



*GE Consumer Service Training*

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# TECHNICIAN MANUAL

**GE, HOTPOINT & RCA  
1990 REFRIGERATORS**

**TMNF 14/16**

**RFF 89  
PUB. NO. 31-5218**

## GENERAL DESCRIPTION

A new series of top-mount no-frost (TMNF) refrigerators, introduced into the "M" (1990) product lines for GE, Hotpoint and RCA brands during the fall of 1989, consists of several energy efficient 14 and 16 cu.ft. models.

These new models are more similar than different with respect to each other. Accordingly, many of the replacement parts are common between brands and sizes. The basic differences among the brands are the door handles, nameplates, trims on the doors, interior shelves and storage drawers.

The primary difference between the 14 cu.ft. and 16 cu.ft. sizes is the height of the cabinet - reflected in the volume of the fresh food compartment. Accordingly, the 16 cu.ft. models have an additional shelf position in the fresh food compartment.

## OPERATION & PERFORMANCE

Temperatures of the freezer and fresh food compartments are regulated by one control, located in the control console, at the top of the fresh food liner. The control knob, at the front of the console, is small to prevent the control setting from being inadvertently changed. A slot in the knob permits the use of a coin (or similar object) to turn the knob.

The control knob has nine settings plus "off". Initially, the knob should be set at "5". At this setting, under average use conditions, the freezer temperature should be near 0-degrees F and the fresh food temperature approximately 38-degrees F. When changing a control setting, the consumer should allow 24 hours for the temperatures to stabilize before making another change.

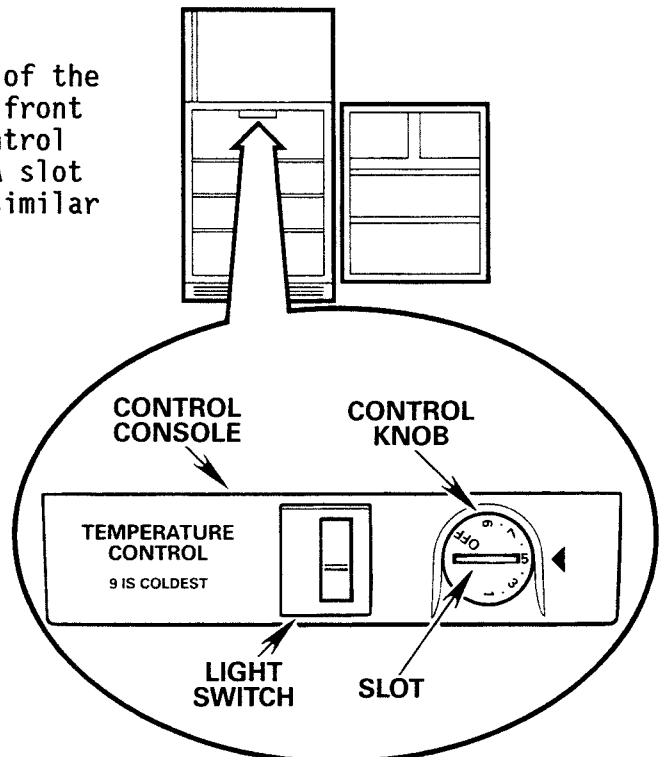
The refrigerator should not be installed where the ambient temperature will be below 60-degrees F because the compressor will not run frequently enough to maintain proper temperatures.

## NEW MODELS FOR 1990

GE	HOTPOINT	RCA
TBX14AM	CTX14AM	MTX14EM
TBX14DM	CTX14CM	MTX16EM
TBX14SM	CTXY14CM	
TBXY14SM	CTX14EM	
TBX16AM	CTX16AM	
TBX16DM	CTX16CM	
TBXY16DM	CTXY16CM	
TBX16SM	CTX16EM	
TBXY16SM	CTX16GM	
TBX16ZM		

## SPECIFICATIONS

DIMENSIONS	TMNF14	TMNF16
Height	61"	64"
Width	28"	28"
CUBIC FEET		
Freezer	3.86	3.86
Fresh Food	10.58	11.76
Total	14.4	15.6

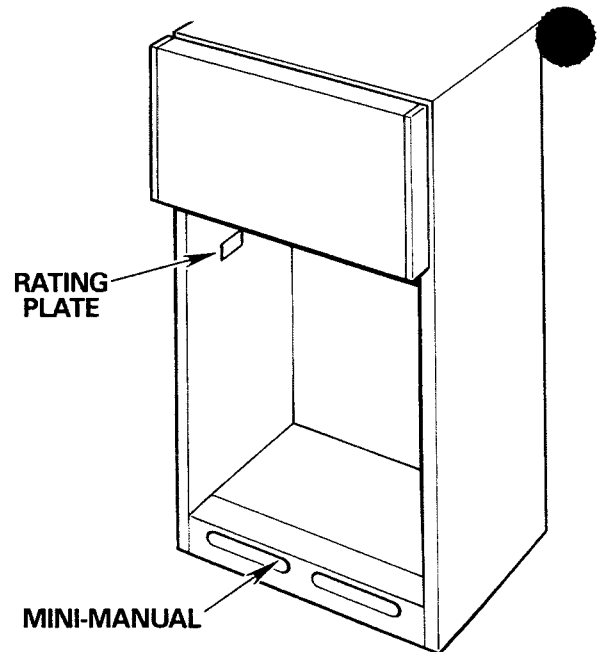


## RATING PLATE & MINI-MANUAL

The rating plate is located on the left side of the fresh liner, near the top. In addition to the refrigerator model number and serial number, the rating plate specifies: the minimum installation clearances; the electrical voltage, frequency and amperage rating; the month and year the product was manufactured; and the refrigerant type and charge quantity.

An additional label, applied to the top of the outer case back, also provides the model and serial numbers of the refrigerator.

The Mini-Manual is in an envelope that is attached with a plastic pin fastener to the case bottom behind the base channel at the front of the machine compartment.



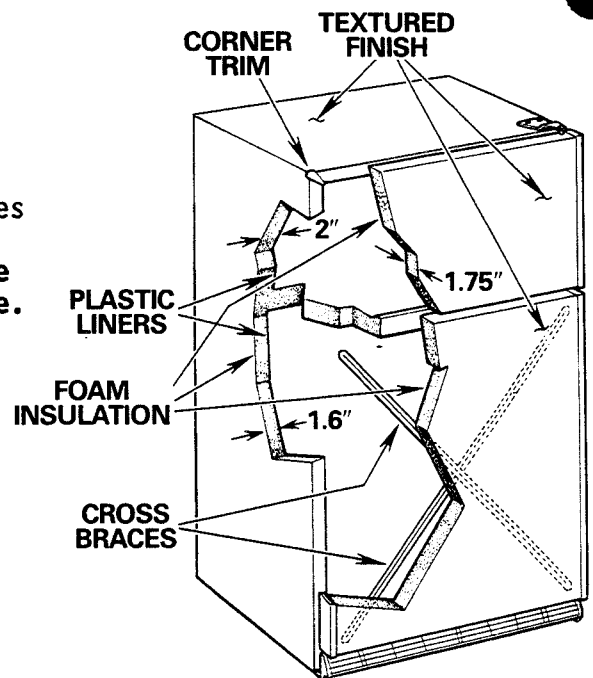
## CABINET STRUCTURE

The outer case (top and sides) is made of prepainted steel with a textured finish. Color matched corner trims, press-fitted (not cemented) over the top front corners of the outer case, cover the miters.

Two separate liners, made of ABS plastic, form the freezer and fresh food compartments. The outer case is insulated with urethane foam - surrounding both liners. Wall thickness at the sides of the fresh food compartment is 1.6-inches and more than 2-inches at the sides of the freezer compartment. The mullion, riveted to the outer case and foamed-in-place, is not removable.

The outer doors are also made of prepainted steel with a textured finish and have urethane foam insulation. Both doors are more than 1.75-inches thick. The freezer door extends slightly above the top of the outer case for improved appearance. Diagonal cross braces, secured inside the fresh food door, increase rigidity and maintain the door plane.

Foam insulation in the outer case and doors greatly reduces heat leakage and provides a tightly sealed cabinet. Accordingly, after a door is opened and closed, the resulting vacuum may prevent either door from being easily reopened for several seconds.



The door swing is reversible on all models. Instructions for reversing the hinges, handles and other hardware are included in the Use and Care booklet.

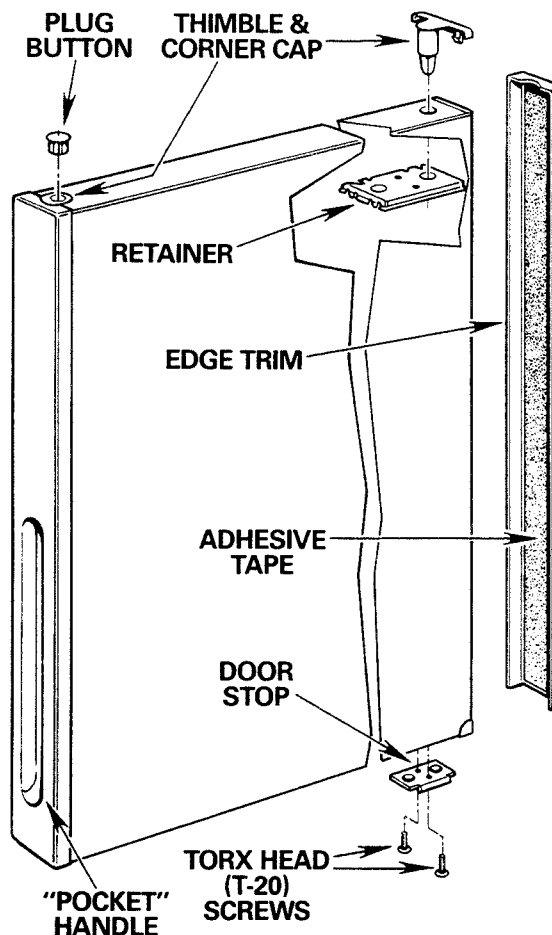
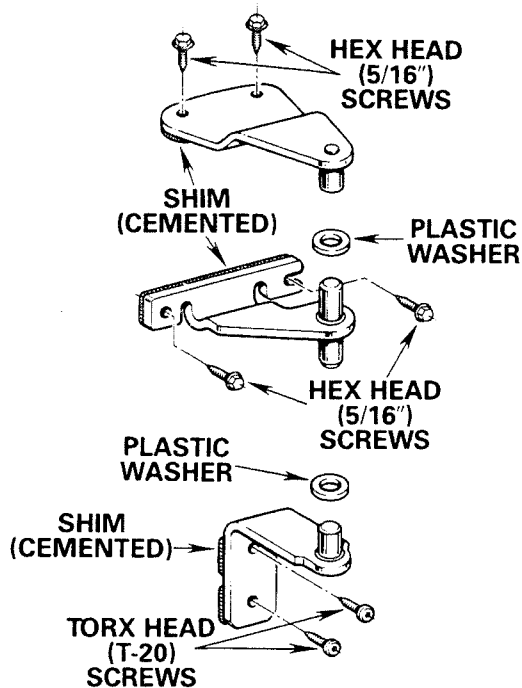
Shims are cemented to the door hinges to prevent them from becoming lost when the hinges are removed. Screws for the top and center hinges have 5/16-inch hex heads. Torx head (T-20) screws are used for the bottom hinge. Mounting holes in all three hinges are not elongated. Accordingly, the hinges are not adjustable. When reinstalling the hinges, tighten the screws firmly but avoid overtightening to prevent stripping.

Plastic washers are used on the center and bottom hinges to properly position the doors and assure smooth door operation.

Plastic thimbles for the hinge pins are molded onto the door corner caps. The thimbles are held securely by retainers inside the door at each corner and are foamed-in-place. Accordingly, the thimbles and corner caps are not replaceable. Plug buttons are inserted into the unused thimbles (opposite the hinges) at the top of each door.

A door stop, located at the bottom of each door limits the door opening to prevent damaging the side of the cabinet. A chrome plated stop is used for the freezer door and a black coated stop is used for the fresh food door. The stops are secured with two Torx head (T-20) screws that thread into the retainer inside the door.

Door edge trims, made of ABS plastic and either color matched or of a contrasting color, are attached to the sides of the outer door with two-sided foam adhesive tape. Replacement door edge trims are furnished with foam adhesive tape. On some models, the edge trims (at both sides of the door) incorporate "pocket" handles.

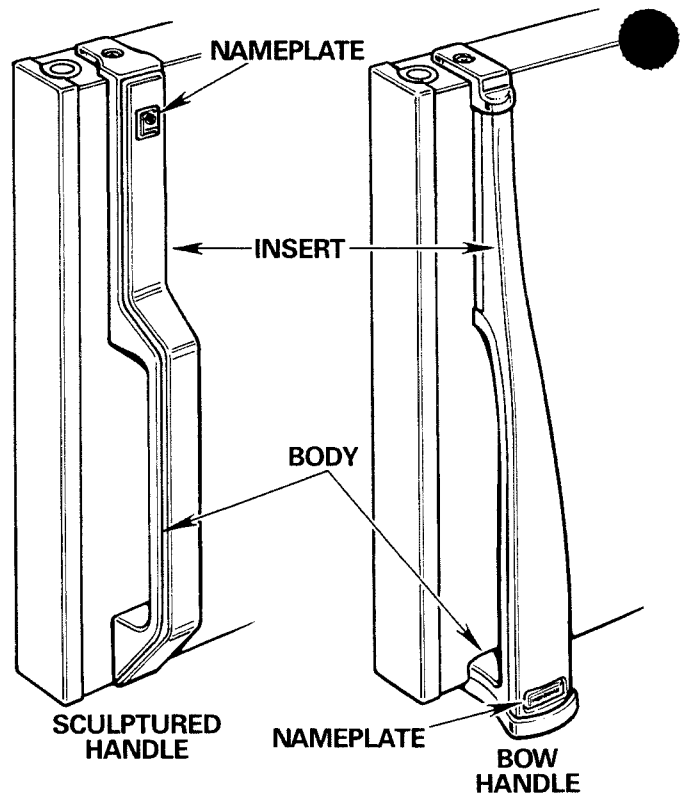


On most models, conventional door handles are secured to the outer door with screws. The handles are either color matched or of a contrasting color. The nameplate (brand logo) is incorporated into the freezer door handle insert.

Appliance polish wax should not be applied to the handle inserts because the wax may soak into the grain and result in a streaked white appearance.

Sculptured door handles are used on most GE brand models. Due to the snug fit of the insert, removal will result in unavoidable damage to the handle body and/or insert. To release the insert from the body, using slip-joint pliers, pinch (crush) the sides of the insert at 1-inch intervals.

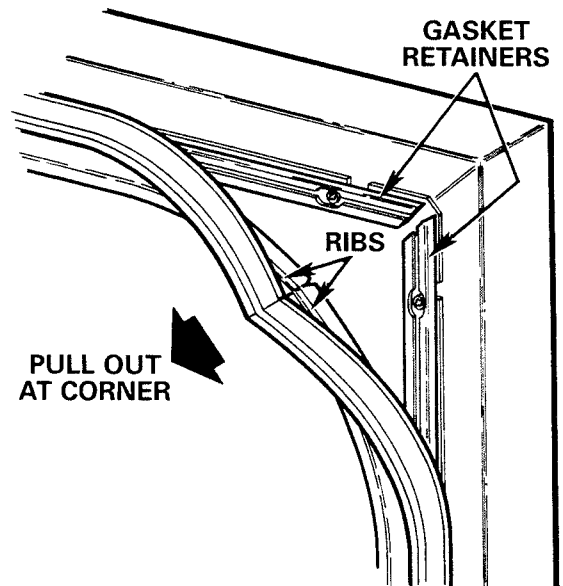
Most Hotpoint and RCA brand models have bow handles - similar to those used on previous models. Although the bow handle insert fits tightly to the handle body, it can be readily removed by sliding it toward the smaller end.



Door gaskets are press-fitted into retainers at all four sides of each inner door. To remove the gasket, grasp it at one corner and pull it from the retainers.

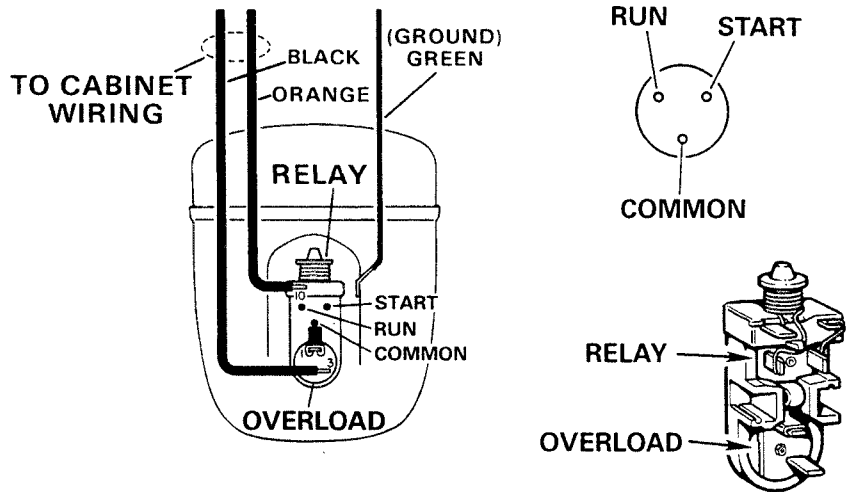
To ease installation of a gasket, rub paraffin wax into retainer groove. Place the gasket on the inner door and position the rib of the gasket in the retainer groove. Beginning at one corner, press the gasket firmly to seat the rib into the retainer. Continue pressing the gasket at 1-inch intervals until it is fully installed along all four sides.

After installing a new door gasket, a thin film of wax should be applied along the hinge side to prevent the gasket from scrubbing the cabinet as the door is opened and closed. Rub the sealing surface of the gasket with a piece of pure paraffin wax once or twice, from top to bottom, to uniformly coat the gasket sealing surface. In time, the lubricant contained in the gasket will leach out and provide self-lubrication.



Black and orange harness wires with push-on terminals are connected to the relay and overload terminals.

The current type relay plugs directly onto the compressor terminals. The overload is nested into an opening in the relay housing and attached to the relay common terminal. The replacement relay and overload are furnished as an assembly (rather than individual components).



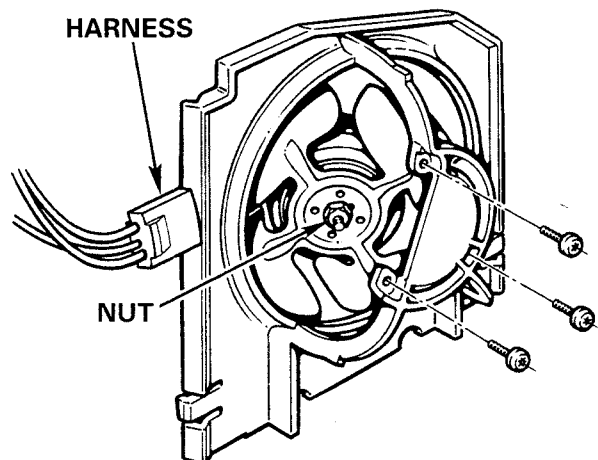
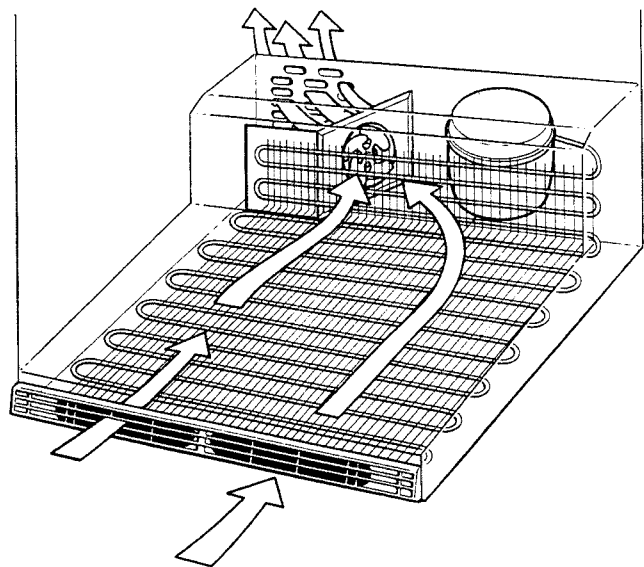
The condenser fan, located in the rear of the machine compartment draws room ambient air through the base grille at the front of the cabinet. Air entering the machine compartment flows through the condenser and is expelled through slots in the rear access cover.

The rear access cover must be tightly fitted to prevent air from entering at the rear of the cabinet and bypassing the condenser.

Because the machine compartment air is discharged at the rear; clearance must be provided at the top; sides and rear of the cabinet for air circulation. The minimum requirement at the top and rear is 1-inch. At each side 3/4-inch is required.

To remove the condenser fan, disconnect the wiring harness and remove the 3 motor mounting screws. Rotate the motor and fan assembly so that the fan blade is facing toward the rear. Remove the nut from the blade. Remove the blade then the motor.

Reassemble the fan blade and motor in reverse procedure.



**AIR FLOW SYSTEM**

Cold air from the evaporator, forced into the air tower by the evaporator fan, enters the freezer compartment. Air circulating throughout the freezer compartment, picking up heat and moisture, enters slots along the front of the freezer floor. The freezer air, passing under the freezer floor, is then returned to the evaporator. The evaporator fan draws the warmer moisture-laden air up through the evaporator where heat is removed and moisture is deposited in the form of frost.

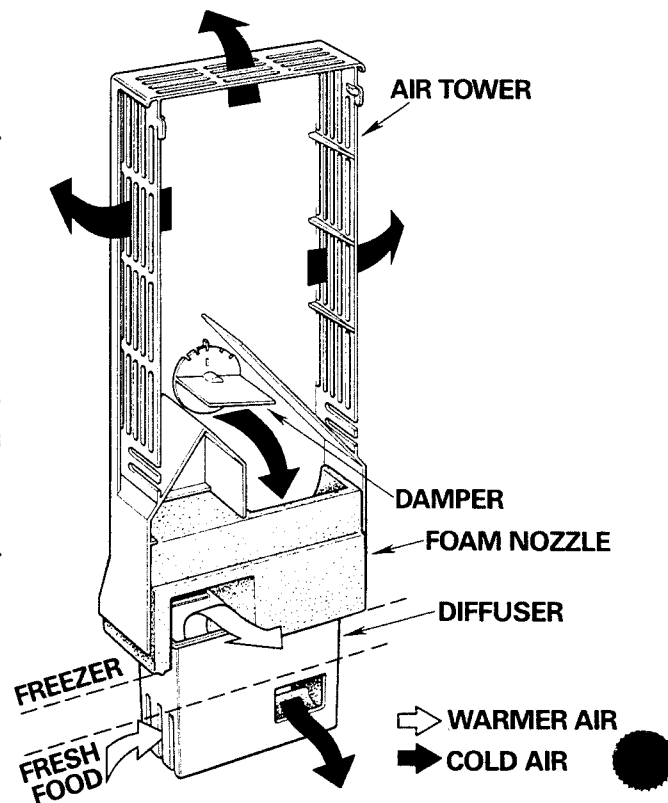
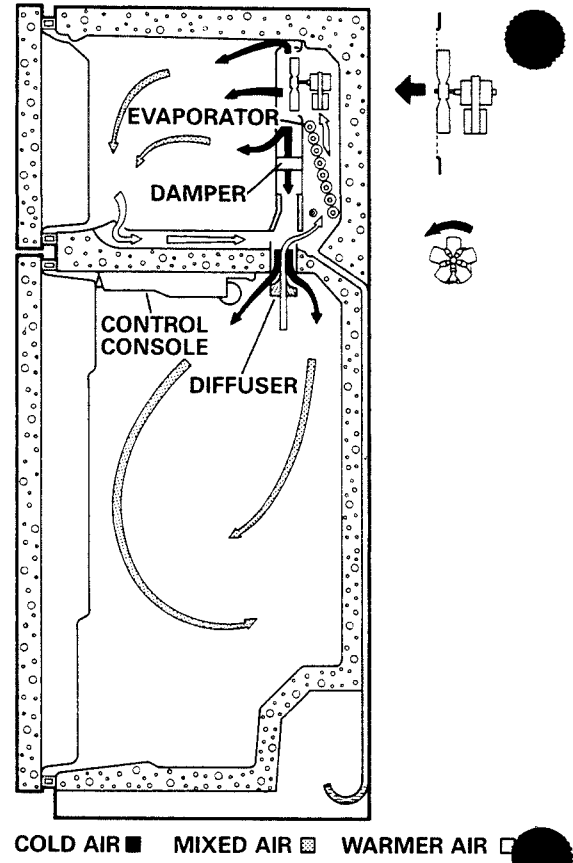
Cold air from the evaporator is also forced downward in the air tower, through the diffuser, and into the fresh food compartment. Openings in the diffuser direct streams of cold air toward the front and rear. Cold air exiting from the forward opening of the diffuser passes over the sensing point of the temperature control capillary. Air circulating throughout the fresh food compartment, picking up heat and moisture, is then returned to the evaporator through the diffuser.

The evaporator fan motor rotates in a counter-clockwise direction. The 5-blade fan is correctly positioned when the front edge of the blade is flush with the front edge of the orifice in the evaporator cover.

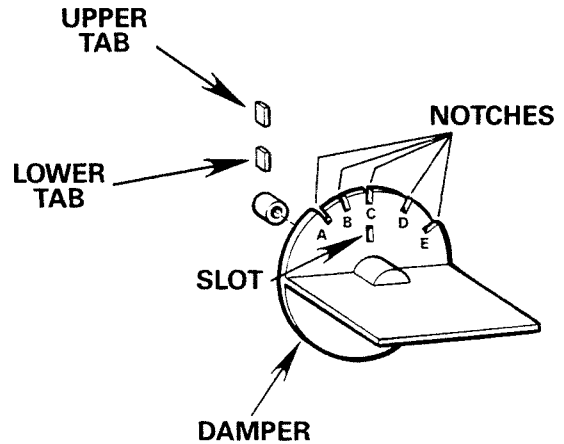
Cold air is uniformly distributed into the freezer compartment through slots in the sides and top of the air tower - located in front of the evaporator fan.

A damper, located inside the air tower, regulates the supply of cold air directed downward into the fresh food compartment. The damper is not adjustable by the consumer. The consumer can satisfactorily regulate the temperatures of both compartments by adjusting the temperature control - located in the fresh food compartment.

Cold air forced downward in the air tower, passing by the damper, enters the left side of the foam nozzle and exits through openings in the front and rear of the diffuser into the fresh food compartment. Warmer air from the fresh food compartment enters slots at the right side and bottom of the diffuser, passes through the right side of the foam nozzle, and is returned to the evaporator.

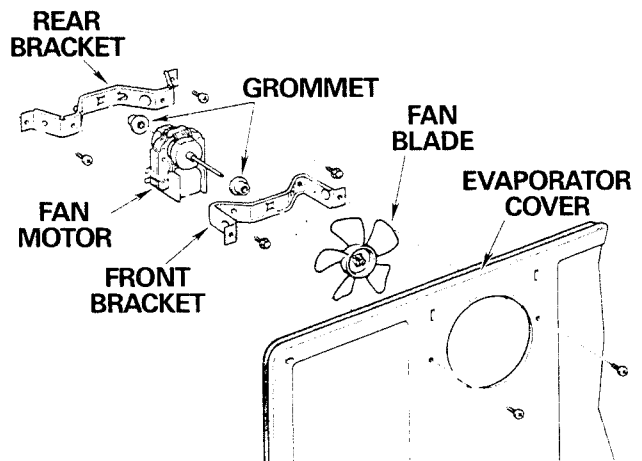


The damper setting, preset to the "C" (middle) setting, can be changed if there is a need to change the temperature balance (variance) between the two compartments. Remove the air tower and lift off the damper. Break off the lower tab (that mates with the slot). Reposition the damper to engage one of the notches by the upper tab. (The notches in the damper are marked with letters "A" through "E" for identification.)



When changing the damper setting, reposition it only one setting (notch) and allow 24 hours for temperatures to stabilize before making another setting change.

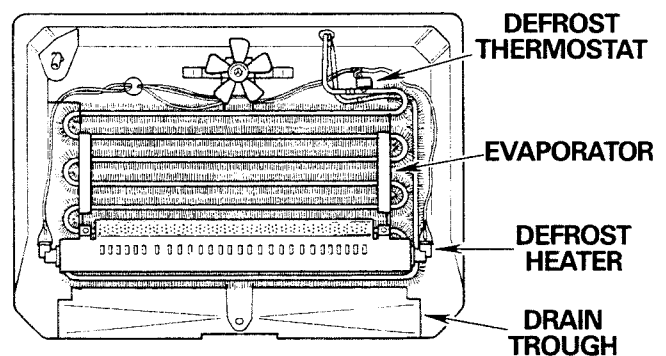
The evaporator fan assembly, located above the evaporator at the rear of the freezer liner, is mounted with two brackets that are secured to the freezer liner and the evaporator cover. Grommets, positioned over the front and rear end caps of the motor, serve as cushions to dampen the sound of the motor.



Black and orange harness wires with push-on terminals are connected to the electrical terminals of the fan motor. A green ground wire with a push-on terminal is connected to the motor frame. To remove the evaporator fan motor, the evaporator cover must first be dismantled from the freezer compartment.

**DEFROST SYSTEM**

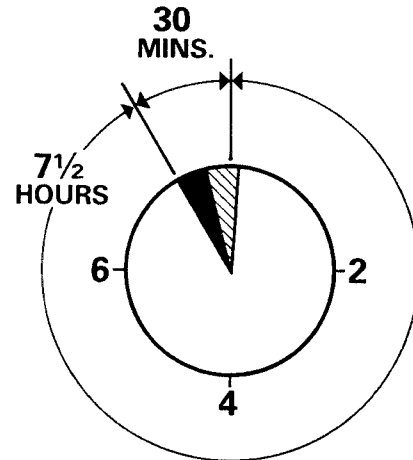
Frost that has collected on the evaporator is automatically defrosted by a radiant type defrost heater positioned at the lower front of the evaporator. After 7 1/2 hours of accumulated compressor operation time, the defrost control interrupts the circuit to the compressor and energizes the defrost heater circuit for 30 minutes. The heater (rated at approximately 350 watts) remains energized until the temperature rises to 70-degrees F at the outlet tube of the evaporator - where the bi-metal type defrost thermostat is located. With an average frost load, the thermostat contacts open the heater circuit after the heater has been energized for about 15 minutes.





During the remaining time allotted for the defrost interval, water (resulting from the melted frost) is permitted to drain from the evaporator into the drain trough below the evaporator. At the end of the 30-minute defrost interval, the defrost control opens the contacts for the defrost heater circuit and closes the contacts to the compressor circuit.

After the compressor resumes operation, the thermostat will be cooled by the evaporator. When the temperature at the outlet tube of the evaporator drops to 28-degrees F, the thermostat contacts will close in preparation for the next defrost cycle.



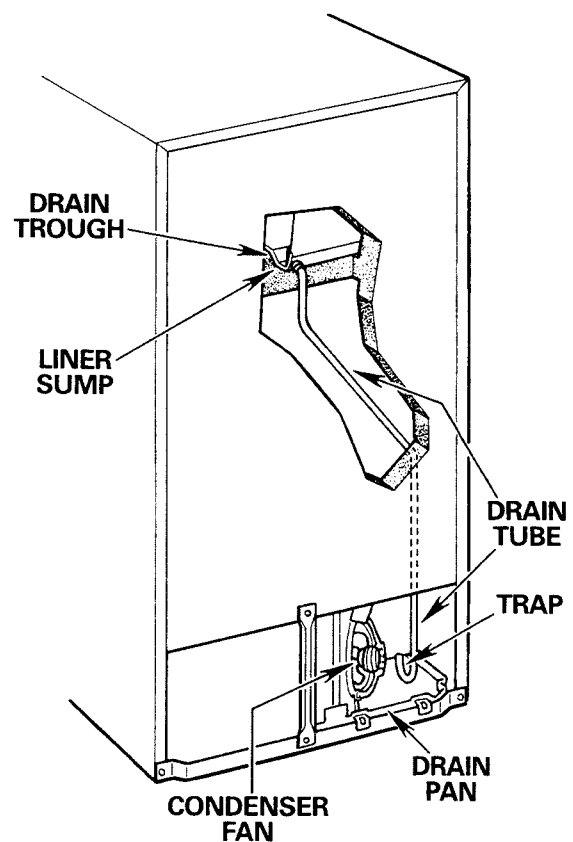
- ACCUMULATED COMPRESSOR OPERATION TIME
- DEFROST HEATER ENERGIZED
- ▨ DEFROST THERMOSTAT OPEN

Defrost water flows from the drain trough (nested in the sump at the bottom of the freezer liner) into the plastic drain tube that extends downward (through the cabinet foam insulation) into the machine compartment.

At the lower end of the drain tube a 180-degree bend, formed into the tube, provides a trap for water to collect. The trap prevents warm air from being drawn up into the freezer compartment.

Defrost water empties into a molded plastic pan securely mounted in the machine compartment. Warm air, discharged from the condenser fan, (located in the water pan) evaporates the water that collects in the pan.

A drain tube extension is available to repair a damaged or broken drain tube at the lower end (inside the machine compartment).

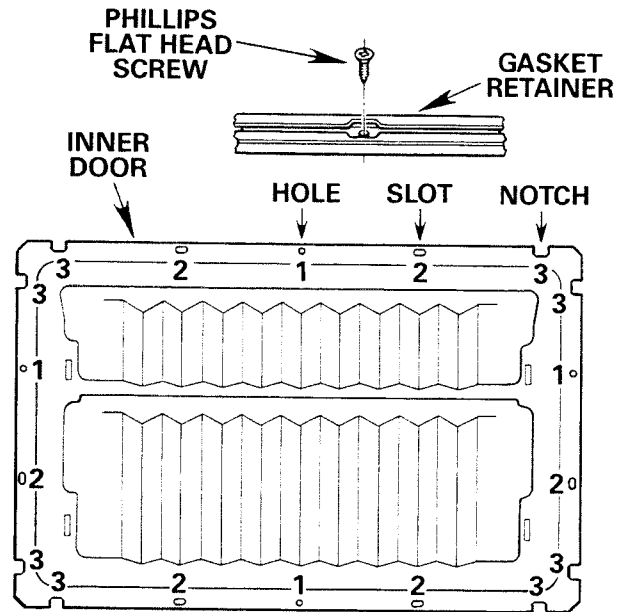


Inner doors, made of ABS plastic, are secured to outer doors with Phillips flat head (chamfered) screws. The screws are driven through holes in the gasket retainers and through holes, slots and notches along the periphery of the inner door.

The gasket retainers and inner door must be aligned to the outer door and the screws driven in sequence to insure a proper gasket seal.

When installing an inner door, place the door on a flat surface. Initially drive only the screw in the hole (near the center of each retainer). Next, drive the screws in all of the slots. Then, drive the remaining screws in the notches at the corners (ends of each retainer).

After installing the door, if it is out of plane with respect to the cabinet, loosen the screws and replane the door.



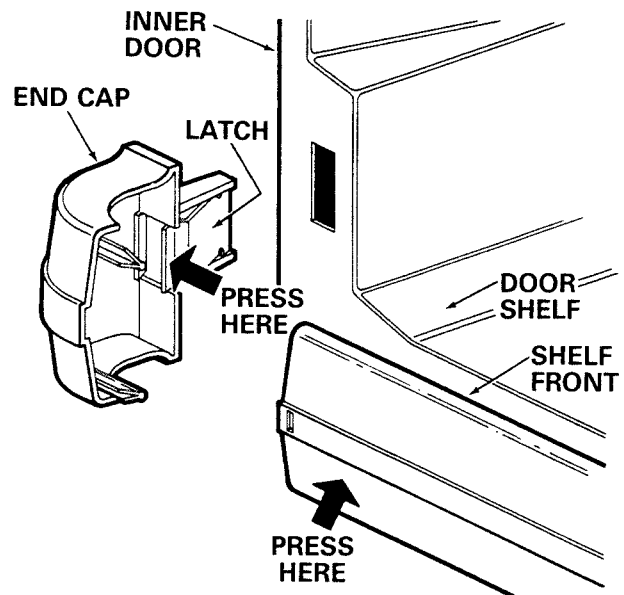
Door shelf fronts are attached to the inner doors with end caps. The end cap incorporates a latch that firmly engages a slot in the inner door.

To release the end cap from the inner door, press the latch and pull the end cap firmly out of the slot.

To release the shelf front from the end cap, press firmly near the center of the front (to release the barb on the end cap from the slot near the end of the front) while pulling the front from the fluted pins of the end cap.

To reinstall the shelf front, position it over the fluted pins of the end cap. Press the two parts firmly together until the slot, near the end of the front, snaps over the barb on the end cap.

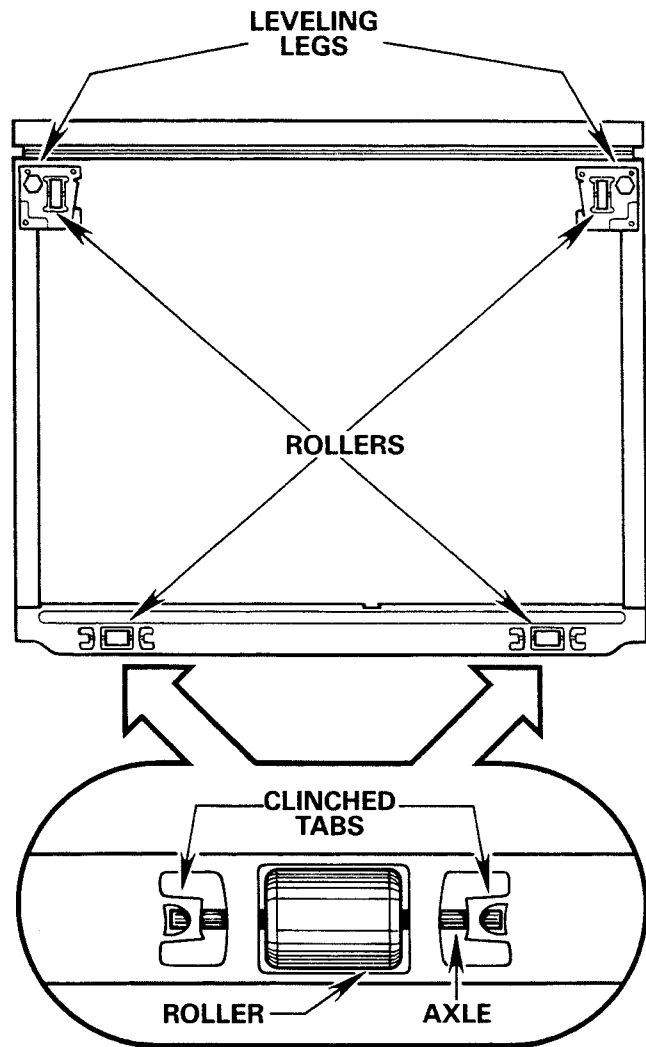
To reinstall the end cap, position latch into the slot in the inner door and firmly press it until the latch locks the end cap to the inner door.



All models are equipped with fixed-position rollers and leveling legs. Although the rollers are not adjustable, the larger diameter front rollers elevate the front of the cabinet an additional 1/4-inch to provide a tilted cabinet installation.

The rear rollers, located inboard toward the center, help compensate for uneven floors. Axles for the rear rollers are clinched to the underside of the rear channel.

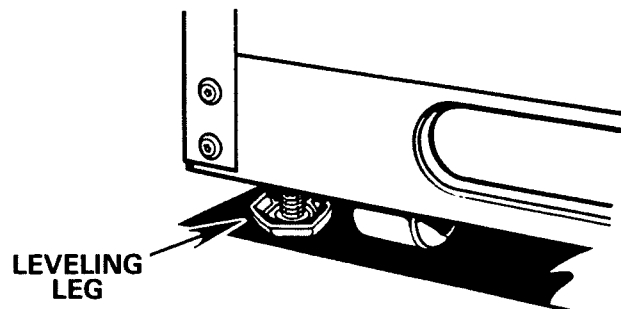
To remove a rear roller, tilt the cabinet and place 3-inch blocks under the sides of the outer case. Using a large blade screwdriver, pry one clinched tab downward and slide the axle out of the channel.



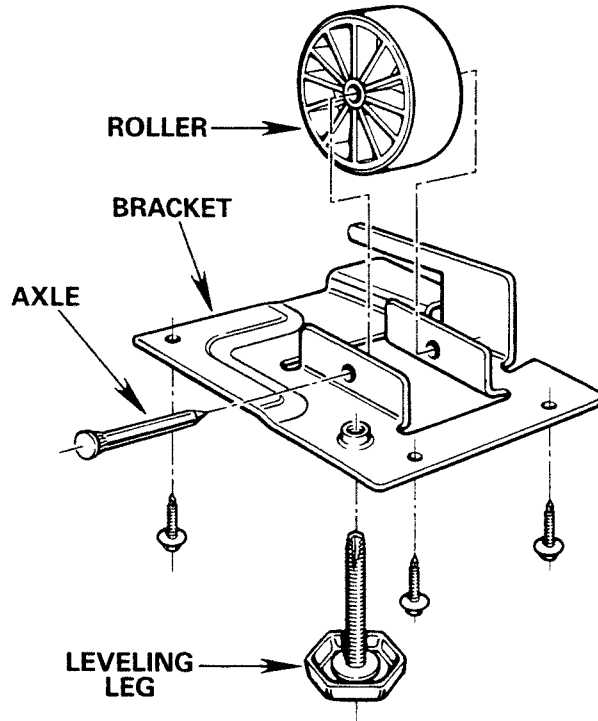
Leveling legs, near each front corner of the cabinet, should be adjusted to: firmly stabilize the cabinet on uneven floors; prevent the cabinet from rolling when the doors are opened; and assure the doors close easily when opened about halfway.

The leveling legs must be adjusted upward before rolling the refrigerator away from the wall to prevent possible floor damage.

The consumer is instructed to adjust the leveling legs upward before moving the refrigerator for cleaning and then readjust them after rolling the refrigerator back in place.

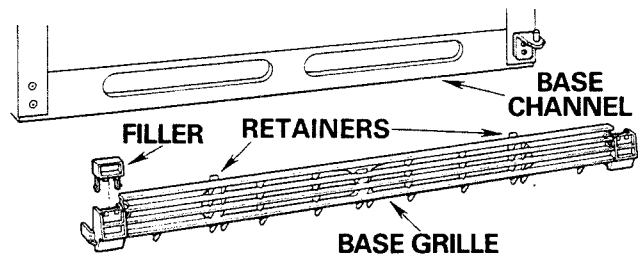


Leveling legs and front rollers are assembled to front corner brackets that are mounted to the outer case and base channel with screws. The leveling legs are threaded into extruded holes at the corner of each bracket.

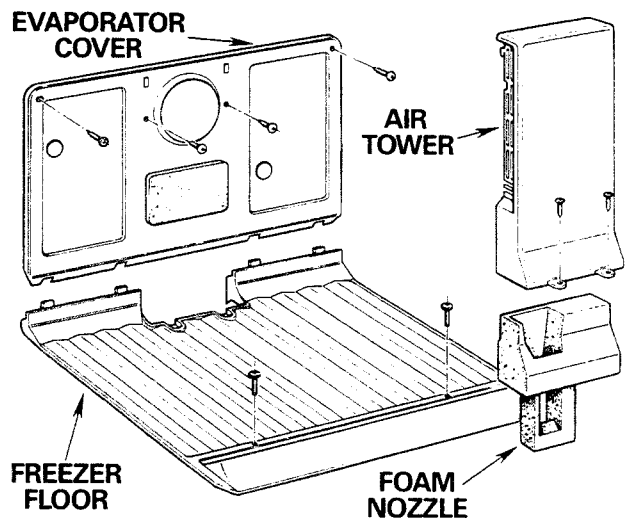


To remove a front roller, tilt the cabinet to the rear and place 3-inch blocks under the sides of the outer case. Remove the three 1/4-inch hex-head screws to dismount the bracket. Pull the axle out of the bracket to release the roller, using pliers or a large screwdriver to dislodge the fluted head of the axle.

A base grille (not used on some models) is attached to the base channel with two spring steel retainers that grip into the elongated openings. To remove the grille, grasp it at the bottom and pull outward. The grille is notched at the upper corners of both ends to allow clearance for the bottom hinge. A removable plastic filler is fitted into the notch at the end opposite the hinge.

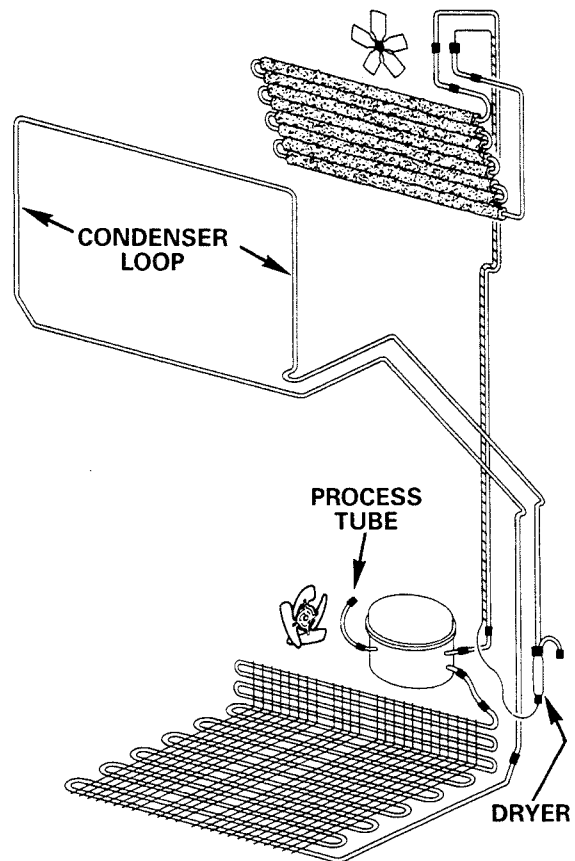


The painted steel evaporator cover is mounted with screws near the top and notches along the bottom that engage tabs molded onto the back of the plastic freezer floor. To remove the evaporator cover, remove the icemaker (if used). Remove the two Phillips head screws at the base of the air tower. Lift the tower to disengage the hooks on the back from the two slots at the top of the cover. While pressing inward on the evaporator cover, lift the foam nozzle out of the freezer liner carefully (to avoid breaking it). Remove the four Phillips head screws from the cover - one at each top corner and one at each side of the fan orifice. Remove the two Phillips head screws near the front of the freezer floor. Tilt the front of the floor upward and pull it forward to disengage the cover. Remove the floor then remove the cover from the freezer compartment.

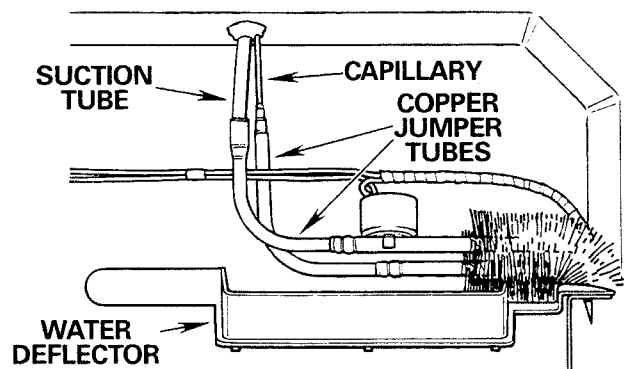


## REFRIGERATION SYSTEM

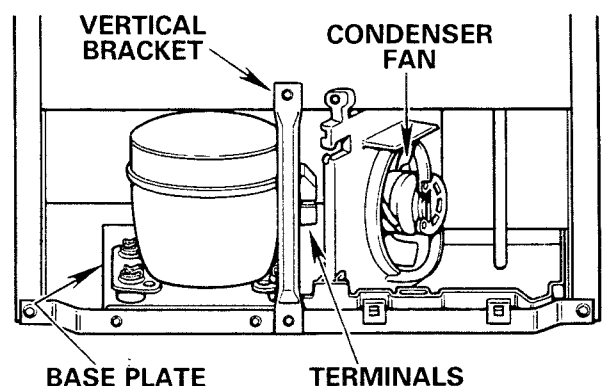
The refrigeration system, including the refrigerant charge, is the same for 14 and 16 cu.ft. models. The reciprocating type compressor, made by Danfoss, is rated at 680 BTU/hr. The condenser is made of 1/4-inch steel tubing and formed into an "L" shape. A condenser loop, made of 5/32-inch copper tubing, is positioned completely around the front of the freezer compartment. Hot gas flowing through the loop is first directed toward the mullion then to the left side, top and right side. The loop, permanently installed behind the mullion and the cabinet front flanges, is not accessible for replacement. The aluminum spine fin evaporator, in a serpentine configuration, is mounted to the back of the freezer liner. A replacement evaporator will not be available until a satisfactory method for connecting the tubing is developed. The heat exchanger, foamed-in-place behind the freezer and fresh food liners, is not replaceable.



A plastic water deflector, located below the evaporator inlet and outlet tubes, is mounted to the rear of the liner and the top of the evaporator end bracket. The purpose of the deflector is to direct water, dripping from the copper tubing, to the rear of the liner and away from the aluminum evaporator. Water, dripping from the copper tubing onto the aluminum evaporator, can corrode the aluminum and cause the evaporator to leak.

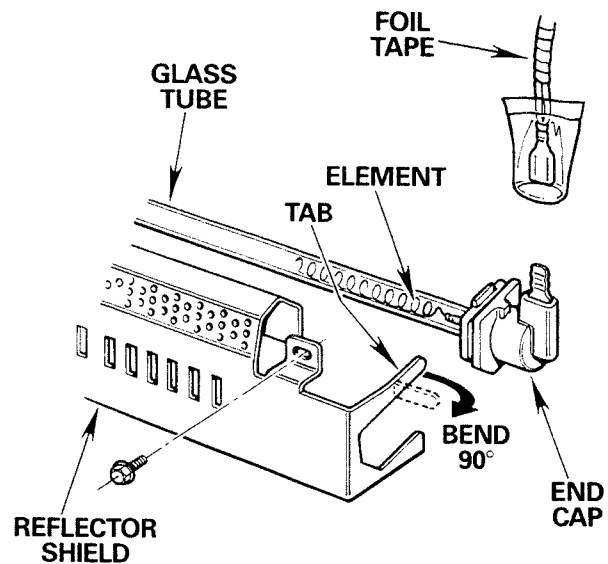


The compressor, mounted with 4 rubber grommets to dampen the sound, is positioned over studs on a steel baseplate. Spring steel retainers, positioned on the studs, secure the compressor to the baseplate. The compressor terminals are located on the side of the compressor, toward the condenser fan. Access to the relay and overload is provided after removing the vertical bracket at the rear of the cabinet. As an alternate, if additional access is needed, the condenser fan motor and blade can be removed.



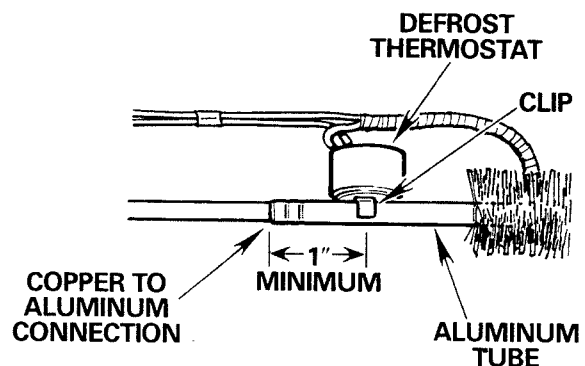
The defrost heater consists of a heating element that is encased in a glass tube with electrical terminals extending through end caps. Blue and yellow harness wires, connected to the heater terminals with push-on terminals, are wrapped with foil tape (for protection from sharp edges). The defrost heater is secured to the reflector shield which is mounted with screws to the evaporator end brackets.

To replace the defrost heater, dismantle the reflector shield and straighten the tabs to release the end caps. Avoid handling the glass tube with bare hands. Contaminants deposited on the glass will cause premature failure of the defrost heater. The tabs should be bent 90-degrees toward the terminals to properly secure the heater. The harness wires should be dressed toward the rear, between the evaporator end brackets and the liner.

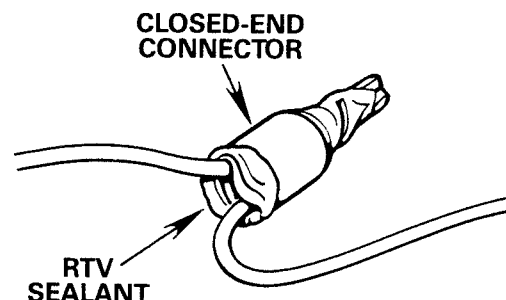


The defrost thermostat is located above the evaporator, at the right side. A clip, welded to the sensing surface of the thermostat, is pressed onto the bare aluminum evaporator outlet tube.

The proper position for mounting the thermostat is 1-inch from the end of the aluminum tube. Mounting the thermostat closer to the copper-to-aluminum connection, or on the copper tube will likely result in the defrost heater remaining energized longer than necessary.



When replacing the defrost thermostat, it will be necessary to splice the thermostat leads to the yellow and orange harness wires. Closed-end wire connectors should be used for the splices.



The open end of the connectors must be filled with RTV sealant. Moisture entering the connection can cause excessive current leakage.

## ELECTRICAL SYSTEM

The complete wiring harness consists of three segments joined together with polarized connectors that prevent crossed connections.

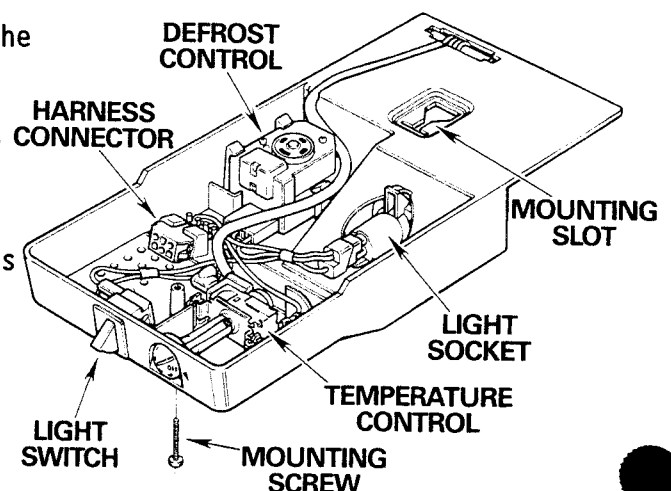
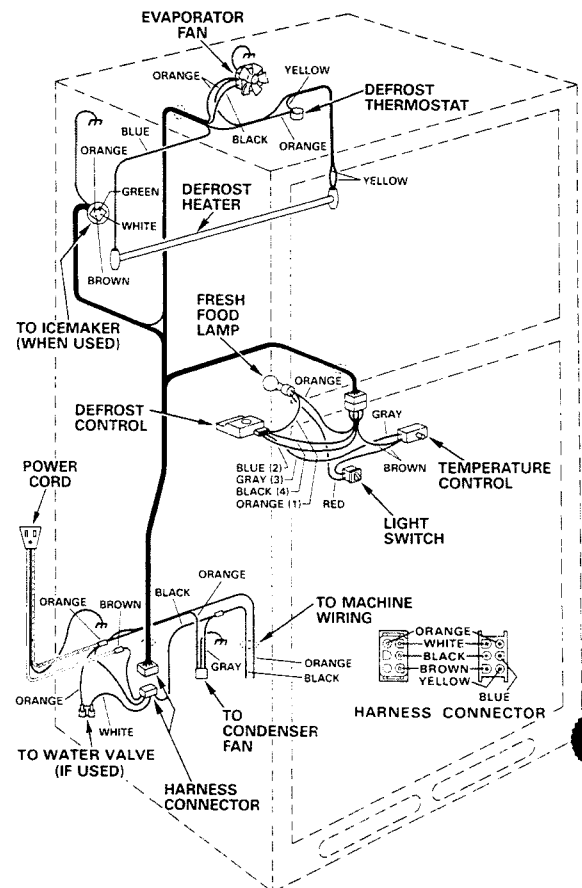
The machine harness includes the power cord spliced to brown and orange wires which, respectively, become line-1 and neutral for the electrical system. This harness connects to the icemaker water valve (if used), the condenser fan motor, the compressor and the cabinet harness.

The cabinet harness extends from the machine compartment up to the control console, the icemaker receptacle and to the evaporator area where connections are made to the evaporator fan motor, the defrost thermostat and the defrost heater. Although this harness is foamed-in-place, there are no wire splices in the foam insulation (except for terminals in the icemaker receptacle). The blue wire and a yellow wire, connected to the defrost heater, are extended to the harness connector in the machine compartment. These two wires are provided for circuit testing and do not connect to the machine harness.

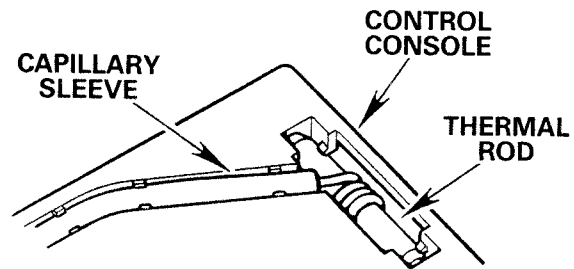
The control console harness is connected to the cabinet harness extending to the top of the fresh food liner. This harness connects to the fresh food lamp, the defrost control, the temperature control and the light switch.

To dismantle the control console from the liner, remove the Phillips head screw. Tip the front down slightly and pull forward to disengage the console from a support at the rear. All components of the console are replaceable separately. To disassemble any component from the console only a small blade screwdriver is required to release the locking tabs.

To reinstall the console, position the harness connector into the retainer (molded into the console) and reconnect the cabinet wiring harness. Position the flaps of the insulator board (attached to the top of the liner) into the sides of the console while engaging the rear support into the mounting slot. Push the console toward the rear and reinstall the mounting screw at the front.

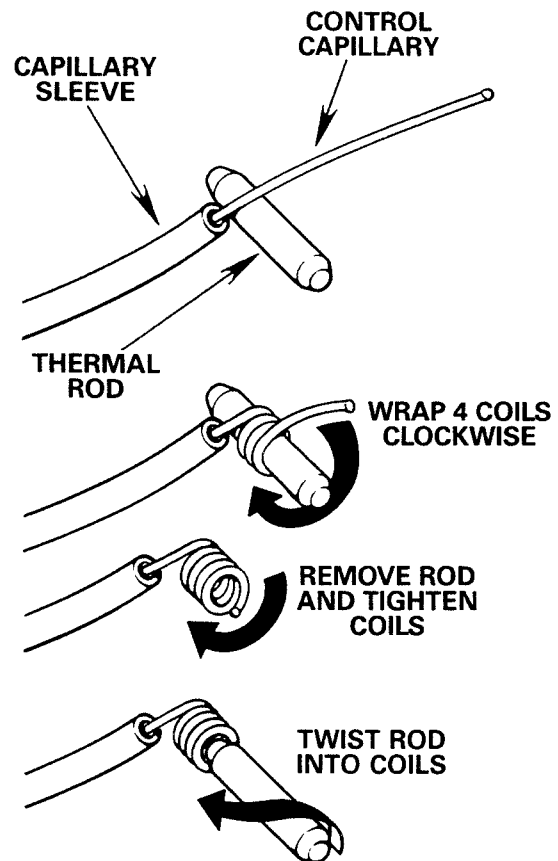


The temperature control capillary is covered with a clear vinyl sleeve to shield it from stray air currents that could short-cycle the control and cause poor performance. The end of the capillary, coiled around an aluminum thermal rod (heat sink), is the sensing point for controlling temperatures inside the cabinet. The thermal rod is press-fitted into an opening at the rear of the console.



When replacing a temperature control, the capillary must be tightly wound around the thermal rod to insure proper temperatures.

After dismantling the control and rod from the console, unwind the capillary from the rod and remove the sleeve. Reinstall the sleeve over the capillary of the replacement control. Beginning about 2-inches from the end, wrap the capillary tightly around the rod in a clockwise direction to form 4 coils. Remove the rod from the coils and tighten the coils slightly. Twist the rod back into the coils in a counter-clockwise direction. If the rod does not fit tightly into the coils, remove the rod and tighten the coils slightly once again.

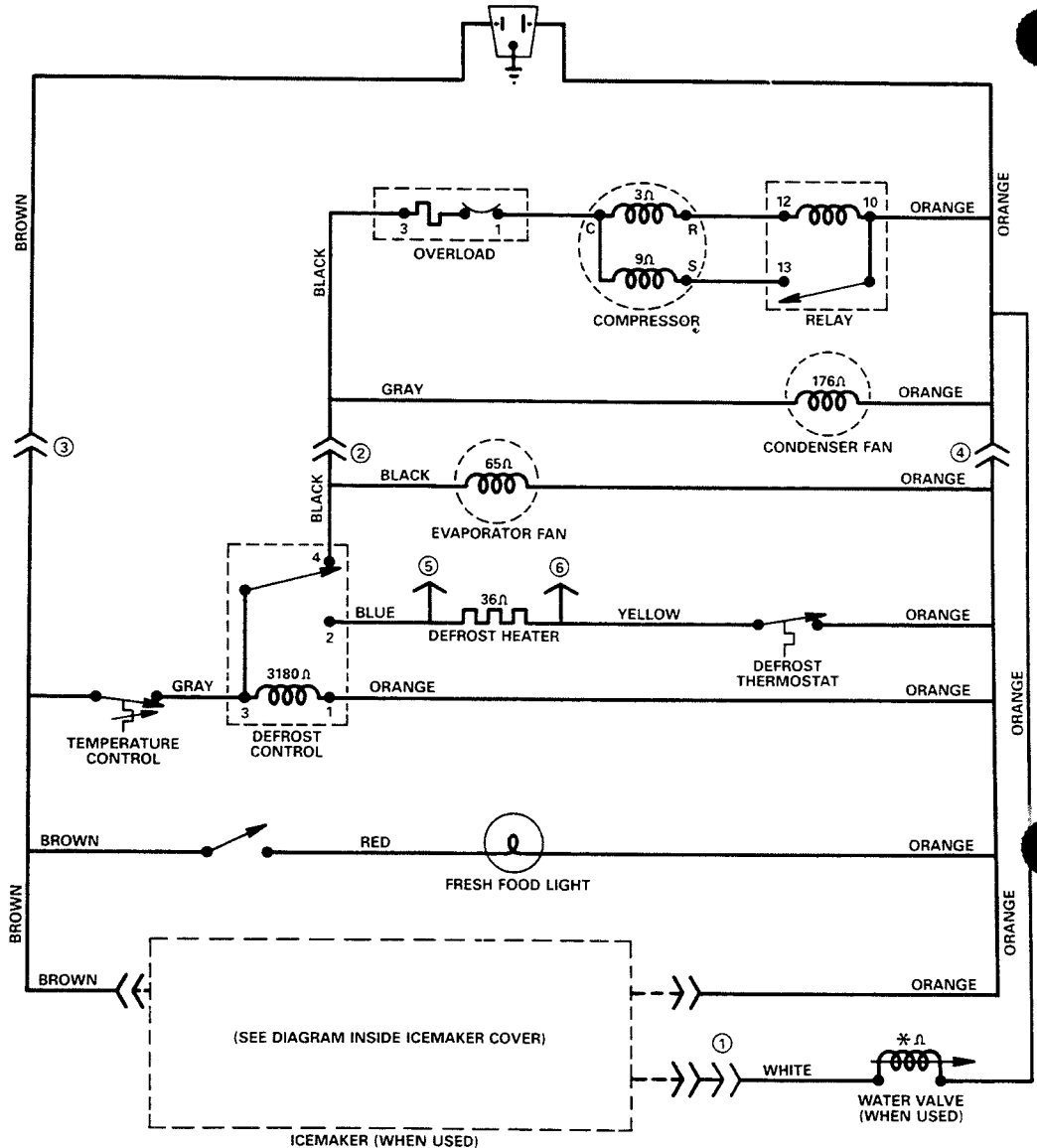


Mount the control into the console then, press the thermal rod (with the coiled capillary) securely into the opening at the rear of the console. Press the capillary sleeve into the groove at the rear of the console. Dress the capillary (and sleeve) around the defrost control and down into the console.



A schematic diagram is provided to aid diagnosing problems that may arise in the electrical system. Terminals in the harness connector, at the rear of the machine compartment, are represented by arrow heads and tails with adjacent numbers (1 through 6) circled. These terminals are useful for testing various circuits from the rear of the refrigerator. As examples: terminals 5 and 6 permit testing the defrost heater; terminals 4 and 6 permit testing the defrost thermostat.

Electrical components of the control console can be tested individually after dismantling the console. Also, the defrost heater and thermostat circuit can be tested by means of terminals for the blue and orange wires in the console harness connector.



\* WATER VALVE RESISTANCE MAY BE 90Ω TO 245 Ω

## ICEMAKER

A crescent cube type icemaker (Model JS 2) is factory installed on models: TBX14A, TBX16A, CTX14A and CTX16A.

All other TMNF14 and 16 models are equipped for Accessory Icemaker Kit IM-1. Installation of the accessory kit is essentially the same as for previous models. Installation instructions are furnished with the accessory kit. After the kit is installed, the ice tray shelf should be reinstalled above the icemaker to provide additional storage space for food packages.

