



CARRIER COMMERCIAL REFRIGERATION, INC.

Providing BEVERAGE-AIR • FRIGIDAIRE • KELVINATOR • UNIVERSAL NOLIN Products/Services

# SERVICE & INSTALLATION MANUAL



## Frozen Food & Ice Cream Merchandisers CMCT

**If additional information is necessary, call the factory.**

Our toll free number is **1-800-684-1199**. Technical assistance engineers are willing to assist you in any way possible. Office hours are from 8:00a.m. to 5:30 p.m., Eastern Standard Time.

**Important information is contained in this manual which should be retained in a convenient location for future reference.**

All data and information in this manual is subject to change without notice.

| <b>MODEL DESIGNATION INFORMATION</b> |                |                   |
|--------------------------------------|----------------|-------------------|
| <b>115V, 60HZ</b>                    |                |                   |
| <b>PART #</b>                        | <b>MODEL #</b> | <b>DATA PLATE</b> |
| 52-2038-01                           | CMCT4-4        | SL12/CMCT4        |
| 52-2038-03                           | CMCT6-4        | SL20/CMCT6        |
| 52-2038-05                           | CMCT8-4        | SL28/CMCT8        |
| 52-2038-06                           | CMCT10-4       | SL36/CMCT10       |
| <b>EXPORT 220V, 50HZ</b>             |                |                   |
| <b>PART #</b>                        | <b>MODEL #</b> | <b>DATA PLATE</b> |
| 52-2040-01                           | ECMCT4-4       | ECMCT4            |
| 52-2040-02                           | ECMCT6-4       | ECMCT6            |
| 52-2040-04                           | ECMCT8-4       | ECMCT8            |

# SECTION I

## Introduction

## CMCT Merchandisers – Introduction

These cabinets are produced for the merchandising of frozen food and ice cream markets. They range in size from 4' to 10' in length. Operating ambients range from 70°F. to 85°F. with cavity temperatures at load line between 0°F. to -20°F.

Except for routine cleaning, these cabinets will require little maintenance. In the unusual event that repair should be necessary, this manual presents information that is helpful in maintaining, diagnosing, and repairing these cabinets.

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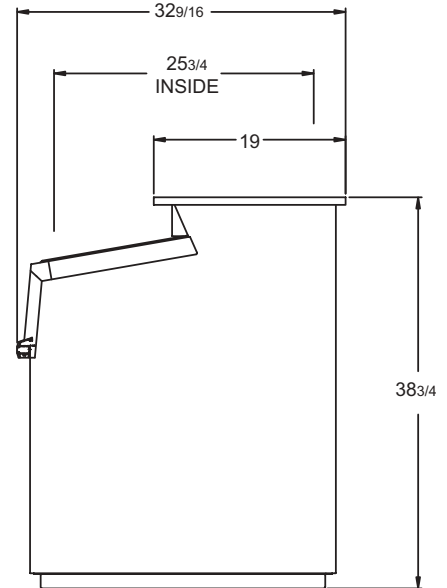
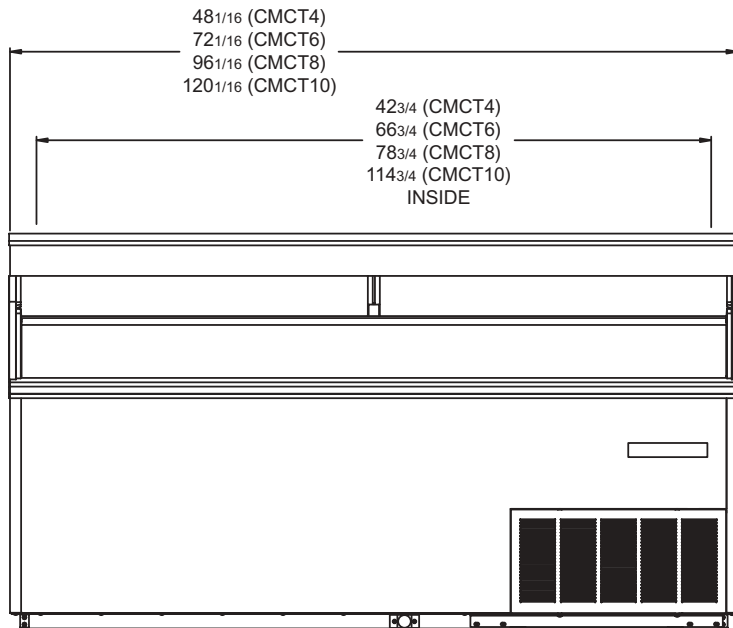
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Due to the manufacturer's policy of continuous quality improvement, specifications are subject to change without notice.

# Specifications - Specifications Subject to Change without Notice.

|                                | CMCT-4                              | CMCT-6                              | CMCT-8                              | CMCT-10   |
|--------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---|
| Temperature Range              | 0° to -20°F                         | 0° to -20°F                         | 0° to -20°F                         | 0° to -20°F   |
| Insulation                     | 2½" Urethane Foam in Place          | 2½" Urethane Foam in Place          | 2½" Urethane Foam in Place          | 2½" Urethane Foam in Place  |
| Number of Lids                 | 2                                   | 2                                   | 3                                   | 4   |
| Lid Construction               | 3/16" Glass Radiant Heated          | 3/16" Glass Radiant Heated          | 3/16" Glass Radiant Heated          | 3/16" Glass Radiant Heated  |
| Capacity                       | 11 cu. ft.                          | 19 cu. ft.                          | 27 cu. ft.                          | 35 cu. ft.  |
| Capacity (1/2 gallons)         | 120                                 | 225                                 | 322                                 | 435   |
| Novelty Baskets Load Level     | 10                                  | 14                                  | 20                                  | 26  |
| Capacity Novelty Baskets Total | 16                                  | 24                                  | 36                                  | 48  |
| Shipping Weight (Approx.)      | 486 lbs.                            | 624 lbs.                            | 780 lbs.                            | 874 lbs.  |
| Compressor Size                | 1/2 HP                              | 1/2 HP                              | 3/4 HP                              | 1 HP  |
| Condenser Type                 | Bare Tube Forced Air                | Bare Tube Forced Air                | Bare Tube Forced Air                | Fin & Tube Forced Air   |
| Evaporator Type                | Fin & Tube Gravity Coil & Cold Wall | Fin & Tube Gravity Coil & Cold Wall | Fin & Tube Gravity Coil & Cold Wall | Fin & Tube Gravity Coil & Cold Wall                                 |
| Refrigerant Type               | R404A                               | R-404A                              | R-404A                              | R-404A  |
| Refrigerant Control            | Capillary                           | Capillary                           | Capillary                           | Capillary   |
| Defrost System                 | Electric                            | Electric                            | Electric                            | Electric  |
| Rated Amps                     | 8.0                                 | 8.0                                 | 12                                  | 4.8 (11V0/6.7 (230V)  |
| Electrical Specs. (V/Hz/Ph)    | 115/60/1                            | 115/60/1                            | 115/60/1                            | 115 & 230/60/1  |
| Power Cord                     | 15 Amp Cord<br>with 5-15P NEMA Plug | 15 Amp Cord<br>with 5-15P NEMA Plug | 15 Amp Cord<br>with 5-15P NEMA Plug | Conduit Connected / Max. Fuse<br>Size 15A Min. Circuit Ampacity 15A |
| NSF-7 (Ice Cream Storage)      | Yes                                 | Yes                                 | Yes                                 | Yes   |
| UL & CUL Listed                | Yes                                 | Yes                                 | Yes                                 | Yes   |
| Interior Finish                | White Baked Enamel                  | White Baked Enamel                  | White Baked Enamel                  | White Baked Enamel  |
| Exterior Finish                | White Baked Enamel                  | White Baked Enamel                  | White Baked Enamel                  | White Baked Enamel  |
| Lighted Sign                   | Standard                            | Standard                            | Standard                            | Standard  |



# SECTION I – HANDLING & INSTALLATION

## FREIGHT DAMAGES AND SHORTAGES

**IMPORTANT:** The cabinet was inspected and packaged at the factory, and should arrive in excellent condition. The transportation company or other parties involved in the shipment are responsible for loss and/or damage. Always make an inspection before and after uncrating. Inspect the crated unit(s) before locating (preferably at the point of unloading by the transportation company).

## INSPECTING FOR DAMAGES

**NOTE:** *Always use care when removing shipping tape, blocks, pads, hardware or other material until you are satisfied that the unit is completely operational.*

Check the cartons or containers. If these are damaged in any way, open them and inspect the contents in the driver's presence. If damage is detected:

1. Have the driver note the nature and extent of the damage on the freight bill.
2. Notify the transportation company's office to request an inspection. Carrier claim policies usually require inspections to be made within 15 days of delivery.
3. If damage is noticed, file a claim with the transportation company.

## FILING A CLAIM

File a claim for loss at once with the transportation company for:

A. A cash adjustment; B. Repairs; or C. Replacement

When filing your claim, retain all packaging materials and receipts.

## HANDLING THE CABINET

**NOTE:** *The refrigeration system of the cabinet is designed to operate with the cabinet located on a level surface. **Do not tilt the cabinet more than 10° to any side.** If the cabinet must be tilted on an angle for handling or moving purposes, allow it to sit in an upright position 30 minutes prior to starting.*

## CHOOSING A LOCATION

This model cabinet should be situated to allow proper air circulation. Cabinets require a 2" minimum clearance behind for proper air circulation.

The cabinet must be installed on a sturdy, solid, level floor.

The cabinet must be located so it can be plugged or wired into a properly grounded three-prong electrical outlet of 115/220 volt, 60 hz. The electrical outlet should not be controlled by a wall switch which might be turned off accidentally.

## UNCRATING THE CABINET

The cabinet should be moved as close as possible to the operating location before removing crate base. Be sure to follow the steps in the "INSPECTING FOR DAMAGES" instructions.

## INSTALLING THE CABINET

After removing the skid from the cabinet, slide cabinet into location. **Level cabinet** to insure proper draining of the defrost water.

To meet NSF requirements, these cabinets must be sealed to the floor with an NSF or FDA approved sealant.

Remove the front grill from cabinet. Remove front hold down bolts and pull unit out of cabinet. Remove shipping band from compressor. Be sure that the compressor "floats" freely on the compressor springs. Check refrigeration lines to see that they are "free" and no damage was done in shipping. Check fan blade for free operation.

Check voltage and amp draw on the serial plate to determine proper fuse and line size. Voltage should be checked at the compressor terminals as the compressor is starting, to determine if there is excessive "voltage drop." This voltage drop should not exceed 10% of the rated compressor voltage. If the voltage reads 115 or 230 with no load and it drops below 103 or 208 when the compressor tries to start, it is an indication that the supply wiring is too small in size or too long in length.

It is recommended that a separate circuit be run for each cabinet to prevent the possibility of another appliance blowing a fuse causing subsequent loss of product.

# CLEANING INSTRUCTIONS

## CLEANING THE CABINET EXTERIOR

Wipe the exterior occasionally with a cloth dampened in mild detergent water; rinse, and wipe dry with a soft, dry cloth. Do not use abrasive or caustic cleaners or scouring pads.

## CLEANING THE CONDENSER

Periodic cleaning of the condenser can be easily accomplished by brushing the coils with a soft brush and/or using a vacuum cleaner with a brush attachment.

Be sure that dirt, dust, and a collection of other debris do not build up to a point that air circulation through the condenser is restricted.

## CLEANING THE STORAGE COMPARTMENT

1. Remove product and store it in another suitable cabinet, if possible. Be sure to prevent spoilage of the product which may occur if it is left at room temperature.
2. Turn OFF the thermostat and unplug the cabinet.
3. Defrost completely prior to cleaning.
4. Wash the entire interior storage area with warm water and baking soda solution — about a tablespoon of baking soda per quart of water. Rinse thoroughly with clean water and wipe dry.
5. A drain hose is provided. Connections are made to fit a standard garden hose for ease of draining water from inside of the tank area.

### IMPORTANT:

Do not use any objects or cleaners which may leave residues, odors, or particles. Avoid the use of strong chemicals or abrasive cleaners which may damage the interior surfaces and contaminate product within the storage area.

6. Be sure to correctly plug in to cabinet, set the temperature control, and allow time for cooling of the storage area before storing product.

## DESCRIPTION OF REFRIGERATION SYSTEM: CONDENSING UNIT

All CMCT cabinets are equipped with Copelametic compressors utilizing 404A refrigerant:

1/2 HP on the CMCT-4 and CMCT-6

3/4 HP on the CMCT-8

1 HP on the CMCT-10

A back pressure valve is used to protect the compressor against excessive pressures during initial cabinet start-up and upon termination of the defrost cycle. This valve is factory pre-set to limit the crankcase pressure to 10# and should not be changed.

## CABINET OPERATION

### REFRIGERATION CYCLE:

Refrigeration is accomplished by both a “wrap-around” tank coil and fin coil. This tank coil consists of several passes of copper tubing wrapped completely around the tank or product compartment. The fin coil located behind the light fixture serves two purposes — it creates a blanket of cold air over the product and collects moisture in the form of frost from the warm air entering the cabinet, thus reducing frost collection on the tank coil. The refrigerant enters the top of the tank coil first and progresses downward to the bottom of the tank; from there it enters the top of the fin coil and again downward. By circuiting the refrigeration in this manner, it assures the fin coil of being the coldest part of the system.

### DEFROST CYCLE:

Because of the large size and fin arrangement, the CMCT fin coils have the ability to collect a large amount of frost before becoming blocked. These features permit the CMCT cabinets to operate on one defrost cycle per 24 hours, thus reducing product shock to the ice cream.

The fin coil and drain pan are defrosted with **one** 4-pass heater located on the underside of the evaporator assembly. The back pass of the heater lays in the drain trough which slopes from left to right along the back edge of the drain pan.

## WARNING:

**To avoid the possibility of an electrical shock, turn OFF thermostat and unplug the electrical cord of the cabinet before cleaning or touching electrical connections or parts.**



Defrosting is initiated by the time clock and terminated by a temperature thermostat set to close at 76°F. When this thermostat closes, it energizes a solenoid in the time clock which in turn trips the clock mechanism off defrost. Should this thermostat fail to close, the defrost cycle will be terminated by the failsafe pin on the time clock (set at 40 minutes).

As an additional safety feature, the temperature limiting thermostat is wired in series with the defrost heater. This thermostat will also open the heater circuit when the top coil reaches 76°F. should any malfunction of the defrost thermostat occur.

**NOTE:** *Any time the system has been opened and exposed to the atmosphere, a new drier should be installed, system completely evacuated, and recharged to the specified refrigerant and amount listed on the serial plate located inside the unit compartment on the left wall.*

**IMPORTANT:** **DO NOT ATTEMPT CHARGING BY PRESSURES ALONE!!** Charge is very critical! Charging should be accomplished by means of weighing, or the use of a charging cylinder.

# CMCT ELECTRICAL DATA

| CMCT-4                                     | OHMS | WATTS | AMPS | VOLTS |
|--|------|-------|------|-------|
| Def. Heater on Bottom side of Top Coil     | 24.7 | 582   | 4.8  | 120   |
| Control Bellows Heater below Def. Controls | 1600 | 9     | .075 | 120   |
| End Breaker Heater behind each End Breaker | 960  | 15    | .12  | 120   |
| Glass Heater around Front Glass            | 262  | 56    | .46  | 120   |

| CMCT-8                                     | OHMS | WATTS | AMPS | VOLTS |
|--|------|-------|------|-------|
| Def. Heater on Bottom side of Top Coil     | 11.8 | 1200  | 10   | 120   |
| Control Bellows Heater below Def. Controls | 1600 | 9     | .075 | 120   |
| End Breaker Heater behind each End Breaker | 960  | 15    | .12  | 120   |
| Glass Heater around Front Glass            | 134  | 107   | .89  | 120   |

| CMCT-6                                     | OHMS | WATTS | AMPS | VOLTS |
|--|------|-------|------|-------|
| Def. Heater on Bottom side of Top Coil     | 15.9 | 904   | 7.5  | 120   |
| Control Bellows Heater below Def. Controls | 1600 | 9     | .075 | 120   |
| End Breaker Heater behind each End Breaker | 960  | 15    | .12  | 120   |
| Glass Heater around Front Glass            | 175  | 82    | .68  | 120   |

| CMCT-10                                    | OHMS | WATTS | AMPS | VOLTS |
|--|------|-------|------|-------|
| Def. Heater on Bottom side of Top Coil     | 3.38 | 1561  | 6.7  | 230   |
| Control Bellows Heater below Def. Controls | 1600 | 9     | .075 | 120   |
| End Breaker Heater behind each End Breaker | 960  | 15    | .12  | 120   |
| Glass Heater around Front Glass            | 190  | 132   | 1.1  | 120   |

# REFRIGERATION/ELECTRICAL SPECIFICATIONS CMCT (404A)

| CABINET MODEL | MFG.     | MODEL             | HP  | VOLTS   | START AMPS | RUN AMPS |
|---------------|----------|-------------------|-----|---------|------------|----------|
| CMCT-4        | Copeland | KAGB-005E-IAA-222 | 1/2 | 115     | 45         | 8.0      |
| CMCT-6        | Copeland | KAGB-005E-IAA-222 | 1/2 | 115     | 45         | 8.0      |
| CMCT-8        | Copeland | KAJB-007E-IAA-222 | 3/4 | 115     | 59         | 12.0     |
| CMCT-10       | Copeland | KALB-010E-CAV-221 | 1   | 230/208 | 33.5       | 8.1      |

## REFRIGERATION CYCLE (80° Ambient)

| CABINET MODEL | REFRIG. CYCLE            | DEFROST CYCLE            | REFRIG. | OZ. | CAP. TUBE    | SUCT. | DISCH. | CONTROL SETTING | CAVITY TEMP. |
|---------------|--------------------------|--------------------------|---------|-----|--------------|-------|--------|-----------------|--------------|
| CMCT-4        | 8.0 - 115V               | 6.8 - 115V               | 404A    | 22  | 8' x .042 ID | 2#    | 225#   | No. 7           | -22°F        |
| CMCT-6        | 8.0 - 115V               | 8.4 - 115V               | 404A    | 23  | 8' x .042 ID | 5#    | 223#   | No. 7           | -19°F        |
| CMCT-8        | 12.0 - 115V              | 12.0 - 115V              | 404A    | 27  | 7' x .049 ID | 2#    | 228#   | No. 7           | -22°F        |
| CMCT-10       | 8.1 - 230V<br>4.8 - 115V | 6.7 - 230V<br>4.8 - 115V | 404A    | 29  | 7' x .054 ID | 2#    | 223#   | No. 7           | -27°F        |

NOTE: Refer to Data plate for refrigerant type and charge.

**Condenser Fan** .....G.E. 5KSM51GG37845 or  
5KPM51BL-40466 (Reversible Motor)  
230 - V.E.M.S. ESP-L35-EM2

**Time Clock** .....115 Paragon 145-00B (24 Hr.)  
230V Paragon 145-20B (24 Hr.)

**Temperature Control** .....RANCO A10-4491-00

**Back Pressure Valve** .....Sporlan 10# setting  
CRO-4-0-20  
CRO-6-0-60 (CMCT-10)

# ECMCT REFRIGERATION/ELECTRICAL DATA

## Export Models (R-404A)

| ECMCT-4                                    | OHMS   | WATTS | AMPS | VOLTS |
|--|--------|-------|------|-------|
| Def. Heater on Bottom side of Top Coil     | 72.4   | 582   | 2.7  | 215   |
| Control Bellows Heater below Def. Controls | 5375   | 9     | .04  | 215   |
| End Breaker Heater behind each End Breaker | 3071.4 | 15    | .07  | 215   |
| Glass Heater around Front Glass            | 826.9  | 56    | .26  | 215   |
| Heated Glass Lid (each)                    | 41.3   | 14    | .58  | 24    |

| ECMCT-6                                    | OHMS   | WATTS | AMPS | VOLTS |
|--|--------|-------|------|-------|
| Def. Heater on Bottom side of Top Coil     | 51     | 904   | 4.2  | 215   |
| Control Bellows Heater below Def. Controls | 5375   | 9     | .04  | 215   |
| End Breaker Heater behind each End Breaker | 3071.4 | 15    | .07  | 215   |
| Glass Heater around Front Glass            | 565.8  | 82    | .38  | 215   |
| Heated Glass Lid (each)                    | 26.1   | 22    | .92  | 24    |

## COMPRESSOR AMPERAGE

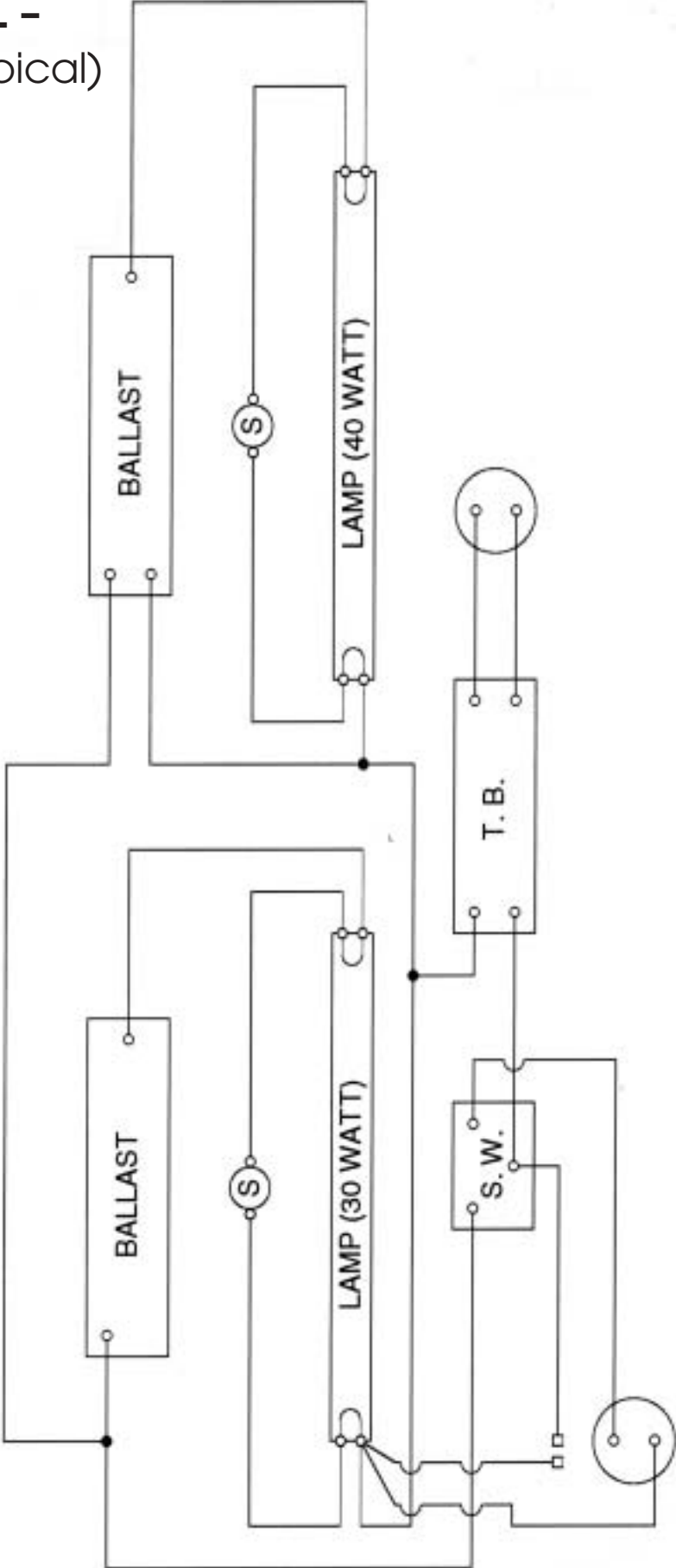
| CABINET MODEL | MFG.     | MODEL         | HP | VOLTS | LRA | RUN AMPS | OZ. | CAP. TUBE |
|---------------|----------|---------------|----|-------|-----|----------|-----|-----------|
| ECMCT-4       | Copeland | KAJB-010E-CAV | 1  | 200   | 40  | 8.0      | 20  | 8' x .042 |
| ECMCT-6       | Copeland | KAJB-010E-CAV | 1  | 200   | 40  | 8.0      | 25  | 8' x .042 |







**LAMP WIRING DETAIL -**  
Upper Raceway (Typical)





# SECTION II

## Maintenance & Repair

# CABINET TEMPERATURE CONTROL

**CAUTION:** Disconnect the power supply before servicing the cabinet.

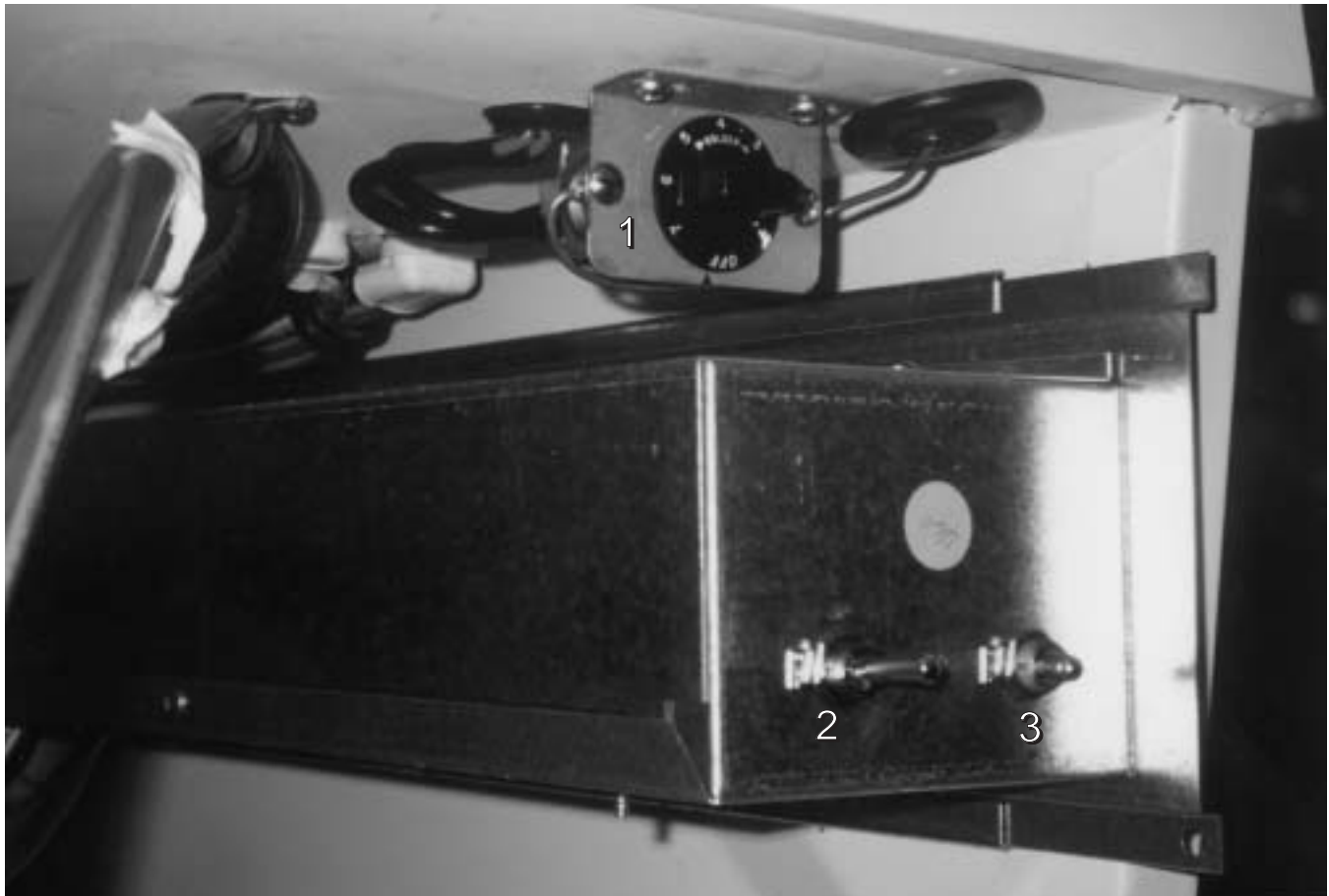
Remove the front grill.

The control is located in the machine compartment in the upper righthand corner, just above the electrical box. Control settings are numbered from #1 (warmest) to #7 (coldest) positions.

The control capillary is inserted in a copper bulb well just to the right of the control. The well is approximately 20" long and is secured to the cold wall evaporator. The control reacts to the evaporator temperature which is approximately -40°F in order to maintain a cavity temperature of -20°F.

| COLD OUT                         | NORMAL OUT | NORMAL IN | WARM IN |
|----------------------------------|------------|-----------|---------|
| -30°F                            | -23°F      | -15°F     | -2°F    |
| TERMINALS: .25 QUICK CONNECT TAB |            |           |         |
| CAP TUBE LENGTH: 24"             |            |           |         |

1. Temperature Control
2. 115V Cabinet Power Switch (115V models)
3. 230V Cabinet Power Switch (230V models)



# ELECTRICAL BOX LAYOUT

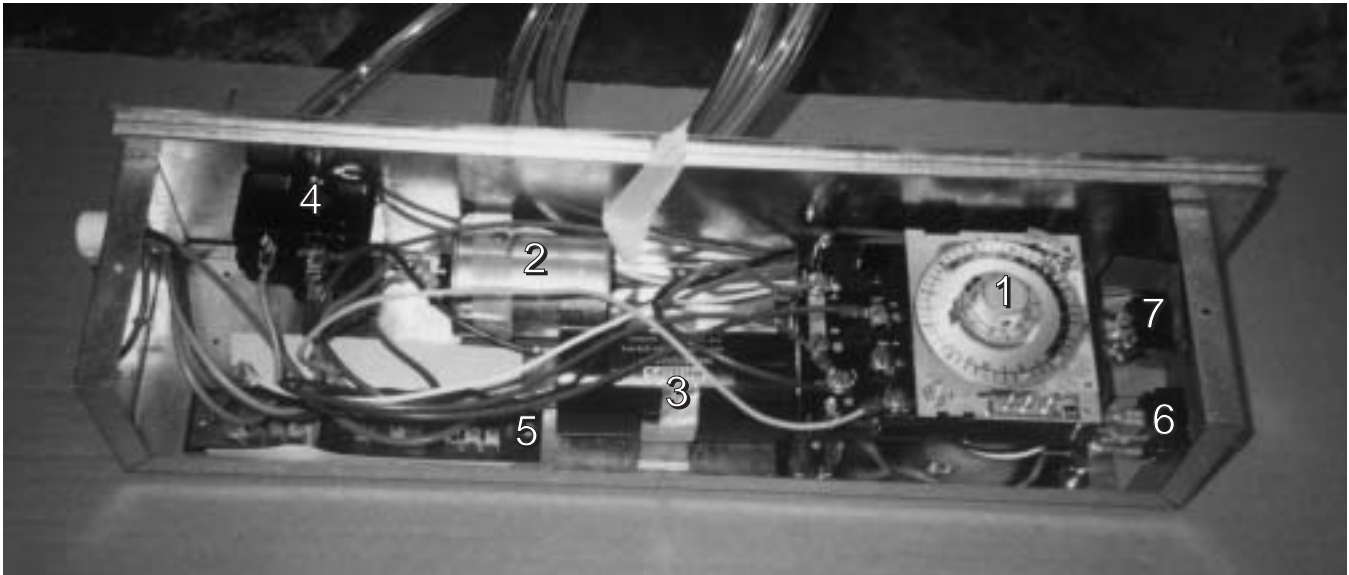
**CAUTION:** Disconnect the power supply before servicing the cabinet.

The electrical box can be accessed by removing the front grill.

The electrical box can be pulled out for component troubleshooting.

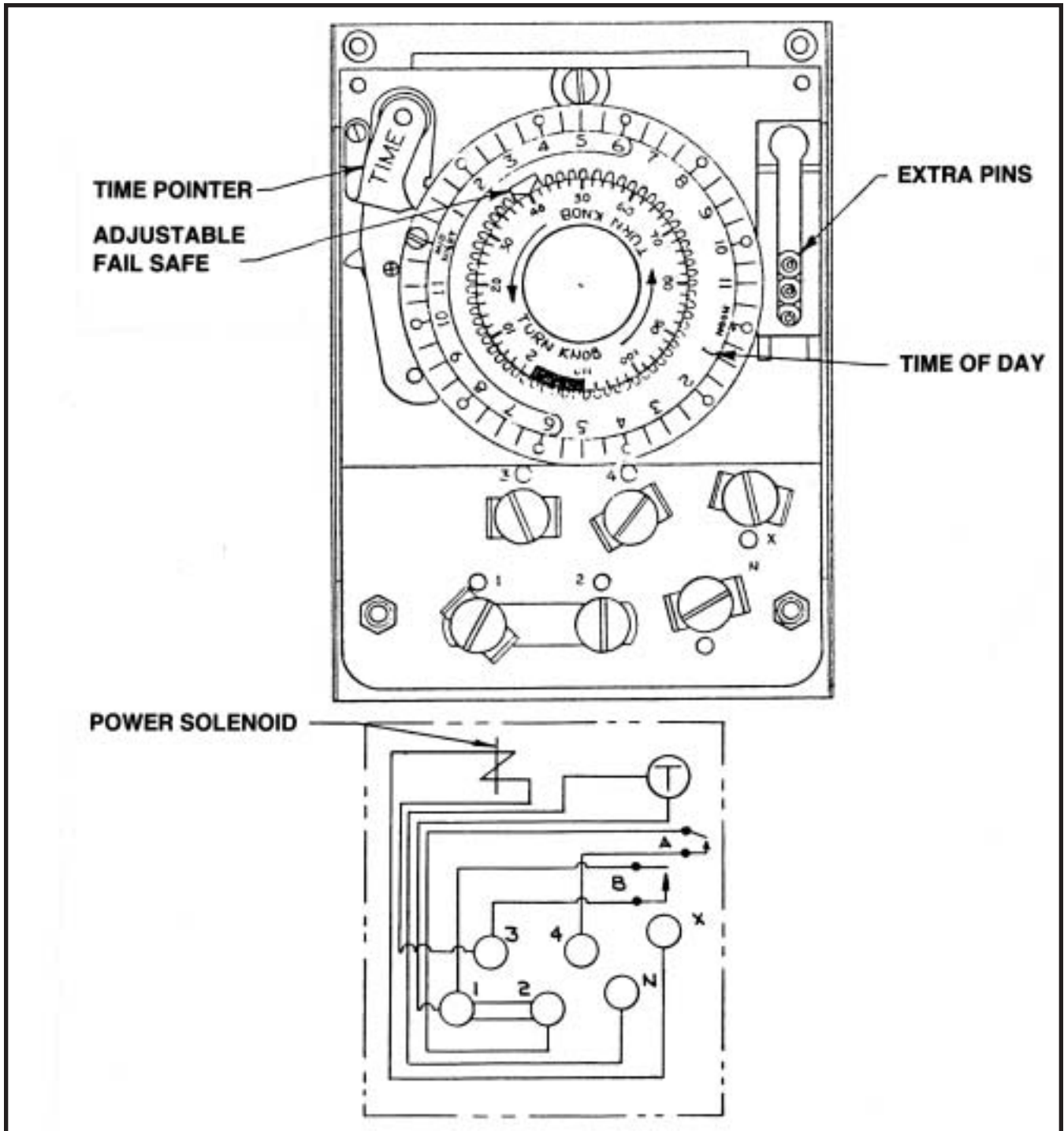
The following components are located within the box.

- |                                      |  |
|--------------------------------------|--|
| <b>1.</b> Defrost Timer - 1/24 Hours | <b>5.</b> Main Terminal Board                    |
| <b>2.</b> Run Capacitor              | <b>6.</b> 115V Power Supply Switch (115V models) |
| <b>3.</b> Start Capacitor            | <b>7.</b> 230V Power Supply Switch (230V models) |
| <b>4.</b> Potential Relay            |  |



# DEFROST TIMER LAYOUT

After the cabinet is connected to proper voltage supply, the time clock should be set to the correct time of day by turning the inner knob counterclockwise until the correct time is opposite the time indicator on the clock. The time clock is set to go into defrost **once** every 24 hours. This defrost occurs at midnight. Under extreme humidity conditions it might be necessary to add a second defrost.



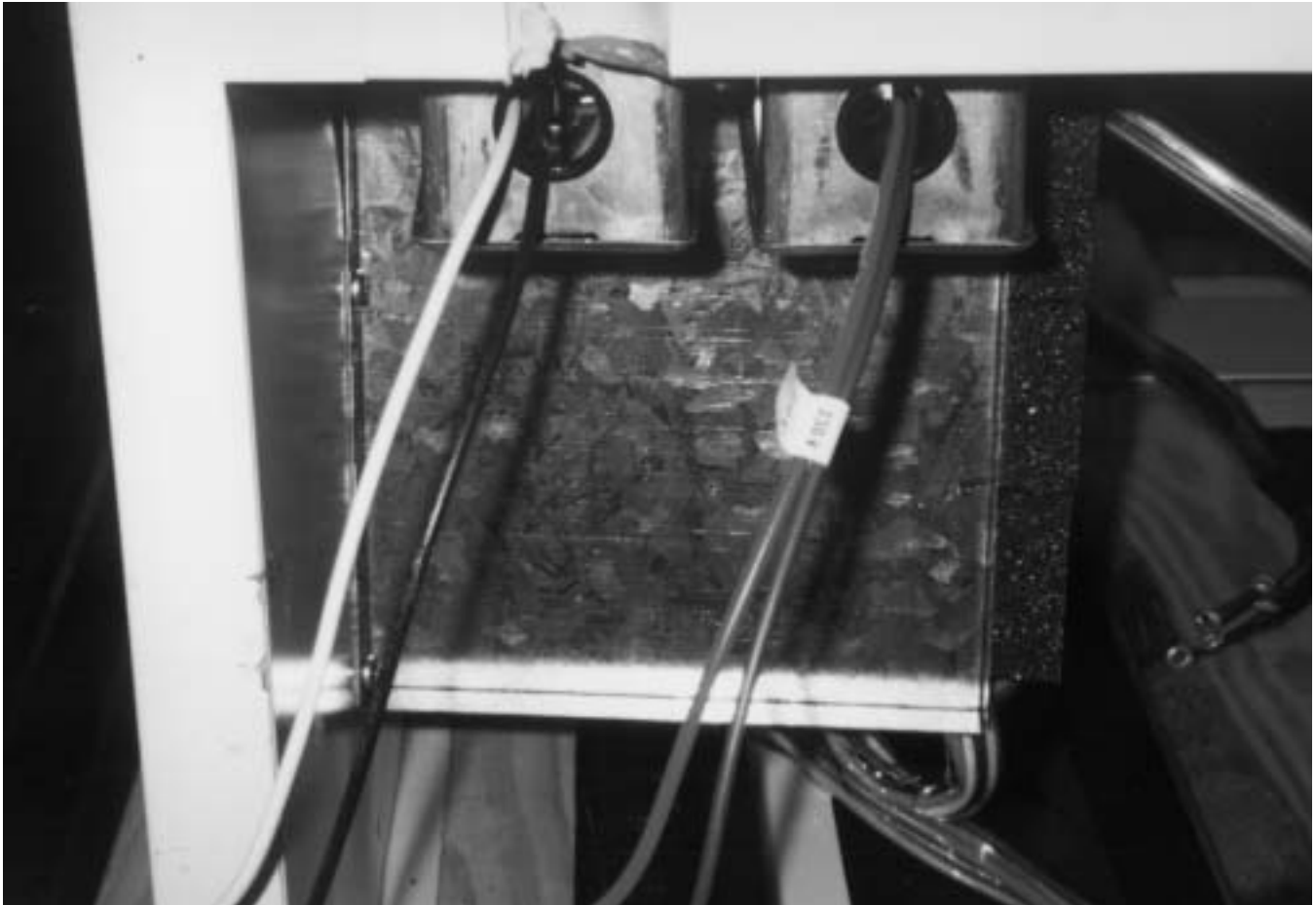
# CABINET ELECTRICAL SUPPLY

The connection points can be accessed by removing the rear grill. Models CMCT-4 up through CMCT-8 have 115V service cords. CMCT-10 is 230V, hard wire connected.

**NOTE:** *These cabinets must be on a dedicated circuit unto themselves. Failure to do so could result in loss of product.*

**IMPORTANT:** Wiring and connections in power supply system must meet all applicable (local and national) electrical codes. Consult these codes for wire lengths and sizes prior to cabinet installation.

The wiring diagram should be consulted before attempting any electrical service.



# CONDENSING UNIT ASSEMBLY

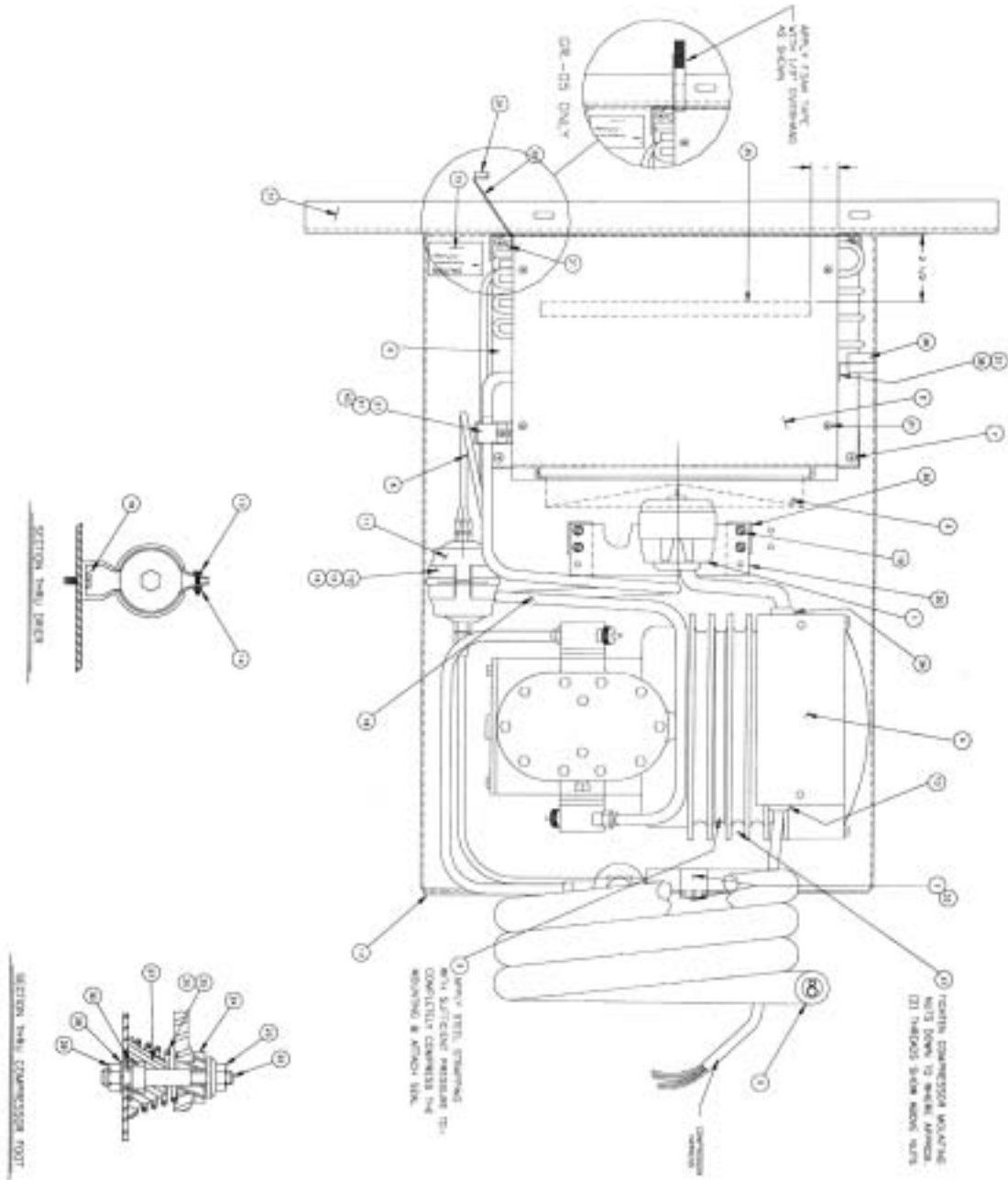
This product utilizes the pull out feature on its low temperature applications. This is to aid service personnel in the event service is needed.

**CAUTION:** *Disconnect the power supply before servicing the cabinet.*

1. Remove front grill.
2. Remove two (2) hold down bolts that are located in the front base rail. Pull unit out for service.



# CONDENSING UNIT LAYOUT



| NO. | DESCRIPTION            | QTY. | UNIT                   |
|-----|------------------------|------|------------------------|
| 1   | CONDENSER COIL         | 1    | CONDENSER COIL         |
| 2   | COMPRESSOR             | 1    | COMPRESSOR             |
| 3   | ELECTRICAL CONNECTIONS | 1    | ELECTRICAL CONNECTIONS |
| 4   | ...                    | ...  | ...                    |
| 5   | ...                    | ...  | ...                    |
| 6   | ...                    | ...  | ...                    |
| 7   | ...                    | ...  | ...                    |
| 8   | ...                    | ...  | ...                    |
| 9   | ...                    | ...  | ...                    |
| 10  | ...                    | ...  | ...                    |
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| 42  | ...                    | ...  | ...                    |
| 43  | ...                    | ...  | ...                    |
| 44  | ...                    | ...  | ...                    |
| 45  | ...                    | ...  | ...                    |
| 46  | ...                    | ...  | ...                    |
| 47  | ...                    | ...  | ...                    |
| 48  | ...                    | ...  | ...                    |
| 49  | ...                    | ...  | ...                    |
| 50  | ...                    | ...  | ...                    |

## UNIT COMPARTMENT – REAR

**NOTE:** *CMCT-10 models still use fin and tube condensers.*



1. Accordion Coil
2. Process Tube Evaporator
3. Suction Line
4. Cap Tube Inlet

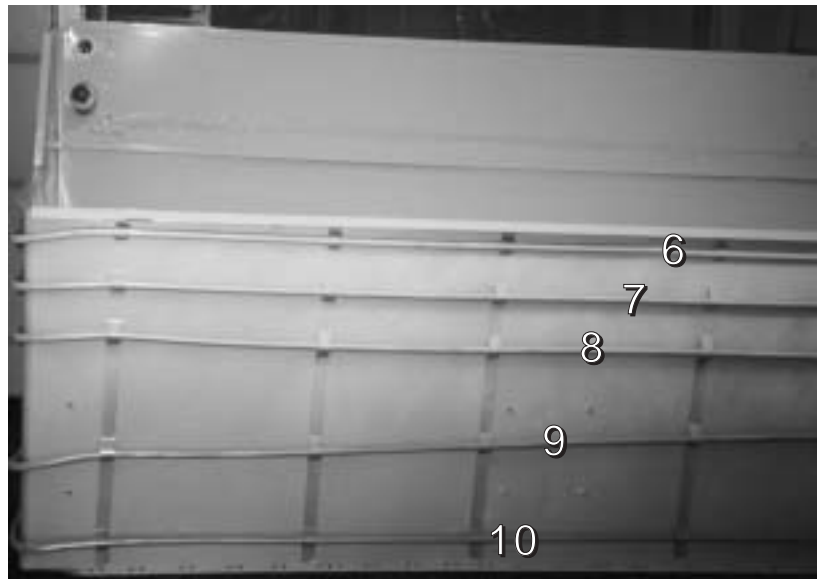
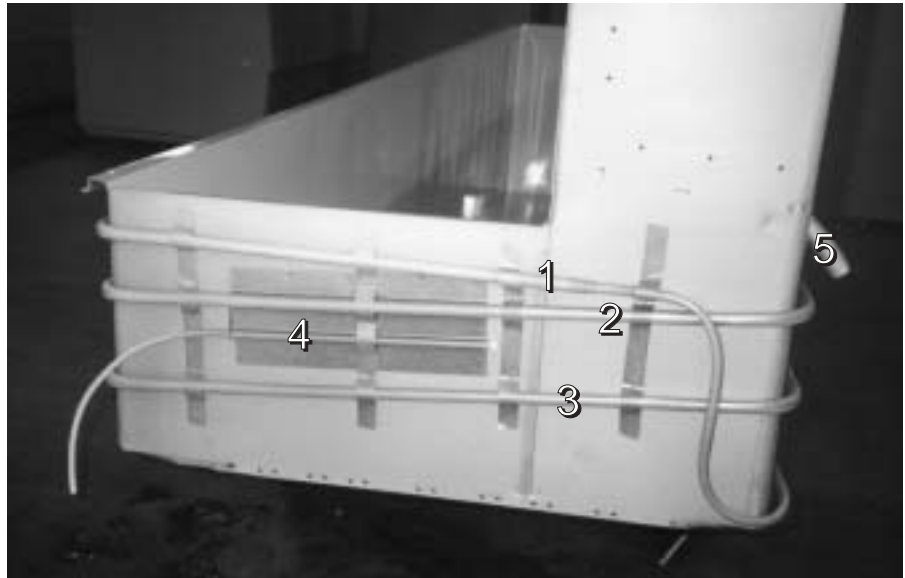


# EVAPORATOR TUBING ILLUSTRATION

## EVAPORATOR TANK WRAP - RH SIDE VIEW:

**NOTE:** *Evaporator inlet tube on top row.*

1. Tank Wrap Inlet
2. #2 Pass
3. #3 Pass
4. Thermostat Bulb Well
5. Condensate Drain



## TANK WRAP - FRONT SIDE

6. #1 Pass
7. #2 Pass
8. #3 Pass
9. #4 Pass
10. #5 Pass

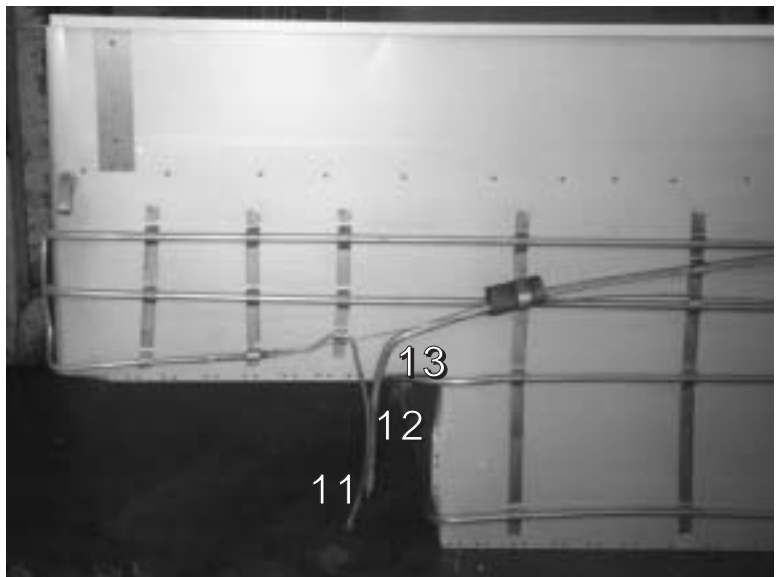
**NOTE:** *Upper evaporator coil connections are on the top, left back wall.*

## EVAPORATOR TANK WRAP - RIGHTHAND REAR OF CABINET:

Capillary tube and heat exchange are foamed in place. Three lines exit the cabinet shell:

11. 1/4" Process Line
12. Capillary Tube
13. Suction Line

If the capillary tube should ever become restricted, the 1/4" process tube can be substituted as an evaporator inlet.



# NEW LUBRICANTS

In switching from refrigerant 502 to refrigerant 404A, the compressor lubricants had to be changed. Oils used in the compressors in the past were mineral based. The new oils used are polyol esters. Special consideration must be made when handling these oils. Processing procedures must be more rigorous to avoid absorbing moisture. Also, P.O.E.'s are better solvents which means they will dislodge and carry debris through a system to a far greater extent than do mineral oils. The oil used in Copeland compressor is Mobil Artic EAL-22-CC.

## BACK PRESSURE VALVE – #1

These models are equipped with a back pressure valve. The purpose of this valve is to limit the suction pressure at the compressor during initial cabinet start up and start up after a defrost cycle. This valve is set at 10 PSIG and **should not be changed**. To check this setting it is necessary that the pressure on the inlet side or evaporator side of the valve be above 10 PSIG. Put cabinet into defrost cycle to obtain high-low side pressure. With gauge installed on suction service valve, check valve setting after cabinet comes off the defrost cycle. Allow the compressor to run a few minutes before determining correct setting. (CRO6 shown)



# LIGHT CHANNEL ASSEMBLY – Component Identification

**CAUTION:** Disconnect the power supply before servicing the cabinet.

Wiring from the pull out electrical box is connected via a wiring harness to the upper lighting channel which houses the following components:

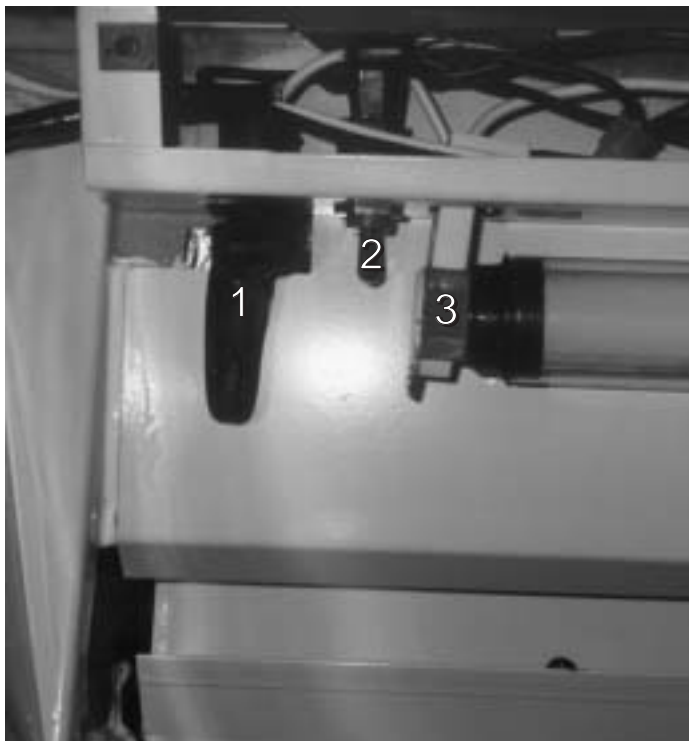
- |                                       |   |
|---------------------------------------|---|
| <b>1.</b> Product Reflector           | <b>4.</b> Light Ballast                   |
| <b>2.</b> Defrost Termination Control | <b>5.</b> Lamp Receptacle & Starter       |
| <b>3.</b> Upper Terminal Board        | <b>6.</b> Ambient Temperature Compensator |



# BAFFLE HEATER COMPONENT IDENTIFICATION & REMOVAL INSTRUCTIONS

1. Baffle Heater
2. Light Switch
3. Light Receptacle – Lefthand side

**NOTE:** *When light switch is ON, baffle heater is de-energized.*



**CAUTION:** Disconnect the power supply before servicing the cabinet.

The baffle heater is located just behind the light fixture at the warm air intake to coil.

The baffle can be accessed by removing screws located at the bottom edge of V baffle. The heater is attached at the back side of the V baffle with self-adhesive tape.

The heater resistance can be checked by unplugging the heater at the plug-in connector on the lefthand end of the light channel. The heater is only energized when the light is turned OFF.

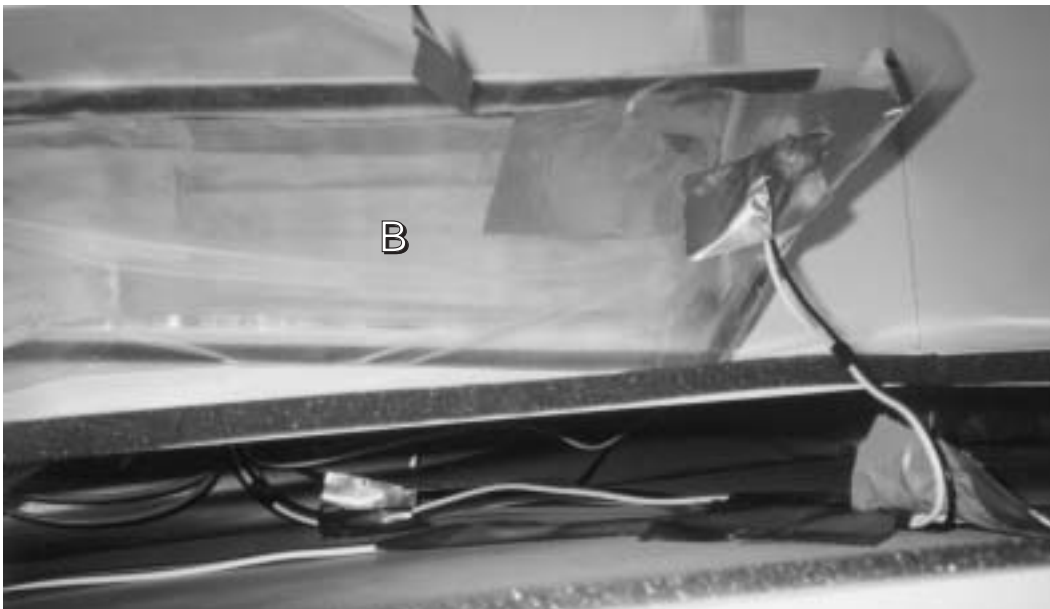
# END PANEL BREAKER & HEATER REMOVAL

**CAUTION:** Disconnect the power supply before servicing the cabinet.

1. Remove eight (8) screws in the end panel breaker (A) and pull breaker down and out.
2. Disconnect heater leads from end panel breaker heater (A) and pull end panel breaker out.
3. To remove end panel breaker heater, remove tape.

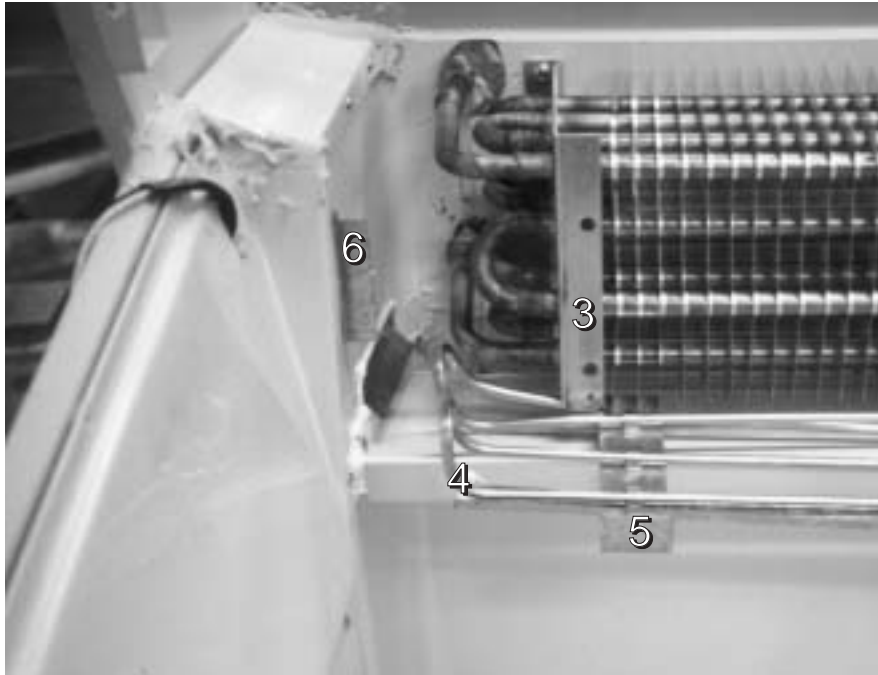


**NOTE:** *The heater is taped to the back side of the side arm breaker.*



# REFRIGERATED UPPER SECTION COMPONENT IDENTIFICATION & REMOVAL INSTRUCTIONS

- 1. Defrost Heater Lead Connection
- 2. Air Baffle
- 3. Upper Fin Coil
- 4. Defrost Heater
- 5. Defrost Heater Retainer Bracket
- 6. Front Coil Housing Cover Bracket

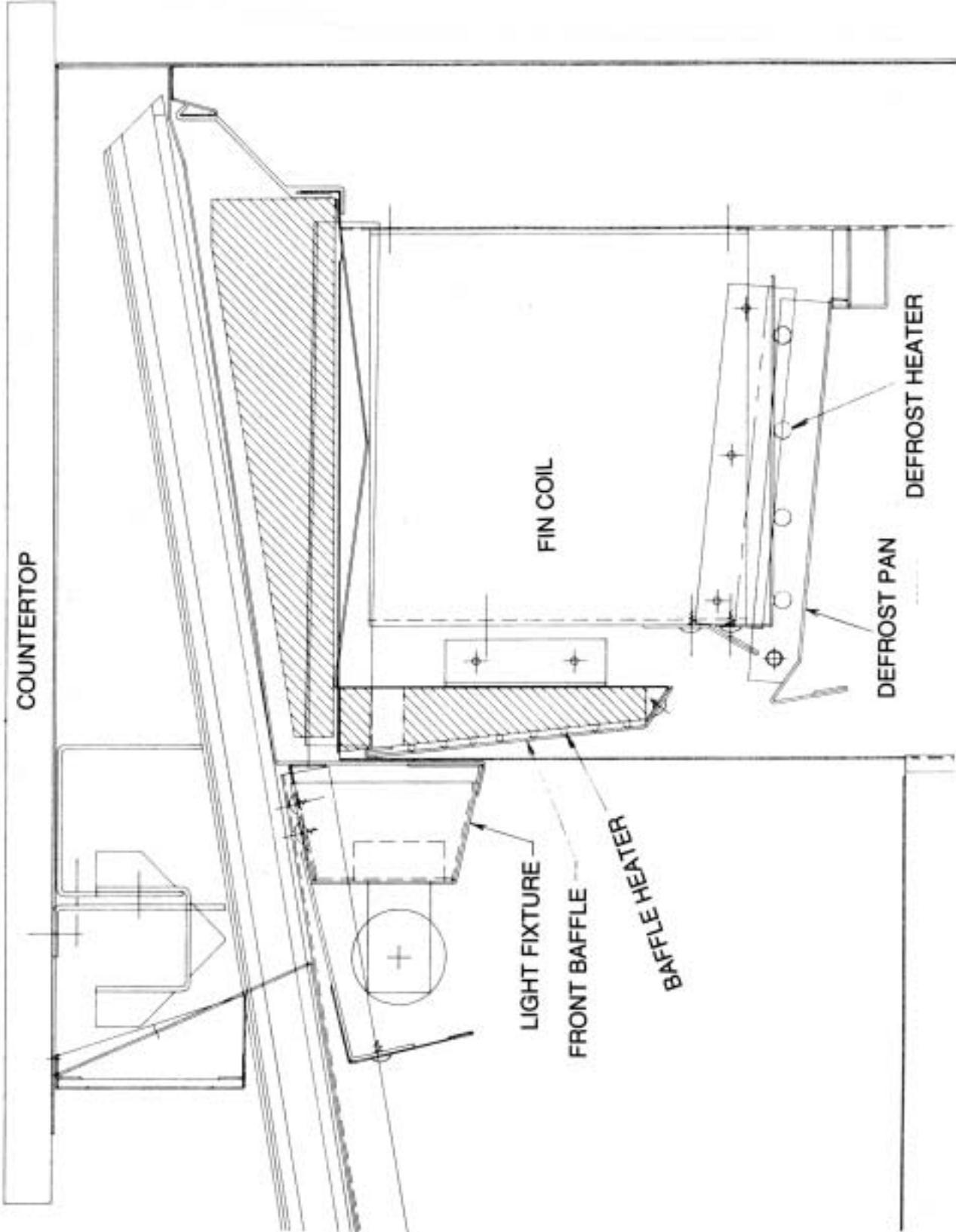


## REMOVAL INSTRUCTIONS:

**CAUTION:** Disconnect the power supply before servicing the cabinet.

1. Disconnect the defrost heater leads located on the lower right-hand side of the lamp channel – Figure #1.
2. Remove the air diverter shown as Figure #2. This will expose the defrost heater rack which is mounted to the evaporator fin coil. Heater and rack assembly can now be removed.
3. Reattach new heater to rack. NOTE: Last pass of the defrost heater must lay down in the drain trough.
4. Reassemble in reverse order.

# UPPER CROSS SECTION - CMCT Models

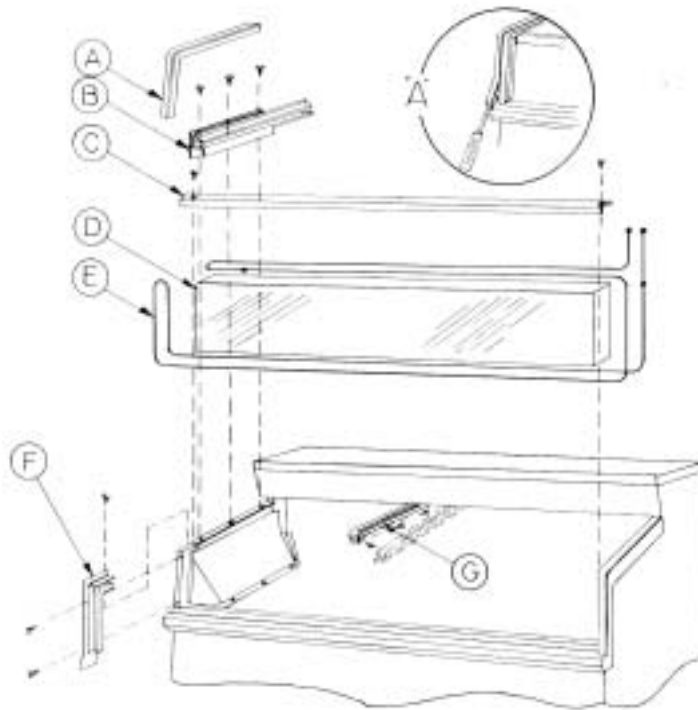




# FRONT GLASS HEATER REPLACEMENT

**CAUTION:** Disconnect the power supply before servicing the cabinet.

Photograph shows the electrical connection between the cabinet and the front glass heater.



## REMOVAL OF FRONT GLASS HEATER AND/OR END TRACK:

1. Remove glass lids.
2. Remove side arm trim (A) at both sides per detail 'A'.
3. Remove three (3) screws in vertical trim post (F) and pull vertical trim post forward. Typical at both ends.
4. Remove three (3) screws in end track (B). Pull track forward and lift up. Typical both ends. (Not necessary for glass removal.)
5. Remove two (2) screws in the front of center track (G) and swing center track from dotted line position to solid line position.
6. Remove two (2) screws (one each end) on glass rail (C) and lift glass rail straight up.
7. Pull top of front glass (D) forward and lift glass and heater (E) up.
8. To remove end track only, execute the first four steps. To remove front glass heater, execute the first seven steps, omitting step number 4.

**NOTE:** Pay close attention to the way the heater wire is arranged on the front glass when replacing.

# CMCT Models

The countertop can be raised in order to service various interior components, as shown below.

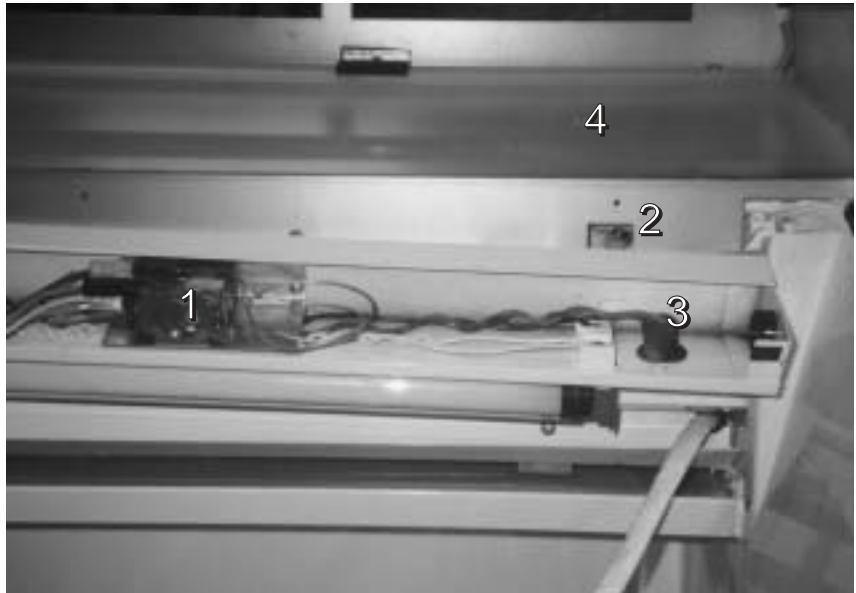


- 1.** Product Reflector
- 2.** Defrost Heater Plug
- 3.** Lamp
- 4.** Upper Electrical Component Housing
- 5.** Righthand Arm Heater Leads

# EVAPORATOR COIL REMOVAL

**CAUTION:** Disconnect the power supply before servicing the cabinet.

- A. Raise up the counter top.
- B. Remove screws along the back wall of the sub top.
- C. Remove the high air intake baffle located on the righthand side of the sub top.
- D. Remove the cabinet lids and lid rails.
- E. Remove the screws that hold the light channel to the sub top.
- F. Pull the defrost termination bulb out of the evaporator coil bulb well. Lift the sub top up and out of the cabinet.



- 1. Defrost Termination & High Limit Control
- 2. Defrost Termination Bulb Well
- 3. Defrost Heater Receptacle
- 4. Sub Top

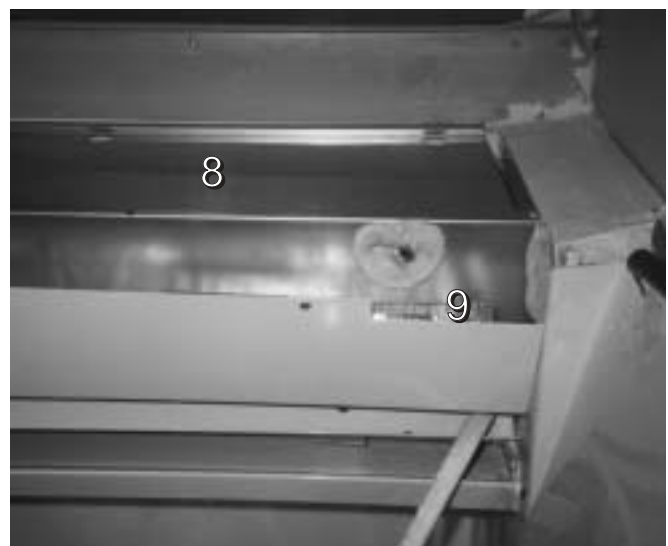


- G. Lift the insulation up and out of the cabinet. Do not break. This will expose the coil housing cover. This cover is attached by three screws, one on each end and one at the rear on the top.

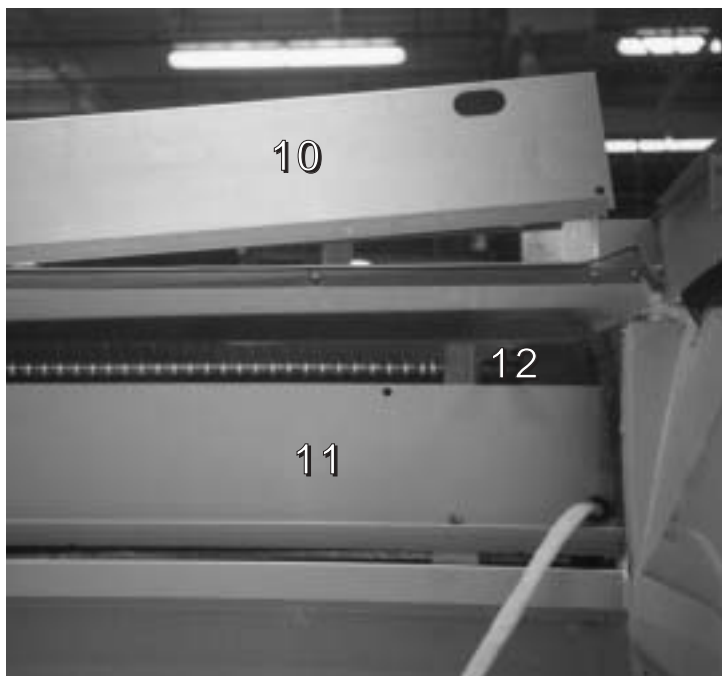
- 5. Upper Coil Insulation
- 6. V Baffle Insulation
- 7. V Baffle Front

**NOTE:** Reseal bulb well and coil cover with permagum as shown.

- 8. Coil Cover
- 9. V Baffle Heater



## EVAPORATOR COIL REMOVAL – continued

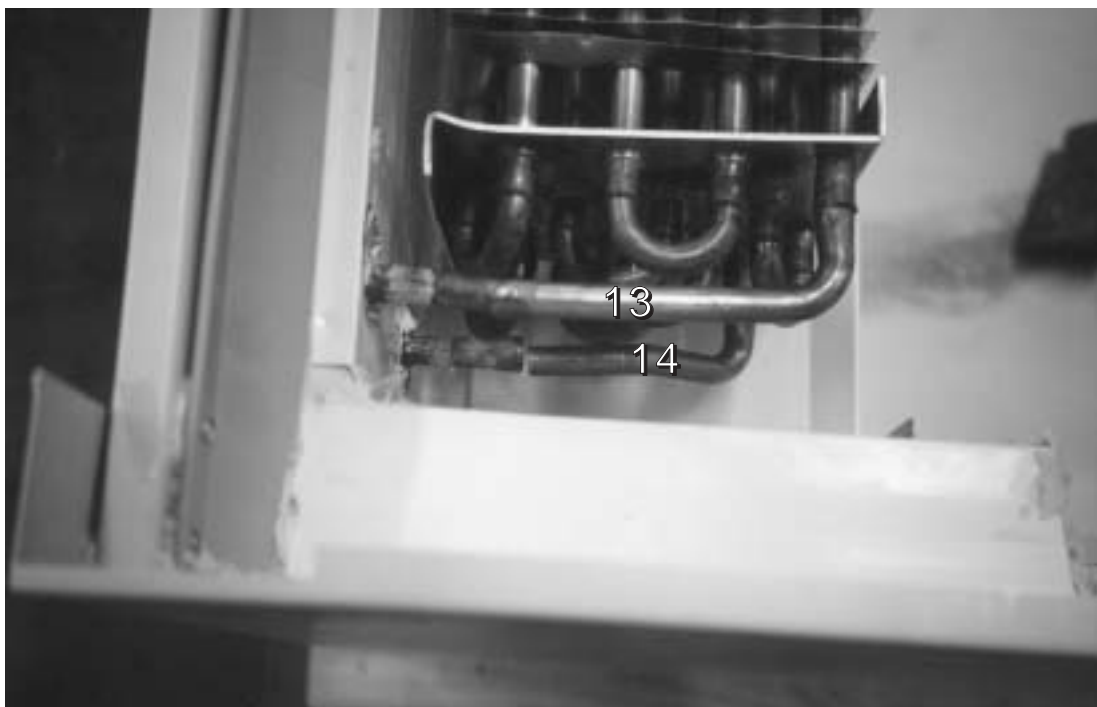


**10.** Sub Top

**11.** Air Diverter

**12.** Defrost Termination Bulb Well

The view below illustrates the evaporator coil and tube connections on the lefthand end of the cabinet. Take care when reinstalling the coil housing cover. Reseal areas where moisture could migrate down into the coil area. This coil area runs at a temperature of  $-40^{\circ}\text{F}$ .



**13.** Upper Coil Inlet

**14.** Upper Coil Outlet

# CMCT TROUBLESHOOTING GUIDE

The following is a guide to aid in the proper diagnosing of service problems.

## High Head Pressure & High Back Pressure

1. Air in system.
2. Defective fan motor or fan blade dragging on condenser shroud.
3. Defrost heater on during refrigeration cycle due to heater going to ground or defective time clock.
4. Refrigerant over charge.
5. Blocked condenser (dirty)

## Low Back Pressure & Low Head Pressure

1. Defective back pressure valve—check for proper setting as described under “Back Pressure Valve.”
2. Shortage of refrigerant—place a temperature indicating device on outlet of top coil (lower lefthand side of coil). Temperature should read within 3 to 4 degrees of low side pressure taken at the compressor suction service valve. Add gas slowly until these conditions are obtained or remove charge with certified recovery equipment, and recharge with correct charge.
3. Cap tube plugged due to moisture or dirt.

## Pressures Normal - Cabinet Warm

1. Top coil blocked with frost—see corrective measures under “Coil Block With Frost.”
2. Refrigerant under charge. Due to the fact that it takes a considerable amount of under charge before it has any great effect on pressures and inaccuracy of gauges it is possible to have normal pressures and yet have an under charge of refrigerant. This under charge will “starve” the top coil and seriously affect cabinet temperature. To determine correct charge see #2 under “**Low Back Pressure ...**”

## Coil Blocked With Frost

1. Bad timer or timer motor.
2. Bad drafts in store caused by heating or air conditioning fans; cabinet located too close to door.
3. Defective defrost heater.
4. Defective defrost terminating thermostat, safety thermostat or defective solenoid in time clock.

Either of these (#4) can keep the cabinet from going through a defrost cycle. The defrost thermostat (see wiring diagram) should be in open position between terminals 1 & 2 when the cabinet goes into defrost.

After the coil reaches 76°F, it closes, energizing a solenoid in the time clock which in turn trips the time clock mechanism off defrost. Should this thermostat be in the closed position when the clock trips into the defrost cycle, it will immediately trip it off again. (NOTE: Switch between terminals 1 & 2 will not open until thermostat drops below 59°F).

If the solenoid in the clock is stuck closed (plunger up), it will have the same effect. To determine which is at fault, remove the wire from X on the clock and turn clock dial into defrost cycle; if cabinet goes into defrost, it is the defrost thermostat that is bad. If it still does not go into defrost, remove clock and inspect the plunger of the solenoid coil.

5. Defective safety thermostat.

This thermostat has a SPDT switch with one side wired in series with the defrost heater. Contacts between terminals 2 & 3 should be in the closed position during the refrigeration cycle. Its only purpose is, in case of failure of the defrost timer during the defrost cycle, it will open the heater circuit when the coil reaches 76°F, preventing any over heating of the defrost heater.

If this thermostat is in the open position when the cabinet goes into the defrost cycle, the heater will remain off. For access to thermostat connections to check continuity, refer to wiring diagram. Disconnect this thermostat and check with ohmmeter.

If for any reason the temperature termination feature is inoperative, the fail safe settings on the timer should be set for 30 minutes defrost time.

## Defrost Cycle Too Long - Terminating On Fail Safe (Heater On)

1. Bad solenoid in time clock (opening winding).

If there is an open circuit in the coil of this solenoid, it will not trip the time clock off defrost when the thermostat closes. The cabinet will stay on defrost for the length of time the fail-safe lever on the time clock is set. (Factory set at 40 minutes.)

2. Defrost terminating thermostat not closing when coil reaches 76°F.

To determine which is at fault, turn clock into defrost, place jumper across X and N on clock. If solenoid is good, this will trip the clock off defrost indicating that it is the defrost thermostat that is at fault.

**NOTE:** *Be certain that the defrost thermostat has reached 76°F before determining that either the solenoid coil or the thermostat is defective.*

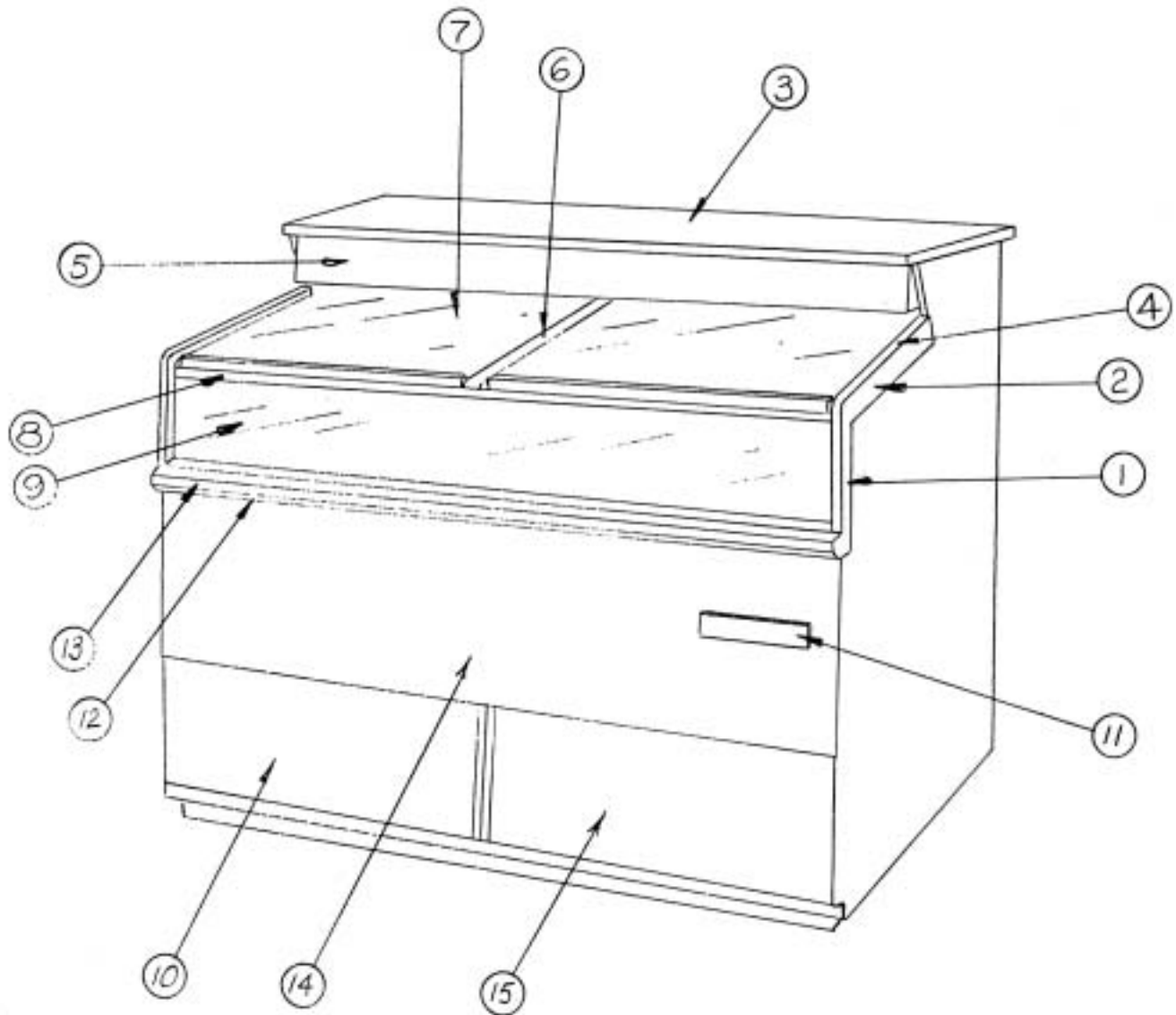
# SECTION III

## Parts List

# CABINET EXTERIOR PARTS IDENTIFICATION

## CMCT Models

- |                                   |                                     |                                     |
|-----------------------------------|-------------------------------------|-------------------------------------|
| <b>1.</b> Vertical Trim Post (RH) | <b>6.</b> Center Track              | <b>11.</b> Nameplate                |
| <b>2.</b> End Track (LH)          | <b>7.</b> Glass Lid                 | <b>12.</b> Front Bumper             |
| <b>3.</b> Countertop              | <b>8.</b> Glass Rail                | <b>13.</b> Bumper Trim              |
| <b>4.</b> End Trim                | <b>9.</b> Front Glass               | <b>14.</b> Front Trim Panel – Upper |
| <b>5.</b> Lighted Sign            | <b>10.</b> Front Trim Panel – Lower | <b>15.</b> Front Grill              |



# DOMESTIC CMCT PARTS LIST – R-404

| Parts List - CMCT's         |            |            |            |            |
|-----------------------------|------------|------------|------------|------------|
| Description                 | CMCT-4     | CMCT-6     | CMCT-8     | CMCT-10    |
| Compressor                  | 16-0322-00 | 16-0322-00 | 16-0323-00 | 16-0324-00 |
| Start Relay                 | 17-0163-00 | 17-0163-00 | 17-0163-00 | 17-0167-00 |
| Start Capacitor             | 17-0164-00 | 17-0164-00 | 17-0165-00 | 17-0168-00 |
| Run Capacitor               |            |            | 17-0166-00 | 19-2678-00 |
| Condenser Coil              | 51-0709-02 | 51-0709-02 | 51-0709-03 | 18-0533-00 |
| Fan Motor                   | 19-0933-00 | 19-0933-00 | 19-0933-00 | 19-0304-00 |
| Fan Blade                   | 19-0101-00 | 19-0101-00 | 19-0101-00 | 19-0706-00 |
| Drier/ Filter               | 18-1109-00 | 18-1109-00 | 18-1109-00 | 18-1109-00 |
| Heat Exchanger              | 50-1106-01 | 50-1106-01 | 50-1106-03 | 50-1109-00 |
| CRO Valve                   | 18-0365-00 | 18-0365-00 | 18-0365-00 | 18-0315-00 |
| Capillary Tube              | 14-2402-00 | 14-2402-00 | 14-2405-00 | 14-2403-00 |
| Evaporator Coil             | 18-0079-06 | 18-0079-08 | 18-0079-10 | 18-0009-07 |
| Heater, Defrost             | 19-1243-01 | 19-1243-03 | 19-1243-05 | 19-1243-06 |
| Thermostat, Defrost Term    | 19-0833-00 | 19-0833-00 | 19-0833-00 | 19-0833-00 |
| Heater, Front Glass         | 19-0231-01 | 19-0231-03 | 19-0231-05 | 19-0231-06 |
| Heater, Baffle              | 19-0235-07 | 19-0235-09 | 19-0235-11 | 19-0235-12 |
| Heater, End Breaker         | 19-0853-00 | 19-0853-00 | 19-0853-00 | 19-0853-00 |
| Thermostat, control         | 19-0190-00 | 19-0190-00 | 19-0190-00 | 19-0190-00 |
| Switch, Power               | 19-0103-00 | 19-0103-00 | 19-0103-00 | 19-0103-00 |
| Time Clock                  | 24-0513    | 24-0513    | 24-0513    | 19-0624-00 |
| Service Cord                | 19-0620-00 | 19-0620-00 | 19-0620-00 |            |
| Switch, Light               | 19-0133-00 | 19-0133-00 | 19-0133-00 | 19-0133-00 |
| Ballast, Lamp 30 Watt       | 19-0458-00 | 19-0458-00 | 19-0458-00 | 19-0458-00 |
| Ballast, Lamp 20 Watt       |            | 19-0146-00 |            |            |
| Lamp, Fluorescent 30 Watt   | 19-0150-00 | 19-0150-00 | 19-0150-00 | 19-0150-00 |
| Lamp, Fluorescent 20 Watt   |            | 19-0149-00 |            |            |
| Lamp, Fluorescent 34 Watt   |            |            | 19-0151-00 |            |
| Lampholder                  | 19-0142-00 | 19-0142-00 | 19-0142-00 | 19-0142-00 |
| Lampholder w/Starter Socket | 19-0143-00 | 19-0143-00 | 19-0143-00 | 19-0143-00 |
| Lamp Starter, 30-40 watt    | 19-0145-00 | 19-0145-00 | 19-0145-00 | 19-0145-00 |
| Lamp Starter, 20 watt       |            | 19-0144-00 |            |            |
| Track, LH End               | 08-0161-01 | 08-0161-01 | 08-0161-01 | 08-0161-01 |
| Track, RH End               | 08-0161-02 | 08-0161-02 | 08-0161-02 | 08-0161-02 |
| Track, Center               | 08-0190-00 | 08-0190-00 | 08-0190-00 | 08-0190-00 |
| Track, Lid Slide            | 10-0200-00 | 10-0200-01 | 10-0200-02 | 10-0200-03 |
| Bumper, Front               | 08-0165-01 | 08-0165-03 | 08-0165-05 | 08-0165-06 |
| Trim, Front Bumper          | 10-0936-01 | 10-0936-03 | 10-0936-05 | 10-0936-06 |
| Rail, glass                 | 08-0168-01 | 08-0168-03 | 08-0168-05 | 08-0168-06 |
| Post, Vertical Trim LH      | 08-0518-01 | 08-0518-01 | 08-0518-01 | 08-0518-01 |
| Post, Vertical Trim RH      | 08-0518-02 | 08-0518-02 | 08-0518-02 | 08-0518-02 |
| Trim, side Arm              | 10-0935-00 | 10-0935-00 | 10-0935-00 | 10-0935-00 |
| Breaker, End Panel LH       | 10-0094-01 | 10-0094-01 | 10-0094-01 | 10-0094-01 |
| Breaker, End Panel RH       | 10-0094-02 | 10-0094-02 | 10-0094-02 | 10-0094-02 |
| Handle, Lid                 | 10-0218-01 | 10-0218-03 | 10-0218-05 | 10-0218-06 |
| Front Grill                 | 50-4192-04 | 50-4192-04 | 50-4192-04 | 50-4192-04 |
| Glass, Front                | 20-0008-01 | 20-0008-03 | 20-0008-05 | 20-0010-00 |
| Lid Assy, Glass             | 50-1756-07 | 50-1756-09 | 50-1756-11 | 50-1756-12 |
| Glass, Lid                  | 20-0047-01 | 20-0047-03 | 20-0047-05 | 20-0047-06 |
| Counter Top                 | 12-0522-01 | 12-0522-03 | 12-0522-05 | 12-0522-06 |



# EXPORT CMCT PARTS LIST – R-404

| Export Parts List - CMCT's  |            |            |            |
|-----------------------------|------------|------------|------------|
| Description                 | ECMCT-4    | ECMCT-6    | ECMCT-8    |
| Compressor                  | 16-0298-00 | 16-0298-00 | 16-0290-00 |
| Start Relay                 | 17-0167-00 | 17-0167-00 | 17-0167-00 |
| Start Capacitor             |            |            |            |
| Run Capacitor               | 19-2678-00 | 19-2678-00 | 19-2678-00 |
| Condenser Coil              | 51-0709-03 | 51-0709-03 | 51-0709-03 |
| Fan Motor                   | 19-0501-00 | 19-0501-00 | 19-0501-00 |
| Fan Blade                   | 19-0101-00 | 19-0101-00 | 19-0101-00 |
| Drier/ Filter               | 18-1109-00 | 18-1109-00 | 18-1109-00 |
| Heat Exchanger              | 50-1106-02 | 50-1106-02 | 50-1106-03 |
| CRO Valve                   |            |            | 18-0365-00 |
| Capillary Tube              | 14-2402-00 | 14-2402-00 | 14-2405-00 |
| Evaporator Coil             | 18-0079-06 | 18-0079-08 | 18-0079-10 |
| Heater, Defrost             | 19-0891-01 | 19-0891-03 | 19-0891-05 |
| Thermostat, Defrost Term    | 19-0833-00 | 19-0833-00 | 19-0833-00 |
| Heater, Front Glass         | 19-0890-01 | 19-0890-03 | 19-0890-05 |
| Heater, Baffle              | 19-0907-01 | 19-0907-03 | 19-0907-05 |
| Heater, End Breaker         | 19-0893-00 | 19-0893-00 | 19-0893-00 |
| Thermostat, control         | 19-0190-00 | 19-0190-00 | 19-0190-00 |
| Switch, Power               | 19-0103-00 | 19-0103-00 | 19-0103-00 |
| Time Clock                  | 19-0864-00 | 19-0864-00 | 19-0864-00 |
| Service Cord                | 19-0620-00 | 19-0620-00 | 19-0620-00 |
| Switch, Light               | 19-0133-00 | 19-0133-00 | 19-0133-00 |
| Ballast, Lamp 30 Watt       | 19-0911-00 | 19-0911-00 | 19-0911-00 |
| Ballast, Lamp 20 Watt       |            | 19-0912-00 | 22-0200    |
| Lamp, Fluorescent 30 Watt   | 19-0150-00 | 19-0150-00 | 19-0150-00 |
| Lamp, Fluorescent 20 Watt   |            | 19-0149-00 |            |
| Lamp, Fluorescent 34 Watt   |            |            | 19-0151-00 |
| Lampholder                  | 19-0142-00 | 19-0142-00 | 19-0142-00 |
| Lampholder w/Starter Socket | 19-0143-00 | 19-0143-00 | 19-0143-00 |
| Lamp Starter, 30-40 watt    | 19-0145-00 | 19-0145-00 | 19-0145-00 |
| Lamp Starter, 20 watt       |            | 19-0144-00 |            |
| Track, LH End               | 08-0161-01 | 08-0161-01 | 08-0161-01 |
| Track, RH End               | 08-0161-02 | 08-0161-02 | 08-0161-02 |
| Track, Center               | 08-0190-00 | 08-0190-00 | 08-0190-00 |
| Track, Lid Slide            | 10-0200-04 | 10-0200-05 | 10-0200-06 |
| Bumper, Front               | 08-0165-01 | 08-0165-03 | 08-0165-05 |
| Trim, Front Bumper          | 10-0936-01 | 10-0936-03 | 10-0936-05 |
| Rail, glass                 | 08-0168-01 | 08-0168-03 | 08-0168-05 |
| Post, Vertical Trim LH      | 08-0518-01 | 08-0518-01 | 08-0518-01 |
| Post, Vertical Trim RH      | 08-0518-02 | 08-0518-02 | 08-0518-02 |
| Trim, side Arm              | 10-0935-00 | 10-0935-00 | 10-0935-00 |
| Breaker, End Panel LH       | 10-0094-01 | 10-0094-01 | 10-0094-01 |
| Breaker, End Panel RH       | 10-0094-02 | 10-0094-02 | 10-0094-02 |
| Handle, Lid                 | 10-0218-01 | 10-0218-03 | 10-0218-05 |
| Front Grill                 | 50-4192-04 | 50-4192-04 | 50-4192-04 |
| Glass, Front                | 20-0008-01 | 20-0008-03 | 20-0008-05 |
| Lid Assy, Glass             | 50-1756-07 | 50-1756-09 | 50-1756-11 |
| Glass, Lid                  | 20-0047-01 | 20-0047-03 | 20-0047-05 |
| Counter Top                 | 12-0522-01 | 12-0522-03 | 12-0522-05 |

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