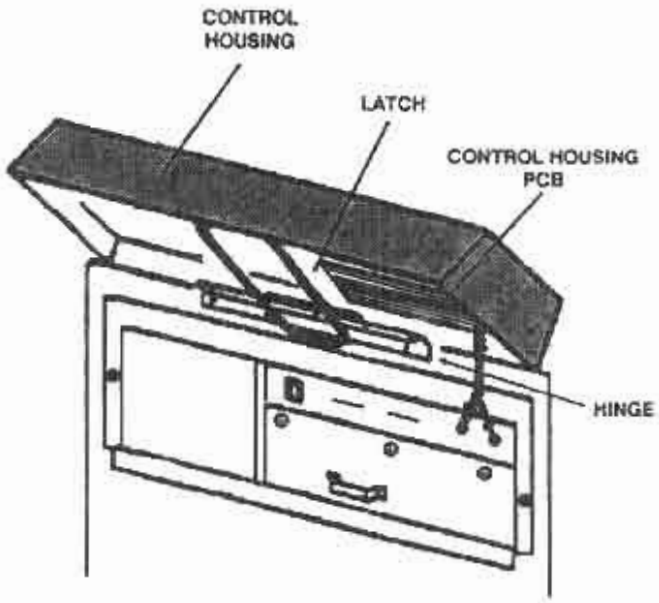


Figure 3-1. Control housing PCB location.

(4) Check that the light emitting diodes (LEDs), identified in figure 3-2 as DS11 and DS12, are glowing. LED DS11 indicates that the fans are operating and LED DS12 indicates that the heaters are operating.

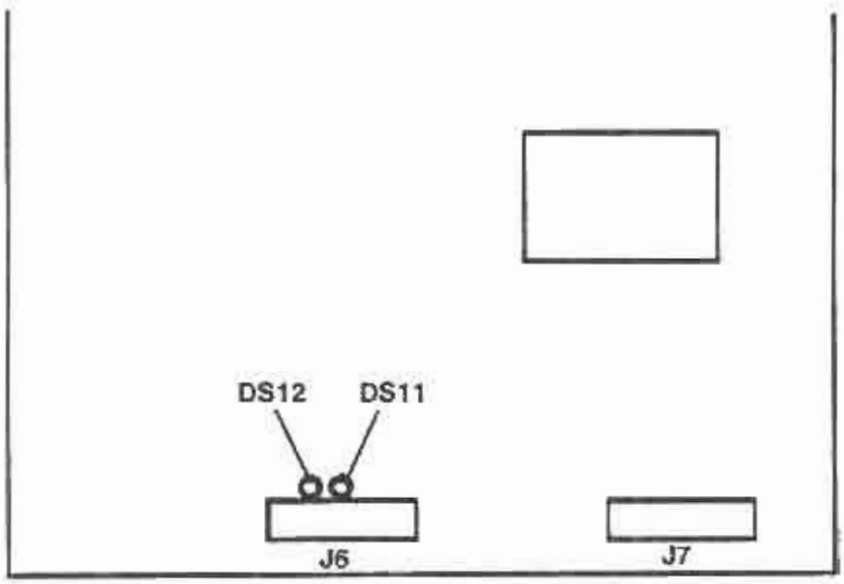


Figure 3-2. Functional testing LED indicators.

(5) Open the warming cabinet door and observe that both LEDs are now off.

(6) Close the door.

(7) Observe the operation of the warming cabinet until the temperature stabilizes.

(8) Close the control housing by completing the following actions:

(a) Lift the control housing slightly upward to release the latch and then lower it.

(b) Open the storage compartment door.

(c) Twist the screw located in the lower right corner to lock the control housing.

(d) Close the storage compartment door.

(9) Depress the power off switch.

Section VI. TROUBLESHOOTING

3-12. General.

a. General troubleshooting information for locating and correcting many of the operating malfunctions which may develop in the warming cabinet is located in table 3-2. Symptoms are provided for common malfunctions. Each symptom is followed by possible causes and corrective actions.

b. This manual cannot list all possible malfunctions. If a malfunction is not listed or is not determined by routine diagnostic procedures, notify your appropriate maintenance support unit.

Table 3-2. General troubleshooting.

SYMPTOM POSSIBLE CAUSE CORRECTIVE ACTION
1. WARMING CABINET CANNOT BE TURNED ON.
Power on switch defective.
Replace switch.
Circuit breaker problems.
Refer to symptom numbers 2 and 3.
Control housing PCB defective.
Perform the functional testing (para 3-11), verify calibrations (para 3-16 through para 3-18), and repair as required.
Power supply defective.
Determine defective wiring or component, verify calibrations, and repair as required.
2. CIRCUIT BREAKER TRIPS WHEN WARMING CABINET IS COLD.
Defective circuit breaker.
Replace circuit breaker.
Short circuit in unit
Determine defective wiring or component(s) and replace as required.
3. CIRCUIT BREAKER TRIPS DURING WARM-UP OPERATION.
Incorrect temperature selection.

Table 3-2. General troubleshooting - continued.

SYMPTOM POSSIBLE CAUSE CORRECTIVE ACTION
Reset the operating temperature. (Refer to para 2-2f.)
Defective fan(s).
Replace fan(s).
Defective safety thermostat.
Replace the thermostat.
Defective PCB.
Repair or replace PCB.
4. WARMING CABINET WILL NOT HEAT.
Door open or ajar.
Close the door.
Door switch defective.
Replace door switch.
Defective PCB.
Repair or replace PCB.
Defective electrical wiring.
Locate defective wiring or terminals and repair or replace as necessary.
Clogged shelf filter.
Clean or replace filter.
Defective heater(s).
Replace heater(s).

3-13. Power supply troubleshooting.

Specific troubleshooting information for the +5 VDC, +11.6 VDC, -11.6 VDC, 18 VAC, and 24 VAC power supply voltages is located in table 3-3.

Table 3-3. Power supply troubleshooting.

SYMPTOM POSSIBLE CAUSE CORRECTIVE ACTION
1. DC VOLTAGES (-5, -11.6, AND +11.6) LESS THAN OR GREATER THAN SPECIFIED VOLTAGES AND TOLERANCES.
No voltage to power supply
Check and repair power supply input circuitry.
Specific voltage(s) out of adjustment.
Calibrate voltage(s).

Table 3-3. Power supply troubleshooting - continued .

SYMPTOM POSSIBLE CAUSE CORRECTIVE ACTION
Defective power supply.
Repair or replace power supply.
2. AC VOLTAGES (18 AND 24) LESS THAN OR GREATER THAN SPECIFIED VOLTAGES AND TOLERANCES.
No voltage to power supply.
Check and repair power supply input circuitry.
Specific voltage(s) out of adjustment.
Calibrate voltage(s).
Defective 24-volt transformer.
Replace transformer.
Defective power supply.
Repair or replace power supply.

3-14. Problem indicator troubleshooting.

Specific troubleshooting procedures to correct malfunctions revealed by the problem indicators are located in table 3-4.

Table 3-4. Problem indicator troubleshooting.

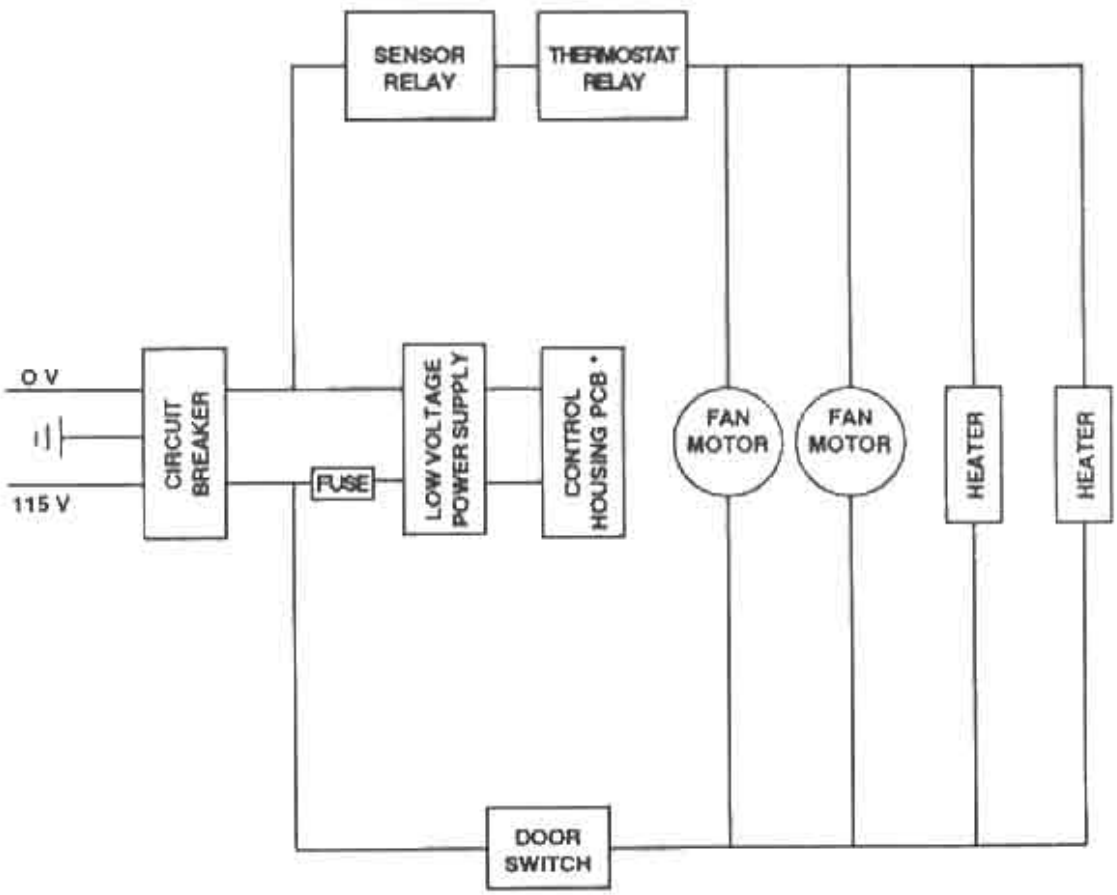
SYMPTOM POSSIBLE CAUSE CORRECTIVE ACTION
1. YELLOW PROBLEM INDICATOR GLOWS.
Incorrect -11.6 V power supply voltage.
Calibrate the voltage or repair the power supply.
Defective PCB, wiring, or temperature sensor.
Disconnect the electrical connector identified as P6 and observe the yellow problem indicator. If the yellow indicator continues to glow, replace the PCB. Otherwise, either faulty wiring or a defective temperature sensor is causing the problem. Check and repair the wiring or adjust/replace the temperature sensor.
2. RED PROBLEM INDICATOR GLOWS AND CODE "OF" IS VISIBLE IN TEMPERATURE DISPLAY.
Incorrect -11.6 V power supply voltage.
Calibrate the voltage or replace the power supply.
Defective PCB, wiring, or temperature sensor.
Disconnect the electrical connector identified as P6 and temporarily jumper pin connectors P6-9 and P6-10 together. Observe the red indicator and if it continues to glow, replace the PCB. Otherwise, either faulty wiring or a defective temperature sensor is causing the problem. Check and repair the wiring or adjust/replace the temperature sensor.

Table 3-4. Problem indicator troubleshooting - continued.

SYMPTOM POSSIBLE CAUSE CORRECTIVE ACTION
3. RED PROBLEM INDICATOR GLOWS AND NUMBERS ARE VISIBLE IN THE TEMPERATURE DISPLAY.
Incorrect operating temperature
Reset temperature.
Defective power supply.
Check and adjust power supply voltages or replace the power supply
Defective PCB.
Replace the PCB.

3-15. Electrical diagram information.

a. An electrical block diagram is provided (fig 3-3) to assist you in using the preceding troubleshooting tables. The diagram will also be useful with the subsequent calibration procedures and maintenance instructions.



* TEMPERATURE DISPLAYS AND INDICATORS

Figure 3-3. Electrical block diagram

b. Additional information about the electrical wiring and components follows.

(1) Alphanumeric codes identifying electrical wires are stamped on the protective insulation of the wires.

(2) Red markings on white wires denote 120-volt usage.

(3) Black markings on white wires denote a neutral 0-volt usage.

(4) Violet markings on white wires denote low voltage usage.

(5) Jumper strips on terminal block "2TB" are furnished with the warming cabinet.

Section VII. CALIBRATION INSTRUCTIONS

3-16. Power supply voltage calibration.

a. Operate the warming cabinet by following the start-up procedures in paragraph 2-2. Allow the temperature to stabilize.

b. Access the control housing PCB by completing the following actions:

(1) Open the storage compartment door.

(2) Twist the screw located in the lower right corner to release the control housing.

(3) Close the storage compartment door.

(4) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

WARNING

Prevent electrical shock, injury, or death by avoiding contact with the electrical circuitry.

NOTE

The control housing PCB is located on the underside of the control housing behind the control panel. (See fig 3-4.)

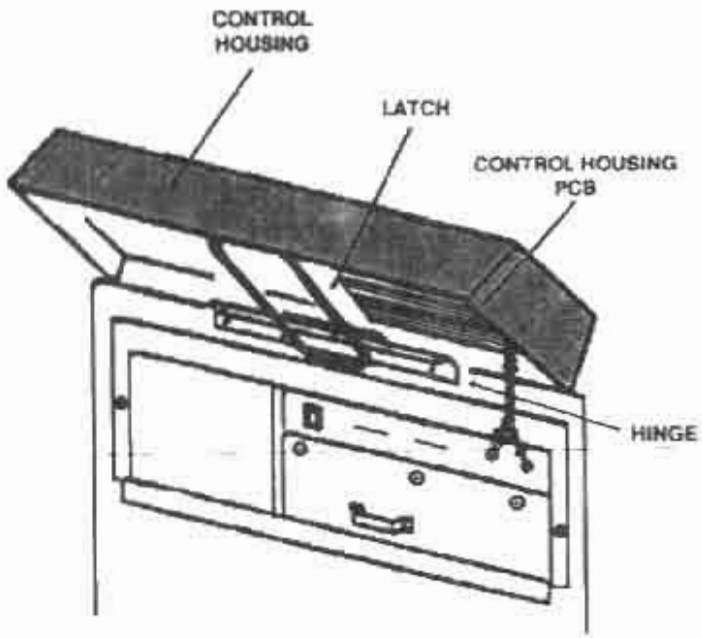


Figure 3-4. Control housing (power supply voltage calibration).

NOTE

Electrical pin and jack locations are illustrated in figure 3-5 and potentiometer settings are illustrated in figure 3-6.

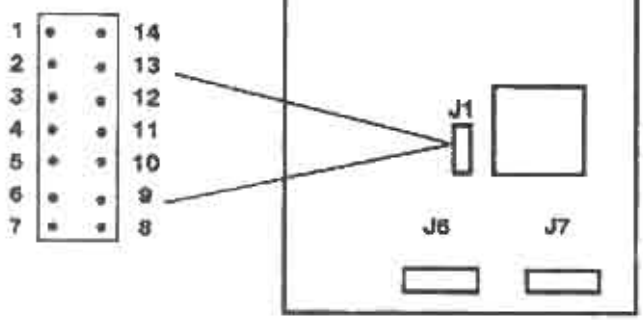


Figure 3-5. Pin and jack locations.

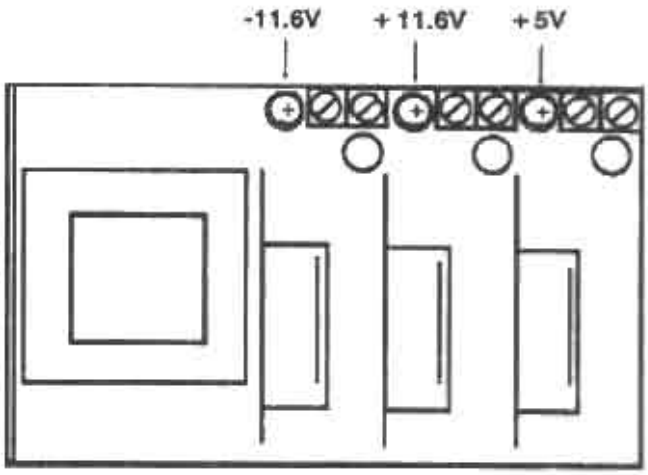


Figure 3-6. Potentiometer settings.

c. Calibrate the +5 VDC supply as follows:

(1) Place the voltmeter negative probe on pin 6, jack 1 (P6 - J1) and the positive probe on P7 - J1 of the PCB.

(2) Adjust the potentiometer until the voltmeter indicates +5 VDC ± 0.01 VDC.

d. Calibrate the +11.6 VDC supply as follows:

(1) Place the voltmeter negative probe on P6 - J1 and the positive probe on P10 - J1.

(2) Adjust the potentiometer until the voltmeter indicates +11.6 VDC ± 0.01 VDC.

e. Calibrate the -11.6 VDC supply as follows:

(1) Place the voltmeter negative probe on P6 - J1 and the positive probe on P8 - J1.

(2) Adjust the potentiometer until the voltmeter indicates -11.6 VDC ± 0.01 VDC.

f. Verify the power supply voltage calibrations as follows:

(1) Depress the temperature selection knob and rotate it both fully clockwise and counterclockwise. The temperature display should indicate from 36°C (97°F) to 71°C (160°F).

(2) Place the voltmeter probes between P1 - J7 and P2 - J7. The voltage should be 18 VAC ± 4 VAC.

(3) Place the voltmeter probes between P9 - J7 and P10 - J7. The voltage should be 24 VAC ± 5 VAC.

g. Close the control housing by completing the following actions:

(1) Lift the control housing slightly upward to release the latch and then lower it.

(2) Open the storage compartment door.

(3) Twist the screw located in the lower right corner to lock the control housing.

(4) Close the storage compartment door.

h. Depress the power off switch.

3-17. Temperature control calibration.

a. Operate the warming cabinet by following the start-up procedures in paragraph 2-2. Allow the temperature to stabilize.

b. Access the control housing PCB by completing the following actions:

(1) Open the storage compartment door.

(2) Twist the screw located in the lower right corner to release the control housing.

(3) Close the storage compartment door.

(4) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

c. Calibrate the power supply. (Refer back to para 3-16.)

d. Calibrate the +2.5 VDC supply as follows:

WARNING

Prevent electrical shock, injury, or death by avoiding contact with the electrical circuitry.

NOTE

The control housing PCB is located on the underside of the control housing behind the control panel. (See fig 3-4.)

Electrical jack and resistor locations are illustrated in figure 3-7.

(1) Place the voltmeter negative probe on P6 - J1 and the positive probe on P2 - J1 of the PCB.

(2) Adjust resistor "R28" until the voltmeter indicates +2.5 VDC ± 0.005 VDC.

e. Calibrate the +2.0 VDC supply as follows:

(1) Place the voltmeter negative probe on P6 - J1 and the positive probe on P1 - J1.

(2) Adjust resistor "R26" until the voltmeter indicates +2.0 VDC ± 0.005.

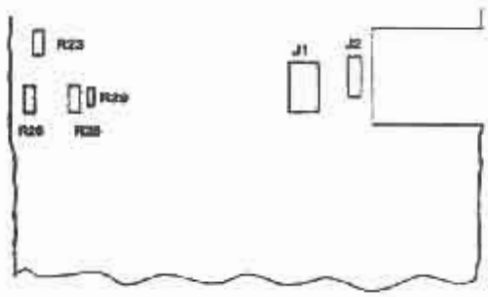


Figure 3-7. Jacks and resistors.

f. Connect a temporary jumper from P3 - J1 to P12 - J1 to turn on the third digit of the temperature display.

g. Connect a temporary jumper from the upper end of resistor "R29" to P3 - J1. Adjust resistor "R23" so that the temperature display is "000" (fig 3-8).

h. Remove the temporary jumpers.

i. Close the control housing by completing the following actions:

(1) Lift the control housing slightly upward to release the latch and then lower it.

(2) Open the storage compartment door.

(3) Twist the screw located in the lower right corner to lock the control housing.

(4) Close the storage compartment door.

j. Depress the power off switch.

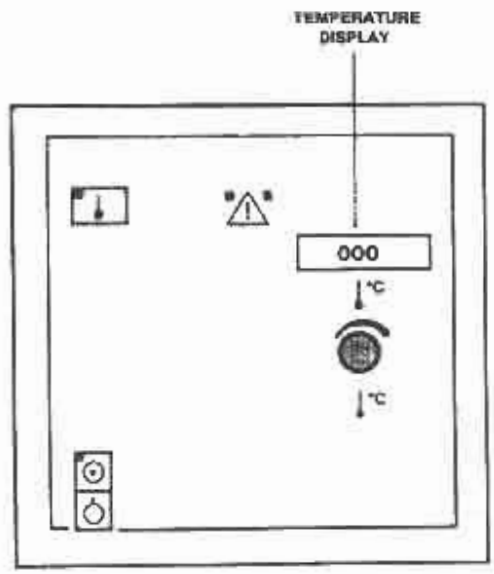


Figure 3-8. Temperature control calibration display.

3-18. Temperature sensor calibration.

a. Operate the warming cabinet by following the start-up procedures in paragraph 2-2. Allow the temperature to stabilize.

b. Access the control housing PCB by completing the following actions:

(1) Open the storage compartment door.

(2) Twist the screw located in the lower right corner to release the control housing.

(3) Close the storage compartment door.

(4) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

WARNING

Prevent electrical shock, injury, or death by avoiding contact with the electrical circuitry.

NOTE

The control housing PCB is located on the underside of the control housing behind the control panel. (See fig 3-9.)

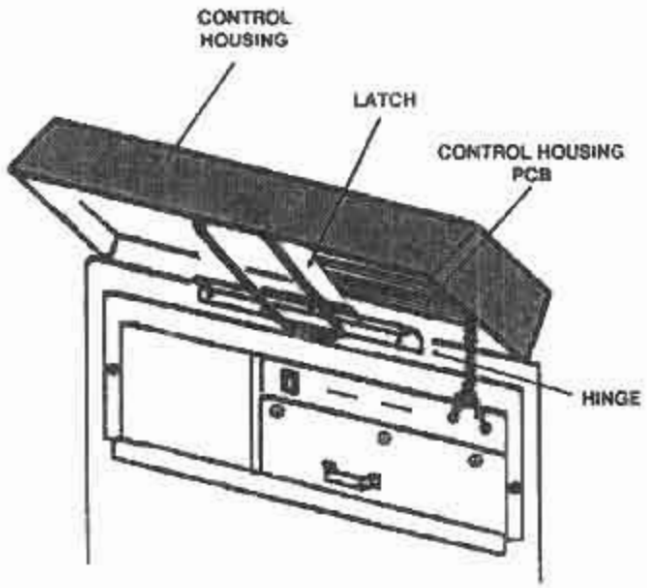


Figure 3-9. Control housing (temperature sensor calibration).

NOTE

Electrical pin, jack, and resistor locations are illustrated in figure 3-10.

c. Disconnect P6 from the PCB.

d. Connect a temporary jumper from P3 - J1 to P12 - J1.

e. Connect the positive lead of a DC external power supply to P9 - J6 and the negative lead to P10 - J6.

f. Turn on the external DC power supply and adjust it to +2.730 VDC.

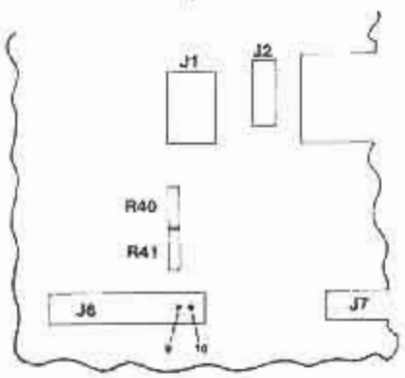


Figure 3-10. Pin, jack, and resistor locations.

g. Adjust resistor "R41" until the temperature display indicates "000" (fig 3-11).

h. Adjust the external DC power supply to +3.730 VDC.

i. Adjust resistor "R40" until the temperature display indicates "1000" (fig 3-12).

j. Repeat the preceding steps f through i to ensure accuracy.

k. Turn off the external DC power supply and remove it.

l. Remove the temporary jumper from P3 - J1 to P12 - J1.

m. Reconnect P6 to the PCB.

n. Close the control housing by completing the following actions:

(1) Lift the control housing slightly upward to release the latch and then lower it.

(2) Open the storage compartment door.

(3) Twist the screw located in the lower right corner to lock the control housing.

(4) Close the storage compartment door.

o. Depress the power off switch.

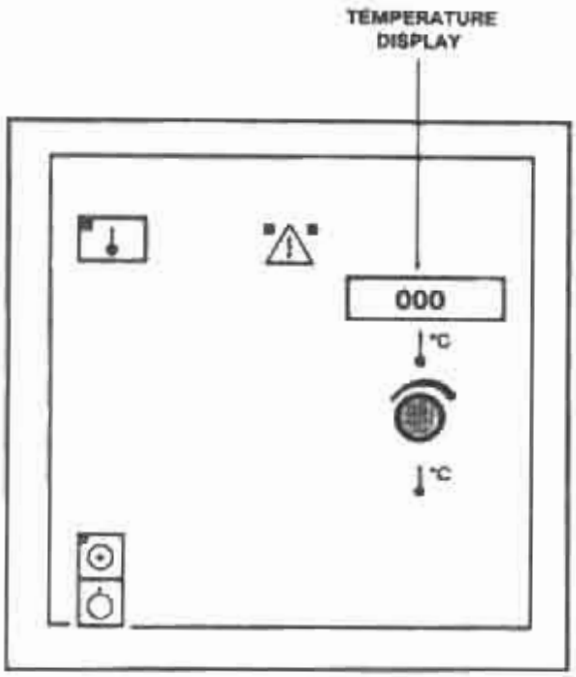


Figure 3-11. Temperature sensor calibration display (000).

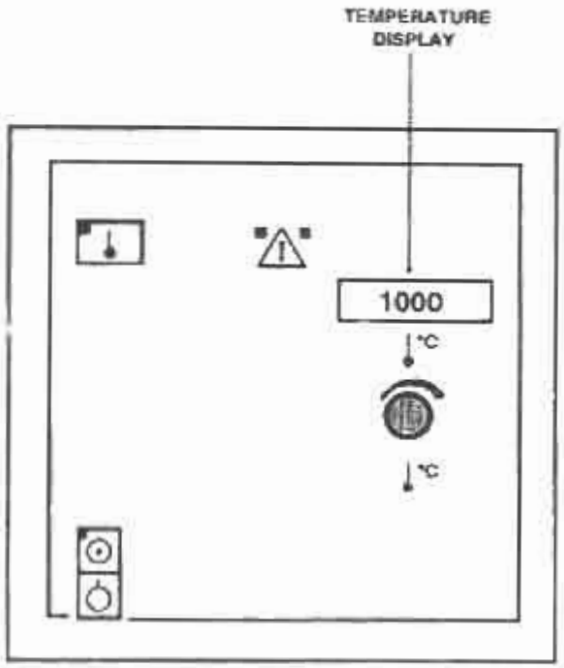


Figure 3-12. Temperature sensor calibration display (1000).

Section VIII. MAINTENANCE INSTRUCTIONS

3-19. General.

Procedures for adjusting, repairing, or replacing defective assemblies, modules, or components are provided in this section of the manual.

3-20. Door (cabinet).

a. Adjustment (fig 3-13).

(1) Loosen the two hex head screws on both the upper and lower hinge mounting brackets.

(2) Arrange blocking under the lower edge of the door to align it with the front of the cabinet.

(3) Tighten the hex head screws.

(4) Ensure that the door alignment is correct or repeat steps (1) through (3) again.

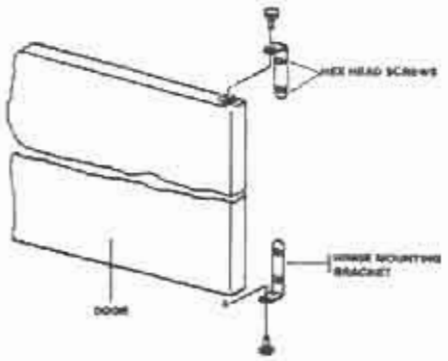


Figure 3-13. Door brackets.

b. Gasket removal and replacement (fig 3-14).

(1) Ensure that the warming cabinet is off by depressing the power off switch.

(2) Open the door fully and stabilize it with blocking.

(3) Lift the edge of the shelf gasket to expose the mounting strip and the Phillips-head screws.

(4) Remove the screws and then remove the mounting strip and shelf gasket.

(5) Lift the edge of the door gasket to sequentially expose the mounting strips and the Phillips-head screws. Remove the screws, mounting strips, and door gasket.

(6) Clean the edge of the inner door panel with a mild cleaning agent.

(7) Insert the mounting strips into the new gaskets.

(8) Install new gaskets by sequentially replacing the screws around the gaskets.

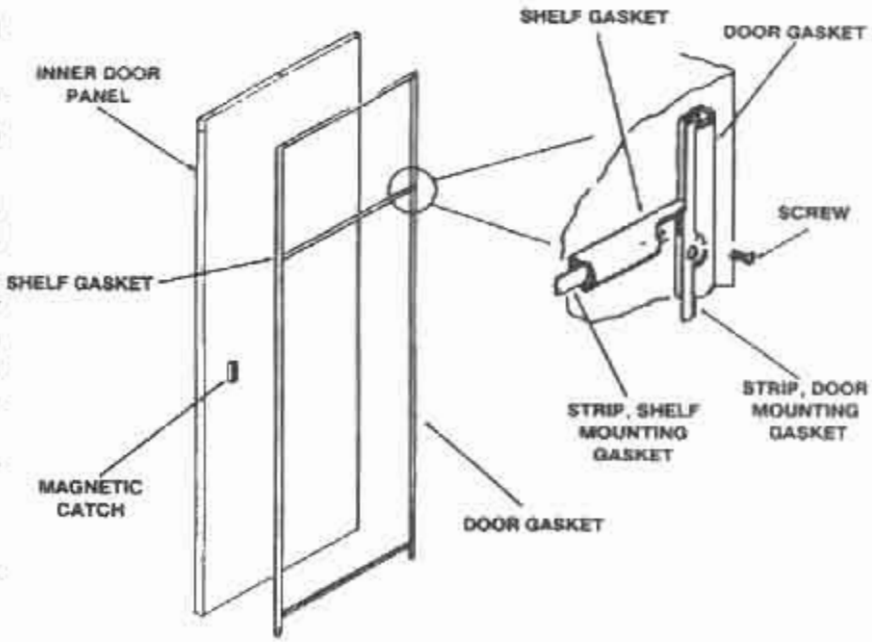


Figure 3-14. Door and shelf gaskets.

c. Door swing conversion (fig 3-15 through fig 3-18). The warming cabinet door may be converted from right hand to left hand or left hand to right hand swing. Conversion procedures are as follows:

(1) Remove the upper and lower hinge pins while holding the door closed against the cabinet. Remove the door and set it aside.

(2) Remove the two hex head screws from both the upper and lower hinge mounting brackets.

(3) Remove the two sets of screws, trim washers, and stiffeners from the opposite side of the warming cabinet and reinstall them in the holes where the upper and lower hinge mounting brackets were just removed.

(4) In turn, reinstall the hinge mounting brackets on the opposite side using the two screws previously removed from each bracket.

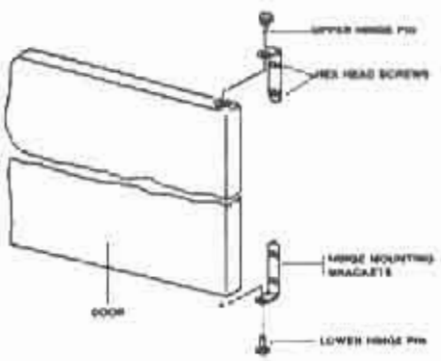


Figure 3-15. Door hinges.

(5) Remove the three screws and the door striker plate assembly.

(6) Remove the three washer-head screws from the identical mounting position of the opposite side panel and reinstall them where the door striker panel assembly was removed in the preceding step.

(7) Reinstall the door striker plate assembly with the three screws.

(8) Lift the edge of the shelf gasket and the door gasket to sequentially expose the mounting strips and the Phillips-head screws. Remove the 45 screws.

(9) Release the nameplate by removing the two tinnerman nuts, rotate the nameplate 180 degrees, and reinstall the nameplate.

(10) Remove the screw and trim washer directly below the door handle.

(11) Remove the upper screw that fastens the door handle.

(12) Loosen the lower door handle screw and carefully allow the door handle to swing downward.

(13) Reinstall the screw to fasten the lower end of the door handle.

(14) Rotate the door 180 degrees.

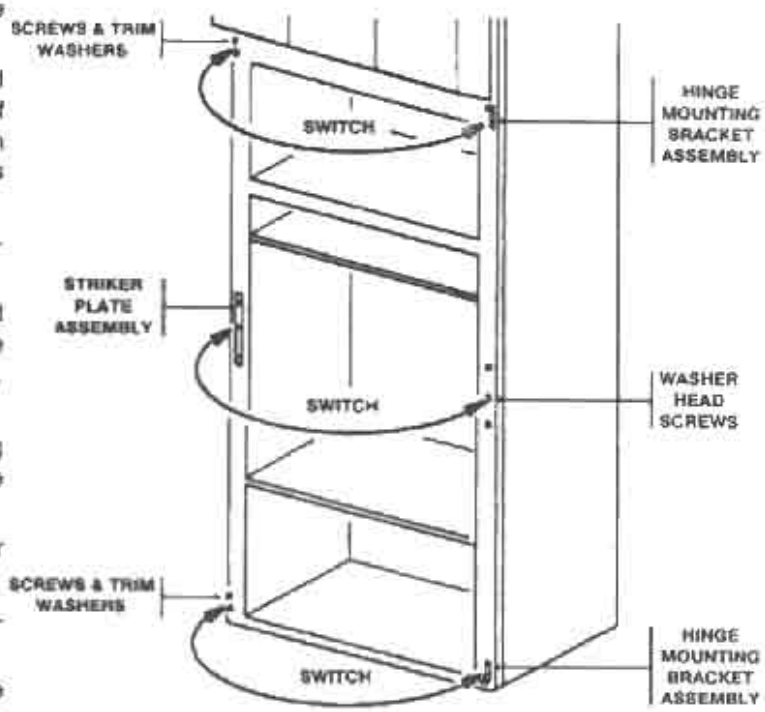


Figure 3-16. Door components.

CAUTION

Do not rotate the shelf and door gaskets.

(15) Ensure that the inner edge of the door panel is clean before mounting the gasket.

(16) Reinstall the shelf and door gaskets by sequentially replacing the screws around the gaskets.

(17) Reinstall the door using the two hinge pins.

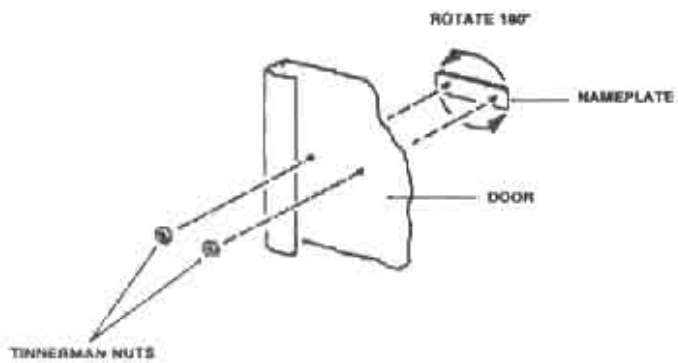


Figure 3-17. Manufacturer nameplate.

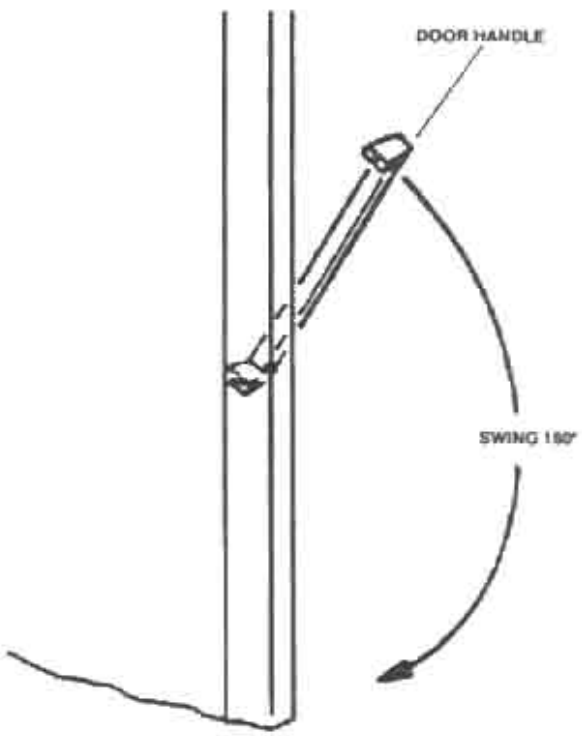


Figure 3-18. Door handle.

3-21. Transformer (fig 3-19 and fig 3-20).

a. Disassembly.

(1) Disconnect the electrical power to the unit.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its track until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(3) Disconnect the wires from the transformer.

(4) Remove the two nuts, washers, and bolts fastening the transformer and then remove the transformer.

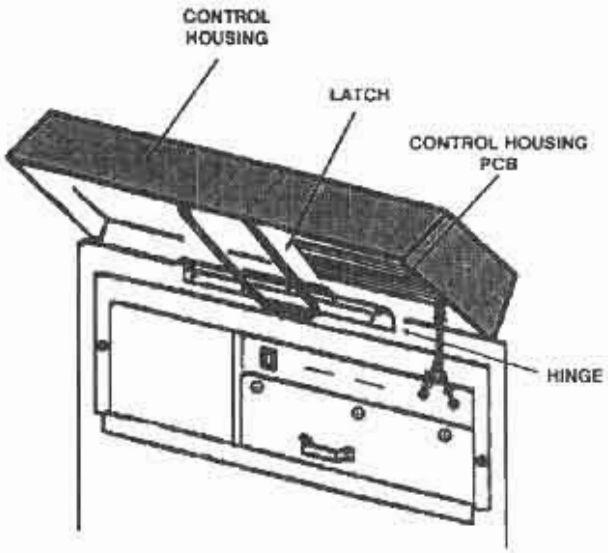


Figure 3-19. Cabinet control chassis (transformer).

b. Assembly.

(1) Install a replacement transformer and replace the two bolts, washers, and nuts.

(2) Reconnect the wires to the transformer.

(3) Close the cabinet control chassis by completing the following actions:

(a) Close the control module door and replace the three screws.

(b) Push the cabinet control chassis backward on its track.

(c) Replace the fastening screw on each side of the cabinet control chassis.

(d) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(e) Lift the control housing slightly upward to release the latch and then lower it.

(f) Open the storage compartment door.

(g) Twist the screw located in the lower right corner to lock the control housing.

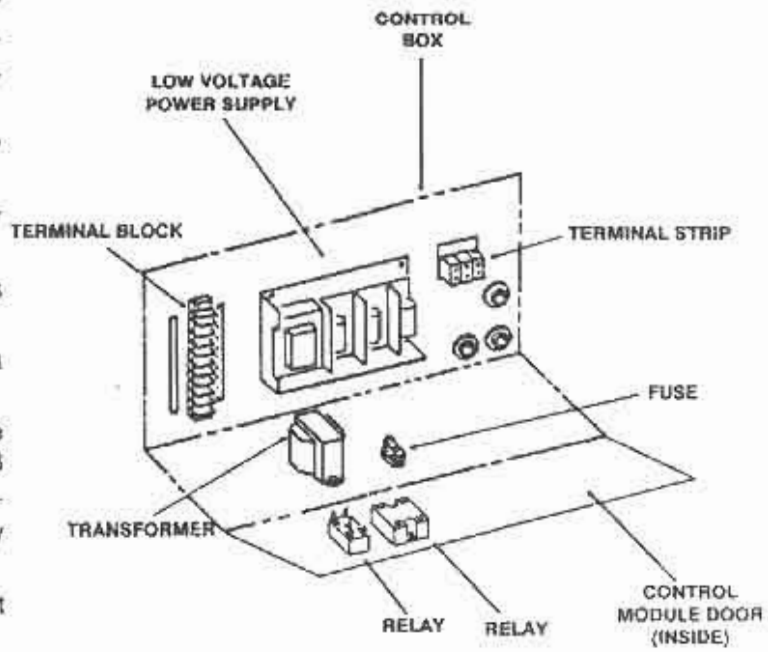


Figure 3-20. Transformer.

(h) Close the storage compartment door.

(4) Reconnect the electrical power to the unit.

(5) Test the warming cabinet and verify all calibrations as specified in paragraph 3-16 through paragraph 3-18.

3-22. Low voltage power supply (fig 3-21 and fig 3-22).

a. Disassembly.

(1) Disconnect the electrical power to the unit.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its track until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

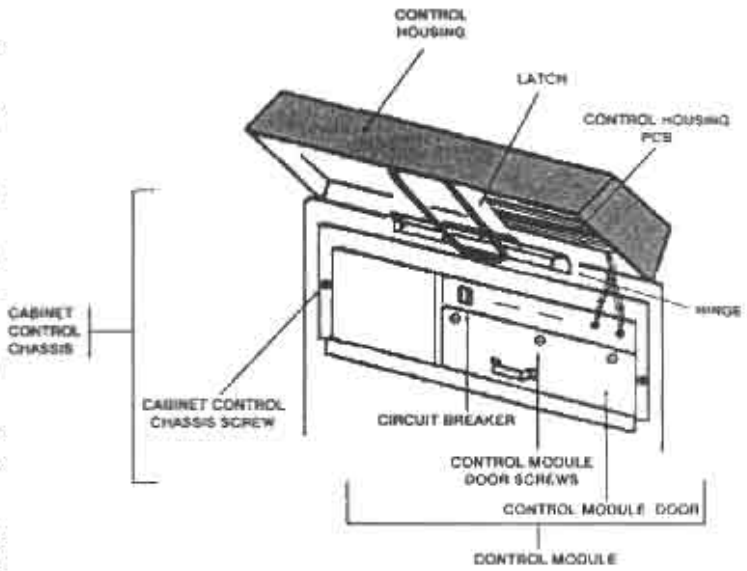


Figure 3-21. Cabinet control chassis (low voltage power supply).

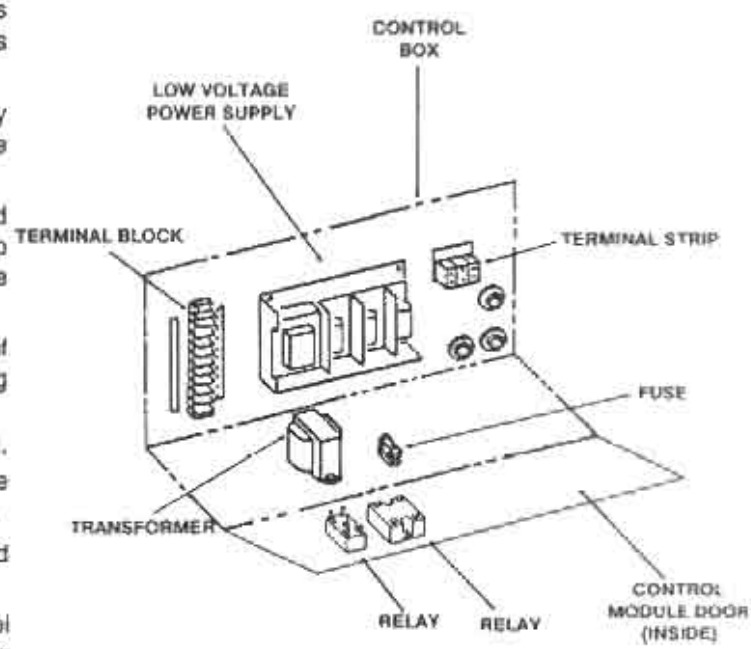


Figure 3-22. Low voltage power supply.

(n) Open the control module door by removing the screw temporarily holding the door closed.

(3) Remove the electrical wires from the low voltage power supply.

(4) Remove the four nuts, washers, and screws that fasten the power supply to the rear wall of the control module, and remove the defective power supply.

b. Assembly.

(1) Install a replacement power supply and replace the four screws, spacers, washers, and nuts.

(2) Reconnect the electrical wires to the low voltage power supply.

(3) Close the cabinet control chassis by completing the following actions:

(a) Close the control module door and temporarily replace one of the three screws.

(b) Lift the cabinet control chassis onto its mounting and push it rearward while simultaneously pushing it downward into its mounting.

(c) Open the control module door by removing the screw temporarily holding the door closed.

(d) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.

(e) Pull the power supply wires through the cable bushing into the control module.

(f) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.

(g) Close the control module door and replace the three screws.

(h) Push the cabinet control chassis into the warming cabinet.

(i) Replace the fastening screw on each side of the cabinet control chassis.

(j) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(k) Lift the control housing slightly upward to release the latch and then lower it.

(l) Open the storage compartment door.

(m) Twist the screw located in the lower right corner to lock the control housing.

(n) Close the storage compartment door.

(5) Reconnect the electrical power to the unit.

(6) Test the warming cabinet and verify all calibrations as specified in paragraphs 3-16 through 3-18.

3-23. Fans (fig 3-23 and fig 3-24).

a. Disassembly.

(1) Disconnect the electrical power to the unit.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

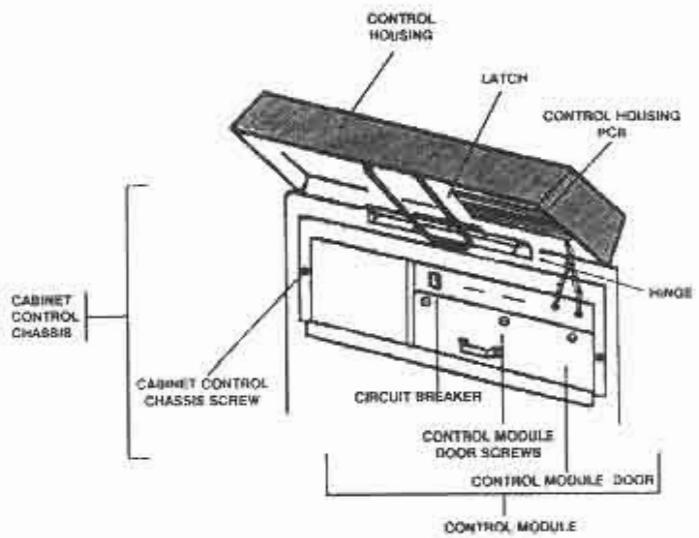


Figure 3-23. Cabinet control chassis (fans).

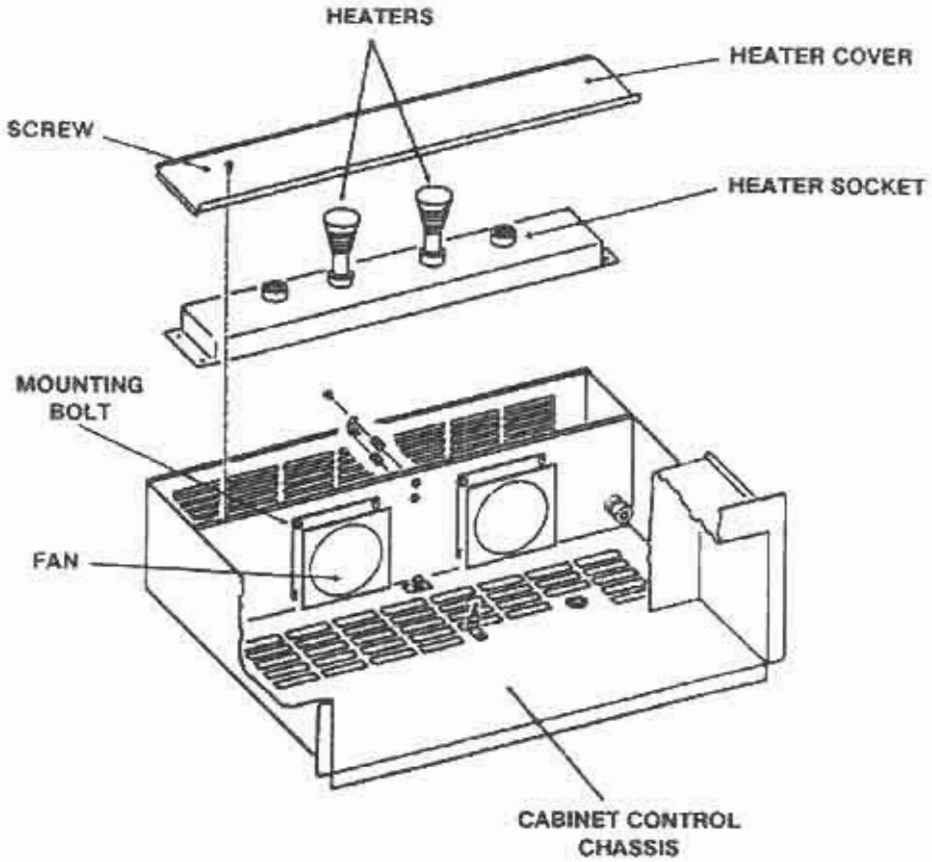


Figure 3-24. Fans.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its track until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

(n) Remove the three screws from the heater compartment cover and then remove the cover.

(3) Disconnect the electrical wires from the fan.

(4) Remove the four nuts, washers, and screws that fasten the fan to the compartment wall and then remove the fan.

b. Assembly.

(1) Install a replacement fan and fasten it with the four screws, washers, and nuts.

(2) Reconnect the electrical wires to the fan.

(3) Close the cabinet control chassis by completing the following actions:

(a) Reinstall the heater compartment cover and replace the three screws.

(b) Lift the cabinet control chassis onto its mounting by pushing it rearward while simultaneously pushing it downward into its mounting.

(c) Open the control module door by removing the screw temporarily holding the door closed.

(d) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.

(e) Pull the power supply wires through the cable bushing and into the control module.

(f) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.

(g) Close the control module door and replace the three screws.

(h) Push the cabinet control chassis into the warming cabinet.

(i) Replace the fastening screw on each side of the cabinet control chassis.

(j) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(k) Lift the control housing slightly upward to release the latch and then lower it.

(l) Open the storage compartment door.

(m) Twist the screw located in the lower right corner to lock the control housing.

(n) Close the storage compartment door.

(4) Reconnect the electrical power to the unit.

(5) Test the warming cabinet for operation of the fans as specified in paragraph 3-11.

3-24. Heaters (fig 3-25 and fig 3-26).

a. Disassembly.

(1) Disconnect the electrical power to the unit.

(2) Access the cabinet control chassis by completing the following actions.

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

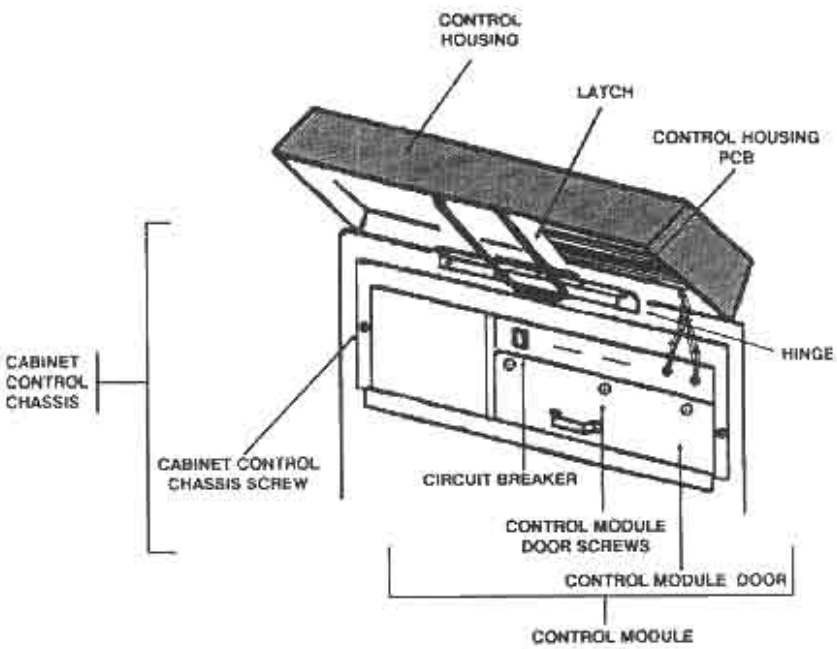


Figure 3-25. Cabinet control chassis (heaters).

(g) Pull the cabinet control chassis forward on its track until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

(n) Remove the three screws from the heater compartment cover and then remove the cover.

(3) Unscrew the heater from its socket.

b. Assembly.

(1) Screw a replacement heater into the same socket from which the defective heater was removed.

(2) Close the cabinet control chassis by completing the following actions:

(a) Reinstall the heater compartment cover and replace the three screws.

(b) Lift the cabinet control chassis onto its mounting by pushing it rearward while simultaneously pushing it downward into its mounting.

(c) Open the control module door by removing the screw temporarily holding the door closed.

(d) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.

(e) Pull the power supply wires through the cable bushing and into the control module.

(f) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.

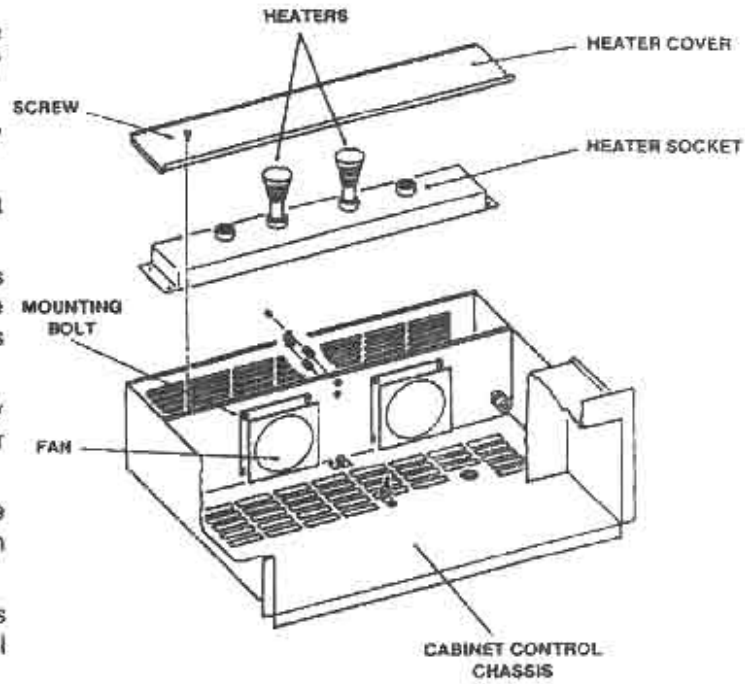


Figure 3-26. Heaters.

(g) Close the control module door and replace the three screws.

(h) Push the cabinet control chassis into the warming cabinet.

(i) Replace the fastening screw on each side of the cabinet control chassis.

(j) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(k) Lift the control housing slightly upward to release the latch and then lower it.

(l) Open the storage compartment door.

(m) Twist the screw located in the lower right corner to lock the control housing.

(n) Close the storage compartment door.

(3) Reconnect the electrical power to the unit.

(4) Test the warming cabinet by following the procedures in paragraph 2-2.

3-25. Thermostat (fig 3-27 and fig 3-28).

a. Disassembly.

(1) Disconnect the electrical power to the unit.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its track until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

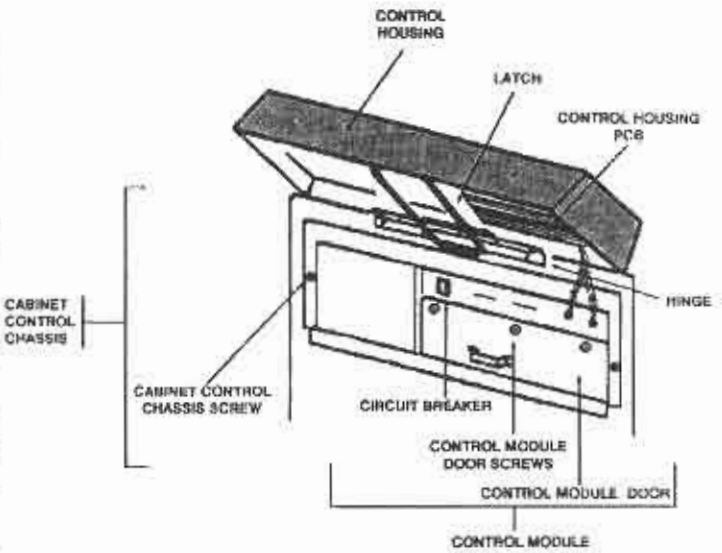


Figure 3-27. Cabinet control chassis (thermostat).

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

(n) Remove the three screws from the heater compartment cover and then remove the cover.

(3) Remove the electrical wires from the thermostat.

(4) Remove the two screws fastening the thermostat to the spacers and remove the thermostat.

b. Assembly.

(1) Reinstall the thermostat by positioning it against the spacers and inserting the two screws.

(2) Reconnect the electrical wires to the thermostat.

(3) Close the cabinet control chassis by completing the following actions:

(a) Reinstall the heater compartment cover and replace the three screws.

(b) Lift the cabinet control chassis onto its mounting by pushing it rearward while simultaneously pushing it downward into its mounting.

(c) Open the control module door by removing the screw temporarily holding the door closed.

(d) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.

(e) Pull the power supply wires through the cable bushing and into the control module.

(f) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.

(g) Close the control module door and replace the three screws.

(h) Push the cabinet control chassis into the warming cabinet.

(i) Replace the fastening screw on each side of the cabinet control chassis.

(j) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(k) Lift the control housing slightly upward to release the latch and then lower it.

(l) Open the storage compartment door.

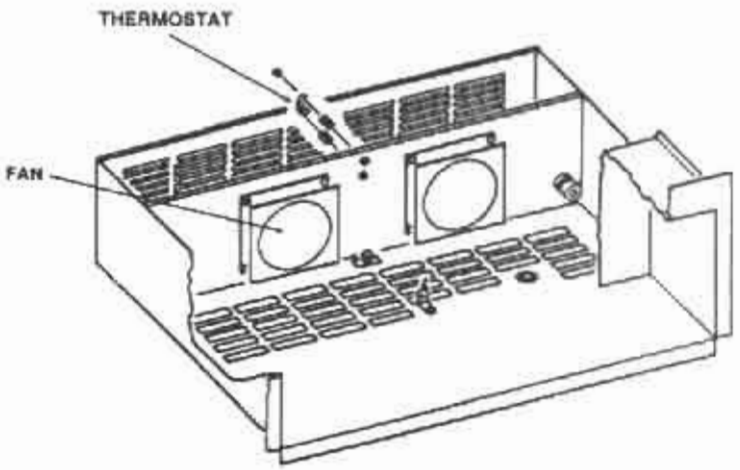


Figure 3-28. Thermostat.

(m) Twist the screw located in the lower right corner to lock the control housing.

(n) Close the storage compartment door.

(4) Reconnect the electrical power to the unit.

(5) Test the warming cabinet by following the procedures in paragraph 2-2.

3-26. Temperature sensor (fig 3-29 and fig 3-30).

a. Disassembly.

(1) Disconnect the electrical power to the unit.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from both sides of the cabinet control chassis.

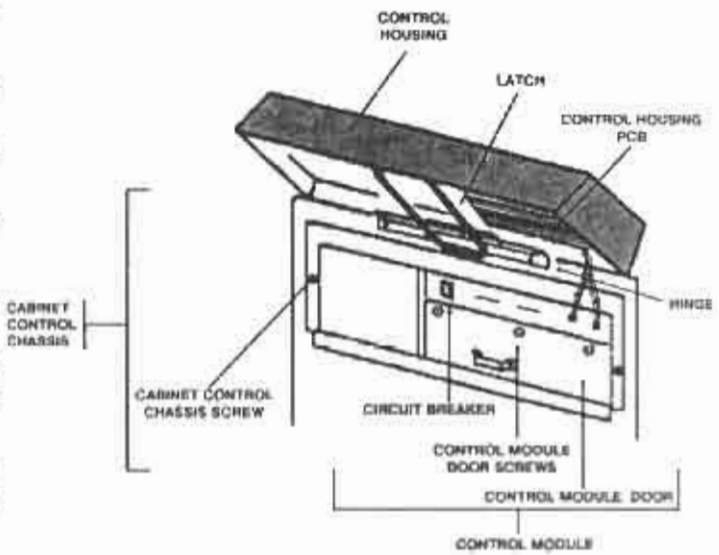


Figure 3-29. Cabinet control chassis (temperature sensor).

(g) Pull the cabinet control chassis forward on its tracks until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

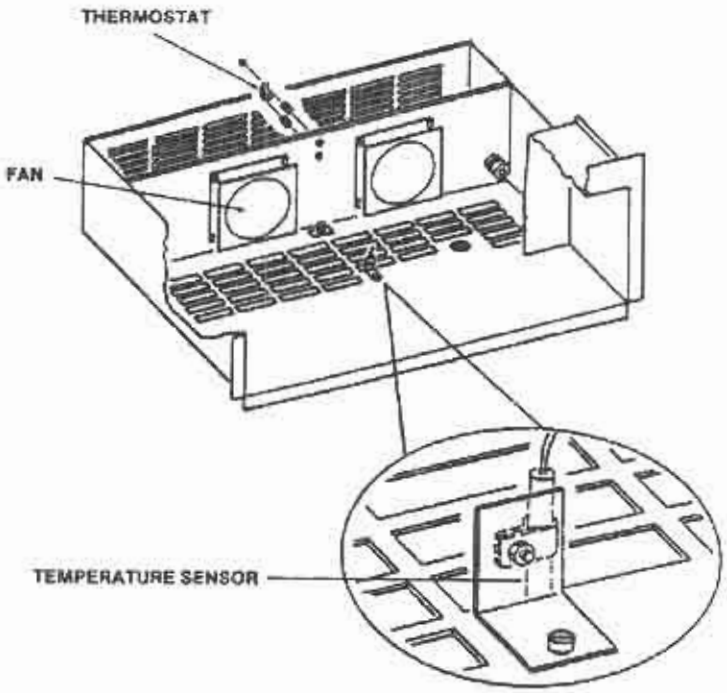


Figure 3-30. Temperature sensor.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

(3) Disconnect the wires from the temperature sensor.

(4) Loosen the nut that fastens the sensor to the mounting bracket.

(5) Remove the temperature sensor.

b. Assembly.

(1) Install a new temperature sensor into its mounting bracket.

(2) Tighten the nut on the sensor mounting bracket.

(3) Reconnect the wires to the temperature sensor.

NOTE

Ensure that the temperature sensor extends 1/8 inch below the grill of the cabinet control chassis.

(4) Close the fan cabinet control chassis by completing the following actions:

(a) Lift the cabinet control chassis onto its mounting by pushing it rearward while simultaneously pushing it downward into the mounting.

(b) Open the control module door by removing the screw temporarily holding the door closed.

(c) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.

(d) Pull the power supply wires through the cable bushing and into the control module.

(e) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.

(f) Close the control module door and replace the three screws.

(g) Push the cabinet control chassis into the warming cabinet.

(h) Replace the fastening screw on both sides of the cabinet control chassis.

(i) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(j) Lift the control housing slightly upward to release the latch and then lower it.

(k) Open the storage compartment door.

(l) Twist the screw located in the lower right corner to lock the control housing.

(m) Close the storage compartment door.

(n) Reconnect the electrical power to the cabinet.

(5) Test the warming cabinet by following the procedures in paragraph 2-2 and calibrating the temperature sensor as specified in paragraph 3-18.

3-27. Relays (fig 3-31 and fig 3-32).

a. Disassembly.

(1) Disconnect the electrical power to the unit.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its tracks until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(3) Disconnect the electrical wires from the defective relay after noting the position of each wire.

(4) Remove the hardware fastening the relay and then remove the relay.

b. Assembly.

(1) Install a replacement relay and replace the hardware.

(2) Reconnect the electrical wires to the relay terminals.

(3) Close the cabinet control chassis by completing the following actions:

(a) Close the control module door and replace the three screws.

(b) Push the cabinet control chassis backward on its track.

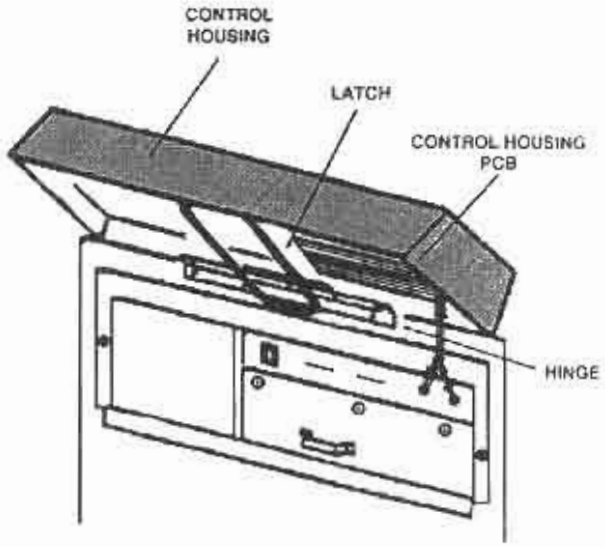


Figure 3-31. Cabinet control chassis (relays).

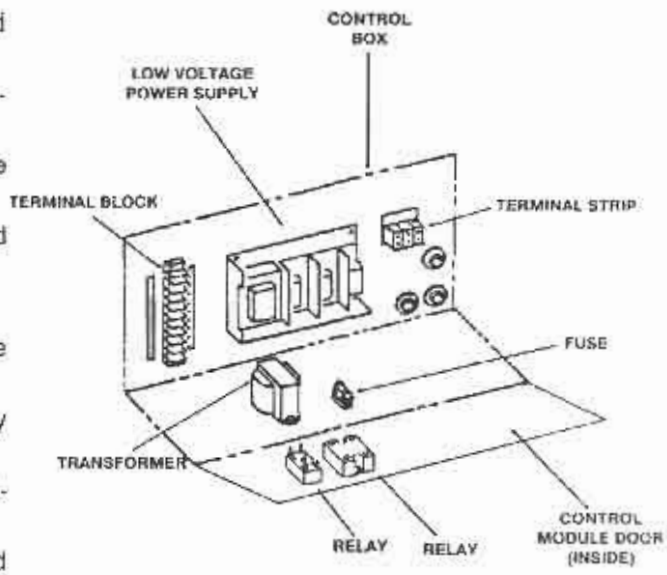


Figure 3-32. Relays.

(c) Replace the fastening screw on each side of the cabinet control chassis.

(d) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(e) Lift the control housing slightly upward to release the latch and then lower it.

(f) Open the storage compartment door.

(g) Twist the screw located in the lower right corner to lock the control housing.

(h) Close the storage compartment door.

(4) Reconnect the electrical power to the unit.

(5) Test the warming cabinet for proper operation by following the procedures in paragraph 2-2.

Section IX. STORAGE AND SHIPMENT PROCEDURES

3-28. Preparation for storage.

This section contains the procedures for preparing the warming cabinet for storage within an ISO shelter.

a. Ensure that the warming cabinet is empty.

b. Turn off the circuit breaker by completing the following actions:

(1) Open the storage compartment door.

(2) Twist the screw in the lower right corner to release the control housing.

(3) Close the storage compartment door.

(4) Pull forward on the bottom of the control housing, which is hinged at the top, and lift it upward.

(5) Depress the circuit breaker to the "OFF" position.

(6) Lift the control housing slightly upward to release the latch and then lower it.

(7) Open the storage compartment door.

(8) Twist the screw located in the lower right corner to lock the control housing.

(9) Close the storage compartment door.

c. Clean the warming cabinet. (Refer to chap 2, sec IV.)

3-29. Preparation for shipment.

This section contains the instructions for preparing the warming cabinet for shipment outside of its ISO shelter.

CAUTION

To preclude damage to the ISO shelter or to the warming cabinet, do not remove the unit from the ISO shelter, or disassemble or crate it without assistance from support level maintenance.

a. Ensure that the warming cabinet is empty.

b. Remove the two adjustable shelves and place them on the bottom of the warming cabinet.

c. Disconnect electrical power to the warming cabinet.

d. Remove the cover plate of the electrical power junction box.

e. Loosen the screws in the terminal block (fig 3-33) and remove the electrical power cable.

f. Replace the cover plate.

g. Transfer the warming cabinet to the supporting activity for crating and shipping.

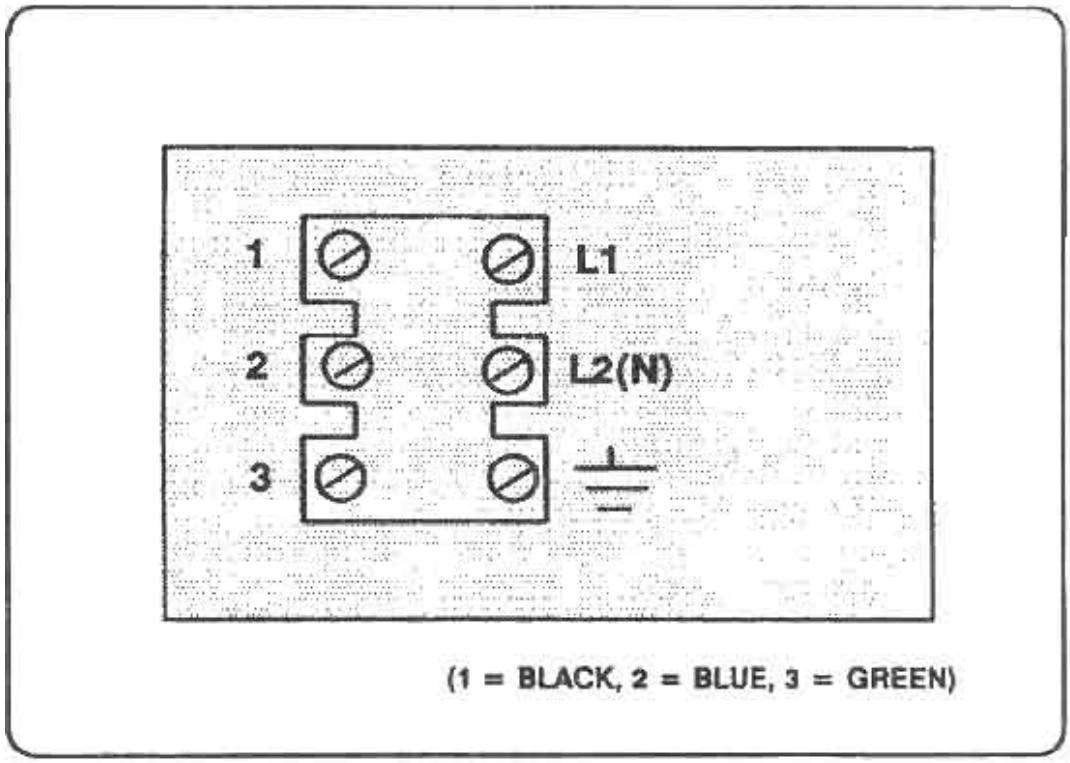


Figure 3-33. Terminal block.

CHAPTER 4

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

Section I. GENERAL INFORMATION

4-1. Overview.

This chapter provides for maintenance that is beyond the capability, capacity, and authorization for unit level maintenance personnel. The procedures in this chapter should not be attempted at the unit level.

4-2. Tools and test equipment.

Common tools and test equipment required for support maintenance of the unit are listed in appendix B, section III. Refer to your unit's MTOE or installation table of distribution and allowances (TDA) for authorized items.

4-3. Components of end item and basic issue items.

Components of end item and basic issue items are listed in appendix C, sections II and III.

4-4. Expendable supplies.

Expendable and durable supplies and materials for support maintenance are listed in appendix D, section II.

4-5. Repair parts.

Repair parts required for support maintenance are listed in appendix E, section II.

4-6. Special tools.

Special tools required for support maintenance are listed in appendix E, section III.

4-7. Support maintenance services.

Specific procedures and instructions for support maintenance services are not currently available.

Section II. TROUBLESHOOTING

4-8. General.

Specific troubleshooting procedures for the low voltage power supply and the control housing PCB are not currently available.

Section III. VOLTAGE CONVERSION

4-9. Voltage conversion procedures.

Specific procedures for converting the warming cabinet to operate from 230 volts rather than the current 115-volt configuration are not currently available.

APPENDIX A
REFERENCES

A-1. Army regulations.

AR 40-61	Medical Logistics Policies and Procedures
AR 710-2	Supply Policy Below the Wholesale Level
AR 725-50	Requisitioning, Receipt, and Issue System
AR 750-1	Army Materiel Maintenance Policy and Retail Maintenance Operations

A-2. Technical manual.

TM-DPSC-6500-RPL	Medical Materiel: Medical Repair Parts Reference List

A-3. Technical bulletins.

TB 8-6500-MPL	Mandatory Parts List for Medical Equipment
TB 38-750-2	Maintenance Management Procedures for Medical Equipment
TB 740-10/DLAM 4155.5/AFR 67-43	Quality Control, Depot Storage Standards, Appendix M, Medical Supplies
TB 750-8-1	Maintenance Expenditure Limits for Medical Materiel: FSC Groups (Medical Only)

A-4. Field manual.

FM 21-11	First Aid for Soldiers

A-5. Supply bulletin.

SB 8-75-( )-series	Army Medical Department Supply Information

A-6. Other publications.

(These publications may be obtained from Commander, U.S. Army Medical Materiel Agency, ATTN: SGMMA-M, Frederick, MD 21702-5001.)

Installation Package, MDT Biologic Company

Installation Instructions, MDT Biologic Company

Operators Manual, MDT Biologic Company

Service Manual, MDT Biologic Company

Parts Catalog, MDT Biologic Company

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance levels.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions, explanatory notes, and/or illustrations required for a particular maintenance function.

B-2. Explanation of columns in section II.

a. Group Number, Column 1. The assembly group number (Group No.) column is a numerical group assigned to each assembly. The applicable assembly groups are listed in the maintenance allocation chart (MAC) in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. Assembly Group, Column 2. This column contains a brief description of the components of each assembly group.

c. Maintenance Functions, Column 3. This column lists the various maintenance functions (A through K) and indicates the lowest maintenance level authorized to perform these functions. The symbol designations for the various maintenance levels are as follows:

C - Operator or crew

O - Unit maintenance

F - Direct support maintenance

H - General support maintenance

D - Depot maintenance

The maintenance functions are defined as follows:

A - Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B - Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C - Service. To clean, to preserve, to charge, and to add lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

D - Adjust. To rectify to the extent necessary to bring into proper operating range.

E - Align. To adjust specified variable elements of an item to bring it to optimum performance.

F - Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison 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 with the certified standard.

G - Install. To set for use in an operational environment such as tents or International Standards Organization shelters.

H - Replace. To replace unserviceable items with serviceable like items.

I - Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage to a specific failure. Repair may be accomplished at each level of maintenance.

J - Overhaul. Normally the highest degree of maintenance performed by the Army in order to minimize time work in process consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by a maintenance standard in technical publications for each item of equipment. Overhaul normally does not return an item to like new condition.

K - Rebuild. The highest degree of material maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance level.

d. Tools and Equipment, Column 4. This column is provided for referencing by code, the tools and test equipment (sec III) required to perform the maintenance functions.

e. Remarks, Column 5. This column is provided for referencing by code, the remarks (sec IV) pertinent to the maintenance functions.

B-3. Explanation of columns in section III.

a. Reference Code, Column 1. This column correlates to section II, column 4.

b. Maintenance Level, Column 2. This column identifies the maintenance levels using the tools and test equipment.

c. Nomenclature, Column 3. This column identifies the tools and test equipment.

d. National Stock Number, Column 4. This column provides the national stock number of the specific tools or test equipment.

B-4. Explanation of columns in section IV.

a. Reference Code, Column 1. This column correlates to section II, column 5.

b. Remarks, Column 2. This column provides supplemental information or explanatory notes pertinent to the maintenance function in section II.

Section II. MAINTENANCE ALLOCATION CHART FOR WARMING CABINET

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS A	B	C	D	E	F	G	H	I	J	K	(4) TOOLS AND EQUIPMENT	(5) REMARKS
00	Warming Cabinet	O 0.5	O 1.2	O 0.6		O 0.3	O 1.2	D 7.0	D 9.0	O 1.5	F 14.0	D 21.0	01,02,03 04,05,06, 07,08	CODE A, B, C
01	Cabinet												01,02,03	CODE A
	Panels	O 0.2		O 0.2					O 2.4					
	Door	O 0.1		O 0.1		O 0.3			O 1.2	O 0.8				
	Gaskets	O 0.1		O 0.3					O 1.4					
	Handle	O 0.1							O 0.2					
	Latch	O 0.1			O 0.3				O 0.5					
	Hinges	O 0.1			O 0.4				O 0.6					
02	Electrical Components												01,02,03 04,05	CODE A, B
	Door Switch		O 0.3						O 0.6					
	Circuit Breaker		O 0.3						O 0.6					
	Temperature Sensor Relay		O 0.3						O 0.6					
	Thermostat Safety Relay		O 0.3						O 0.6					

Section II. MAINTENANCE ALLOCATION CHART FOR WARMING CABINET

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS A	B	C	D	E	F	G	H	I	J	K	(4) TOOLS AND EQUIPMENT	(5) REMARKS
	Transformer		O 0.5						O 0.6					
	Fuse		O 0.2						O 0.2					
	Power Supply		O 0.6		O 0.6				O 1.2	O 0.5				
	Fan(s)		O 0.3						O 0.8					
	Heater(s)		O 0.3						O 0.8					
	Temperature Sensor		O 0.6		O 1.1				O 1.2					
	Thermostat		O 0.6		O 1.1				O 1.2					
03	Electronic Components												01,02,03 04,05,06 07,08	CODE A, B, C
	Control Housing PCB		O 0.8		O 0.6				O 1.6	D 1.4		D 2.2		

Section III. TOOLS AND TEST EQUIPMENT FOR WARMING CABINET

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER
01	O,F,H,D	Tool Kit, Medical Equipment Maintenance and Repair: Repairmans	5180-00-611-7923
02	O,F,H,D	Tool Kit, Medical Equipment Maintenance and Repair: Organizational	5180-00-611-7924
03	F,H	Shop Equipment, Medical Maintenance: Depot (MEDSOM) Maintenance	4940-00-594-6455
04	O,F,H,D	Multimeter, AN/USM 486	6625-01-145-2430
		or	
		Multimeter, AN/PSM 45A	6625-01-265-6000
05	O,F,H,D	Tester, Current Leakage, TS 2514/P	6625-01-142-8233
06	O,F,H,D	Oscilloscope, AN/USM 488	6525-01-187-7847
		or	
		Oscilloscope, OS262 (P)/U w/Amplifier, Dual Trace, AM 6785/U w/Time Base, Dual Trace, TD1159/U	6625-01-007-9416 6625-00-361-5318 6625-00-261-5139
		or	
		Oscilloscope, OS291/G	6625-01-258-0022
07	O,F,H,D	Test Set, Circuit Component, TS 4138/P	6625-01-255-0839
08	O,F,H,D	Tester, Semiconductor, TS 1836 D/U	6625-00-138-7320
09	O,F,H,D	Generator, Signal, SG1171A/U	6625-01-216-9684
10	O,F,H,D	Counter, Electronic, Digital, AN/USM 459	6625-01-271-3012

Section IV. REMARKS FOR WARMING CABINET

(1) REFERENCE CODE	(2) REMARKS
A	Tools and test equipment are listed for each assembly group.
B	Perform an annual electrical safety inspection and test. Perform the inspection and test after repair or replacement of electrical/electronic components.
C	Perform a semiannual calibration.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. Scope.

This appendix lists components of end item and basic issue items for the equipment to help you inventory items required for safe and efficient operation.

C-2. General.

The Components of End Item and Basic Issue Items lists are divided into the following sections.

a. Section II. Components of End Item. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the equipment in operation, to operate it, and to perform emergency repairs. Basic issue items must be with the equipment during operation and whenever it is transferred between property accounts. This manual is your authority to request or requisition basic issue items, based on MTOE authorization of the end item.

C-3. Explanation of columns.

The following provides an explanation of columns found in both listings:

a. Item Number, Column 1. This column indicates the item number assigned to the item.

b. National Stock Number, Column 2. This column indicates the national stock number assigned to the item.

c. Description, Column 3. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the commercial and government entity (CAGE) code in parentheses followed by the part number.

d. Unit of Measure, Column 4. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation. These abbreviations are listed in the glossary.

e. Quantity, Column 5. This column indicates the quantity (QTY) of the item(s) provided with the equipment.

Section II. COMPONENTS OF END ITEM FOR WARMING CABINET

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
1		Shelf, Adjustable (32510) 69193	EA	2

Section III. BASIC ISSUE ITEMS FOR WARMING CABINET

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
1		Installation Instructions (32510) 30971	EA	1
2		Operators Manual (32510) 30923	EA	1
3		Service Manual (32510) 30926	EA	1
4		Parts Catalog (32510) 30927	EA	1

APPENDIX D

EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope.

This appendix lists expendable and durable supplies and materials that are required to maintain the equipment. This listing is authorization to requisition and retain the items if not otherwise authorized.

D-2. Explanation of columns.

a. Item Number, Column 1. The item number (Item No.) is sequentially assigned.

b. Level, Column 2. This column identifies the lowest level of maintenance that requires the listed item. An explanation of the alphabetical character is provided in appendix B, section I of this manual.

c. National Stock Number, Column 3. This column indicates the national stock number assigned to the item.

d. Description, Column 4. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

e. Unit of Measure, Column 5. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by an alphabetical abbreviation. These abbreviations are listed in the glossary.

f. Quantity, Column 6. This column indicates the quantity (QTY) of the item(s) provided with the equipment.

Section II. EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS LIST FOR WARMING CABINET

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UNIT OF MEASURE	(6) QTY
1	O	7920-01-004-7847	Cloth, Cleaning (97327) Rymple Cloth 301	RO	1
2	O	4940-01-087-3458	Workstation, ESD Control (12038) 4560901	EA	1
			or		
		4940-01-250-4236	Workstation, ESD Control (81349) MIL-W-87893-30	EA	1
			or		
		5920-01-253-5368	Workstation, ESD Control (12038) ASGK-MIL	EA	1
3	O	7930-00-926-5171	Polish, Stainless Steel (81348) P-C-1121	PT	1
4	O	6810-00-753-4993	Isopropyl Alcohol (81348) TTI735	PT	1
5	O	7920-00-985-6849	Cloth, Polishing, 13½ in by 11 in Sheet (81348) DDD-C-450	EA	2

APPENDIX E

REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

E-1. Scope.

This manual lists spare and repair parts, special tools, special test equipment; and other special support equipment required for the performance of unit level, direct support, general support, and depot level maintenance. It authorizes the requisitioning and issue of spare and repair parts in consonance with the MAC (app B).

E-2. General.

The Repair Parts and Special Tools List is divided into the following sections:

a. Repair Parts, Section II. A list of repair parts authorized for the performance of maintenance in figure number and item number sequence.

b. Special Tools, Test, and Support Equipment, Section III. A list of special tools, test, and support equipment authorized for the performance of maintenance.

E-3. Explanation of columns in section II.

a. Illustration, Column 1.

(1) *Figure Number.* This column indicates the figure number (FIG NO.) of the illustration on which the item is shown.

(2) *Item Number.* This column indicates the item number (ITEM NO.) used to identify each item on the illustration.

b. National Stock Number, Column 2. This column indicates the national stock number assigned to the item.

c. Description, Column 3. This column indicates the federal item name of the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

d. Unit of Measure, Column 4. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

e. Quantity, Column 5. This column indicates the quantity (QTY) of the item(s) to be used with or on the illustrated component, assembly, module, or end item.

E-4. Explanation of columns in section III.

a. Item Number, Column 1. This number is sequentially assigned.

b. Level, Column 2. This column identifies the lowest level of maintenance that requires the listed item. An explanation of the alphabetical character is provided in appendix B, section I of this manual.

c. National Stock Number, Column 3. This column indicates the national stock number assigned to the item.

d. Description, Column 4. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

e. Unit of Measure, Column 5. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

f. Quantity, Column 6. This column indicates the quantity (QTY) of the item(s) to be used with or on the equipment.

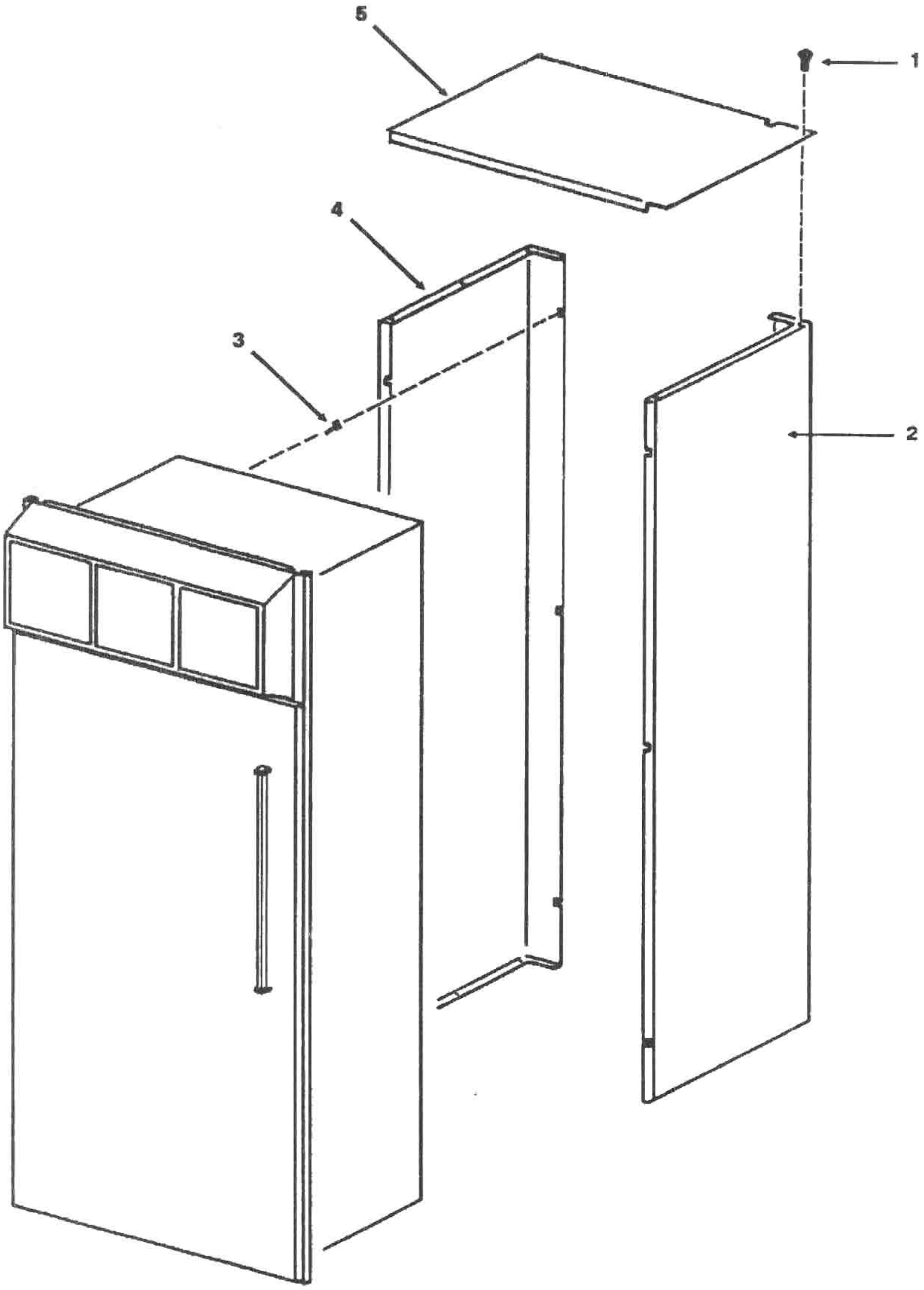


Figure E-1. Warming cabinet exterior.

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-1	1		Screw, 10-24 by 3/8 in, Self-tapping, Pan Head (32510) E6896	EA	6
E-1	2		Panel, Right Side (32510) 69020	EA	1
E-1	3		Screw, 10-24 by 3/8 in, Hex Socket Head (32510) E5293	EA	6
E-1	4		Panel, Left Side (32510) 60530	EA	1
E-1	5		Cover, Top (32510) 69182	EA	1

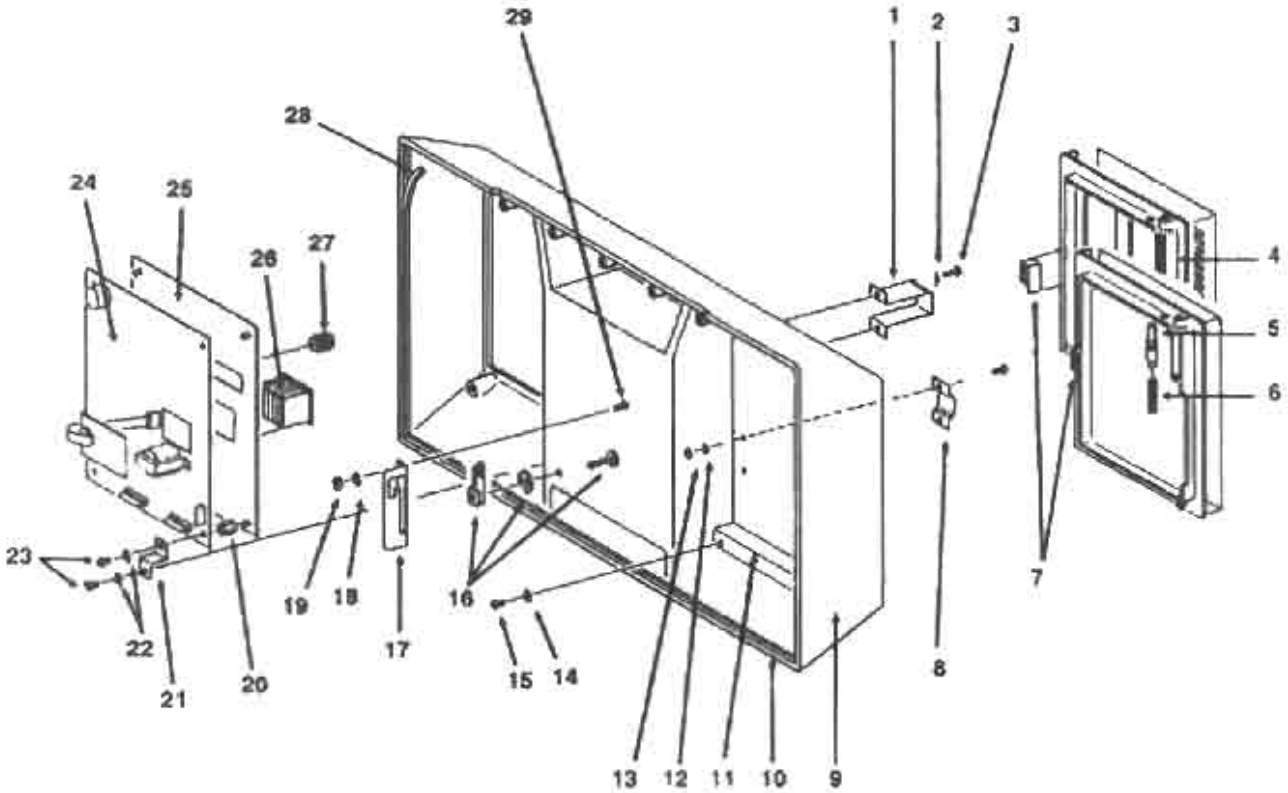


Figure E-2. Control housing.

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-2	1		Bracket, Storage Compartment Door Catch (32510) 86533	EA	1
E-2	2		Washer, No. 4, Internal Tooth Lock (32510) E2053	EA	2
E-2	3		Screw, 4-40 by ½ in, Phillips Pan Head (32510) E0013	EA	2
E-2	4		Door, Control Housing (32510) 86600	EA	2
E-2	5		Pin, Door Hinge (32510) 86534	EA	2
E-2	6		Spring, Compression (32510) 86535	EA	2
E-2	7		Catch, Magnetic Door (32510) 86531	EA	2
E-2	8		Bracket, Door Catch (32510) 86529	EA	2
E-2	9		Housing, Control Head (Control Housing) (32510) 86717	EA	1
E-2	10		Gasket, Control Housing, Bottom/Top (32510) 86654	EA	2
E-2	11		Panel, Closure (32510) 69238	EA	1
E-2	12		Washer, No. 4, Internal Tooth Lock (32510) E2053	EA	2
E-2	13		Nut, 4-40, Hex (32510) E7028	EA	2
E-2	14		Washer, No. 8, Internal Tooth Lock (32510) E6389	EA	2
E-2	15		Screw, 8-32 by ¼ in, Phillips Pan Head (32510) E0069	EA	2
E-2	16		Latch (32510) 86440	EA	1
E-2	17		Bracket, Control Housing Latch (32510) 86513	EA	1

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-2	18		Washer, No. 8, Internal Tooth Lock (32510) E6389	EA	1
E-2	19		Nut, 8-32, Hex (32510) E6391	EA	1
E-2	20		Standoff (Spacer), 8-32 Internal Thread by 1/2 in (32510) 86532	EA	4
E-2	21		Bracket, Control Housing PCB (32510) 86445	EA	4
E-2	22		Washer, No. 8, Internal Tooth Lock (32510) E6389	EA	4
E-2	23		Screw, 8-32 by 1/4 in, Phillips Pan Head (32510) E0069	EA	4
E-2	24		Control Housing PCB (32510) 69127	EA	1
E-2	25		Control Panel (32510) 69064	EA	1
E-2	26		Switch Assembly (32510) 69189	EA	1
E-2	27		Knob (32510) 69237	EA	1
E-2	28		Gasket, Control Housing, Side (32510) 86655	EA	2
E-2	29		Screw, 8-32 by 1/2 in, Phillips Flat Head (32510) E2229	EA	1

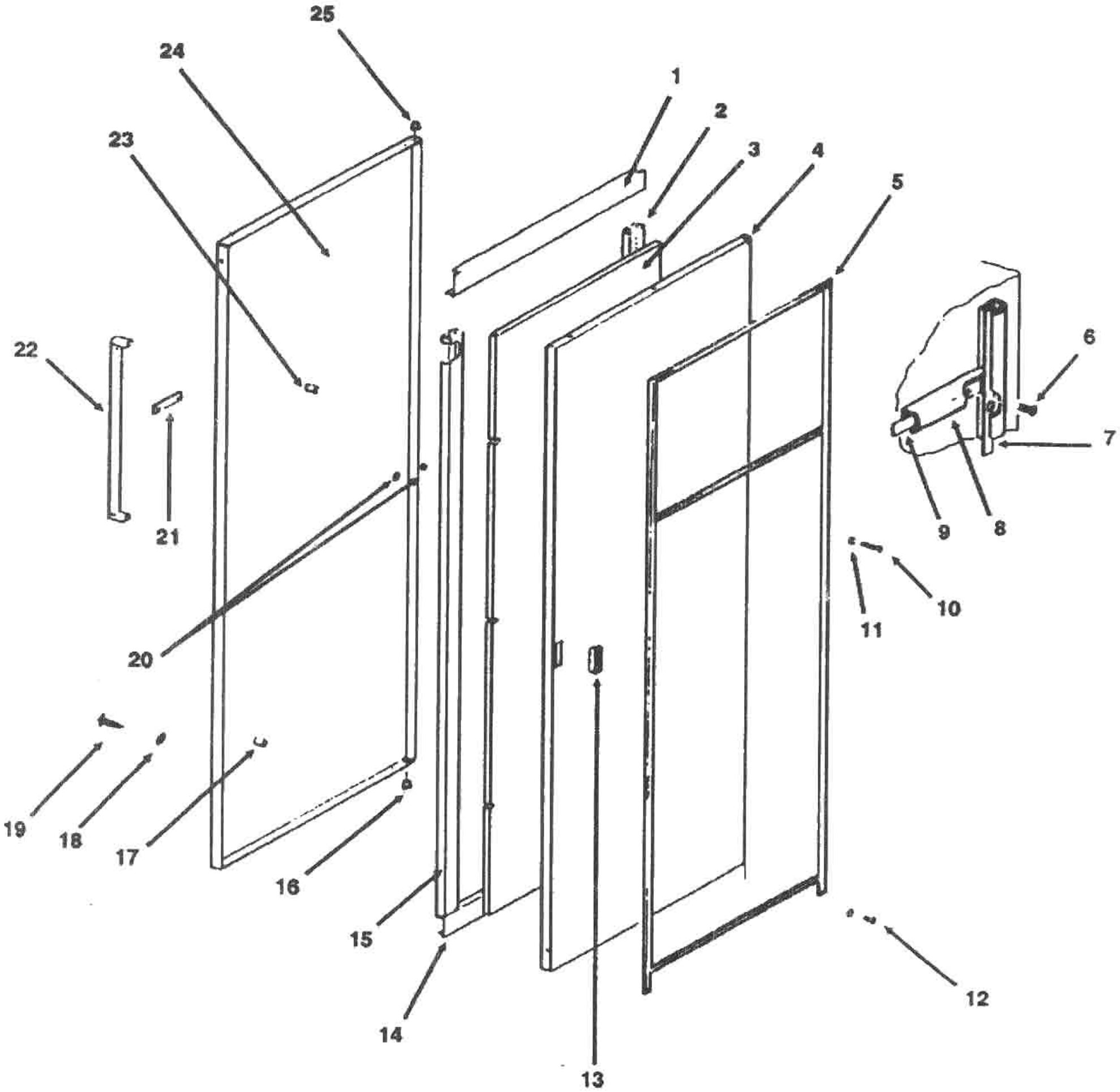


Figure E-3. Door assembly.

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-3	1		Brace, Door Support, Top (32510) 69861	EA	1
E-3	2		Brace, Door Support, Side (32510) 69862	EA	1
E-3	3		Insulation, Door (32510) 69868	EA	1
E-3	4		Panel, Inside, Door (32510) 69451	EA	1
E-3	5		Gasket, Door (32510) 69037	EA	1
E-3	6		Screw, 8-32 by 3/8 in, Self-tapping, Phillips Binding Head (32510) E2195	EA	40
E-3	7		Strip, Gasket Mounting, 57 5/8 in (32510) 69864	EA	2
E-3	8		Gasket, Shelf (32510) 69216	EA	1
E-3	9		Strip, Shelf Gasket Mounting, 27 1/4 in (32510) 69863	EA	1
E-3	10		Screw, 10-24 by 1 1/2 in, Flat Head (32510) E7069	EA	2
E-3	11		Washer, No. 10 (32510) 59977	EA	2
E-3	12		Screw, 10-32 by 1/2 in, Phillips Flat Head (32510) E4636	EA	45
E-3	13		Catch, Magnetic (32510) 60624	EA	1
E-3	14		Brace, Door Support, Bottom (32510) 69861	EA	1
E-3	15		Brace, Door Support, Side (32510) 69862	EA	1
E-3	16		Bushing, Door Hinge (32510) 69042	EA	1
E-3	17		Spacer, 10-32 Internal Thread, 7/8 in Long (32510) 69870	EA	2

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-3	18		Washer, No. 10 (32510) 59977	EA	2
E-3	19		Screw, 10-32 by 1/2 in, Phillips Flat Head (32510) E4636	EA	1
E-3	20		Nut, Tinnerman, 1/8 in Shaft (32510) E4628	EA	2
E-3	21		Bezel, Nameplate (32510) 86547	EA	1
E-3	22		Handle, Door, 18 in (32510) 69865	EA	1
E-3	23		Spacer, 13/64 in id by 5/16 in od by 7/8 in (32510) 69869	EA	2
E-3	24		Panel, Outside, Door (32510) 69452	EA	1
E-3	25		Bushing, Door Hinge (32510) 69042	EA	1

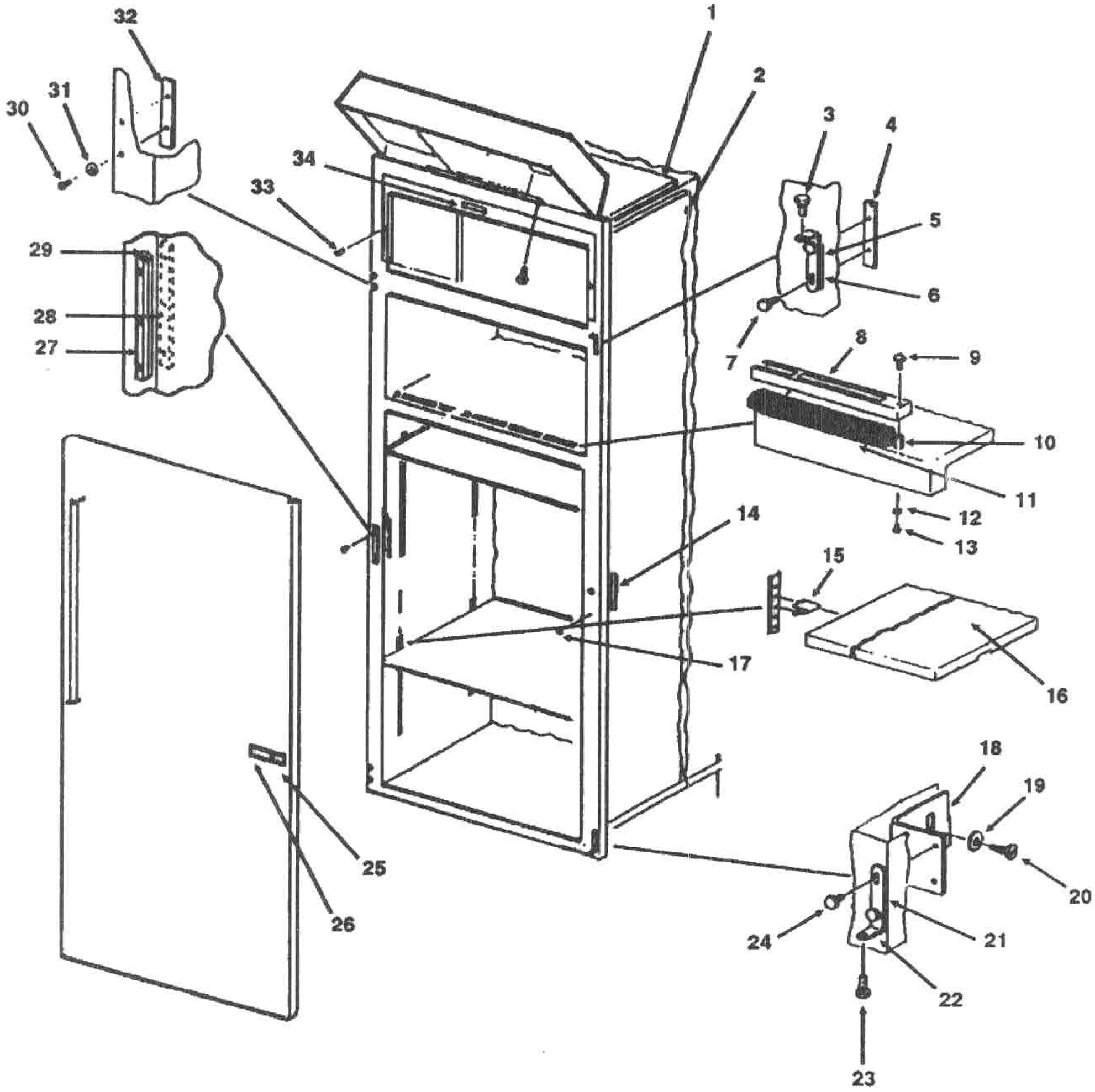


Figure E-4. Warming cabinet (front).

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-4	1		Insulation, Top (32510) 69242	EA	1
E-4	2		Insulation, Side (32510) 69243	EA	2
E-4	3		Pin, Door Hinge (32510) 69047	EA	1
E-4	4		Plate, Hinge Mounting Bracket (32510) 69133	EA	2
E-4	5		Bracket, Hinge (32510) 69044	EA	1
E-4	6		Shim, Door Hinge, 1/16 in Thick (32510) 69445	EA	1
			and/or		
			Shim, Door Hinge 7/64 in Thick (32510) 60596	EA	1
			and/or		
			Shim, Door Hinge, 23/64 in Thick (32510) 60572	EA	1
E-4	7		Screw, 10-32 by 3/4 in, Hex Head (32510) E4699	EA	2
E-4	8		Cover, Shelf Air Filter (32510) 69165	EA	1
E-4	9		Thumbscrew, 8-32 by 5/8 in (32510) 69164	EA	1
E-4	10		Standoff, 8-32 Internal Thread by 1/2 in Long (32510) 86532	EA	2
E-4	11		Filter, Shelf (32510) 69195	EA	1
E-4	12		Washer, No. 8, Internal Tooth Lock (32510) E6389	EA	2
E-4	13		Screw, 8-32 by 3/16 in, Phillips Pan Head (32510) E5019	EA	2
E-4	14		Plate, Strike Mounting (32510) 69867	EA	1

Section II. REPAIR PARTS LIST
FOR
WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-4	15		Bracket, Shelf Pilaster Clip (32510) 69167	EA	12
E-4	16		Shelf, Adjustable (32510) 69193	EA	3
E-4	17		Screw, 6-32 by 3/8 in, Phillips Truss Head (32510) E0074	EA	2
E-4	18		Bracket, Hinge Support (32510) 69450	EA	1
E-4	19		Washer, No. 10, Flat (32510) E6563	EA	2
E-4	20		Screw, 10-32 by 1/2 in, Self-tapping, Pan Head (32510) E7021	EA	2
E-4	21		Shim, Door Hinge, 1/16 in Thick (32510) 69445	EA	1
			and/or		
			Shim, Door Hinge 7/64 in Thick (32510) 60596	EA	1
			and/or		
			Shim, Door Hinge, 23/64 in Thick (32510) 60672	EA	1
E-4	22		Bracket, Hinge (32510) 69044	EA	1
E-4	23		Pin, Door Hinge (32510) 69047	EA	1
E-4	24		Screw, 10-32 by 3/4 in, Flat Head (32510) E4699	EA	2
E-4	25		Decal, "SYBRON" (32510) 86549	EA	1
E-4	26		Decal, "CASTLE WARMING CABINET" (32510) 69084	EA	1
E-4	27		Plate, Magnetic Catch Strike (32510) 69866	EA	1
E-4	28		Plate, Strike Mounting (32510) 69867	EA	1

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-4	29		Shim, Door Strike Plate, 7/64 in Thick (32510) 60640 and/or Shim, Door Strike Plate, 1/16 in Thick (32510) 60641 and/or Shim, Door Strike Plate, 23/64 in Thick (32510) 60671	EA EA EA	1 1 1
E-4	30		Screw, 10-32 by 1/2 in, Phillips Flat Head (32510) E4636	EA	2
E-4	31		Washer, No. 10 (32510) 59977	EA	2
E-4	32		Plate, Hinge Mounting Bracket (32510) 69133	EA	1
E-4	33		Screw, 6-32 by 3/8 in, Self-tapping, Phillips Pan Head (32510) E2169	EA	2
E-4	34		Decal, Identification (32510) 69077	EA	1

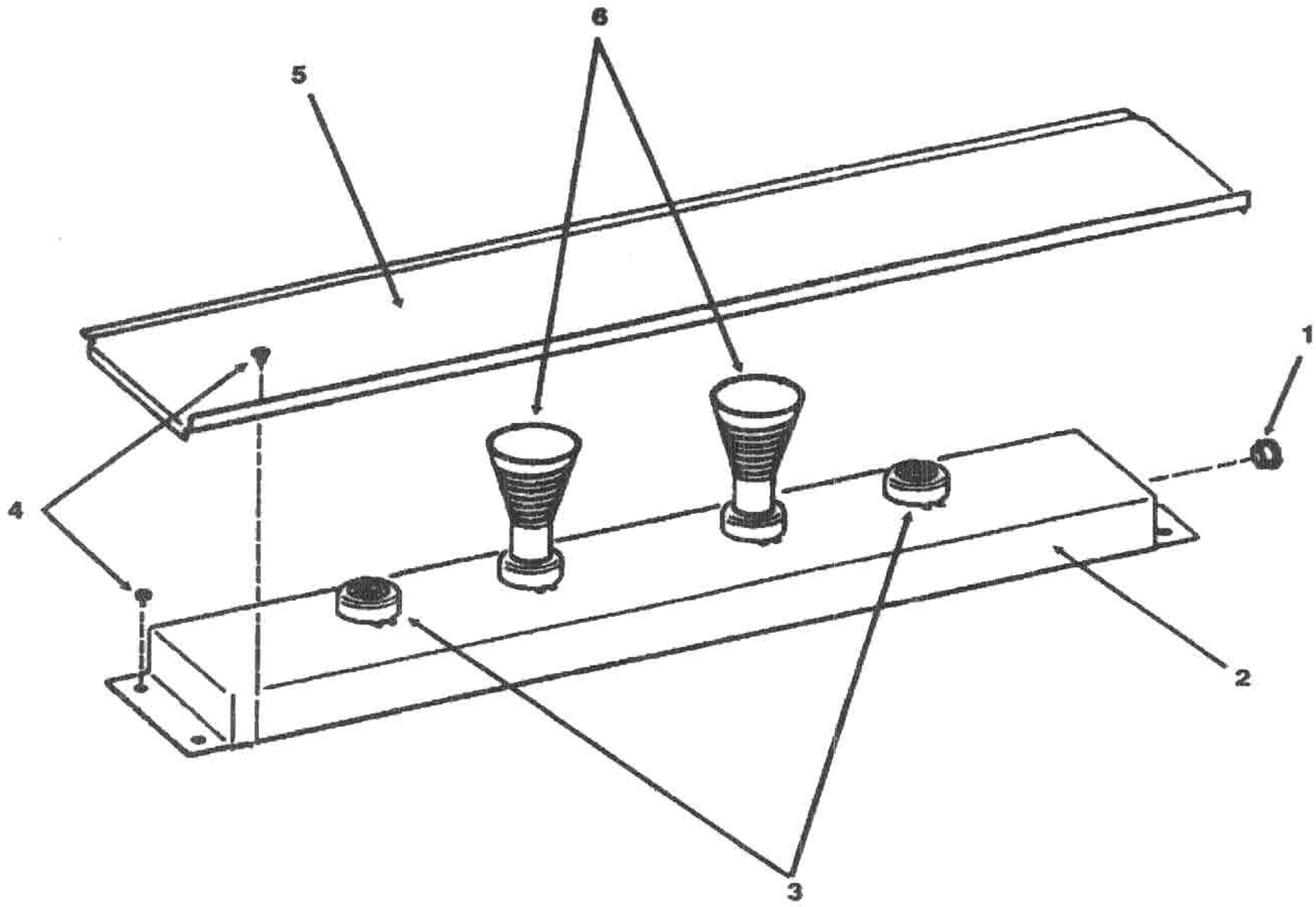


Figure E-5. Heater assembly.

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-5	1		Bushing, Snap (32510) 40730	EA	1
E-5	2		Panel, Heater Mounting (32510) 69068	EA	1
E-5	3		Receptacle, Heater (32510) 61051	EA	4
E-5	4		Screw, 6-32 by 1/4 in, Self-tapping, Phillips Pan Head (32510) E2194	EA	7
E-5	5		Cover, Heater (32510) 69070	EA	1
E-5	6		Heater, 120 V, 500 W (32510) 69093	EA	2

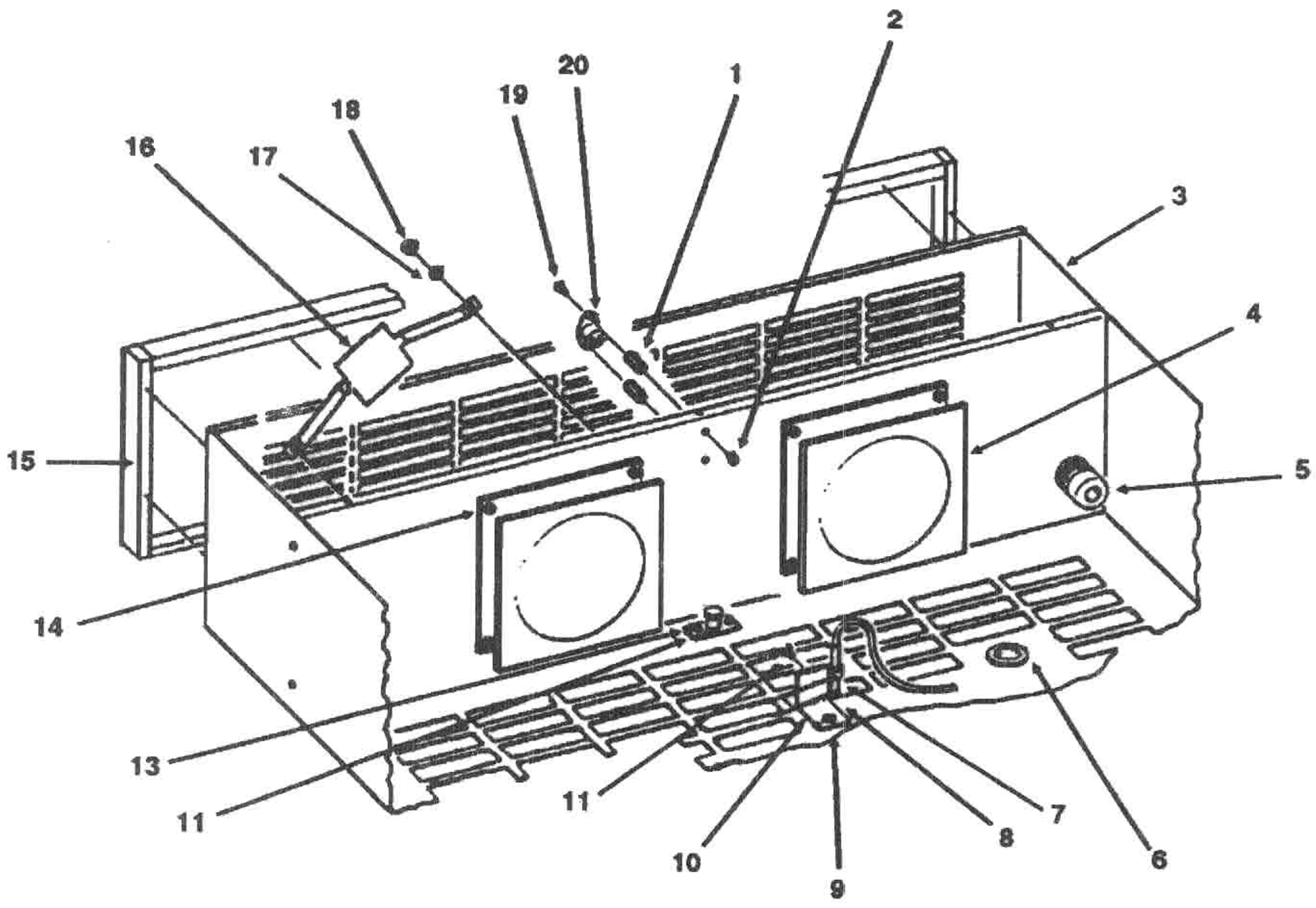


Figure E-6. Fan and heater assemblies.

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-6	1		Stand Off, 3/16 in id by 7/16 in od by 1/16 in Thick (32510) 86757	EA	1
E-6	2		Screw, 4-40 by 5/16 in, Phillips Pan Head (32510) E6610	EA	1
E-6	3		Cabinet Control Chassis (Box, Control) (32510) 69076	EA	1
E-6	4		Fan, 120V, 50/60 Hz, 127 ft^3/min (32510) 69094	EA	2
E-6	5		Connector, 13/16 in dia (32510) 69003	EA	1
E-6	6		Bushing, Snap (32510) 69091	EA	1
E-6	7		Sensor, Temperature (32510) 69200	EA	1
E-6	8		Clamp, 1/4 in dia Cable (32510) 67687	EA	1
E-6	9		Screw, 6-32 by 1/4 in, Self-tapping, Pan Head (32510) E6835	EA	1
E-6	10		Bracket, Temperature Sensor Mounting (32510) 69455	EA	1
E-6	11		Screw, 6-32 by 1/4 in, Self-tapping, Pan Head (32510) E2194	EA	1
E-6	12		Stop, Cabinet Control Chassis (32510) 69173	EA	1
E-6	13		Rivet, 1/8 in dia by 3/8 in Long, Domed Top (32510) E7048	EA	2
E-6	14		Screw, 8-32 by 1/2 in, Phillips Pan Head (32510) E6835	EA	8
E-6	15		Strip, Foam Rubber, 3/8 in by 1/2 in (32510) R3423	FT	AR
E-6	16		Shield, Fan Heat (32510) 56181	EA	2

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-6	17		Washer, No. 8, Internal Tooth Lock (32510) E2041	EA	1
E-6	18		Nut, 8-32, Hex (32510) E0253	EA	1
E-6	19		Screw, 4-40 by 5/16 in, Phillips Pan Head (32510) E6610	EA	1
E-6	20		Thermostat, 100°C (212°F) (32510) 69107	EA	1

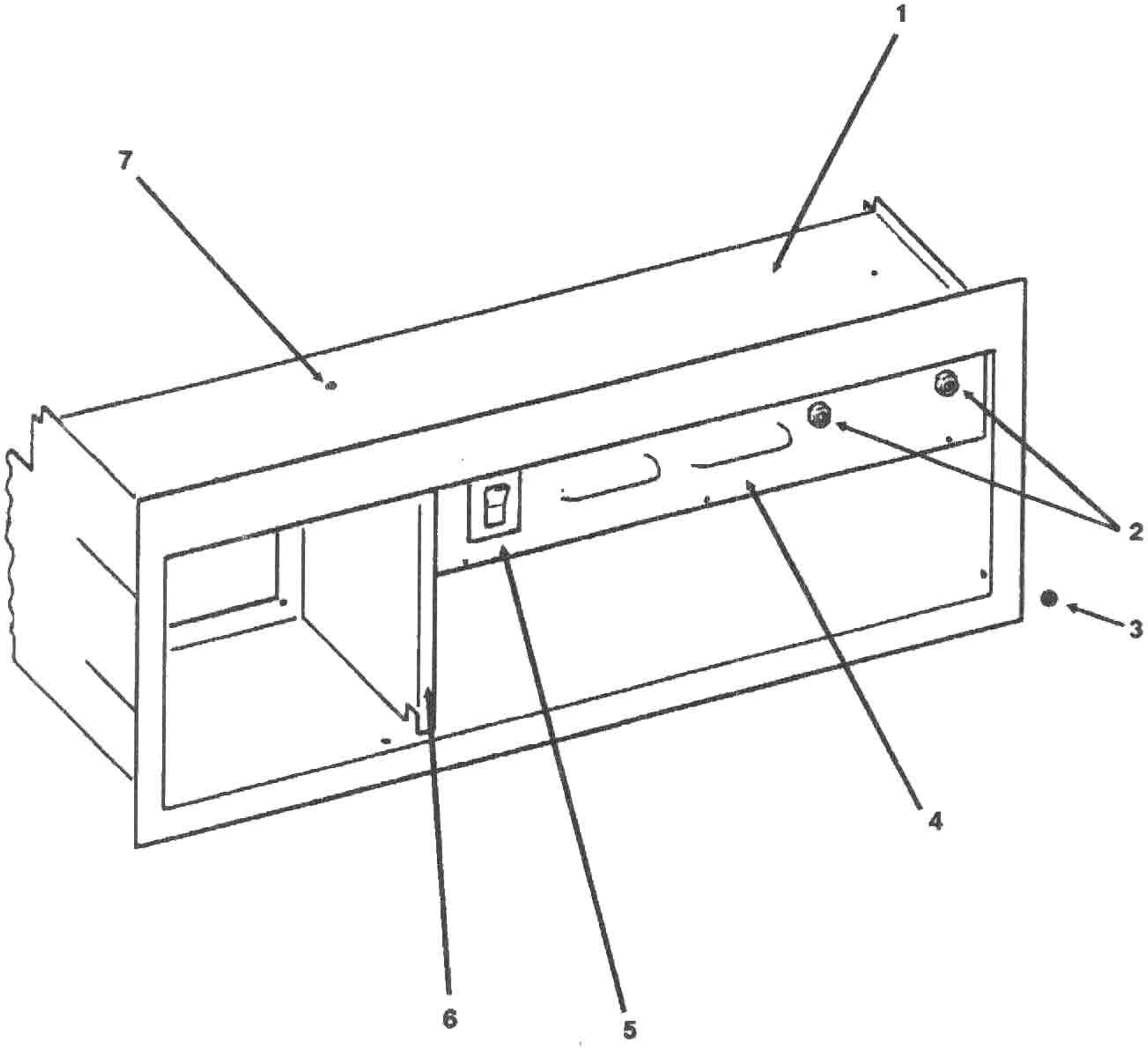


Figure E-7. Cabinet control chassis (front).

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-7	1		Cabinet Control Chassis (Box, Control) (32510) 69076	EA	1
E-7	2		Strain Relief, 21/64 in by 23/64 in dia (32510) 57030	EA	2
E-7	3		Nut, 6-32, Hex (32510) E7044	EA	2
E-7	4		Panel, Control Module (32510) 69073	EA	1
E-7	5		Circuit Breaker, 10 A (32510) 69110	EA	1
E-7	6		Panel, Divider (32510) 69071	EA	1
E-7	7		Rivet(s), 1/8 in dia by 3/8 in Long, Domed Top (32510) E7048	EA	AR

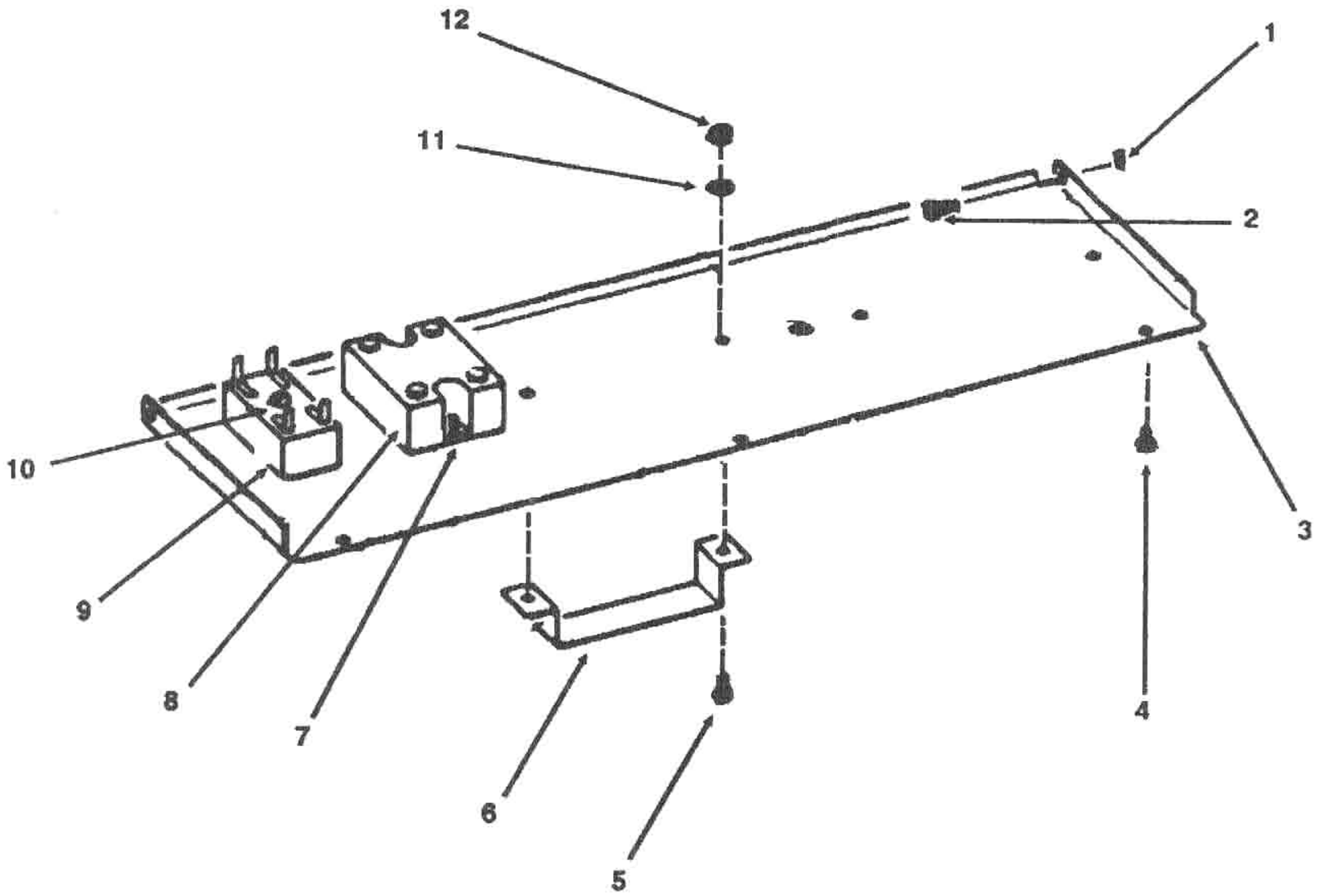


Figure E-8. Control module door (open).

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-8	1		Washer, 3/16 in id by 7/16 in od by 1/16 in Thick (32510) 69102	EA	2
E-8	2		Screw, 8-32 (32510) 69100	EA	2
E-8	3		Door, Control Module (32510) 69072	EA	1
E-8	4		Screw, 6-32 by 1/4 in, Self-tapping, Pan Head (32510) E2194	EA	3
E-8	5		Screw, 6-32 by 1/4 in, Phillips Pan Head (32510) E5010	EA	2
E-8	6		Bracket, Control Module (32510) 86947	EA	1
E-8	7		Screw, 8-32 by 1/2 in, Phillips Pan Head (32510) E6835	EA	2
			and		
			Nut, 8-32, Hex (32510) E0253	EA	2
E-8	8		Relay, 40 A (32510) 69088	EA	1
E-8	9		Relay, 2-1/2 A (32510) 69089	EA	1
E-8	10		Screw, 6-32 by 1-1/4 in, Phillips Pan Head (32510) E4809	EA	1
			and		
			Nut, 6-32, Hex (32510) E7139	EA	1
E-8	11		Washer, No. 6, Internal Tooth Lock (32510) E2043	EA	2
E-8	12		Nut, 6-32, Hex (32510) E7139	EA	2

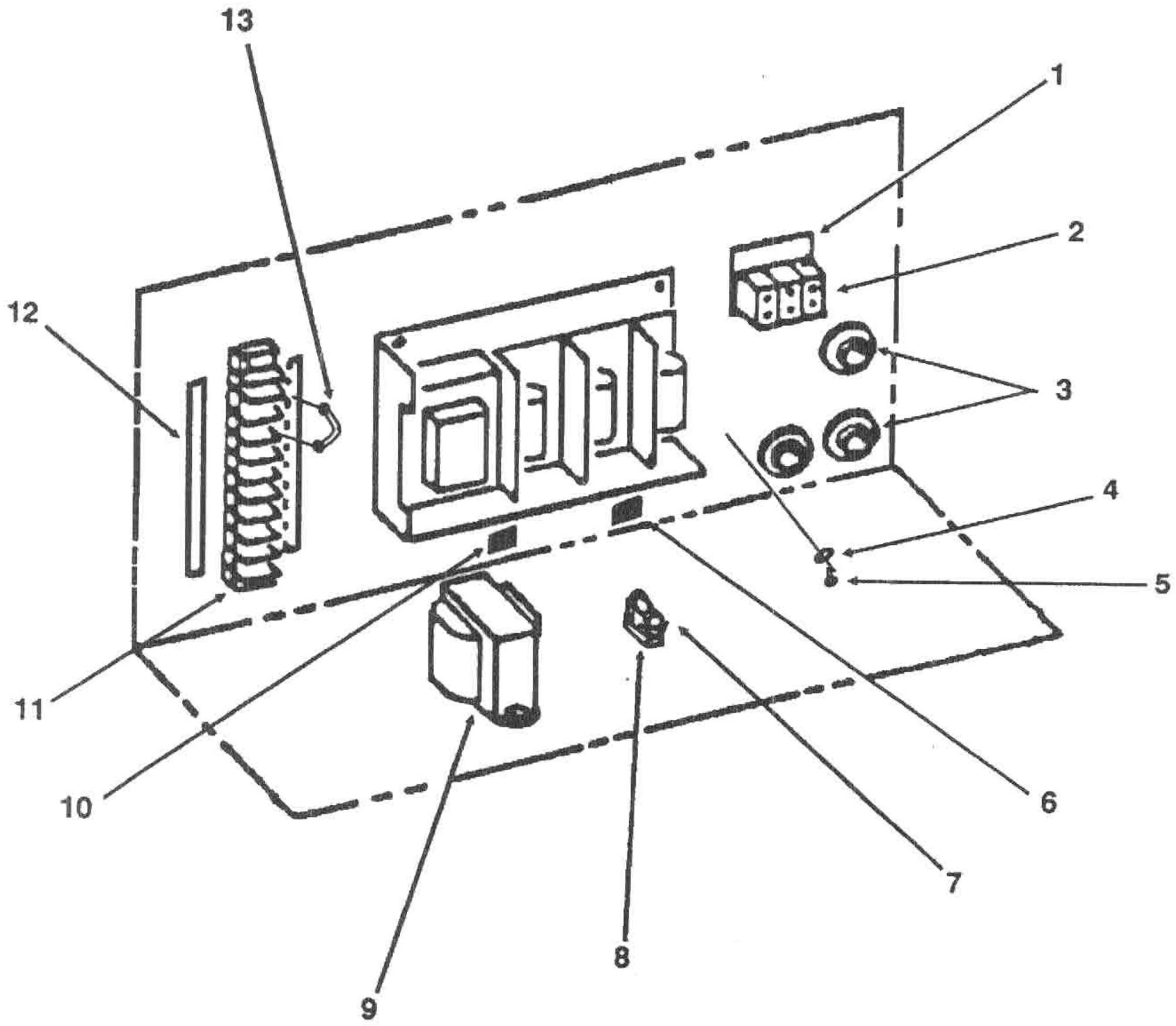


Figure E-9. Control module (inside).

Section II. REPAIR PARTS LIST FOR WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-9	1		Insulator, Electrical (32510) 69410	EA	1
E-9	2		Strip, Terminal, 3-connector (32510) 86591	EA	1
E-9	3		Connector, 13/16 in dia (32510) 69003	EA	3
E-9	4		Washer, No. 10, Terminal Cup (32510) 61419	EA	1
E-9	5		Screw, 10-32 by 3/18 in, Hex Head, Ground (32510) E6645	EA	1
E-9	6		Receptacle, 2-connector (32510) 69092	EA	1
E-9	7		Fuse, 1/4 A, 120 V (32510) 69425	EA	1
E-9	8		Block, Fuse Mounting (32510) 58579	EA	1
E-9	9		Transformer, 115 V - 230 V/24 V (32510) 69090	EA	1
E-9	10		Receptacle, 3-connector (32510) 44831	EA	1
E-9	11		Block, Terminal, 10-connector (32510) 49893	EA	1
E-9	12		Strip, Terminal Block Marking (32510) 51255	EA	1
E-9	13		Jumper, Terminal Block (32510) 52001	EA	AR

Section III. SPECIAL TOOLS, TEST, AND SUPPORT EQUIPMENT FOR WARMING CABINET

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UNIT OF MEASURE	(6) QTY
1	O		Power Supply, Adjustable, 0 - 5 VDC (Not Available)	EA	1

GLOSSARY

A	Amperes.
AC	Alternating current.
AFR	Air Force regulation.
AMPS	Amperes.
AR	Army regulation.
AR	As required. (Used in the quantity column in Appendix E.)
Blocking	Any strong material such as blocks of wood or a wooden box to support the weight of the door while maintenance services are being performed.
C	Operator or crew.
CAGE	Commercial and government entity.
chap	Chapter.
Compartment	The areas inside the warming cabinet divided by the shelves or the areas of the cabinet control chassis separated by metal dividers.
cm	Centimeter.
cu	Cubic.
D	Depot level maintenance.
DA	Department of the Army.
DC	Direct current.
°C	Degrees Celsius.
°F	Degrees Fahrenheit.
ft^3/min	Cubic feet per minute (formerly CFM).
dia	Diameter.
DLAM	Defense Logistics Agency manual.
DPSC	Defense Personnel Support Center.
DS	Direct support.
DS11/DS12	Manufacturer designation for LED indicators performing specific functions.
EA	Each.
ESD	Electrostatic discharge.
F	Direct support maintenance.
fig	Figure.
FM	Field manual.
FSCM	Federal supply code for manufacturers. This is an obsolete term. CAGE (commercial and government entity) is the correct acronym.
ft	Foot (feet).
GS	General support.
H	General support maintenance.

Hz	Hertz.
id	Inner diameter.
in	Inch.
ISO	International Standards Organization
J	Jack.
Jack	Any male connector used in conjunction with electronic circuits.
kg	Kilogram.
lbs	Pounds
LED	Light emitting diode.
m	Meter.
MAC	Maintenance allocation chart.
MEDSOM	Medical supply, optical, and maintenance (battalion).
mm	Millimeter.
MPL	Mandatory parts list.
MTOE	Modified table of organization and equipment.
NO. (No.)	Number
O	Unit maintenance.
od	Outer diameter.
0-volt	Refers to the neutral wire that has zero voltage in relation to electrical earth ground.
P	Pin.
para	Paragraph.
PC	Printed circuit.
PCB	Printed circuit board.
Ø	Phase is the difference in time between any point in an electrical cycle and the beginning of that cycle. The beginning of a cycle is the point at which the cycle passes through zero voltage moving in a positive direction.
Pin	Any single or multiple solid metal projections from an electronic jack (connector).
PMCS	Preventive maintenance checks and services.
PT	Pint.
QA	Quality assurance.
QC	Quality control.
QTY	Quantity
RO	Roll.
RPL	Repair parts list.
SB	Supply bulletin.
sec	Section.
TB	Technical bulletin.

TDA	Table of distribution and allowances.
V	Volts.
VAC	Volts alternating current.
VDC	Volts direct current.
W	Watts.

Index

This index is organized alphabetically by topic and by subtopic. Topics and subtopics are identified by paragraph number.

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TM 8-6530-007-24&P	6 Feb 88	Cabinet, Solution Warming

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E-12		E-5	

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TEMPERATURE CONVERSION

°C	°F	°C	°F	°C	°F	°C	°F
0	32.0	26	78.8	52	125.6	78	172.4
1	33.8	27	80.6	53	127.4	79	174.2
2	35.6	28	82.4	54	129.2	80	176.0
3	37.4	29	84.2	55	131.0	81	177.8
4	39.2	30	86.0	56	132.8	82	179.6
5	41.0	31	87.8	57	134.6	83	181.4
6	42.8	32	89.6	58	136.4	84	183.2
7	44.6	33	91.4	59	138.2	85	185.0
8	46.4	34	93.2	60	140.0	86	186.8
9	48.2	35	95.0	61	141.8	87	188.6
10	50.0	36	96.8	62	143.6	88	190.4
11	51.8	37	98.6	63	145.4	89	192.2
12	53.6	38	100.4	64	147.2	90	194.0
13	55.4	39	102.2	65	149.0	91	195.8
14	57.2	40	104.0	66	150.8	92	197.6
15	59.0	41	105.8	67	152.6	93	199.4
16	60.8	42	107.6	68	154.4	94	201.2
17	62.6	43	109.4	69	156.2	95	203.0
18	64.4	44	111.2	70	158.0	96	204.8
19	66.2	45	113.0	71	159.8	97	206.6
20	68.0	46	114.8	72	161.6	98	208.4
21	69.8	47	116.6	73	163.4	99	210.2
22	71.6	48	118.4	74	165.2	100	212.0
23	73.4	49	120.2	75	167.0		
24	75.2	50	122.0	76	168.8		
25	77.0	51	123.8	77	170.6		

Degrees Fahrenheit to Degrees Celsius: (°F - 32) X 5/9 = °C
Degrees Celsius to Degrees Fahrenheit: (°C X 9/5) + 32 = °F