WCI INTERNATIONAL COMPANY

Service Manual

UPRIGHT & CHEST FOOD FREEZERS

Frigidaire

LEONARD

Gibson

PHILCO

Kelvinator

TAPPAN

White-Westinghouse

599834827

MAY 1993

SAFE SERVICING PRACTICES

To avoid the possibility of personal injury and/or property damage, it is important that safe servicing practices be observed. The following are examples, but without limitation, of such practices:

1. **Do not attempt a product repair if you have any doubts as to your ability to complete it in a safe and satisfactory manner.**

2. **Before servicing or moving an appliance:**
   - **remove power cord from electric outlet, trip circuit breaker to OFF, or remove fuse.**
   - **turn off gas supply.**
   - **turn off water supply.**

3. **Never interfere with the proper operation of any safety device.**

4. **USE ONLY REPLACEMENT PARTS CATALOGED FOR THIS APPLIANCE. SUBSTITUTIONS MAY DEFEAT COMPLIANCE WITH SAFETY STANDARDS SET FOR HOME APPLIANCES.**

5. **GROUNDING: The standard color coding for safety ground wires is GREEN or GREEN with YELLOW STRIPES. Ground leads are not to be used as current carrying conductors. IT IS EXTREMELY IMPORTANT THAT THE SERVICE TECHNICIAN RE-ESTABLISH ALL SAFETY GROUNDS PRIOR TO COMPLETION OF SERVICE. FAILURE TO DO SO WOULD CREATE A POTENTIAL HAZARD.**

6. **Prior to returning the product to service ensure that:**
   - **all electric, gas, and water connections are correctly and securely connected.**
   - **all gas and water connections are tested for leaks. DO NOT TEST FOR GAS LEAKS WITH A FLAME.**
   - **all electrical leads are properly dressed and secured away from sharp edges, high-temperature components and moving parts.**
   - **all uninsulated electrical terminals, connectors, heaters, etc. have adequate spacing from all metal parts and panels.**
   - **all safety grounds (both internal and external to the product) are correctly and securely connected.**
   - **all panels are properly and securely reassembled.**

NOTICE

This service manual is intended for use by persons having electrical and mechanical training and a level of knowledge of these subjects generally considered acceptable in the appliance repair trade. WCI International Company cannot be responsible, nor assume any liability, for injury or damage of any kind arising from the use of this manual.

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OPERATION AND REPAIR

SECTION A - INSTALLATION INSTRUCTIONS

MODEL AND SERIAL NUMBER LABEL

The model number, serial number, refrigerant type and refrigerant charge are printed on a self - adhesive label. The label is located on the cabinet back, near the left side lid hinge, on all chest freezer models, and on the front of the cabinet base, near the bottom door hinge, on all upright freezer models.

LEVELING LEGS

All upright model freezers have screw - type levelers located at each of the four corners of the cabinet. Chest model freezers are not equipped with levelers.

INSTALLATION

All model freezers should be installed in a cool, dry area, away from heat sources such as a range, water heater, furnace or heat registers. Allow at least 4" space on all sides of chest freezers, and all sides and the top of upright freezers, for the internal condenser to work efficiently.

Upright freezers must be level side to side, and have a slight tilt towards the rear so the door will swing towards the cabinet from a 45° open position, to assist in maintaining good door gasket seal. If the cabinet is allowed to tilt forward, the weight of the door plus the door food load will result in poor gasket seal.

Chest freezers are leveled by placing wood or metal shims under the cabinet as required. The weight of the freezer must be equally supported at each of the four cabinet corners to maintain good lid alignment and lid gasket seal.

The floor structure must be sufficiently strong to support the weight of the freezer, when fully loaded.

NOTE: Automatic defrost upright model freezers should not be installed where the ambient temperature will be lower than 32°F, as the defrost water drain system may be restricted by freezing.

UNCRATING

Upright models - Cut the bottom carton band and unfold the carton flaps. Lift the carton up and off the freezer. Using an appliance hand truck or the collapsed freezer carton to protect the floor and freezer cabinet, lay the freezer on its back for access to the wood shipping base. Remove and retain the four screws holding the base to the cabinet. After removing the wood base, replace the screws and screw them all the way in. The shipping screws are the leveling legs.

Chest models - Cut all four sides of the carton about 3/4" up from the floor. To prevent cabinet damage, use a sharp knife with a blade no longer than 1/2". Lift the carton up and off the freezer.

ELECTRICAL CIRCUIT

Connect the freezer power supply cord to a properly grounded electrical wall outlet. A separate circuit from the fuse or breaker box is preferred. The circuit should be protected by a 15 or 20 ampere circuit breaker or time delay type fuse.

The voltage measured at the electrical wall outlet, as the compressor starts, must not vary more than 10 % plus or minus from the 115 V 60 Hz. or 220V 50/60 Hz. rating.

All freezers are equipped with a power supply cord having a three-prong grounded plug, and a ground wire which is attached to the freezer cabinet for protection against shock hazards.

When only a two-prong electrical wall outlet is available, it is the personal responsibility and obligation of the customer to contact a qualified electrician and have it replaced with a properly grounded three-prong electrical wall outlet in accordance with the National Electrical Code. **DO NOT UNDER ANY CIRCUMSTANCES CUT OR REMOVE THE GROUNDING PRONG FROM THE POWER SUPPLY CORD.**

On 110V. 60Hz. Freezer, the use of a two-prong adaptor is not an approved device for connecting a freezer with a three-prong plug to an electrical wall outlet. (Figure A1)

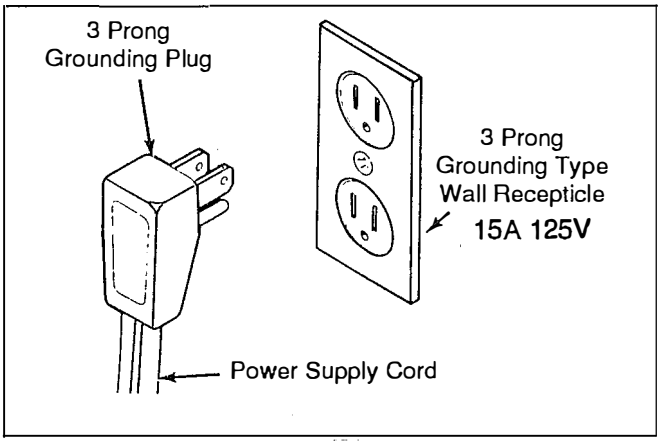


Figure A1 - 115V 60Hz. Power Supply Cord

On 220V 50/60Hz. Freezer, the use of adaptors is not an approved device for connecting a freezer with a electrical wall outlet. (Figure A2)

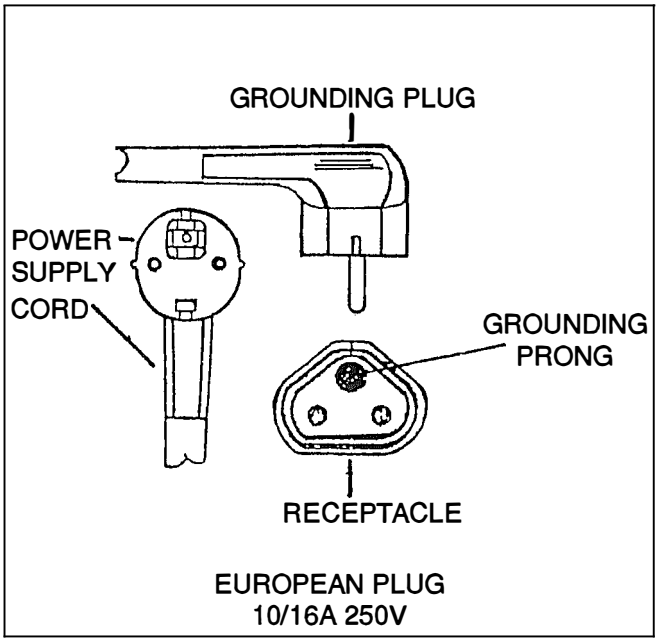


Figure A2 - 220V 50/60 Hz. Power Supply Cord

DOOR/LID REMOVAL

The cabinets of larger freezer models may require removal of doors/lids for clearance in narrow doorways and for sharp turns.

Door Removal - Upright Models

1. Remove the top hinge by removing the two 3/8" hex head screws with a socket wrench, leaving the hinge in the door bearing.

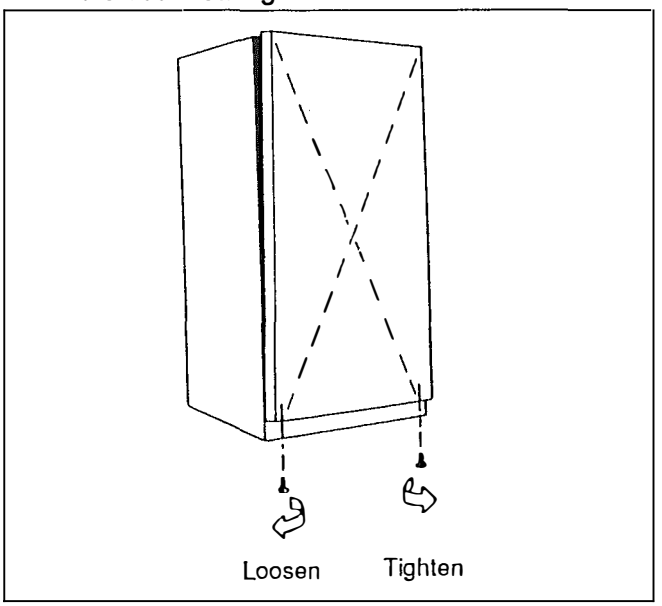


Figure A3 - Adjust Top Of Door In

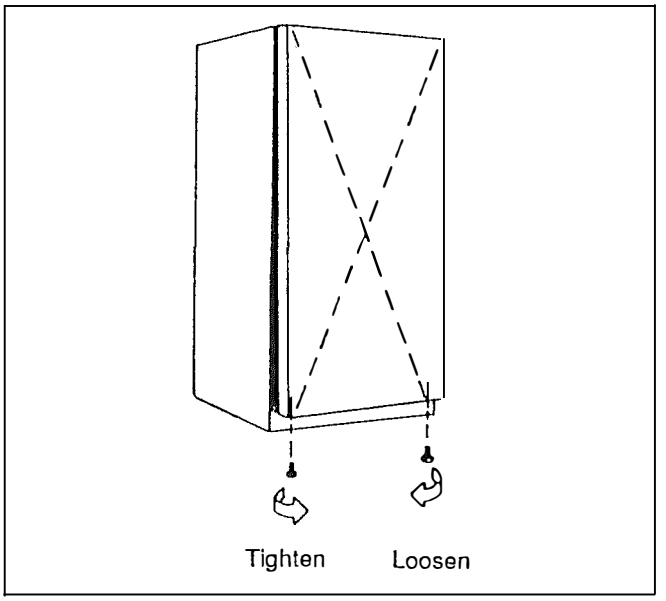


Figure A4 - Adjust Bottom Of Door In

NOTE: If the top hinge has four attaching screws, the two rear screws are Phillips head type locater screws and must be replaced in the rear holes only.

2. Remove the door by lifting off the lower hinge.
3. If necessary, remove the lower hinge by removing the three 3/8" hex head screws with a socket wrench. Before removing the lower hinge, trace around it with a soft lead pencil so that it can be replaced in its original position.

4. Replace the door in reverse order, placing the hinge spacers and washers in their original position to assure proper door alignment.

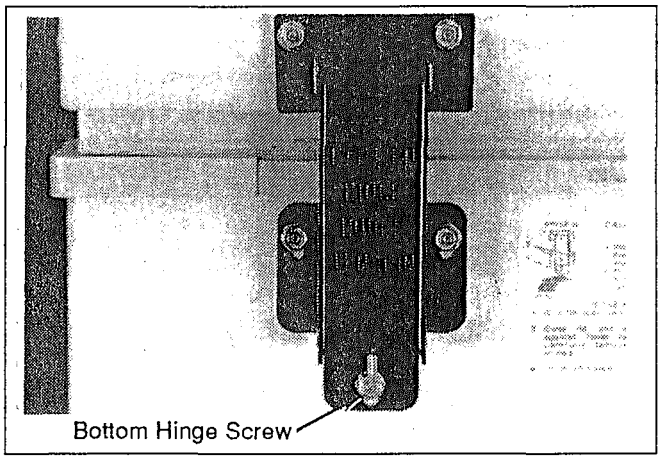


Figure A5 - Lid Removal

5. With the freezer properly leveled, check the door gasket seal.

If the door does not seal, proceed as follows;

1. Loosen all door inner panel mounting screws.
2. On models without alignment screws on the bottom edge of the door, as shown in Figures A3 and A4, manually align the door to the cabinet.

3. On models with alignment screws, adjust the screws with a 5/16" wrench. If the door does not seal at the top, use Figure A3. If the door does not seal at the bottom, use Figure A4.
4. Tighten all the door inner panel mounting screws, and check for proper alignment and seal.

Lid Removal - Compact Chest Models

1. Open the lid and remove the bottom hinge mounting screw. See Figure A5.
2. While holding in on the bottom of the hinge, remove the remaining two hinge mounting screws. See Figure A5.
3. Replace lid in reverse order.
4. Check lid gasket seal, and adjust the hinges as needed. When checked with a strip of paper, pressure on the gasket should be nearly the same on all four sides.

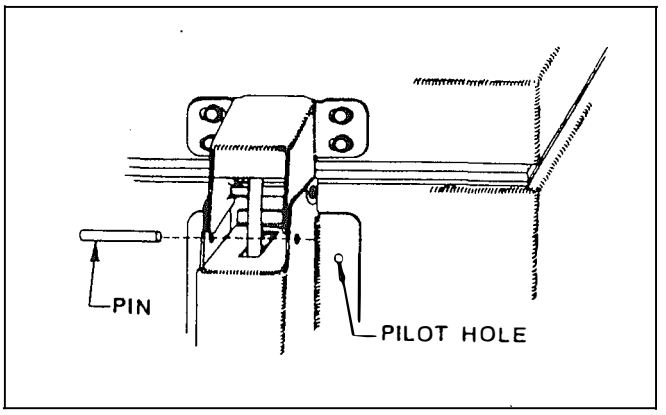


Figure A6 - Hinge Lock Pin

Lid Removal - Standard Chest Models

1. Unplug any lid wiring from the connector in the machine compartment.
2. Insert a pin into the hinge holes as shown in Figure A6. A small Phillips type screwdriver or 16D nail work well as pins.
3. With the pin in place, remove the four 3/8" hex head screws holding the hinge to the cabinet.
4. Replace lid in reverse order, installing the upper right locater screw first. See Figure A7.
5. Check lid gasket seal. Pressure on the gasket should be nearly the same on all four sides, when checked with a strip of paper.
6. If adjustment is required, remove and discard the upper right hinge locater screw before making adjustments.

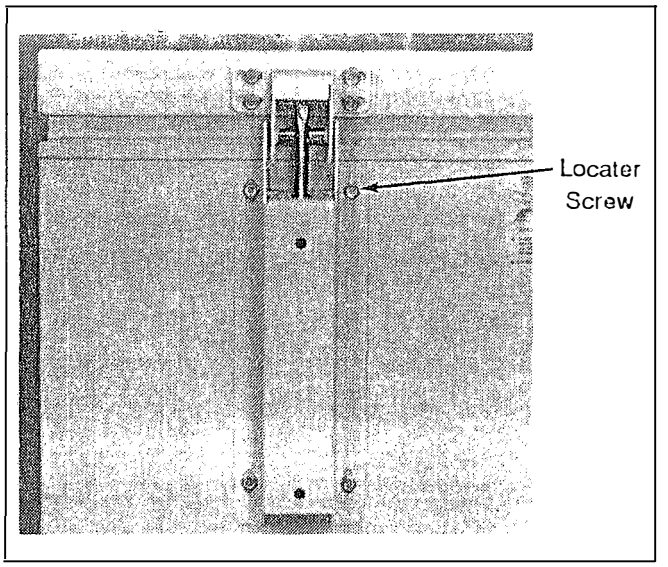


Figure A7 - Lid Removal

NOTES

SECTION B - CABINETS, DOORS AND LIDS

CABINET DESIGN AND CONSTRUCTION

UPRIGHT MODELS

The cabinet shell consists of a seamless, inverted "U" shaped one piece top and sides, a back panel, and a base assembly. The shell components are welded together to form a rigid box type structure. After painting, all seams are internally treated with sealing materials, which act as vapor barriers.

The wrapper type condenser consists of tubing welded to the inside surface of the cabinet shell. A thermal mastic compound is applied to improve heat transfer from the tubing to the shell.

The cabinet liner is formed of steel and is finished with a baked enamel.

The cabinet wrapper and liner are bonded together, with a core of urethane foam insulation, to form a slim three-ply wall of single unit construction.

Because of the foam insulation, the condenser is not accessible for repair. Externally mounted condenser kits are available to correct a rare internal leak. See "Condenser Replacement", Section E.

Upright model freezer cabinets have four plastic breaker trim strips around the periphery of the storage compartment. The trim strips are replaceable.

To replace the breaker trim strips:

1. Starting at the lower corners, force the side trims toward the opposite side of the freezer, as shown in Figure B1.
2. Use a small flat screwdriver to release the breaker trim from the cabinet "U" channel. Then, pull the side trims down and out from the overlapping top trim strip.
3. Remove top and bottom breaker trim strips, by grasping one end and pulling out of the cabinet "U" channel.

Before installing replacement breaker trim, be sure the fiberglass filler insulation is in place.

4. Install bottom breaker trim first. Squeeze one end of the trim and press the front flanges into the "U" channel as shown in Figures B2 and B3.
5. Using palm of hand, press on the rear edge of the trim forcing the lock tabs over the flange of the freezer liner. See Figures B2 and B3.
6. Install the side breaker trims next, and last, install the top breaker trim.

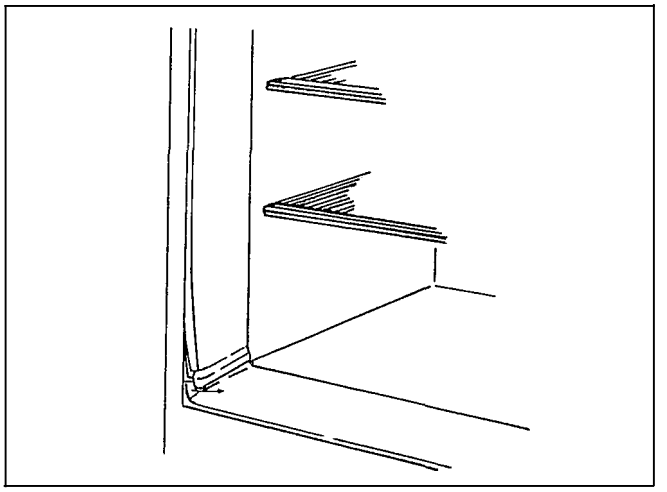


Figure B1 - Removing Breaker Trim

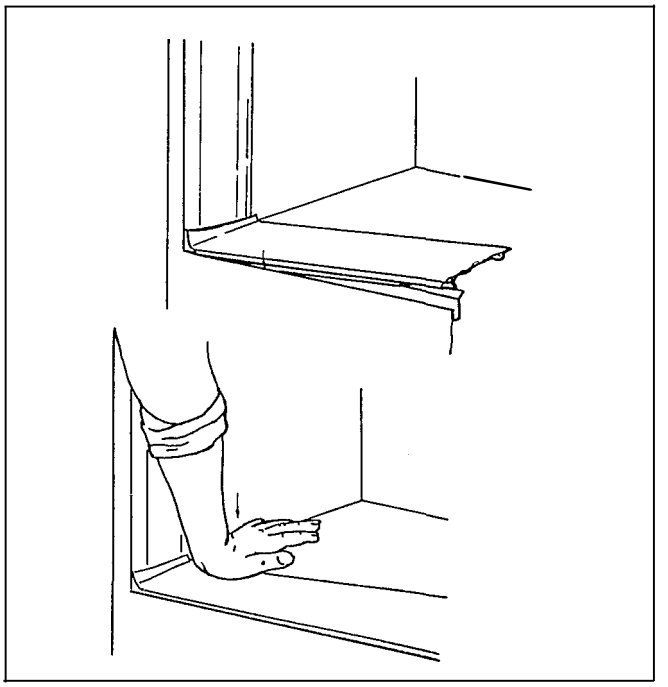


Figure B2 - Installing Breaker Trim

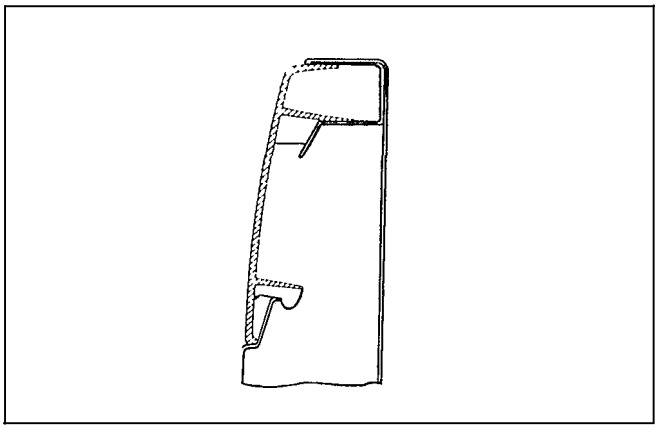


Figure B3 - Cross Section of Breaker Trim in Place

COMPACT CHEST MODELS

The cabinet shell consists of one piece forming the front, back and both sides, with a single joint at the back, and a formed bottom piece. The shell components are welded together to form a box type structure. After painting, all seams are internally treated with sealing materials, which act as vapor barriers. A separate black finished base assembly is attached to the cabinet screws. The base is formed with a raised lip on all four sides, pads at each corner for floor contact areas, and compressor mounting rails.

The wrapper type condenser consists of tubing which is attached, prior to painting, to the inside surface of the cabinet shell with welded saddle clamps. A thermal mastic compound is applied to improve heat transfer from the tubing to the shell.

The cabinet liner consists of one piece forming the bottom and both sides, and separate front and back pieces. The liner components are welded together to form a box type structure. After painting, all seams are internally treated with sealing materials, which act as vapor barriers.

The cold wall type evaporator consists of tubing which is attached, prior to painting, to the outside surface of the freezer liner with welded saddle clamps. A thermal mastic compound is applied to improve heat transfer from the tubing to the liner.

The cabinet wrapper and liner are bonded together, with a core of urethane foam insulation, to form a slim three-ply wall of single unit construction.

Because of the foam insulation, the condenser and evaporator are not accessible for repair. Externally mounted condenser kits are available to correct a rare condenser internal leak. See "Condenser Replacement", Section E. No repair or replacement procedures exist for a defective evaporator.

Compact chest model freezers have a plastic breaker collar trim. This trim also serves as the sealing surface for the lid gasket.

Newer production compact chest models a have breaker collar trim made up of eight (8) separate pieces. Four (4) straight sections, one for each side, and four (4) angled corner sections. This breaker collar trim cannot be repaired or replaced.

Early production compact chest models have a one piece plastic breaker collar trim that may be replaced. Refer to the appropriate parts list for the correct replacement kit part number.

To replace breaker collar trim:

1. Using a putty knife (or suitable tool), insert putty knife under the flange of the breaker trim on the inside of freezer, pry upward on the breaker trim until released. Follow progressively around the cabinet until removed.
2. Place new trim on top of the cabinet, start the inner and outer flanges over the liner and shell, then pound into place using the palm of the hand.

STANDARD CHEST MODELS

The cabinet shell consists of a single piece of pre-painted steel forming the front, back, and both sides, with a single joint at the back, a one piece galvanized steel bottom panel, and a formed galvanized steel compressor compartment. The shell components are assembled with interlocking flanges and fasteners to form a box type structure. After assembly, all seams are treated with sealing materials, which act as vapor barriers.

The wrapper type condenser consists of tubing adhered to the inside surface of the shell with thermal mastic compound and hot melt adhesive.

The cabinet liner consists of a single piece of pre-painted steel forming the front, back, and both sides, with a single joint at the front left corner, and a pre-painted steel bottom panel. The liner components are assembled with interlocking flanges to form a box type structure. After assembly, all seams are treated with sealing materials, which act as vapor barriers.

The cold wall type evaporator consists of tubing adhered to the outside surface of the liner with thermal mastic compound and hot melt adhesive.

The cabinet wrapper, liner, and a core of urethane insulation are bonded together to form a slim three-ply wall of single unit construction.

Because of the foam insulation, the condenser and evaporator are not accessible for repair. Externally mounted condenser kits are available to correct a rare condenser internal leak. See "Condenser Replacement", Section E. No repair or replacement procedures exist for a defective evaporator.

Standard chest model freezers have a replaceable plastic breaker collar trim made up of four (4) separate pieces. The front and back are straight sections and each side has a section that covers the corners. This trim also serves as the sealing surface for the lid gasket. Refer to the model's parts list for the correct breaker collar trim replacement kit part number.

To replace breaker collar trim:

1. Using a wide blade putty knife, wedge in and pry upward from the shell side of the breaker collar trim to separate the trim from the foam.
   NOTE: If only the front or rear breaker collar trim is being replaced, caution must be taken as damage to the overlapping flanges of the side breaker collar trim is very possible. To prevent damage, bow the front or rear trim at the center and pull it out from under the flanges of the side trim. If the side breaker collar trim is also being replaced, install the side trim first, then install the front or back.
2. Once the breaker is removed, use the putty knife to scrape off any foam that may be on the shell flange. Then wipe the shell flange clean with denatured alcohol.
3. Place a layer of 1/2" wide x 1/16" thick double back tape on the entire length of the shell flange, allowing about 1/16" of tape to extend over the outside edge of the shell. See Figure B4.
4. For freezers with locks, place an additional piece of 1/2" wide x 1/32" thick double back tape, 12" long, on the inside surface of the liner. Before applying the tape, remove any foam from the liner surface and clean with denatured alcohol. Also remove an area of foam, 1/4" wide x 1/4" deep x 12" long, from between the liner and shell as shown in Figure B5. Position the tape on the liner inside surface, centered with the center line of the lock catch, and allow about 1/16" of the tape to extend above the liner flange. See Figures B5 and B6.
5. Remove the layer of film from the tape and install the breaker collar trim. Insert the trim over the liner edge first and press down tight. Then pull the breaker over the shell edge and press down firmly.

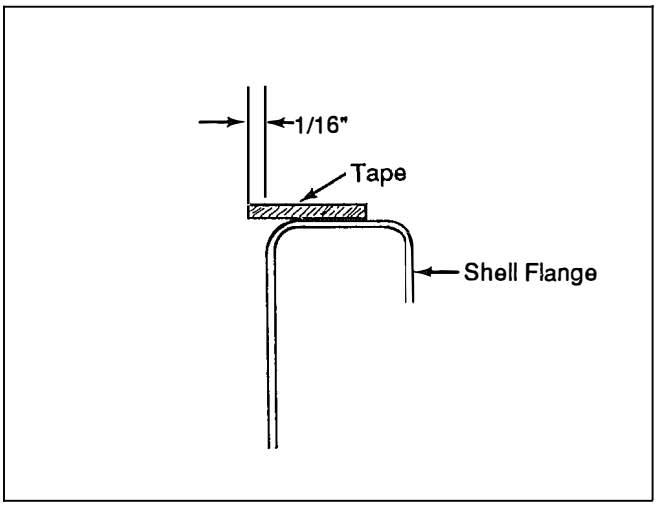


Figure B4 - Shell Flange Tape Position

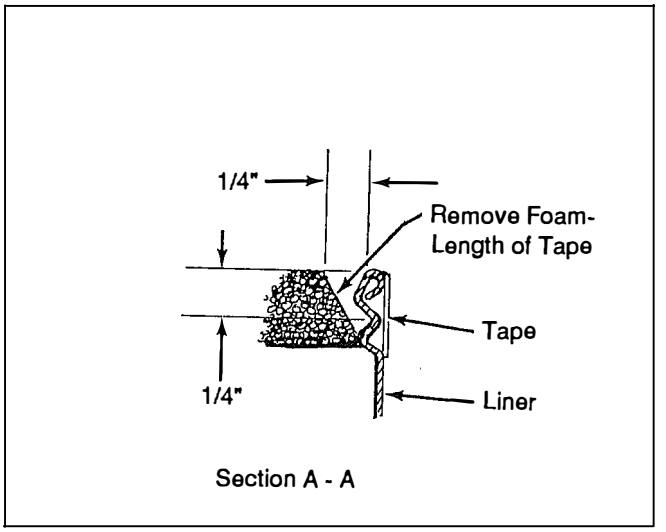


Figure B5 - Lock Area Tape

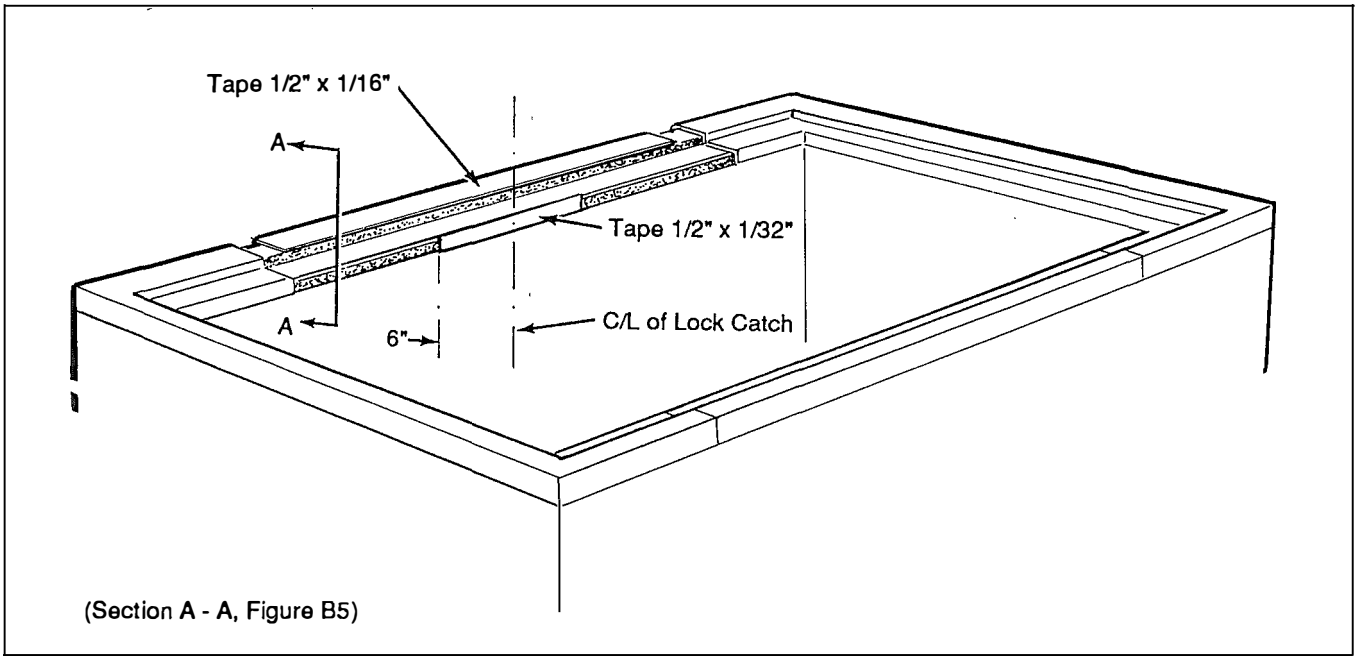


Figure B6 - Breaker Collar Trim Installation

DEFROST DRAIN - ALL CHEST MODELS

Most chest model freezers are equipped with a built in defrost drain assembly. The one-piece molded plastic drain is attached to the bottom of the freezer liner and to the front of the cabinet shell, and is foamed in place. The drain has plugs on both the inside and outside of the cabinet. Both plugs must be removed for defrosting and replaced when defrost is completed. The drain may be cleaned with a small bottle brush as necessary. The drain, being embedded in the foam insulation, cannot be removed or replaced.

DOOR ASSEMBLY - UPRIGHT MODELS

The door assembly consists of an outer door panel, fiberglass insulation, an inner door panel and a vinyl door gasket all held together with screws around the door perimeter. See Figure B7.

Adjustable cross-wires are used on all models larger than 10 cubic feet, and door breather valves are used on all manual defrost models. See Figure B7.

Door optional features found on the various models include recessed or face mounted handles, locks, wide or narrow door shelf fronts, rod type shelf fronts, door stops and ramp type door closers. See Figure B7.

To Disassemble the Door:

1. Remove the door from the cabinet, by removing the screws from the top hinge and lifting the door off the lower hinge.
2. Place the door on a flat surface that is padded, or otherwise protected, to prevent scratching the door or work surface. See Figure B7.
3. Remove all the screws from under the gasket inner flap, that attach the inner door panel and gasket to

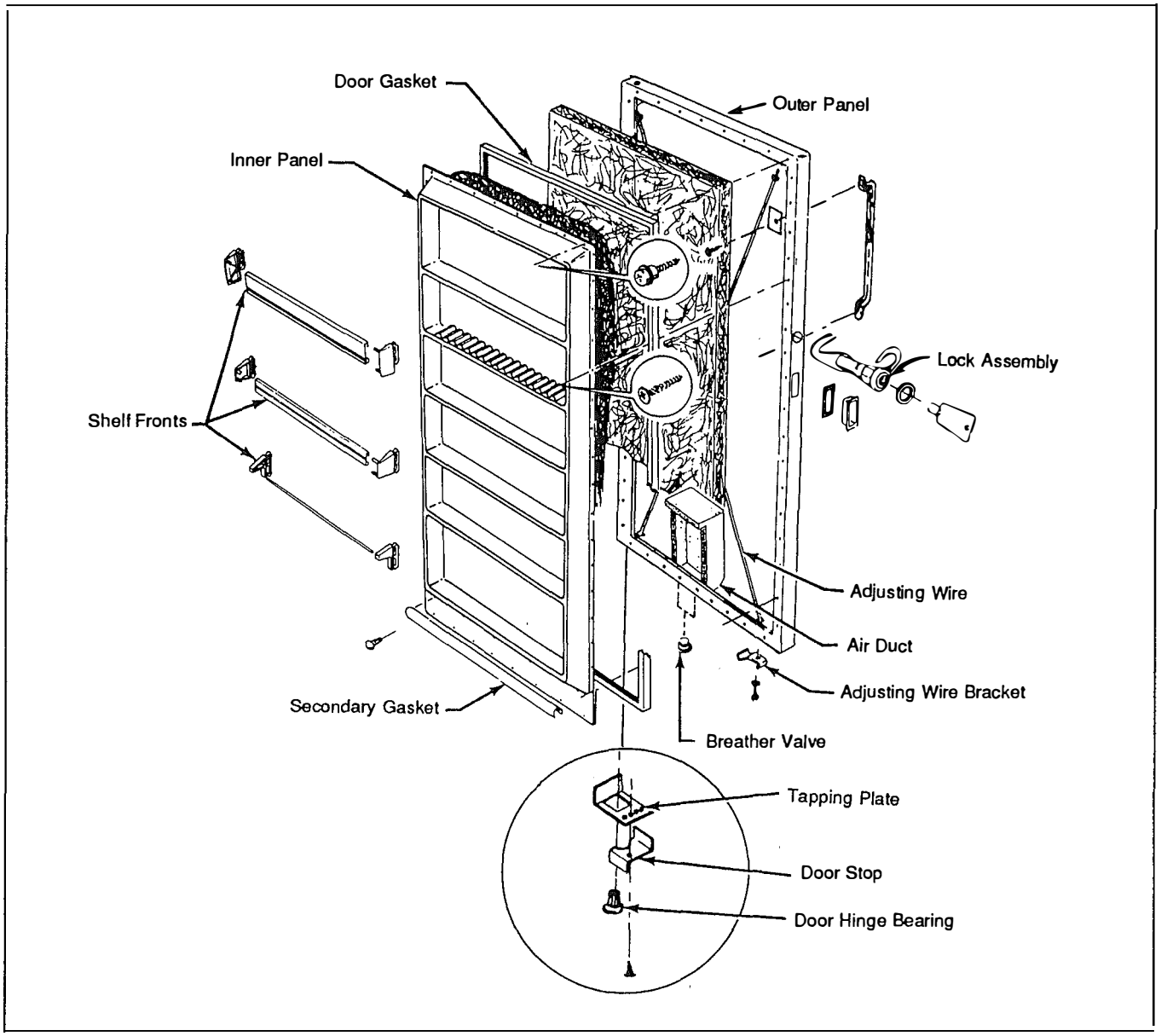


Figure B7 - Upright Freezer Door Assembly

the outer door panel, and lift the inner panel and gasket off the outer panel. Note the quantity and location of the shoulder type screws used at the four corners of the door. When assembling the door, the shoulder screws must go back into the same locations. See Figure B7.

4. With the inner panel and gasket removed, all other door components are accessible for service.
5. Assemble the door in reverse order.

Door Handles

Upright freezer models are equipped with three types of door handles:

1. A molded plastic recessed handle, snapped into a rectangular opening in the left side of the door. To remove, carefully pry out from the door opening.
2. A grip type handle, attached to the left side of the door with screws. Remove by simply removing the exposed mounting screws.
3. A grip type handle, attached to the face of the door with screws that are driven from the inside of the door. To remove, it will be necessary to disassemble the door to gain access to the mounting screws.

Door Shelves

The upright freezers may have one, or more, of three types of shelf fronts. A wide aluminum, a narrow aluminum or a rod type.

To remove a wide type shelf front:

1. Pull out on the top of the end cap, and lift it up in the inner panel opening as far as possible. See Figure B8.
2. Swing the bottom of the end cap out of the inner panel opening, and pull it down and out. See Figure B8.

To remove a narrow or rod type shelf front:

1. Pull out on the bottom of the end cap, and push it down in the inner panel opening as far as possible. This is the same as shown in Figure B8, except reverse the directional procedure.
2. Swing the top of the end cap out of the inner panel opening, and lift it up and out. This is the same as shown in Figure B8, except reverse the directional procedure.

Door Lock

Upright freezers may be equipped with a door lock. The cylinder type lock is located in the left side flange of the door, and has a round key. The lock cylinder is spring loaded so it will eject the key, thus it is not possible to leave the key in the lock. A hook is attached to the lock cylinder, and swings up in the locked position to engage

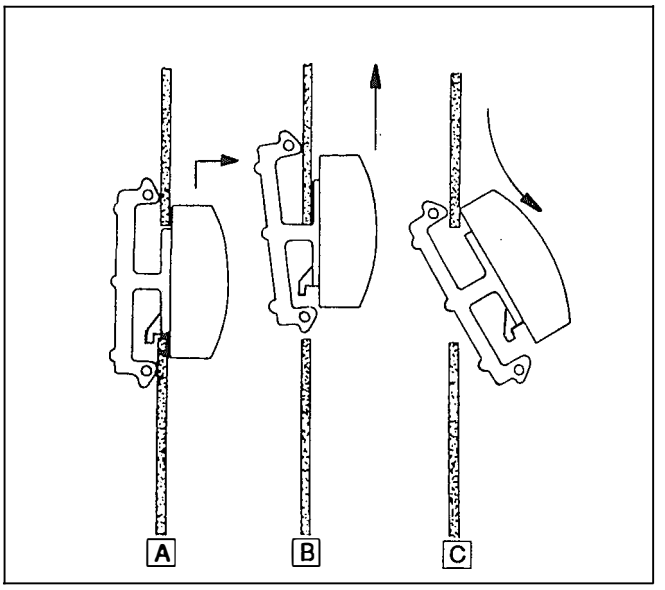


Figure B8 - Door Shelf Removal

the catch on the cabinet.

To remove the lock:

1. Remove the door from the cabinet, and remove the inner panel and gasket.
2. Remove the lock hook by removing the hook mounting screw. See Figure B7.
3. Slide the lock retainer off the lock body and remove the lock from the door opening. See Figure B7.
4. Assemble in reverse order. Note: Use the lock key to check proper orientation when installing the lock into the door opening.

Door Stop

The door stop, on models so equipped, consists of a formed steel bracket that is attached with screws to the bottom flange of the door, near the lower hinge. When the freezer door is opened about 160 to 165 degrees, the stop will bear against the lower door hinge and prevent the door from being opened further. A heavy steel tapping plate, inside the door, provides the extra support required by the door stop. See Figure B7.

With the door opened about 90 degrees, the door stop may be removed by removing the two mounting screws.

Adjustable Cross-Wires

All upright models, except 10 cubic foot, are equipped with adjustable cross-wires within the door. The cross-wires provide stiffness to the door to maintain correct alignment and door gasket seal. The two cross-wires are firmly attached to the upper corners of the door, and each runs diagonally to the opposite bottom corner. The cross-wires are attached at the bottom corners with adjusting brackets and screws. See Figure B7.

To adjust the cross-wires:

1. Loosen all door inner panel to outer panel mounting screws.
2. If the door does not seal at the top, tighten the right hand, and loosen the left hand adjustment screws. See Figure B9.
3. If the door does not seal at the bottom, tighten the left hand, and loosen the right hand adjustment screws. See Figure B10.
   Note: Make adjustments only 1/2 turn at a time, and always turn both the right hand and left hand screws an equal amount.
4. After adjustment, tighten all the door inner panel to outer panel mounting screws.

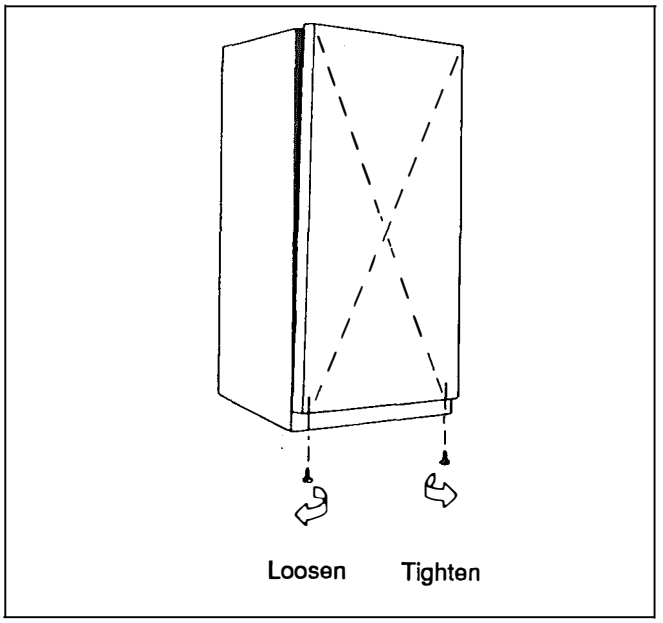


Figure B9 - Adjusting Seal At Top

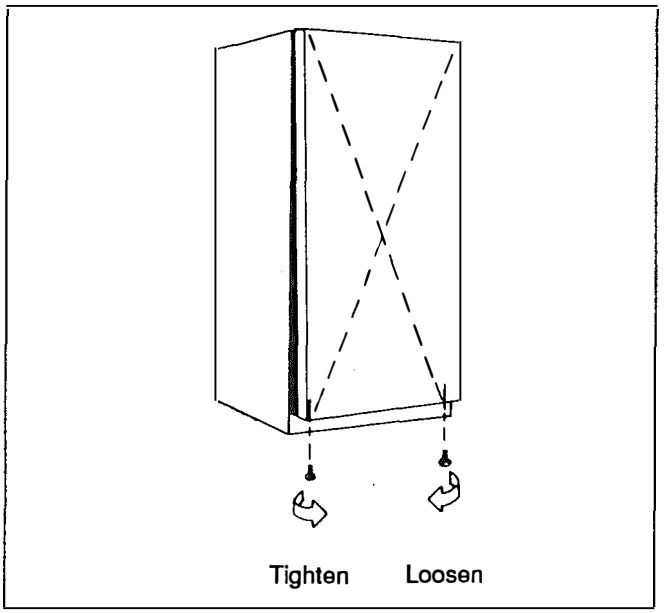


Figure B10 - Adjusting Seal At Bottom

Air Breather Valves

All manual defrost upright model freezers have air breather valves in the bottom flange of the door. The valves allow air to enter the freezer, after the door has been opened and closed, in order to equalize the inside and outside air pressures, and permit immediate re-opening 0f the door.

The air breather valves are normally held closed by their own weight, and are opened by the force of the incoming air. As the air enters the door, an air duct directs the air up to a row of holes in the inner door panel, where the air enters into the freezer compartment.

The air breather valves snap into holes in the bottom flange of the door, and are easily removed by pulling straight out. See Figure B7.

The air duct is accessible by disassembling the door. See Figure B7.

Door Hinges

The upper door hinge is attached to the cabinet with hex head machine screws. If the upper hinge has four attaching screws, the rear two are Phillips head type. These are locator screws, and must be installed in the rear holes only. A four hole hinge may be used to replace a two hole hinge. However, do not attempt to use the rear holes as the screws may pierce the condenser tubing on some models.

The upper hinge is formed with an off-set, to allow the door to be positioned high enough in relation to the cabinet. Models with the door closer feature, have a 1/2" off-set. Models without the door closer, have a 3/8" off-set. The two hinges should not be interchanged.

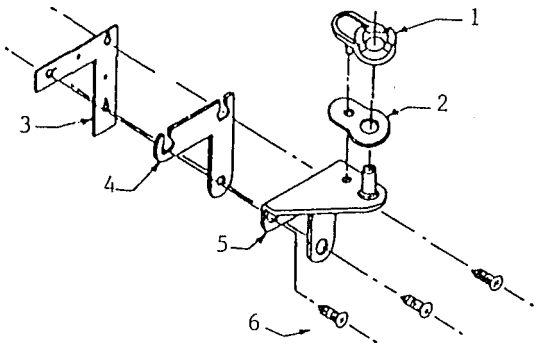
If it is necessary to adjust the position of the upper hinge for door alignment, the two rear locator screws must be removed and discarded.

The lower door hinge is attached to the cabinet base with three hex head or Phillips type screws. The mounting screws thread into a tapping Plate, which is behind the base front panel. One or more spacers may be used behind the hinge to maintain proper door gasket spacing. The hinge mounting holes are large enough to allow hinge adjustment, both side to side and up and down. See Figure B11.

To remove the lower hinge:

1. Remove the upper hinge and lift the door off the lower hinge.
2. With a soft lead pencil, mark around the lower hinge so it may be replaced in the same position.

3. Remove the three mounting screws to remove the lower hinge.
4. Replace in reverse order. Be sure any spacers are placed in their original location.



1. Ramp - Door Closer
2. Spacer - Door Closer Ramp (Opt.)
3. Tapping Plate - Bottom Hinge
4. Spacer - Bottom Hinge
5. Bracket Assembly - Bottom Hinge
6. Screw - Bottom Hinge (3)

Figure B11 - Lower Hinge

Door Closer

All upright freezers may be equipped with a door closer as an optional feature. The ramp type closer consists of a lower hinge bearing insert, with a molded ramp surface, and a closer ramp that fits in place over the lower hinge pin. See Figure B11. In addition, a spacer may be used under the closer ramp. See Figure B11.

The ramp and hinge bearing are formed so that, as the door is opened, the door will be lifted up about 1/8". The door will remain up, until it is opened to about the 160 degree position, where the ramp will allow it to lower. The weight of the door will thus keep it in its full open position. When the door is being closed, and reaches about the 20 degree open position, the ramp will start to allow the door to lower, and thus fully close itself.

To remove the ramp closer components:

1. Remove the upper hinge and lift the door off the lower hinge.
2. Note the small locating tab on one side of the hinge bearing insert. It should be pointed towards the side flange of the door.
3. Carefully pry the hinge bearing insert out of the door.
4. Remove the closer ramp from the lower hinge by pulling straight up off the hinge pin. Note the small locating pin on the bottom of the closer ramp. This pin must be inserted into the small hole in the lower hinge.
5. Assemble in reverse order.

Door Gasket

Upright model freezers have vinyl door gaskets, with full length magnets on all four sides. The gasket is held to the door outer panel by the side flanges of the inner door panel.

To remove the door gasket:

1. Remove the door from the freezer and lay it on a padded, or otherwise protected, flat work surface.
2. Remove the inner panel mounting screws from all four sides of the door. Note the location of the shoulder screws at each of the corners. These screws must be replaced into the same locations.
3. Remove the gasket from the inner door panel.
4. Assemble in reverse order.
5. Check and adjust door alignment and seal, as necessary.

LID ASSEMBLY - ALL CHEST MODELS

The chest freezer lid assembly consists of a steel outer panel, fiberglass insulation, a formed plastic inner panel, and a lid gasket all held together by snap-in clips around the lid perimeter. The lid assembly is mounted to the freezer cabinet with spring-loaded hinges. See Figure B12.

All chest freezer models have "floating" type lids. The lid assembly is designed to flex freely, so it will form a proper seal to the cabinet.

Lid optional features found on the various models include recessed or surface mounted handles, power signal light, interior light, and lid lock.

The lid must be disassembled for access to the lock, handle, and interior light socket. It is not necessary to disassemble the lid to service the hinges, interior light bulb, or the power signal light.

To disassemble a compact chest lid:

1. Open the lid and remove the bottom hinge mounting screw. See Figure B13.
2. Close the lid, and while holding in on the bottom of the hinge, remove the remaining two hinge mounting screws. See Figure B13.
3. Place the lid on a flat surface that is padded, or otherwise protected, to prevent scratching the lid or work surface.
4. Slide a putty knife, or similar tool, between the lid gasket and the outer panel and pry each of the panel clips loose. See Figure B14.
   Note: Masking tape on the putty knife blade helps prevent scratching the painted surfaces.
5. Lift the inner panel and gasket off the outer panel.
6. Assemble and replace the lid in reverse order.

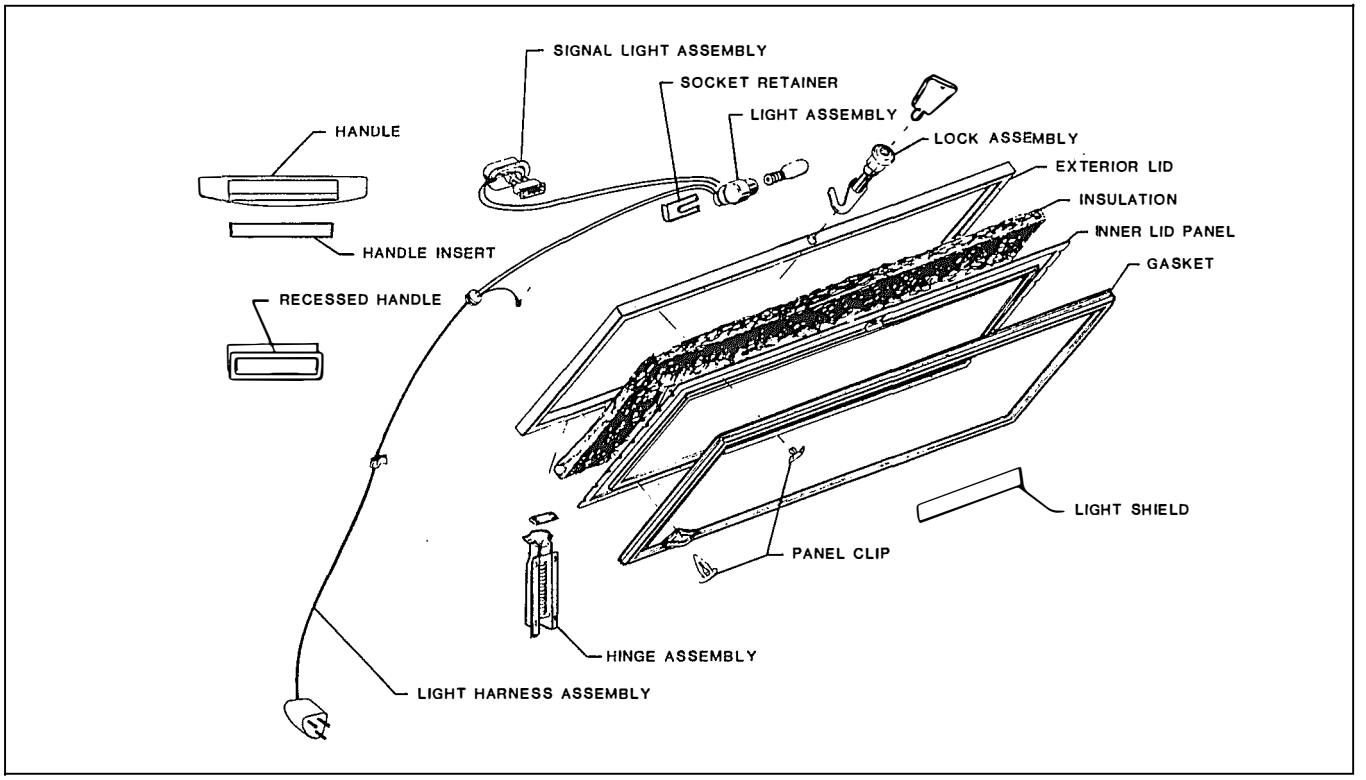


Figure B12 - Chest Freezer Lid Assembly

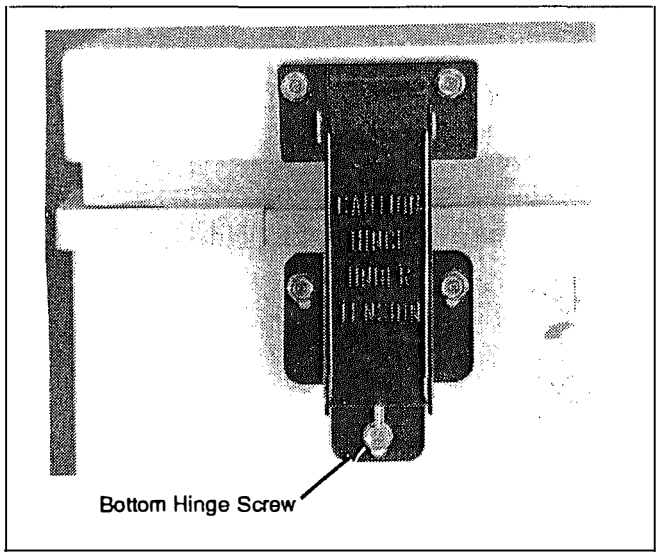


Figure B13 - Compact Chest Lid Removal

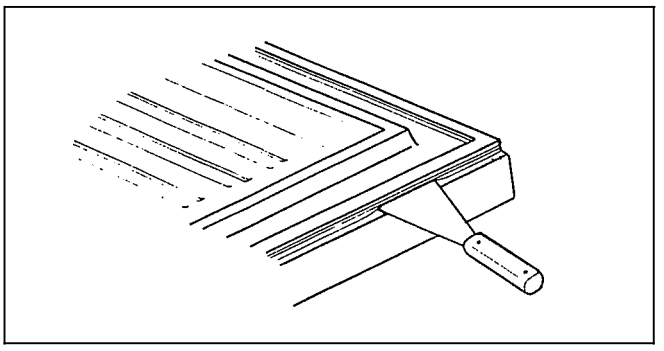


Figure B14 - Lid Inner Panel Removal

7. Check lid gasket seal, and adjust the hinges as needed. When checked with a strip of paper, pressure on the gasket should be nearly the same on all four sides.

To disassemble a standard chest lid:

1. Unplug any lid wiring from the connector in the machine compartment.
2. Insert a pin into the hinge holes as shown in Figure B15. A small Phillips type screwdriver or 16D nail work well as pins.
3. With the pin in place, remove the four 3/8" hex head screws holding the hinge to the cabinet. See Figure B16.
4. Place the lid on a flat surface that is padded, or otherwise protected, to prevent scratching the lid or work surface.
5. Slide a putty knife, or similar tool, between the lid gasket and the outer panel and pry each of the panel clips loose. See Figure B14.
   Note: Masking tape on the putty knife blade helps prevent scratching the painted surfaces.
6. Lift the inner panel and gasket off the outer panel.
7. Assemble and replace lid in reverse order, installing the upper right locater screw first. See Figure B16.
8. Check lid gasket seal. Pressure on the gasket should be nearly the same on all four sides, when checked with a strip of paper.
9. If adjustment is required, remove and discard the upper right hinge locater screw before making adjustments.

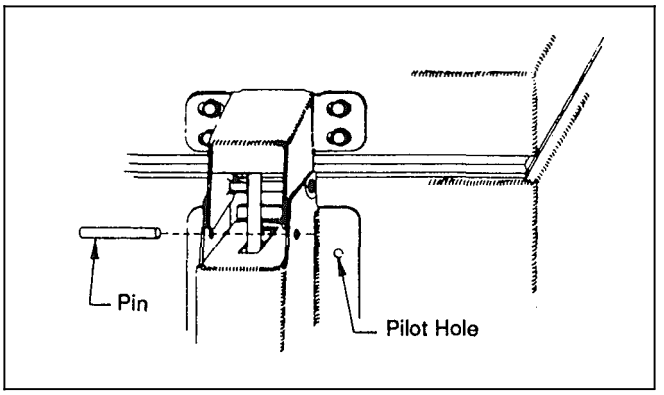


Figure B15 - Hinge Lock Pin

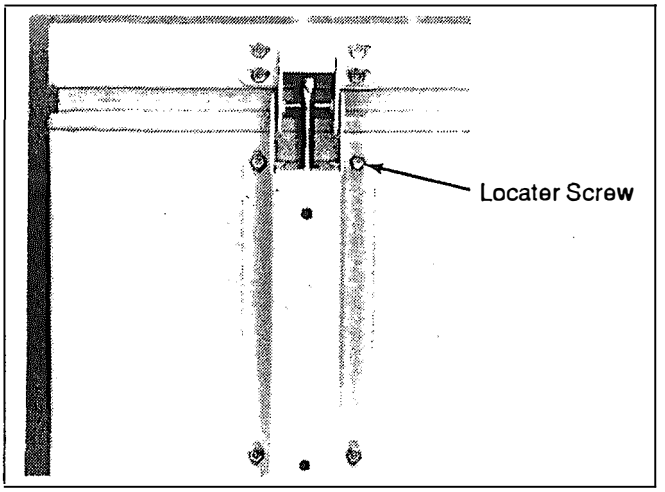


Figure B16 - Lid Removal

Lid Gasket

Chest model freezers have balloon type lid gaskets. The gaskets have no magnets, and depend on the weight of the lid, and lid hinge spring tension, to provide sufficient seal pressure.

The lid gasket is held to the outer lid panel by the inner lid panel and retaining clips. To remove the gasket, remove and disassemble the lid. See "To disassemble a lid", this section.

Lid Lock

Chest freezers may be equipped with a lid lock. The cylinder type lock is located in the front flange of the lid, and has a round key. The lock cylinder is spring loaded so it will eject the key, thus it is not possible to leave the key in the lock. A hook is attached to the lock cylinder, and swings down into the locked position, to engage the catch on the cabinet.

To remove the lock:

1. Remove and disassemble the lid.
2. Remove the lock hook by removing the hook mounting screw.
3. Slide the lock retainer off the lock body and remove the lock from the lid opening.
4. Assemble and replace in reverse order. Note: Use the lock key to check proper orientation when installing the lock into the lid opening.

Lid Handle

Chest freezers are equipped with either recessed or surface mounted lid handles. The recessed type handles are molded plastic, and "snap" into a rectangular opening in the front flange of the lid outer panel. The surface mounted handles are attached with screws from inside the outer lid panel.

To remove the lid handle:

1. Remove and disassemble the lid.
2. Remove the recessed type handle by working it out of the lid, being careful not to bend or distort the opening.
3. Remove the surface mounted handle by removing the mounting screws.
4. Assemble and replace in reverse order.

Interior Light

The chest freezer interior light is located near the center of the inner lid panel. The molded plastic light socket has a built-in mercury switch. When the lid is opening, a pool of liquid mercury flows across a set of internal contacts to illuminate the light. When the lid is closing, the mercury flows away from the contacts.

To remove the light socket:

1. Remove and disassemble the lid.
2. Remove the lid insulation to expose the socket, and disconnect the wire leads. Note the wire lead with the white mark. See Figure B17. The marked wire lead must be connected to the terminal nearest the "W" on the socket, to maintain correct polarity.
3. Slide the socket retainer off the socket, and pull the socket out the front of the lid inner panel.
4. Assemble and replace in reverse order.

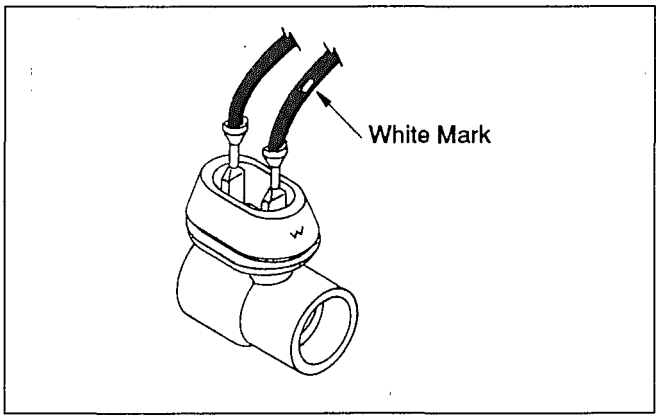


Figure B17 - Interior Light Socket

Power Signal Light

The neon type power signal light is located in the front flange of the freezer lid. The light will glow anytime the freezer is connected to a live power source.

To remove the signal light, use a small flat screwdriver to pry the light out of the lid, and disconnect the wire leads. Replace by connecting the wires and snapping the light into the lid.

Lid Hinges

Compact and standard chest freezers have spring-loaded type hinge assemblies. The hinges have very strong coil springs that counter-balance the weight of the lid, and support the lid in its full open position.

Compact Chest Models

Compact chest freezer hinges have non-adjustable spring tension. Refer to the correct parts list for the proper replacement hinge part number.

To remove the lid hinge:

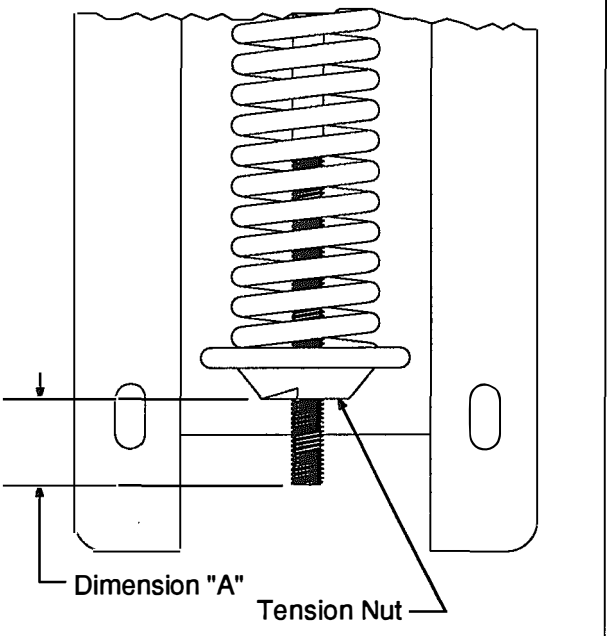
1. Open the lid and remove the bottom hinge mounting screw.
2. Close the lid, and while holding in on the bottom of the hinge, remove the remaining two hinge cabinet mounting screws.
3. Remove the hinge from the lid by removing the two mounting screws.
4. Replace in reverse order.
5. Check lid gasket seal, and adjust the hinges as needed. When checked with a strip of paper, pressure on the gasket should be nearly the same on all four sides.

Standard Chest Models

Standard chest freezer hinges have adjustable spring tension. A single replacement hinge is supplied for all sizes of standard chest models, and must be adjusted prior to installation. Adjust the spring tension nut , with long nose pliers, as shown in Figure B18. An original equipment hinge must be removed from the freezer before adjusting the spring tension.

To remove the lid hinge:

1. With the lid closed, remove the two upper hinge to cabinet 3/8" hex head mounting screws
2. While holding in firmly on the bottom of the hinge, remove the remaining two mounting screws and allow the hinge to swing up slowly.
3. Remove the hinge by removing the four 3/8" hex head hinge to lid mounting screws.
4. If necessary, adjust the hinge spring tension as shown in Figure B18.
5. Replace hinge in reverse order, installing the upper right locator screw first.



Cubic Feet	Dimension "A"
10	0"
15	1/4"
18	1/2"
20	1/2"
23	3/4"
25	1"

Figure B18 - Adjusting Spring Tension

SECTION C - ELECTRICAL COMPONENTS

ELECTRICAL GROUNDING

All freezers are equipped with a power supply cord incorporating a three-prong grounding plug and a ground wire which is attached to the freezer cabinet for protection against shock hazard. Each electrical component is either mounted, or connected through a ground wire, to the cabinet to complete the ground. Certain components, such as defrost timers, may be "double insulated" and not require a ground wire.

Be sure the electrical wall receptacle is of the three-prong type and is properly grounded in accordance with the I Electrical Code in your country and/or local codes.

MAGNETIC RELAY & OVERLOAD PROTECTOR

Two types of magnetic relays and thermal-disc overloads are used. Figure C1 shows separately mounted relay and overload, while Figure C2 shows a combination relay and overload mounting bracket. The two types differ only in mounting. They are electrically and functionally the same.

The starting relays are the push-on type that mount on the Start (S) and Run (R) terminals of the compressor, as shown in Figures C1 and C2. The overload protector is connected to the Common (C) terminal of the compressor.

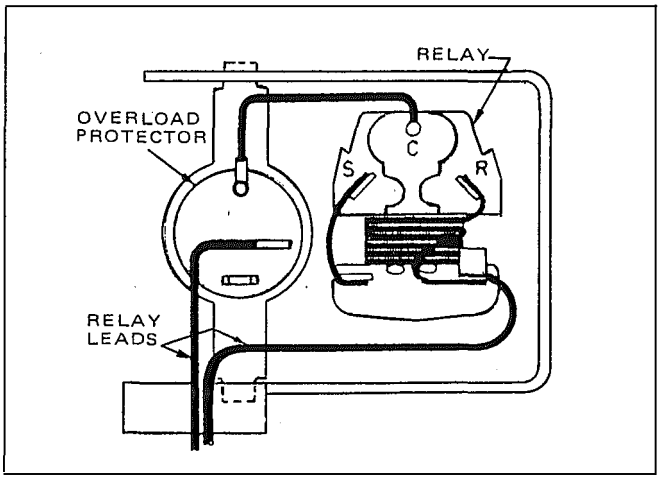


Figure C1 - Separate Mount, Magnetic Relay & Overload

The relay coil carries the main winding current. The relay armature holds the start winding contacts in the open position except during the starting period.

At the moment of starting, when the thermostat closes the electrical circuit, a surge of electric current passes through the main motor winding and through the relay coil. This energizes the relay coil and pulls up the relay armature, allowing the start winding contacts to close.

The current through the start winding introduces a second, out-of-phase, magnetic field in the stator and starts the motor. As the motor speed increases, the main winding current is reduced. At a predetermined condition, the main winding current, which is also the current through the relay coil, drops to a value below that necessary to hold up the relay armature. The armature drops and opens the start winding contacts and takes the starting winding out of the circuit.

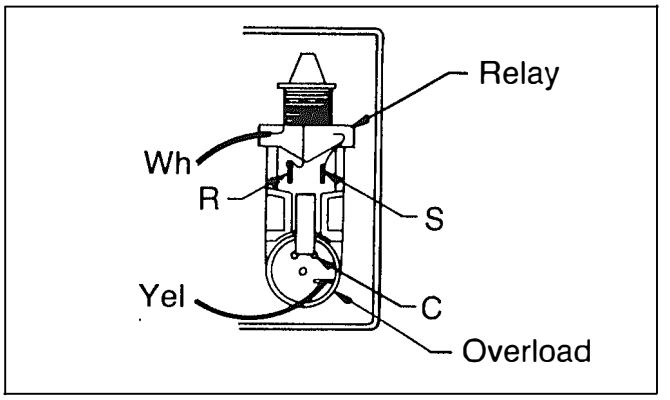


Figure C2 - Combination Mount, Magnetic Relay & Overload

In series with the motor windings is a bi-metallic overload protector, which is held in place on the compressor by either a spring clip or the relay. The overload protector connects to the common (C) terminal on the compressor. See Figures C1 and C2.

Should the current in the motor windings increase to a dangerous point, the heat developed by passage of current through the bi-metallic disc will cause it to deflect and open the contacts. This breaks the circuit to the motor windings and stops the motor before any damage can occur.

Excessive heat radiating from the compressor can also "trip" the overload protector. This is why the overload protector is mounted against the compressor shell.

After a current overload or excessive heat has caused the overload protector to break the circuit, the bi-metallic disc cools and returns the contacts to the closed position. The time required for the overload switch to reset varies with room temperature and compressor shell temperature.

The overload protector is specifically designed with the proper electrical and heat characteristics for the compressor motor and its application. Any replacement must

be made with an exact replacement - the same part number. NEVER SUBSTITUTE AN OVERLOAD PROTECTOR WITH ANOTHER UNAUTHORIZED PART NUMBER. The wrong protector can result in a burned out motor. If the relay is found inoperative, change both relay and overload protector. If protector is inoperative, change only the overload protector.

When the thermostat cuts off after a normal cycle, or when the service cord is pulled from the electrical outlet during a running cycle, about 8 minutes (longer if it occurred during a pull-down) is required for "unloading" (the reduction of the pressure differential between the highside and the lowside of the system). During this unloading period, the overload will trip if the service cord is plugged into the electrical outlet.

To check for an open overload protector, short across its terminals. See Figures C1 and C2. If the compressor starts, replace the overload. If the compressor does not start, look for other trouble (low line voltage during the starting interval, inoperative relay, or inoperative compressor).

If the compressor repeatedly starts and runs for a few seconds, and then cycles on the overload protector, the starting relay contacts may be stuck closed and the excessive current is tripping the overload.

To continuity check a magnetic relay:

1. Remove the relay from the compressor.
2. Check continuity of the relay coil, by connecting an ohmmeter to the relay wiring terminal and the Run (R or M) pin contact. The coil should have continuity.
3. Check continuity of the relay switch, by connecting an ohmmeter to the relay wiring terminal and the Start (S) pin contact. With the relay in its normal upright position, there should be no continuity. With the relay "up-side down" there should be continuity.

VERY HIGH EFFICIENCY COMPRESSOR - ELECTRICAL COMPONENTS & CIRCUITS

The new series of very high efficiency compressors are equipped with all new electrical components consisting of a solid state *PTCR relay, a thermally operated overload protector, and a run capacitor

Solid State Relay - See Figures C3 and C4

The solid state relay has no moving parts. It consists of a PTC resistor mounted in a plastic case with appropriate terminals.

PTC (positive temperature coefficient) simply denotes a resistor which increases in resistance as it temperature is increased. The self heating PTC resistor used in the solid state relay has the unique characteristic of changing from low to very high resistance very abruptly, thus serving as an on-off switch.

The solid state relay plugs directly onto the compressor start and run terminals. Relay terminals 1, 2 and 5 are connected within the relay, as are terminals 3 and 6. The run capacitor is connected to relay terminals 2 and 3, so it is connected in parallel with the PTC resistor. See Figure C3.

Line voltage is connected to relay terminal 1.
(120V 60 Hz or 220V-240V 50/60 Hz.)

To check the relay:

1. Disconnect the freezer service cord from the wall receptacle.
2. Remove the relay cover, disconnect the three (3) wires, and pull the relay off the compressor terminals.
3. With an ohmmeter, check resistance between terminals 2 and 3. The resistance should be 3 to 12 ohms, at normal room temperature. A shorted relay will read "0" resistance. An open relay will read very high or infinite resistance.

Overload Protector - See Figures C3 and C4

The overload protector is completely thermally operated. It will open from excessive heat or current. Unlike prior overloads, the internal bi-metal is not self-heating, and is not a part of the electrical circuit. The overload has a small built-in coil heater that is in series with the compressor start and run windings.

The overload protector plugs directly onto the compressor common terminal.

To check the overload protector:

1. Disconnect the freezer service cord from the wall receptacle.
2. Remove the relay cover and pull the relay off the compressor. Disconnect one wire from the overload protector and pull it off the compressor.
3. With an ohmmeter, check resistance between the tab terminal and the female pin terminal. At normal room temperature the overload protector should have less than 1 ohm resistance. An open overload protector will have infinite resistance.

*PTCR (positive temperature coefficient resistor) defines a resistor that increases in resistance as its temperature is increased. "PTCR" is commonly abbreviated as just "PTC".

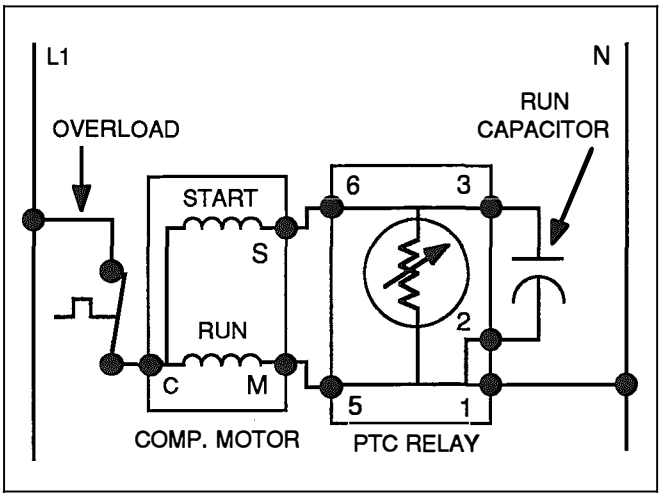


Figure C3 - Electrical Circuits

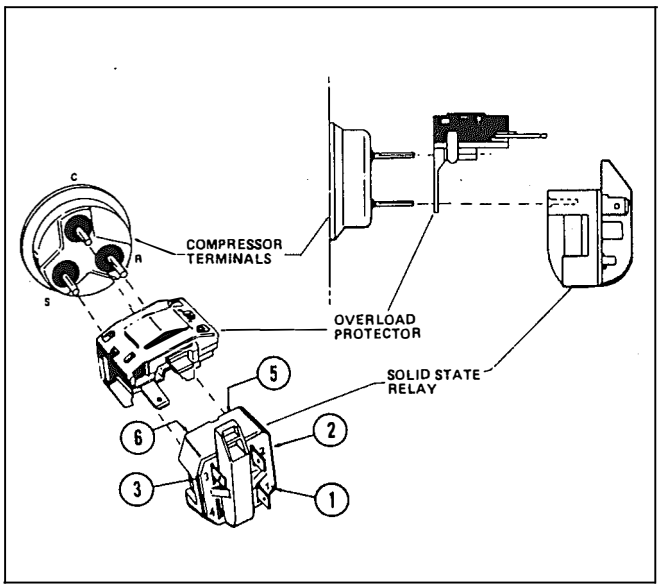


Figure C4 - Electrical Components

Run Capacitor- See Figure C4

If a run capacitor is used,the run capacitor has permanently attached wires which are connected to relay terminals 2 and 3. The capacitor does not have an identified terminal and can be wired without regard to polarity.

To check the run capacitor:

1. Disconnect the freezer service cord from the wall receptacle.
2. Remove relay cover and disconnect the capacitor wires from the relay.
3. Discharge capacitor by shorting across the terminals with a 500K (1 watt) resistor for one minute.
4. With an ohmmeter, check resistance across the capacitor wire terminals with the meter set on the "ohms times 1000" scale.
   a. The needle should jump towards zero ohms and quickly move back to infinity.
   b. If the needle does not move, the capacitor is open.
   c. If the needle reads a constant value at or near zero ohms, the capacitor is shorted.
   d. If the needle jumps toward zero and then moves back to a constant high resistance (not infinity) the capacitor has a high resistance leak.

Compressor Start Circuit - See Figure C5

When the compressor circuit is first energized, the solid state relay has low (3-12 ohms) resistance, and both the run and start windings are energized to start the compressor. The run capacitor is being shunted (by-passed) by the PTC relay, and it has little function during compressor starting.

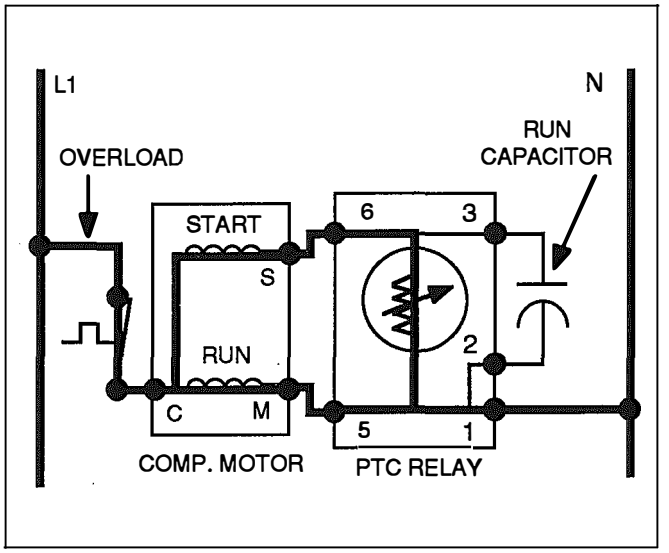


Figure C5 - Compressor Start Circuit

Compressor Run Circuit - See Figure C6

When the self-heating solid state relay has reached sufficient temperature, it will abruptly change from low (3-12 ohms) resistance to very high (10-20K ohms) resistance and, in effect, "switches" off the start windings. The relay no longer shunts the run capacitor. The run capacitor is now in series with the start windings. The only purpose of the run capacitor is to improve compressor operating efficiency, which it does by "correcting" the power factor of the compressor motor.

Compressor Operating Characteristics

1. When the compressor electrical circuit is energized, the start winding current causes the PTC relay to heat, and after an appropriate amount of starting time, "switches off" the start winding circuit. NOTE: The PTC relay will "switch off" the start winding circuit even though the compressor has not started (such as when attempting to re-start after a momentary power interruption).

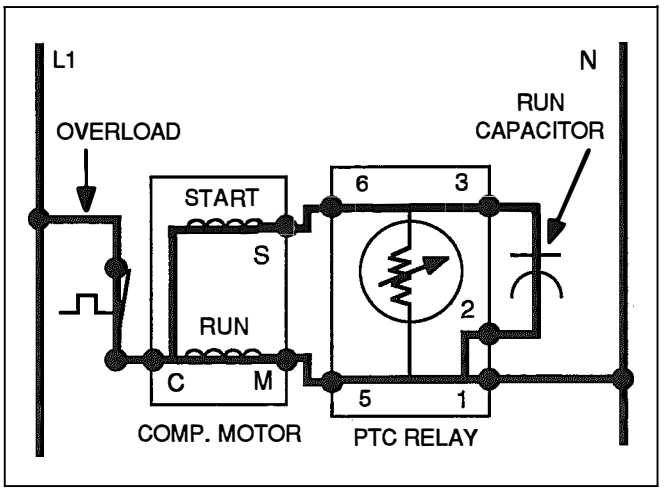


Figure C6 - Compressor Run Circuit

2. Because the PTC relay opens the compressor start circuit whether or not the compressor has started, the overload protector is designed and calibrated to open the compressor electrical circuit with locked rotor run winding current only. CAUTION: Use only the correct specified overload protector for service replacement.

3. With an "open" PTC relay, the compressor will not start as there is little or no current to the start windings. The overload protector will open due to the high locked rotor run winding current.

4. With a "shorted" PTC relay or capacitor, the compressor will start, and the overload protector will quickly open due to the high current of the combined run and start windings.

5. With an open or weak capacitor, the compressor will start and run apparently as normal. The compressor, however, will be operating at reduced efficiency of energy usage.

COMPRESSOR MOTOR ELECTRICAL CHECK

When checking for electrical trouble, always be sure there is a "live" electrical circuit to the cabinet, and that the temperature selector dial is not in the "OFF" position.

When the compressor will not start and the cabinet temperature is warm, the trouble may be in the relay, overload, thermostat, wiring, or in the compressor motor itself.

If the compressor will not run, make a voltage check across the wiring terminals on the relay and overload protector. See Wiring Diagrams, Part 1 of this manual. The voltmeter should show line voltage if the thermostat knob is in a normal operating position. If this check does not show a "live" circuit, the thermostat and wiring should be checked for an open circuit. Pay particular attention to all terminal connections.

A control thermostat check can be made by using a piece of wire as a temporary bridge across the two thermostat terminals. If the compressor now starts and runs with the bridge, the control thermostat is at fault and should be changed.

If the voltage check shows power supply at the relay terminals, check the compressor by means of an external compressor motor test cord. Note: Follow the operating instructions included with the compressor test cord.

If the compressor motor does not start and run with either the test cord or the regular electrical accessories, check the line voltage. There should not be more than 10% variation from the normal 115 V or 220-240V If the voltage is correct and the compressor will not start and run, replace the compressor.

If the compressor starts and runs with the test cord, replace the relay.

CONTROL THERMOSTATS

The control thermostats on all freezer models are of the variable cut-on and cut-off type, and have gas charged capillary tube sensing elements. Refer to Electrical Specifications, Part 1 of this manual for calibration temperatures.

All Chest Models

The control thermostat is mounted to a bracket inside the compressor compartment, with the sensing element inserted about 18.5" to 19.5" into a control well located in the top of the compartment. See Figures C7 and C8.

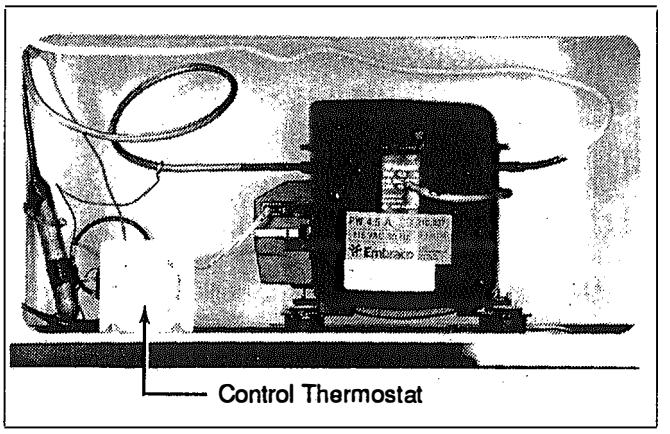


Figure C7 - Compact Chest Control Thermostat

To replace the control thermostat:

1. Disconnect the freezer power cord from the electrical outlet.

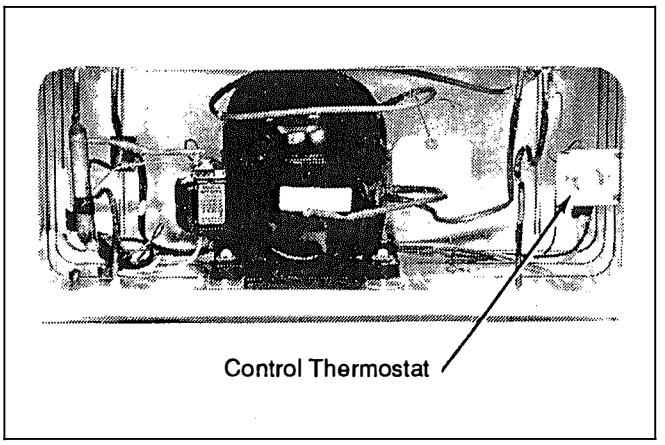


Figure C8 - Standard Chest Control Thermostat

2. Remove the compressor compartment cover, and mark the sensing element at the point where it enters the control well in the top of the compressor compartment with tape or a marking pen.
3. Disconnect the wiring, including the ground wire, from the control thermostat.
4. Remove the control knob and the thermostat mounting screws. Gently pull the sensing element from the control well.
5. Carefully straighten the sensing element of the replacement control thermostat. Using the original thermostat as a pattern, mark the sensing element for the correct depth of insertion into the control well.
6. Push the new control thermostat sensing element into the control well to the proper depth, about 18.5" to 19.5". Seal the end of the well with a mastic sealer, such as "permagum".
7. Assemble in reverse order.

Upright Manual Defrost Models

The control thermostat is mounted in a plastic housing, on the right side of the freezer liner, with two passes of the sensing element clamped to the bottom of a shelf. See Figures C9 and C10.

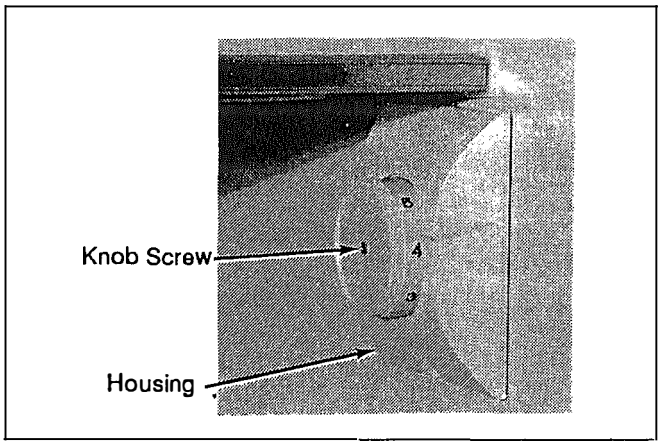


Figure C9 - Control Thermostat Housing

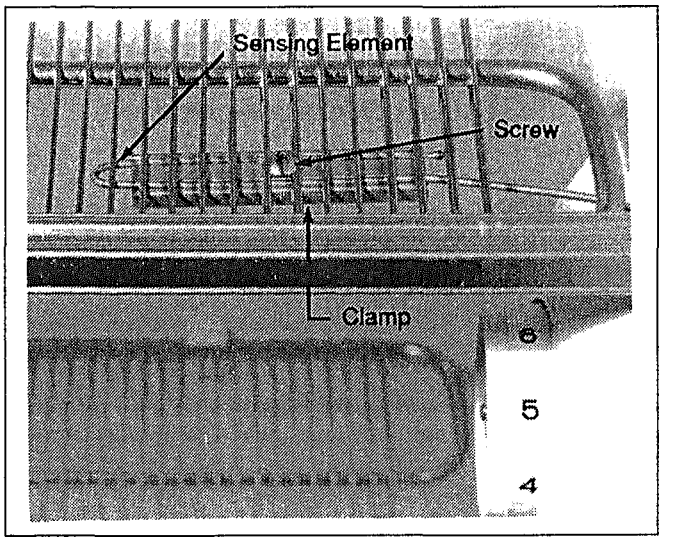


Figure C10 - Control Thermostat Sensing Element

To replace the control thermostat:

1. Disconnect the freezer power cord from the electrical outlet.
2. Remove the thermostat knob, and unclamp the sensing element from the bottom of the shelf.
3. Remove the screw from the bottom of the control housing. Pull the bottom of the housing out and down to disengage the housing tabs from the slots in the liner.
4. Disconnect the wiring, including the ground wire, from the control thermostat.
5. Remove the control thermostat mounting screws, and remove the thermostat from the freezer.
6. Assemble in reverse order.

Upright Automatic Defrost Models

The control thermostat is mounted to the upper right corner of the evaporator cover, with two passes of the sensing element clamped to a bracket located above the right side of the evaporator. See Figures C11 and C12.

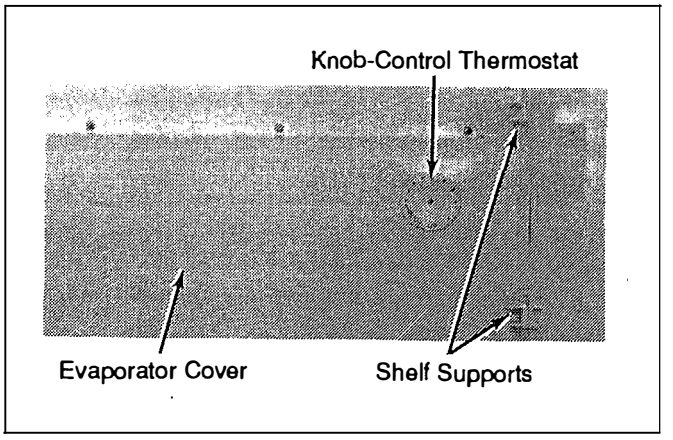


Figure C11 - Control Thermostat Location

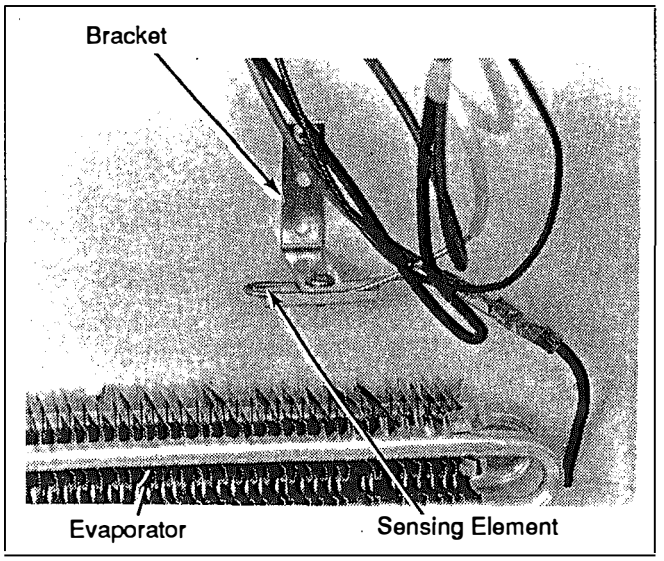


Figure C12 - Control Thermostat Sensing Element

To replace the control thermostat:

1. Disconnect the freezer power cord from the electrical outlet.
2. Remove freezer shelves to allow full access to the evaporator cover.
3. Remove the control thermostat knob, and unsnap the thermostat from the evaporator cover.
4. Tip the thermostat forward, and push it back through the opening in the evaporator cover.
5. Remove the evaporator cover mounting screws and the rear shelf supports for the lower two or three shelves.
6. Pull the top of the evaporator cover forward; disconnect the wiring from the thermostat and the sensing element from the bracket; and remove the thermostat from the freezer.
7. Assemble in reverse order.

AUTOMATIC DEFROST COMPONENTS

Components that are unique to automatic defrosting models include: a fin and tube type evaporator, evaporator fan assembly, defrost thermostat, defrost heater, and defrost timer. See Figure C13.

Evaporator Assembly

The fin and tube type evaporator is located at the lower back of the freezer compartment. See Figure C13. Note the styrofoam air barriers located at each side of the evaporator. These air barriers must be in place for proper operation of the freezer.

Evaporator Fan and Motor

The evaporator fan assembly is located behind the evaporator cover, just above the evaporator. The propeller type fan draws air into the duct (located behind the freezer liner) and forces it up to the top of the freezer compartment. See Figures C13 and C14.

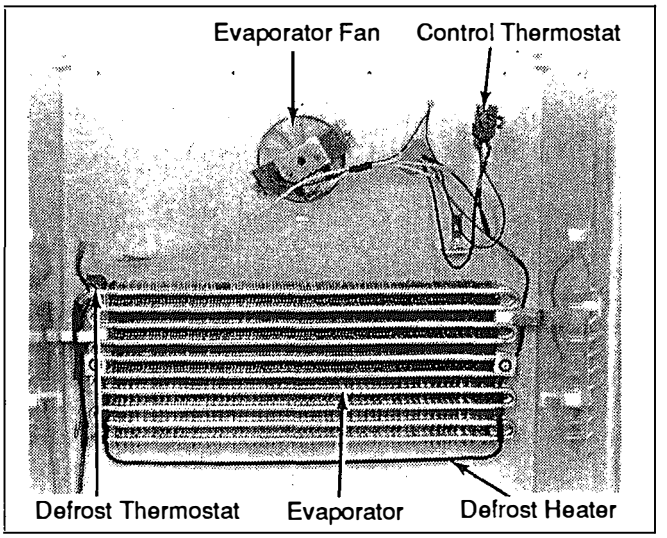


Figure C13 - Automatic Defrost Components

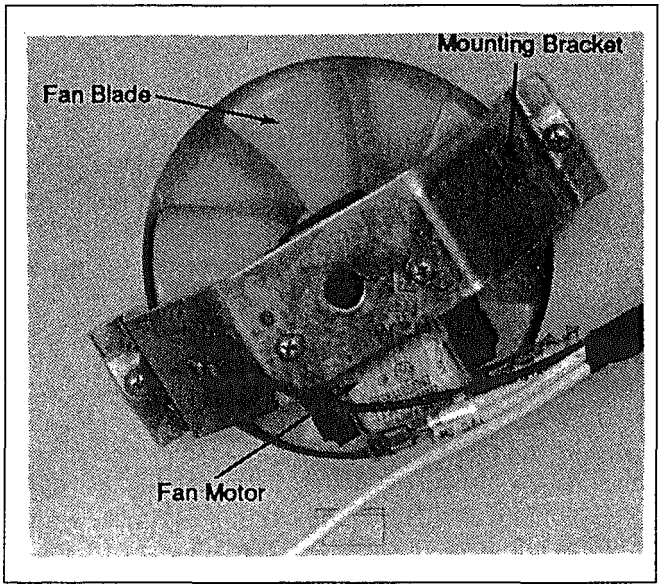


Figure C14 - Evaporator Fan Assembly

To remove the evaporator fan assembly:

1. Disconnect the freezer power cord from the electrical outlet.
2. Remove freezer shelves to allow full access to the evaporator cover.
3. Remove the control thermostat knob, and unsnap the thermostat from the evaporator cover.
4. Tip the thermostat forward, and push it back through the opening in the evaporator cover.
5. Remove the evaporator cover mounting screws and the rear shelf supports for the lower two or three shelves, and remove the evaporator cover.

6. Disconnect the wiring, including the ground wire, and remove the screws attaching the fan assembly to the liner.
7. With the fan assembly removed from the freezer, the fan blade is removed by simply pulling off the motor shaft. The motor is removed by removing the two mounting screws.
8. Assemble in reverse order. Note: When installing the fan blade on the motor shaft, be sure the fan blade hub is flush with the end of the motor shaft.

Defrost Thermostat

The disc type defrost thermostat is located at the upper left corner of the evaporator, and is held in place on the evaporator tubing with a built-in clip. See Figures C13, C15 and C16. The defrost thermostat contacts may be continuity checked with an ohmmeter. At normal room temperature of 65°F or higher, the contacts should be open. Refer to Electrical Specifications, Part 1, for specifiedl cut-in and cut-out temperatures.

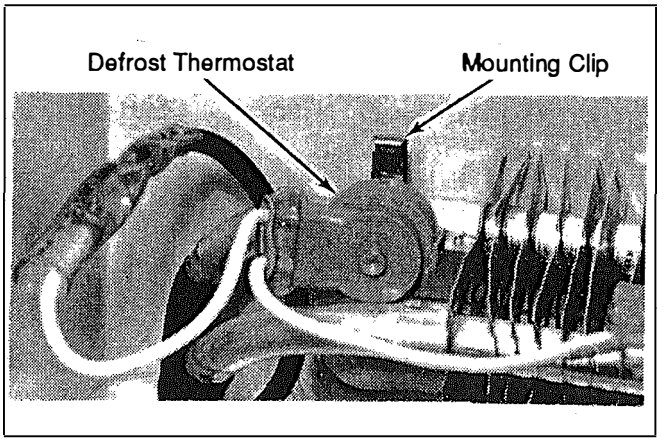


Figure C15 - Defrost Thermostat Location

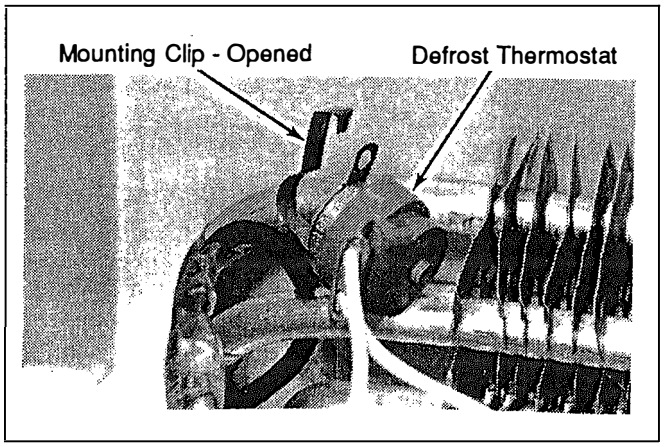


Figure C16 - Defrost Thermostat Mounting Clip

To remove the defrost thermostat:

1. Disconnectthe freezer power cord from the electrical outlet.
2. Remove freezer shelves to allow full access to the evaporator cover.
3. Remove the control thermostat knob, and unsnap the thermostat from the evaporator cover.
4. Tip the thermostat forward, and push it back through the opening in the evaporator cover.
5. Remove the evaporator cover mounting screws and the rear shelf supports for the lower two or three shelves, and remove the evaporator cover.
6. With a small screwdriver, open the defrost thermostat mounting clip and remove the thermostat from the evaporator. See Figures C15 and C16.
7. Disconnect the defrost thermostat wiring. Note: The defrost thermostat has insulated in-line tab type terminals. After assembly, the terminals are sealed against moisture infiltration with a hot melt type sealer. To disconnect the sealed terminals, slit the plastic sleeve lengthwise,and heat the hot melt sealer just enough to pull the wire free. Then disconnect the terminal. If the original insulated terminal is used for assembly, connect the terminal and push the wire into the re-heated hot melt sealer, and re-seal the plastic sleeve with additional hot melt sealer or a silastic type sealer. DO NOT allow the hot melt sealer to contaminate the terminals while disconnecting or connecting.
8. Assemble in reverse order.

Defrost Heater

The radiant type defrost heater is mounted at each lower corner of the evaporator with spring steel clips. See Figures C13 and C17. The heater is centered between the front and rear passes of the evaporator, and has 1/2" clearance from the bottom of the evaporator fins. The defrost heater may be checked for continuity and resistance, with an ohmmeter, by disconnecting the wire leads. Refer to Electrical Specifications packed with the product, or to the Specification Manual.

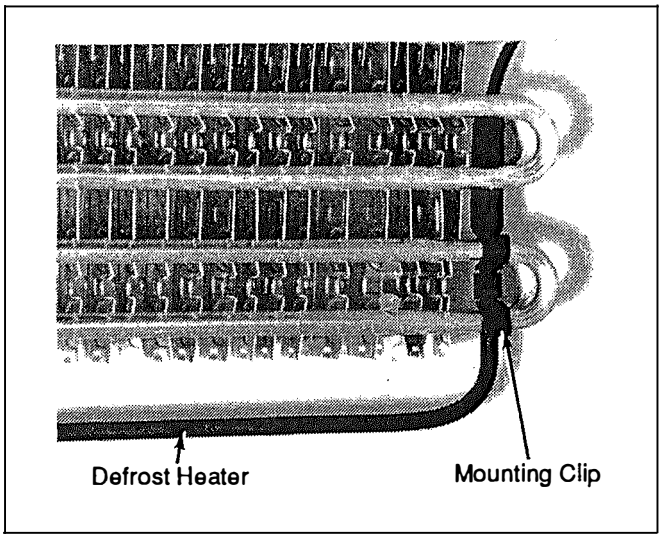


Figure C17 - Defrost Heater

To remove the defrost heater:

1. Disconnect the freezer power cord from the electrical outlet.
2. Remove freezer shelves sufficient to allow full access to the evaporator cover.
3. Remove the control thermostat knob, and unsnap the thermostat from the evaporator cover.
4. Tip the thermostat forward, and push it back through the opening in the evaporator cover.
5. Remove the evaporator cover mounting screws and the rear shelf supports for the lower two or three shelves, and remove the evaporator cover.
6. Disconnect the defrost heater wiring.
   Note: The defrost thermostat has insulated in-line tab type terminals. After assembly, the terminals are sealed against moisture infiltration with a hot melt type sealer. To disconnect the sealed terminals, slit the plastic sleeve lengthwise, and heat the hot melt sealer just enough to pull the wire free. Then disconnect the terminal. If the original insulated terminal is used for assembly, connect the terminal and push the wire into the re-heated hot melt sealer, and re-seal the plastic sleeve with additional hot melt sealer or a silastic type sealer. DO NOT allow the hot melt sealer to contaminate the terminals while disconnecting or connecting.
7. Remove the styrofoam air barriers from each side of the evaporator, and remove the spring steel heater mounting clips by pulling forward off the evaporator tubes.
8. Pull the heater down and away from the evaporator.
9. Assemble in reverse order. Be sure the defrost heater is spaced 1/2" down from the evaporator fins.

Defrost Timer

The defrost timer is mounted to a bracket in the compressor compartment. All wiring connections are made with a single four-conductor connector. The timer will initiate a defrost cycle after 12 hours of compressor run time, and will defrost for up to a maximum of 30 minutes. The timer contacts and motor may be checked, with an ohmmeter, for continuity or resistance.

To remove the defrost timer:

1. Disconnect the freezer power cord from the electrical outlet.
2. Disconnect the timer wiring by pulling the four-conductor connector straight off the timer terminals.
3. Remove the timer mounting screws, and remove the timer from the compressor compartment.
4. Assemble in reverse order.

To check the timer:

1. Remove the timer from the freezer.
2. Check the timer motor by reading resistance from terminals 1 to 3. The motor coil should have about 8,000 to 9,000 Ω 115V / 15,500 to 17,000Ω at 220v resistance.
3. Check the defrost timer contacts by advancing the timer at least 1/4 turn and continuing until it "clicks" just once. Defrost heater terminals 1 to 2 should be closed, and compressor terminals 1 to 4 should be open.
4. Advance the timer slowly until it "clicks" a second time. Defrost heater terminals 1 to 2 should be open, and compressor terminals 1 to 4 should be closed.

INTERIOR LIGHTS

Chest Models

The interior light is located on the inner lid panel. The light has a 25 watt, candelabra base, "showcase" type bulb. The combination lamp socket/mercury switch is attached to the lid with a retaining clip. The 25 watt bulb is replaced by simply opening the lid, and unscrewing the bulb.

To remove the lamp socket assembly:

1. Disconnect the freezer power cord from the electrical outlet.
2. Remove and disassemble the lid. See Lid Removal, Section B, this manual.
3. Disconnect the lamp socket wiring, and remove the socket retaining clip.
4. Assemble in reverse order.

Upright Models

The interior light is located at the top front of the freezer liner. The light has a 25 watt, candelabra base, "showcase" type bulb. The lamp socket "snaps" into a rectangular opening in the freezer liner. The door operated light switch is mounted in the right side breaker trim. Wiring to the lamp socket passes through the foam insulation, and is not replaceable. A lamp shield, in front of the bulb, prevents contact with food packages.

To remove the lamp socket assembly:

1. Disconnect the freezer power cord from the electrical outlet.
2. Remove the lamp shield and unscrew the lamp bulb.
3. With a small screwdriver, carefully push in on the socket retaining tabs and work the socket out of the liner opening. Then disconnect the socket wiring.
4. Assemble in reverse order.

To remove the light switch:

1. Disconnect the freezer power cord from the electrical outlet.
2. Remove the right side breaker trim. See Breaker Trim Removal, Section B, this manual.
3. Disconnect the switch wiring. Then depress the

switch retaining tabs and carefully work the switch out of the breaker trim.

4. Assemble in reverse order.

TEMPERATURE WARNING ALARM

The temperature warning alarm system consists of: an amber "power on" signal light, a red temperature alarm signal light, a temperature alarm buzzer, a buzzer on/off switch, and a temperature sensor. Wiring between the sensor and the alarm assembly passes within the foam insulation and is not replaceable. See Figures C18 and C19.

The amber "power on" light will glow anytime the freezer is connected to a "live" electrical outlet.

The red alarm light and alarm buzzer will be energized by the sensor if the freezer temperature rises to about 22° F. The light will continue to glow and the alarm buzzer will sound continuously, until the freezer temperature has been reduced to a safe food storage level. However, the alarm buzzer may be turned off by the buzzer on/off switch until the red alarm light goes out, and then turned back on.

When the freezer is initially placed in operation, the buzzer switch should be turned to the off position until the red warning light has gone off.

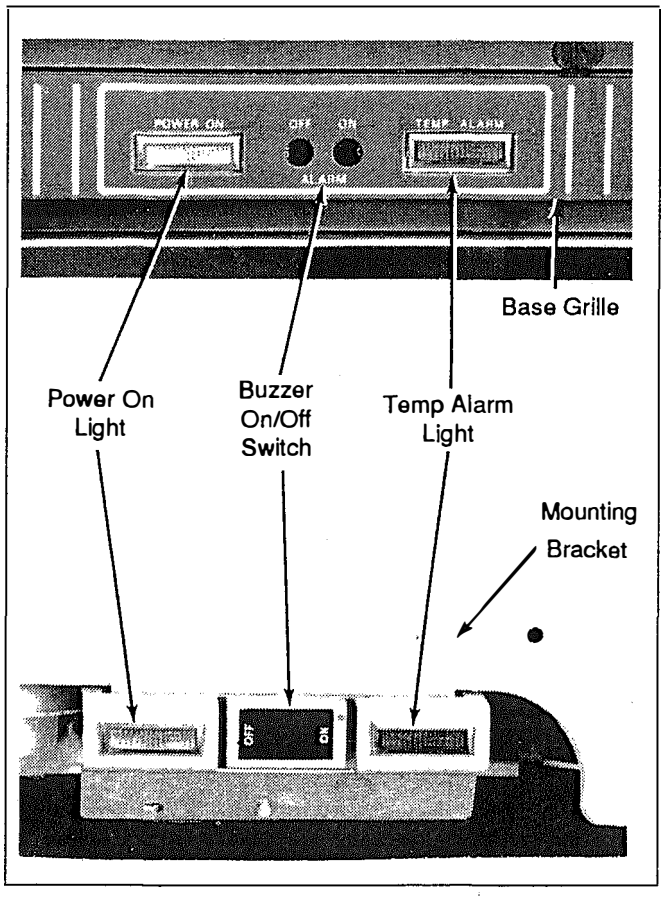


Figure C18 - Upright Freezer Alarm Assembly

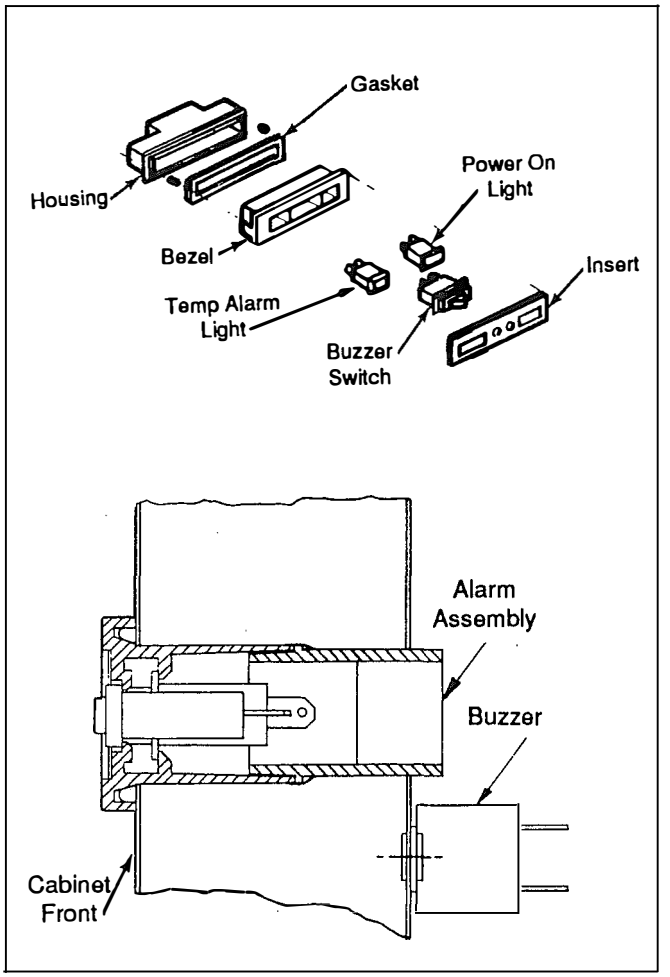


Figure C19 - Chest Freezer Alarm Assembly

The temperature alarm system operates on the standard 120 V or 220V power supply to the freezer.

Upright Models

All alarm assembly components, except the sensor, are mounted to a bracket located behind the right side of the base grille. See Figure C18. The alarm assembly components are accessible for service by removing the base grille and the bracket mounting screws.

The alarm sensor is located on the upper right side of the freezer liner. See Figure C20. The housing is removed by squeezing the top and bottom together to release the mounting tabs. The sensor can then be unplugged.

Chest Models

The alarm signal lights and buzzer on/off switch are contained within a housing assembly. The entire assembly is mounted through a hole in the front of the cabinet, and is retained by two pressure fit studs on the bezel. The alarm buzzer is mounted to the inside wall of the compressor compartment, just below the alarm assembly.

See Figure C19.
The alarm sensor is located on the freezer liner. See Figure C20. The housing is removed by squeezing the top and bottom together to release the mounting tabs. The sensor can then be unplugged.

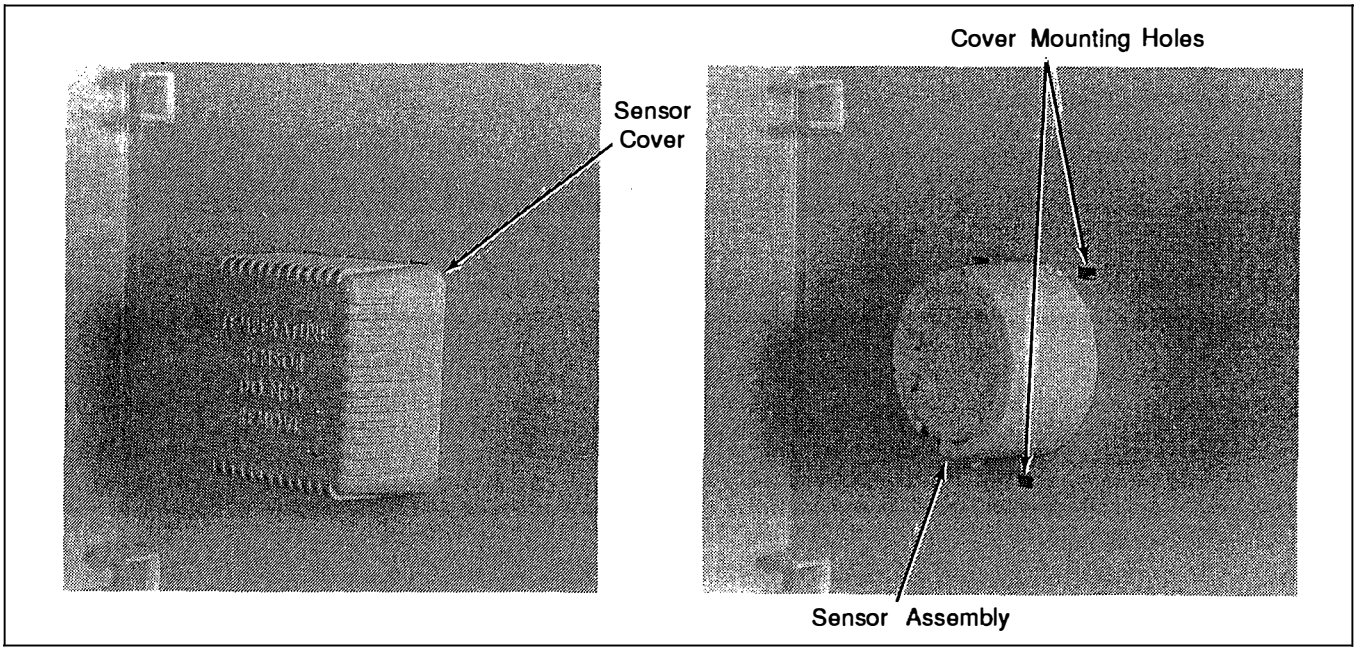


Figure C20 - Alarm Sensor Assembly

NOTES

SECTION D - AIR CIRCULATION

AIR CIRCULATION PATTERN

Automatic defrost freezers have a single evaporator, and have forced-air cooling through-out the freezer.

The fin and tube type evaporator is located on the back wall of the freezer . A circulating fan (suction type) pulls air from the freezer across the evaporator surfaces. The cold dry air is forced into an air duct and discharged into the top of the freezer. See Figure D1.

The air circulating fan in the freezer operates only when the compressor is running. During the defrost period, however, the compressor and circulating fan do not operate. The automatic defrost timer opens the electrical circuit to the fan motor and compressor.

PRINCIPLE OF AUTOMATIC DEFROST OPERATION

Automatic defrost freezers operate on the principle that moisture or frost transfers or migrates to the coldest surfaces (evaporator) in the freezer . As an example, a small amount of water spilled from an ice cube tray in the freezer will freeze immediately; however, this ice in time will evaporate and transfer to the colder surfaces of the freezer evaporator coil.

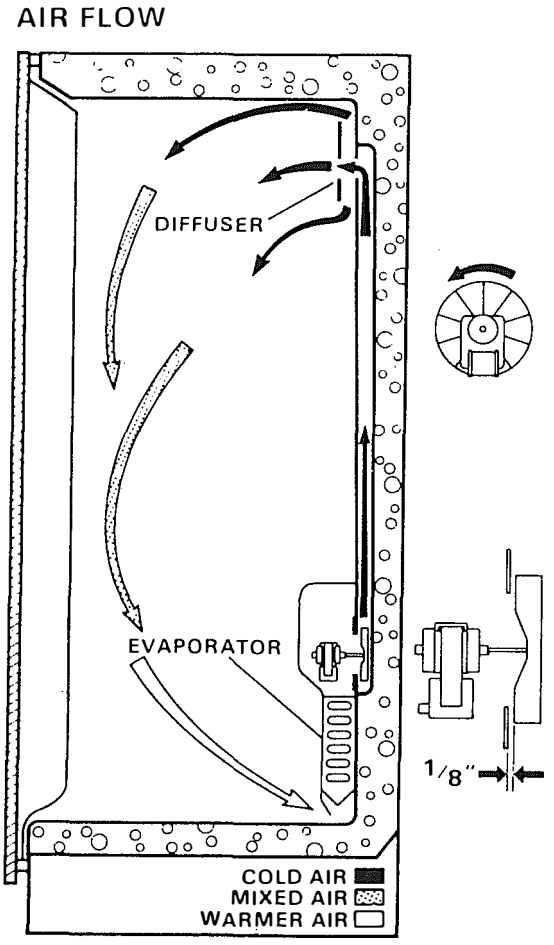


Figure D1 - Automatic Defrost Freezer Air Flow

NOTES

SECTION E - REFRIGERATION SYSTEMS & SERVICE

*** IMPORTANT NOTICE**

INSTRUCTIONS GIVEN HERE ARE FURNISHED AS A GUIDE. THEY ARE WRITTEN TO CONFORM WITH THE REQUIREMENTS ESTABLISHED BY THE MONTREAL PROTOCOL. PERSONS ATTEMPTING TO USE THESE INSTRUCTIONS TO MAKE REPAIRS TO SEALED REFRIGERATION SYSTEMS SHOULD HAVE A WORKING KNOWLEDGE OF REFRIGERATION SERVICE PROCEDURES AND PREVIOUS TRAINING ON SEALED SYSTEM REPAIR. PERSONS MAKING REPAIRS ON SEALED SYSTEMS SHOULD BE TRAINED IN USE OF RECOVERY AND RECYCLING EQUIPMENT, AND KNOW AND UNDERSTAND ALL LAWS (LOCAL AND INTERNATIONAL) GOVERNING HANDLING OF REFRIGERANTS CONTAINING CFC'S.

NOTE: WCI International Company does not permit the use of recovered refrigerant in the servicing of our products for in-warranty and out-of-warranty repairs. Therefore, only new refrigerant or refrigerant that has been reclaimed back to new specifications by a refrigerant manufacturer is to be used.

SAFETY

⚠CAUTION **Compressor Testing:** Whenever testing a compressor, extreme caution should be used to prevent damaging the terminals. A compressor with a damaged terminal or a grounded winding can expel a terminal from its insulated housing when the compressor is energized. If this happens, a mixture of refrigerant and oil will be released that could be ignited by an external heat source (open flame, heater, etc.). Also, if there is air in the system when this happens, a spark at the compressor shell could ignite the refrigerant and oil mixture.

⚠WARNING **Charging Sealed Systems:** Overcharging a freezer system with refrigerant can be dangerous. If the overcharge is sufficient to immerse the major parts of the motor and compressor in liquid refrigerant, a situation has been created which, when followed by a sequence of circumstances, can lead to the compressor shell seam separating.

A hydraulic block occurs preventing the compressor from starting. This condition is known as locked rotor. Electric current continues to flow through the compressor motor windings which become, in effect, electric resistance heaters. The heat produced begins to vaporize the excess refrigerant liquid, causing a rapid increase in system pressure. If the compressor protective devices fail, the pressure within the system may rise to extremes far in excess of the design limits. Under these conditions, the weld seam around the compressor shell can separate with explosive force, spewing oil and refrigerant vapor which could ignite.

To eliminate this exceedingly rare but potential hazard, never add refrigerant to a sealed system. If refrigerant is required, evacuate the existing charge and recharge with the correct measured amount of the refrigerant specified for the system.

SOLDERING

⚠CAUTION Wear the proper and approved safety glasses when working with or on any pressurized system or equipment. Have an approved dry type fire extinguisher handy when using any type of gas operated torch.

1. All joints to be soldered must have a proper fit. The clearance between tubes to be soldered should be from .001" to .006". It is not practical to actually measure this, however you do not want a dry fit or a loose fit. The tubing joints should overlap about the distance of their diameter except for restrictor tubes which should be inserted 1.25".
2. Clean all joint areas with fine steel wool or preferably an abrasive cloth, such as grit cloth No. 23 or "Scotch-Brite."
3. Apply a thin film of a liquid flux recommended for silver soldering to the surfaces to be joined, and to the surfaces immediately adjacent to the joint.
4. Align the tubing so that there is no stress on the joint. Do not move the tubing while the solder is solidifying or leaks will result.

⚠CAUTION During the application of heat, use wet cloths to prevent the heat from conducting to areas other

than the soldered joint. Use a sheet of metal as a heat deflector to keep the flame away from inflammable materials and painted surfaces.

5. Use a torch of adequate capacity so that the joint can be quickly heated with a minimum of heat travel to other points. Use a good grade of silver solder.

6. Solder the connections. If the tubing is properly cleaned and fluxed, solder will flow readily. Do not

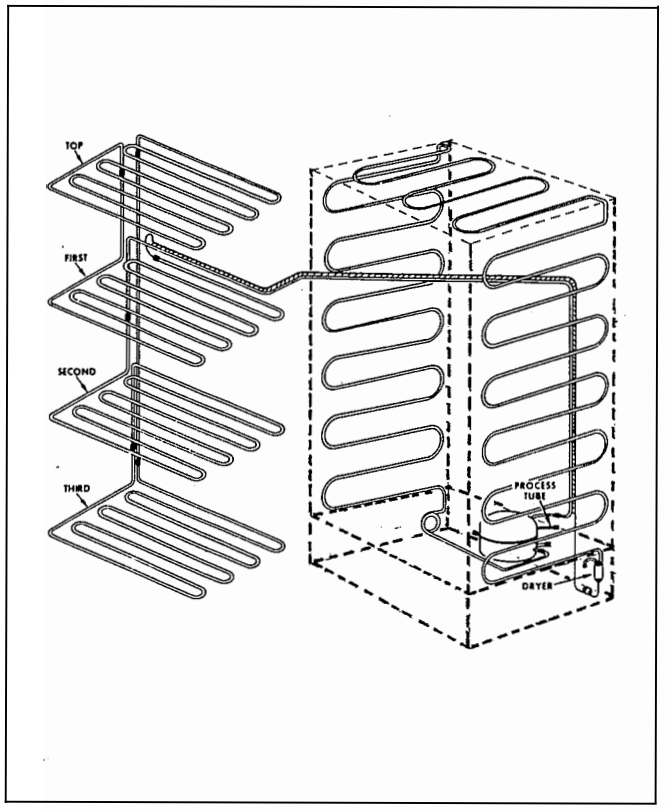


Figure E1 - Upright, Manual Defrost, System Layout

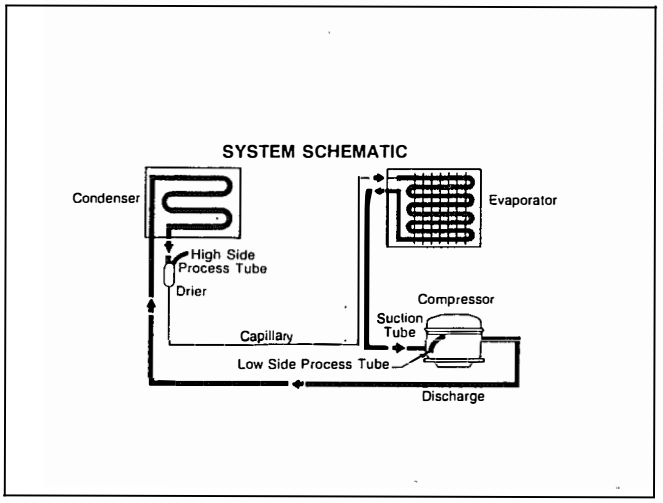


Figure E2 - Upright, Manual Defrost, Refrigerant Flow

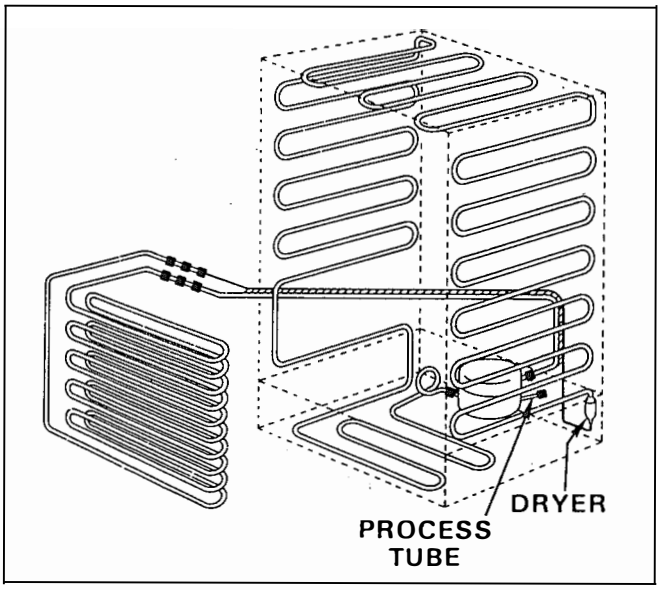


Figure E3 - Upright, Auto Defrost, System Layout

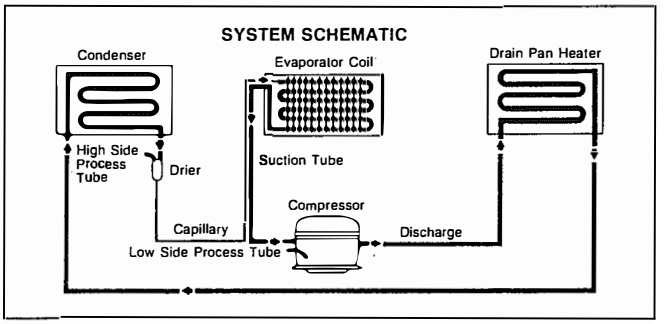


Figure E4 - Upright, Auto Defrost, Refrigerant Flow

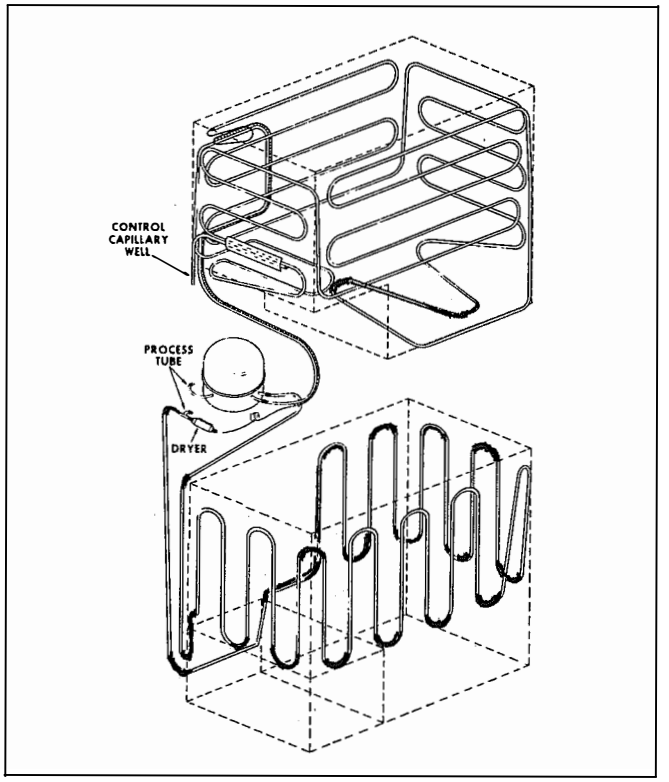


Figure E5 - Compact Chest System Layout

*Refer to page E-8 for IMPORTANT NOTICE.

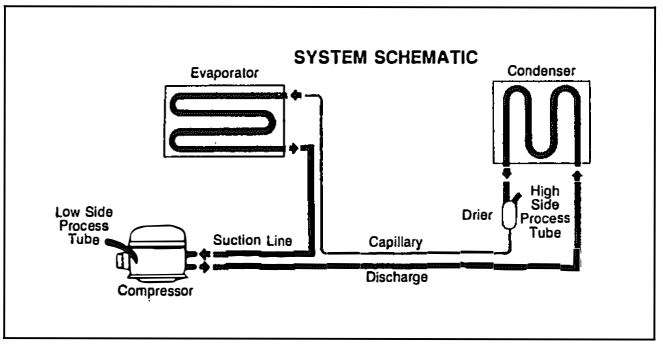


Figure E6 - Compact Chest Refrigerant Flow

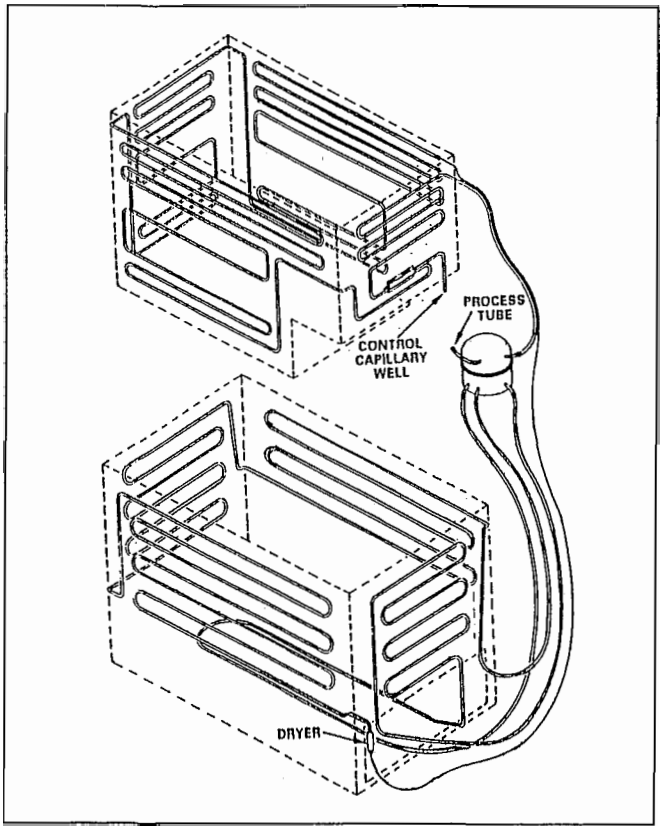


Figure E7 - Standard Chest System Layout

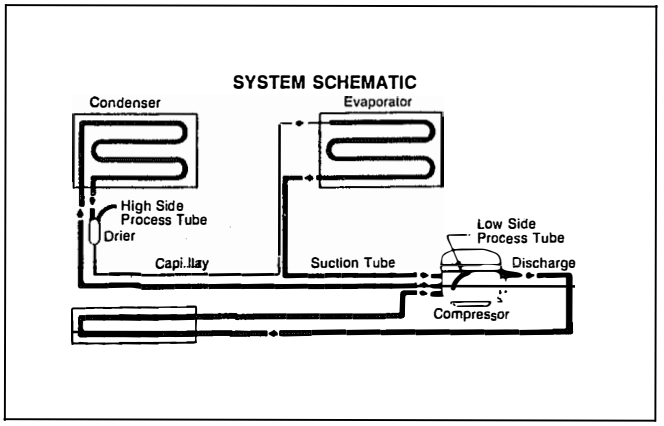


Figure E8 - Standard Chest Refrigerant Flow

use an excessive amount of solder, just enough to make a good bond.

7. Allow the joint to cool then wash exterior with water to remove flux.

REFRIGERATION SYSTEMS

Basic components of a refrigerator are: compressor, condenser, evaporator, capillary tube, suction line and drier. In addition, some models may have a defrost water evaporating plate assembly and/or perimeter hot tube.

REFRIGERANT CYCLE

The refrigerant cycle is a continuous cycle that occurs whenever the compressor is in operation. Liquid refrigerant is evaporated in the evaporator by the heat that enters the cabinet through the insulated walls and heat introduced by product load and door openings. The refrigerant vapor is then drawn from the evaporator, through the suction line, to the compressor. The pressure and temperature of the vapor is raised in the compressor by compression, and the vapor is then forced through the discharge valve into the discharge line and into the condenser. Air passing over the condenser surface removes heat from the high pressure vapor which then condenses to a liquid. The liquid refrigerant flows from the condenser to the evaporator, through the small diameter liquid line (capillary tube). Before it enters the evaporator, it is sub-cooled in the heat exchanger by the low temperature suction vapor in the suction line.

REFRIGERANT SYSTEM LAYOUT AND REFRIGERANT FLOW

The Illustrations show system layout and refrigerant flow in the various types of refrigerating systems:

LOW OR HIGH SIDE LEAK OR UNDERCHARGE

A loss of refrigerant results in excessive or continuous compressor operation; above normal freezer compartment temperature; a partially frosted evaporator (depending on amount of refrigerant loss); below normal freezer compartment temperature; low suction pressure (vacuum); and low wattage. The condenser will be "warm to cool," again, depending on the amount of refrigerant lost.

When refrigerant is added, the frost pattern will improve; the suction and discharge pressures will rise; the condenser will become hot; and the wattage will increase.

In the case of a low side refrigerant leak, resulting in complete loss of refrigerant, the compressor will run, but with no refrigeration. Suction pressure will drop below atmospheric pressure, and air and moisture will be drawn into the system, saturating the filter drier.

If a slight undercharge of refrigerant is indicated, and no leak could be found after a thorough leak test, the charge can be corrected without changing the compressor.

If there is reason to believe the system has operated for a considerable length of time with no refrigerant, and the leak occurred in the evaporator, excessive amounts of moisture may have entered the system. In such cases the compressor may need to be replaced to prevent repetitive service.

If a high side leak is located and some refrigerant remains in the system, it is not necessary to change the compressor.

TESTING FOR REFRIGERANT LEAKS

If the system is diagnosed as short of refrigerant and the system has not been recently opened, there is probably a leak in the system. Adding refrigerant without first locating and repairing the leak, or replacing the component would not permanently correct the difficulty. THE LEAK MUST BE FOUND. Sufficient refrigerant may have escaped to make it impossible to leak test effectively. In such cases, add a 1/4" line piercing valve to the compressor process tube. Add sufficient refrigerant to increase the pressures to 75 lb. per sq. in. Through this procedure, minute leaks are more easily detected before discharging the system and possibly contaminating the surrounding air. **NOTE: The line piercing valve (clamp on type) should be used for adding refrigerant and test purposes only. It must be removed from the system after it has served its purpose.**

PROCEDURE FOR CHECKING INTERNAL LEAKS

Before checking for internal leaks, check all accessible system components and joints for leaks.
If an internal system leak is suspected, it must be determined if the leak is in the condenser or evaporator. Use the following procedure:

1. Discharge the system by using refrigerant recovery equipment.
2. Disconnect the condenser tube from the drier and pinch off and solder both the drier and condenser tube closed.
3. Remove the suction and discharge tubes from the compressor. Oil cooler lines, if so equipped, may remain connected to the compressor. Solder a 1/4" charging hose fitting to both tubes.
4. Connect pressure gauges and access valves to both tubes, and pressurize to 250 lbs. using dry nitrogen or carbon dioxide.

⚠WARNING NEVER PRESSURIZE WITH OXYGEN. NEVER OPEN A HIGH PRESSURE TANK UNLESS IT IS EQUIPPED WITH A PRESSURE REGULATOR. NEVER PUT HIGH PRESSURE ON THE DOME OF THE COMPRESSOR - IT MIGHT EXPLODE. MAKE SURE GAUGES FITTINGS ARE IN GOOD CONDITION AND DO NOT LEAK.

5. Leave the pressure on each side of the system for 24 hours. Any drop in pressure is an indication of a leak.

If dry nitrogen or carbon dioxide is not available. Follow instructions 1 through 3, then use 4. and 5. listed below as an alternative method.

4. Connect gauges to charging hose fittings. Pull a vacuum on each side of the system.
5. Leave the vacuum on each side of the system for 24 hours. Any loss of vacuum is an indication of a leak.

COMPRESSOR REPLACEMENT

NOTE: Before installing new compressor, check for possible system contamination by obtaining an oil sample from the old compressor. If oil has a burned odor, but no color change or residue, a normal compressor change may be made. If oil has a burned sugar odor and shows contamination (dark color), system should be flushed to remove as much of the contamination as possible before installing new compressor and filter-drier. If this contamination is allowed to remain in the system it will mix with the new oil causing it to become contaminated and damage the new compressor, or cause a restriction in the dryer filter or cap tube. **Note: If refrigerant R11 (or any other refrigerant) is used to flush system, it must be recovered. Because recovery is necessary, it is recommended that the system be flushed with dry Nitrogen.**

⚠CAUTION Use extreme care in using Dry Nitrogen to flush systems. Make sure your hoses have adequate ratings for the pressure involved, and that all of your equipment is in good condition. Fasten a cloth over the outlet end of the coil being flushed to prevent old oil from spraying over the room.

To Flush The System:

1. With the compressor removed, and the Filter-Drier disconnected from condenser. Connect a process coupling to the inlet tube of the condenser.
2. Connect hose to process coupling and Nitrogen tank.
3. Open tank and allow nitrogen to flow through condenser until discharge is clear.
4. Connect hose from Nitrogen Tank to precess coupling on suction line for the Evaporator. Flush Evaporator in the same manner as Condenser.

Replacement of the compressor and installation of the filter-drier must be done in a continuous sequence so that the system is not exposed to the atmosphere any longer than necessary. Also avoid opening the system when any of the components or lines are cold.

All replacement compressors are shipped with rubber plugs in the suction, discharge, and process tubes, and will contain the correct oil charge and a holding charge of inert gas. Compressors have a low-side process tube attached to the compressor shell.

A high-side process tube is attached to the filter drier.

⚠WARNING DO NOT OPERATE A RECIPROCATING COMPRESSOR when charging liquid refrigerant into the system through its process tube.

All Models

1. Disconnect the unit from source of power.
2. Remove compressor cover (chest models) from the freezer to gain access to the compressor.
3. Attach an approved self tapping line tap valve to the process tube. **Connect refrigerant recovery system to tap valve.** Turn on recovery system, open the line tap valve, and allow refrigerant to flow into an approved tank.
4. Remove the leads from the motor terminals.
5. Remove the mounting bolts and nuts.
6. After system is completely discharged, cut the suction and discharge lines as close to the compressor as possible. Leave only enough tubing to pinch off and seal the defective compressor. Plug or tape the open system tubing to avoid entrance of moisture and air into the system. Remove the inoperable compressor and transfer the mounting parts to the new compressor.
7. Release the holding charge of the new compressor. (Release slowly to avoid oil discharge.)
8. Install the new compressor in exactly the same manner as the original compressor.
9. Reform both the suction and discharge lines to align with the new compressor. If they are too short, use additional lengths of tubing. The joints should overlap .5" (1.3 mm) to provide sufficient area for a good solder joint. Clean and mark the area where the tubing should be cut and cut the tubing with a tubing cutter. Work as quickly as possible to avoid letting moisture and air into the system. (NOTE: If the low-side process tube is too short, silver solder a four inch (10 mm) piece of tubing onto the process tube at this time.)
10. Solder all connections according to the soldering procedure outlined above.
11. Remove original and install a new filter-drier at condenser oulet. Evacuate and charge the system using the recommended procedure described under Evacuating and Recharging, this Section.
12. Reconnect the compressor terminal leads in accordance with the freezer wiring diagram.

EVAPORATOR REPLACEMENT

Chest model evaporators are foamed in place and are not accessible for repair or replacement. Contact your WCI International Company Field Service Manager for product replacement policy. However, upright model evaporators can be replaced using the following procedures:

Auto Defrost Models

1. Disconnect unit from source of power.
2. Remove sufficient assemblies from the freezer to gain access to the evaporator.
3. Attach an approved self tapping line tap valve to the process tube. **Connect refrigerant recovery system to tap valve.** Turn on recovery system, open the line tap valve, and allow refrigerant to flow into an approved tank. *
4. Remove the evaporator assembly from the freezer and cut the suction and capillary lines as close as possible to the evaporator.
5. Clean the suction and capillary lines with abrasive cloth.
6. Connect the lines to the replacement evaporator and solder joints.
7. Remove original and install a new filter-drier at the condenser oulet. Evacuate and charge the system using the recommended procedure described under Evacuating and Recharging, this Section.
8. Reassemble unit. All sealing materials must be replaced where lines pass through the cabinet.

Manual Defrost Models

1. Disconnect unit from source of power.
2. To prevent damage to the painted steel liner do not attempt to solder inside the cabinet. Pull the evaporator shelves out of the cabinet by disconnecting the thermostat sensor from the shelf and removing the shelf fronts, the screws attaching the top shelf to the liner, and the plastic ties from the refrigerant lines.
3. Attach an approved self tapping line tap valve to the process tube. **Connect refrigerant recovery system to tap valve.** Turn on recovery system, open the line tap valve, and allow refrigerant to flow into an approved tank. *
4. Remove the defective shelf by unsoldering the joints.
5. Prepare joints by cleaning with abrasive cloth.
6. Connect the replacement shelf to the evaporator assembly and silver solder the joints. Clean the joints and coat with an aluminum paint.
7. Reassemble the evaporator assembly into the cabinet, and align the refrigerant lines into the left rear corner of the liner.

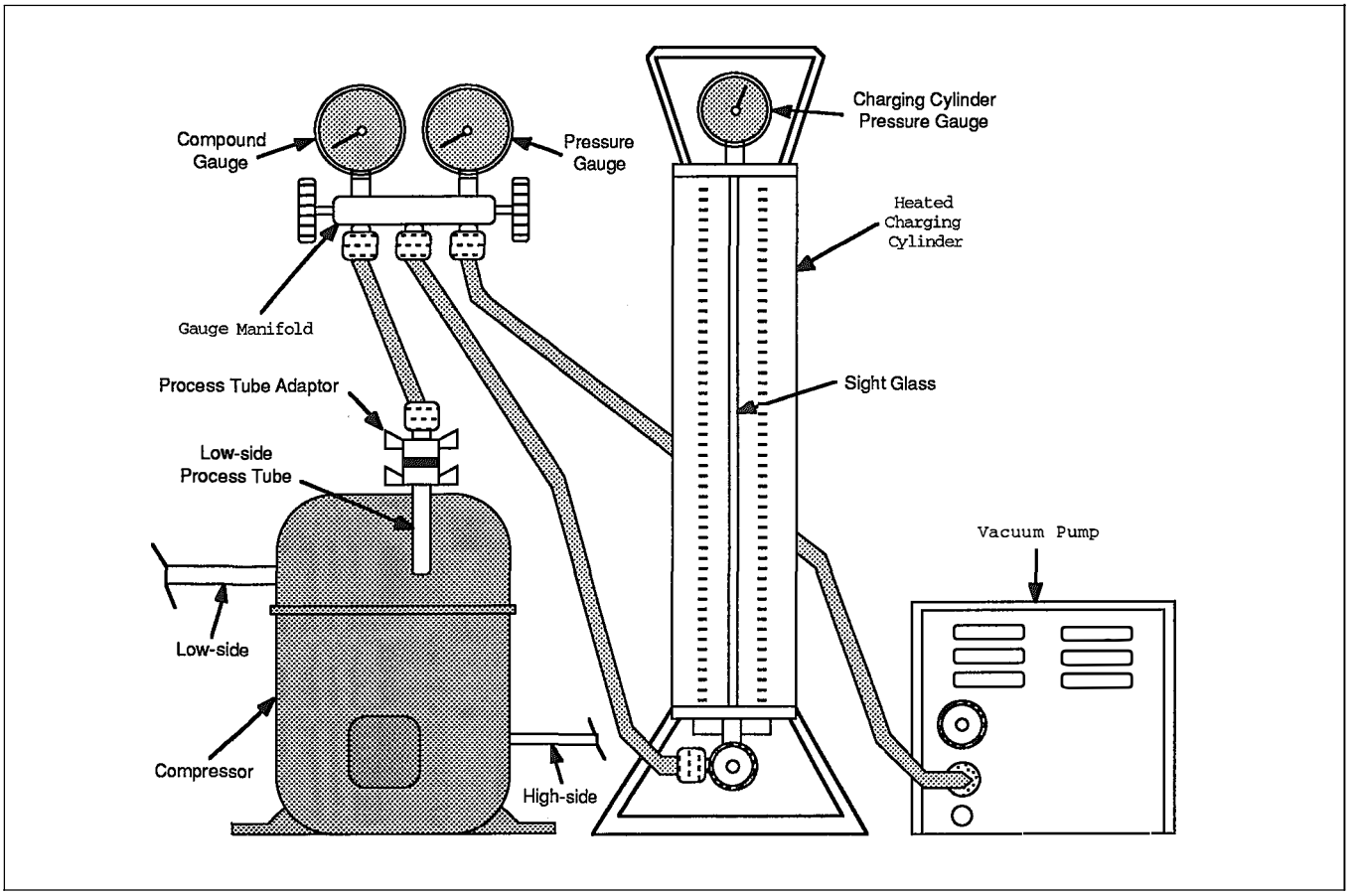


Figure E9 - Installation of Evacuation and Recharging Equipment

8. Remove original and install a new filter-drier at the condenser oulet. Evacuate and charge the system using the recommended procedure described under Evacuating and Recharging, this Section.
9. Reassemble unit. All sealing materials must be replaced where lines pass through the cabinet.

CONDENSER REPLACEMENT ALL MODELS

The condensers are foamed in place and are not accessible for repair. However, repairs can be made by installing a service replacement condenser kit. Refer to the appropriate parts list of the model being serviced for the correct kit part number.

Each service replacement condenser kit consists of: a condenser assembly to be installed on the back of the cabinet, mounting hardware, replacement filter-drier, and complete installation instructions. To install, use the following procedure:

1. Disconnect unit from source of power.
2. Attach an approved self tapping line tap valve to the process tube. **Connect refrigerant recovery system to tap valve.** Turn on recovery system, open the line tap valve, and allow refrigerant to flow into an approved tank. *
3. Install the replacement condenser in accordance with the instructions included with each kit.
4. Evacuate and charge the system using the recommended procedure described under Evacuating and Recharging, this Section.

SUCTION LINE AND CAPILLARY TUBE REPLACEMENT (UPRIGHT MODELS ONLY)

Chest model suction line and capillary tube assemblies are foamed in place and are not accessible for repair or replacement. For upright models, proceed as follows:

1. Disconnect unit from source of power.
2. Attach an approved self tapping line tap valve to the process tube. **Connect refrigerant recovery system to tap valve.** Turn on recovery system, open the line tap valve, and allow refrigerant to flow into an approved tank. *
3. Remove and replace the suction line and capillary tube assembly using the procedure described under Evaporator Replacement, this Section.
4. Evacuate and charge the system using the recommended procedure described under Evacuating and Recharging, this Section.

FILTER-DRIER INSTALLATION

Any time the sealed system is opened and the refrigerant charge removed, a filter-drier must be installed and the system thoroughly evacuated before recharging.

1. Disconnect unit from source of power.
2. Attach an approved self tapping line tap valve to the process tube. **Connect refrigerant recovery system to tap valve.** Turn on recovery system, open the line tap valve, and allow refrigerant to flow into an approved tank. *
3. Heat the capillary tube and pull from filter-drier.
4. Cut the condenser outlet tube at the filter-drier. Discard the filter-drier.
5. Thoroughly clean the condenser outlet tube and capillary tube.
6. Place the inlet connection of the filter-drier over the condenser tube approximately 1/4" (6 mm)and solder.
7. Insert the capillary tube input end into the filter-drier outlet. Do not allow the tube to bottom against the screen. Solder carefully so that the solder does not plug the capillary tube.
8. Evacuate and charge the system using the recommended procedure described under Evacuating and Recharging, this Section.

EVACUATING AND RECHARGING

Equipment Needed:

1. Heated Dial-A-Charge charging cylinder.
2. Recovery/Recycling equipment and Tank
3. External vacuum pump.
4. Pinch-off tool capable of making a leak proof seal.
5. Process tube adapter kit (Robinair No. 12458).
6. Complete Presto-O-Lite torch.
7. Leak detector.
8. Tubing cutter.
9. Small 3-corner file.
10. Grit cloth or Scotch-Brite.
11. Solder and flux.
12. Gauge and Manifold set.

Installing Evacuation and Recharging Equipment:

1. Disconnect unit from source of power.
2. If the compressor was replaced, install the correct sized process tube adaptor on the process tube. If the compressor was not replaced, cut the process tube with a tubing cutter leaving as much tube as possible, and install the correct sized process tube adaptor.
3. Attach refrigeration service gauge manifold to system as follows (refer to Figure E9):
   a. Low-side (compound gauge) hose to suction side process tube adaptor.
   b. High-side (pressure gauge) hose to vacuum pump.
   c. Center manifold hose to charging cylinder.

Evacuating the System:

1. Ensuring that the valve on the charging cylinder is closed, start the vacuum pump. Slowly open both manifold valves, counterclockwise, for two full turns.

⚠CAUTION If high vacuum equipment is used, just crack both manifold valves for a few minutes, then open slowly for the two full turns, counterclockwise. This will prevent the compressor oil from foaming and being drawn into the vacuum pump.

2. Operate vacuum pump for 30 minutes to a minimum of 29.5" of vacuum or until a vacuum of 600 microns is obtained.
3. Close the manifold valve connected to the vacuum pump. Watch the compound gauge for several minutes. If the reading rises, there is a leak in the system, go to step 4. If no leak is indicated, stop vacuum pump. The system is now ready for charging.
4. If a leak is indicated, stop the vacuum pump and introduce a small charge of refrigerant into the system by cracking the valve on the bottom of the charging cylinder until the system is pressurized to 40 or 50 lbs. P.S.I.
5. Leak test the low side. Run the compressor for a few minutes and leak test the high side. When leak is found. **Connect refrigerant recovery system to manifold valve.** Turn on recovery system, open the line manifold valve, and allow refrigerant to flow into an approved tank. *
6. Repair the leak and go back to step 1.

Charging the System:

CHECK SERIAL PLATE FOR THE CORRECT TYPE AND AMOUNT OF REFRIGERANT IN THE SYSTEM.

Preparing the charging cylinder:

1. Charging cylinder must have at least eight (8) ounces more refrigerant than required charge.
2. Plug in cylinder heater and bring pressure up 30 pounds above gauge pressure at ambient temperature. **⚠CAUTION** **Maintain, but do not exceed, this 30 pound increase in gauge pressure during system charging.**

⚠WARNING **DO NOT USE EXTERNAL HEAT SOURCE ON CYLINDER OR EXCEED MAXIMUM GAUGE PRESSURE ON CHARGING CYLINDER.**

To charge the system:

1. Set the charging cylinder scale to the pressure indicated on the cylinder pressure gauge.
2. Observe the refrigerant level in the sight glass. Subtract amount to be charged into the system and note shut off point.
3. Open the charging cylinder valve slowly and allow proper charge to enter system.
4. As soon as the refrigerant in the sight glass has gone down to the predetermined level, close the valve and allow system to set for a few minutes.

   ⚠CAUTION Disconnect charging cylinder heater at this time to prevent cylinder pressure from exceeding its maximum limits.

5. Turn freezer compressor on. Run the compressor for a few minutes for a final check.
6. When satisfied unit is operating correctly, clamp the process tube with pinch-off tool with the unit still running. Remove the process tube adapter tool and manifold set. Using a tubing cutter, cut the process tube about 2 inches from the pinch-off tool. Use Silfos solder and solder process tube closed.
7. Turn off the freezer and allow the unit to set for a few minutes. Check the process tube for refrigerant leaks.

FINAL LEAK TEST

1. With freezer shut off, leak test all low-side system components.
2. Turn the unit on and run until condenser is warm. Leak test high side system components.

SERVICE DIAGNOSTIC TIPS

A prime requisite on the initial contact is: Always allow the customer to explain the problem. Many times the trouble can be diagnosed more quickly, based on the customer's explanation. Most of all, do not jump to conclusions until you have heard the full story and have evaluated the information obtained from the customer. Then proceed with your diagnosis.

Before starting a test procedure, connect the freezer service cord to the power source, through a wattmeter, combined with a voltmeter. **Record line voltage and wattage, if the wattage is with in the normal operating range the sealed system is operating properly.** Then make a visual inspection and operational check of the freezer to determine the following:

1. Is the freezer properly leveled?
2. Is the freezer located for proper dissipation of heat from the condenser? Check recommended spacing from walls.
3. Feel condenser. With compressor in operation, condenser should be hot, with a gradual reduction in temperature from entry to exit of condenser.
4. Are lid or door gaskets sealing properly?
5. Does the door or lid actuate the light switch?
6. Is evaporator fan properly located on motor shaft? (Auto defrost models)
7. Is the thermostat sensing element properly positioned?
8. Observe frost pattern on evaporator.
9. Check thermostat knob setting.
10. Inscribe bracket opposite slotted shaft of defrost timer to determine if timer advances. (Auto defrost models)

The service technician should inquire as to the number of people in the family to determine the service load and daily door openings. In addition, he should know the room temperature.

After this phase of diagnosis is completed, a thorough operational check should be made of the refrigeration system.

Freezer Air Temperatures

Freezer temperatures are affected by improper door or lid seal, frost accumulation on the evaporator, service load, ambient temperature, percent of relative humidity, thermostat calibration (cut-in and cut-out), location of evaporator fan blade on motor shaft, and by compressor efficiency.

From this, it is evident the temperatures are not always the same in every freezer, even under identical conditions.

Line Voltage

It is essential to know the line voltage at the freezer. A voltage reading should be taken at the instant the compressor starts, and also while the compressor is running. Line voltage fluctuation should not exceed 10%, plus or minus, from nominal rating. Low voltage will cause overheating of the compressor motor windings, resulting in compressor cycling on thermal overload, or the compressor may fail to start. Inadequate line wire size, and overloaded lines, are the most common reasons for low voltage at the freezer.

*** IMPORTANT NOTICE**

Your Country may have regulations or restrictions governing the discharging of chlorofluorocarbons (CFC's) such as R-12 and R-22 to the atmosphere. Therefore, when discharging or purging the sealed system, use an approved Refrigerant Recovery System.

SECTION F - TROUBLESHOOTING CHART

COMPLAINT	CAUSE - REMEDY
Compressor will not run.	1. No voltage at wall receptacle - check circuit breaker or fuse. 2. Service cord pulled out of wall receptacle - replace. 3. Low voltage causing compressor to cycle on overload. (Voltage fluctuation should not exceed 10% plus or minus from nominal rating.) 4. Control thermostat dial in "Off" position - turn control on. 5. Inoperative control thermostat - replace control. 6. Compressor stuck - replace compressor. 7. Compressor windings open - replace compressor. 8. Defrost timer stuck in defrost - replace defrost timer. 9. Compressor overload stuck open - replace overload. 10. Relay lead loose - repair or replace lead. 11. Relay loose or inoperative - replace relay. 12. Service cord pulled out of harness - repair connection. 13. Faulty cabinet wiring - repair wiring.
Compressor runs but no refrigeration.	1. System out of refrigerant - check for leaks. 2. Compressor not pumping - replace compressor. 3. Restricted filter drier - replace filter drier. 4. Restricted capillary tube - replace. (Upright models only) 5. Moisture in system - check for leak in low side.
Compressor short cycles.	1. Erratic control thermostat - replace control. 2. Faulty relay - replace relay. 3. Restricted air flow over condenser - ensure condenser has unobstructed air flow. 4. Low voltage - fluctuation exceeds 10%. (Call qualified electrician.) 5. Compressor draws excessive wattage - replace compressor.
Compressor runs too much or 100%.	1. Erratic control thermostat, or set too cold - replace or reset to normal position. 2. Freezer exposed to unusual heat - relocate freezer. 3. Abnormally high room temperature - advise customer. 4. Low pumping capacity compressor - replace compressor. 5. Door or lid gaskets not sealing - adjust or replace necessary parts. 6. System undercharged - check for leaks. 7. System overcharged - correct charge. 8. Interior light stays on - check door or lid switch. 9. Non-condensables in system - replace filter drier,evacuate, and recharge. 10. Capillary tube kinked or partially restricted - replace heat exchanger. (Upright Models Only) 11. Filter drier partially restricted - replace filter drier. 12. Excessive service load - advise customer. 13. Restricted air flow over condenser - ensure condenser has unobstructed air flow
Noisy.	1. Tubing vibrates - adjust tubing. 2. Internal compressor noise - replace compressor. 3. Compressor vibrating on cabinet frame - adjust compressor. 4. Loose parts - check shelving, kickplate, defrost drain pan. 5. Compressor operating at high head pressure due to restricted air flow over condenser - ensure condenser has unobstructed air flow.

COMPLAINT	CAUSE - REMEDY
Freezer too warm.	1. Inoperative fan motor - check wiring and fan motor. 2. Improperly positioned fan - position blade at end of shaft. 3. Evaporator iced up - check defrost system. 4. Defrost heater inoperative - check wiring and defrost heater. 5. Inoperative defrost timer - check wiring and defrost timer. 6. Inoperative defrost thermostat - check wiring and defrost thermostat. 7. Wire loose at defrost timer - repair wire. 8. Excessive service load - advise customer. 9. Abnormally low room temperatures - advise customer. 10. Freezer door left open - advise customer. 11. Control thermostat out of calibration - replace control. 12. Door or lid gasket not sealing - adjust or replace necessary parts. 13. Control thermostat sensing element improperly positioned - reposition sensing element. 14. Shortage of refrigerant - check for leaks. 15. Restricted filter drier or capillary tube - check for leaks or "burned" compressor windings.
Evaporator blocked with ice.	1. Inoperative defrost timer - check wiring and defrost timer. 2. Defrost thermostat terminates too early - check for correct positioning of defrost thermostat or replace. 3. Defrost timer incorrectly wired - check wiring. 4. Inoperative fan motor - check wiring and fan motor. 5. Inoperative defrost thermostat - check wiring and defrost thermostat. 6. Inoperative defrost heater - check wiring and defrost heater. 7. Freezer door left open - advise customer. 8. Freezer defrost drain plugged - clean drain port.

NOTES

SECTION G - GLOSSARY

LENGTH CONVERSION

1 Millimeter	=	0.0394	Inch
1 Centimeter	=	0.394	Inch
1 Meter	=	39.4	Inches
1 Meter	=	3.2808	Feet
1 Meter	=	1.0936	Yards
1 Inch	=	25.4	Millimeters
1 Inch	=	2.54	Centimeters
1 Foot	=	304.8	Millimeters
1 Foot	=	0.3048	Meter
1 Yard	=	0.9144	Meter

ENERGY CONVERSION

1 Horsepower	=	746 Watts = .746	Kilowatts
1 Foot-pound	=	0.138	Kilogram-meter
1 Foot-pound	=	0.001	B. T. U.*
1 Watt	=	0.00134	Horsepower
1 Kilogram-meter	=	7.23	Foot-pounds
1 B. T. U.*	=	778	Foot-pounds

*** British Thermal Unit**

TEMPERATURE CONVERSION

Fahrenheit	=	(1.8 X Centigrade) + 32°
Centigrade	=	.555 X (Fahrenheit - 32°)

AREA or SQUARE CONVERSION

1 Sq. Centimeter	=	0.155	Sq. Inch
1 Sq. Meter	=	10.764	Sq. Feet
1 Sq. Meter	=	1.196	Sq. Yards
1 Sq. Inch	=	6.452	Sq. Centimeters
1 Sq. Foot	=	0.0929	Sq. Meter
1 Sq. Yard	=	0.836	Sq. Meter

VOLUME CONVERSION

1 Cu. Meter	=	35.314 Cu. Ft. = 1.308 Cu. Yd.
1 Cu. Meter	=	264.2 U.S. Gallons
1 Cu. Centimeter	=	0.061 Cu. Inch
1 Liter	=	0.0353 Cu. Ft. = 61.023 Cu. In.
1 Liter	=	0.2642 U.S. Gal. = 1.0567 U.S. Qt.
1 Cu. Yard	=	0.7645 Cu. Meter
1 Cu. Foot	=	0.02832 Cu. Meter = 26.317 Liters
1 Cu. Inch	=	16.38716 Cu. Centimeters
1 U.S. Gallon	=	3.785 Liters
1 U.S. Quart	=	0.946 Liters

WEIGHT CONVERSION (Avoirdupois*)

1 Gram	=	0.03527	Ounce
1 Gram	=	0.002046	Pound
1 Pound	=	453.6	Grams
1 Ounce	=	28.35	Grams

* Based on 16 oz. = 1 lb.

PRESSURE CONVERSION

1 Pound per Square Inch	=	0.0703	Klilogram per Square Centimeter
1 Kilogram per Square Centimeter	=	14.22	Pounds per Square Inch

DEFINITION OF TERMS

Ampere (a) - The measurement of a unit of electrical current produced by one volt applied across a circuit with a resistance of one ohm. (Amps = Volts ÷ Ohms)

British Thermal Unit (B.T.U.) - The measurement of a unit of energy defined as the quantity of heat required to raise the temperature of one pound of water 1°F at or near its point of maximum density.

Celsius (C°) - See Centigrade (C°).

Centigrade (C°) - A unit of temperature defined as a measurement on a thermometric scale on which the interval between the freezing point of water and the boiling point of water is divided into 100 degrees with the 0° representing the freezing point and 100° the boiling point.

Centimeter (cm) - The measurement of a unit of length defined as one hundredth of 1 meter.

Energy - Measured in many different forms, energy is defined as the capacity for performing work.

Fahrenheit (F°) - A unit of temperature defined as a measurement on a thermometric scale on which (under standard atmospheric pressure) the boiling point of water is 212 degrees above the zero of the scale, the freezing point 32 degrees above the zero, and the zero point approximates the temperature produced by mixing equal quantities by weight of snow and common salt.

Foot-pound (ft/lb) - The measurement of a unit of energy defined as the work done in raising one pound (avoirdupois) against the force of gravity the height of one foot.

Gram (g) - The measurement of a unit of weight defined as the weight of one cubic centimeter of distilled water at 4°C.

Horsepower (hp) - The measurement of a unit of power defined as numerically equal to a rate of 33,000 foot-pounds of work per minute (550 foot-pounds per second).

Kilogram (kg) - The measurement of a unit of weight defined as one thousand grams.

Kilogram-meter (kg/m) - The measurement of a unit of energy defined as the amount of work expended in raising one kilogram through the height of one meter, in the latitude of Paris, France.

Kilometer (km) - The measurement of a unit of length defined as one thousand meters.

Liter (l) - The measurement of a unit of volume defined as the volume of one kilogram of distilled water at 4°C.

Meter (m) - A measurement of a unit of length defined as 1,650,763.73 times the wavelength of the orange-red line of Krypton-86 under specified conditions.

Millimeter (mm) - The measurement of a unit of length defined as one thousandth of 1 meter.

Ohm (Ω) - The measurement of a unit of electrical resistance equal to the resistance of a circuit in which a potential difference of one volt produces a current of one ampere. (Ohms = Volts ÷ Amps)

PTC Relay or PTCR - PTC (positive temperature coefficient) denotes a resistor which increases in resistance as its temperature increases. The self-heating PTC resistor used in the solid state relay has the unique characteristic of changing from low to very high resistance very abruptly, thus serving as an on-off switch.

Volt (v) - The measurement of a unit of electromotive force equal to the potential difference across a circuit with a resistance of one ohm with one ampere of current flowing. (Volts = Amps x Ohms)

Watt (w) - The measurement of a unit of electrical energy defined as the rate of work represented by a current of one ampere under a pressure of one volt. (Watts = Volts x Amps)

CONVERSION CHART FOR DETERMINING AMPERES, OHMS, VOLTS, OR WATTS
(Amperes = a, Ohms = Ω, Volts = v, Watts = w)