



*GE Consumer Service Training*

---

# TECHNICIAN MANUAL

**1993 REFRIGERATORS**



**Pub. No. 31-5237**

# 1993 REFRIGERATORS

## TABLE OF CONTENTS

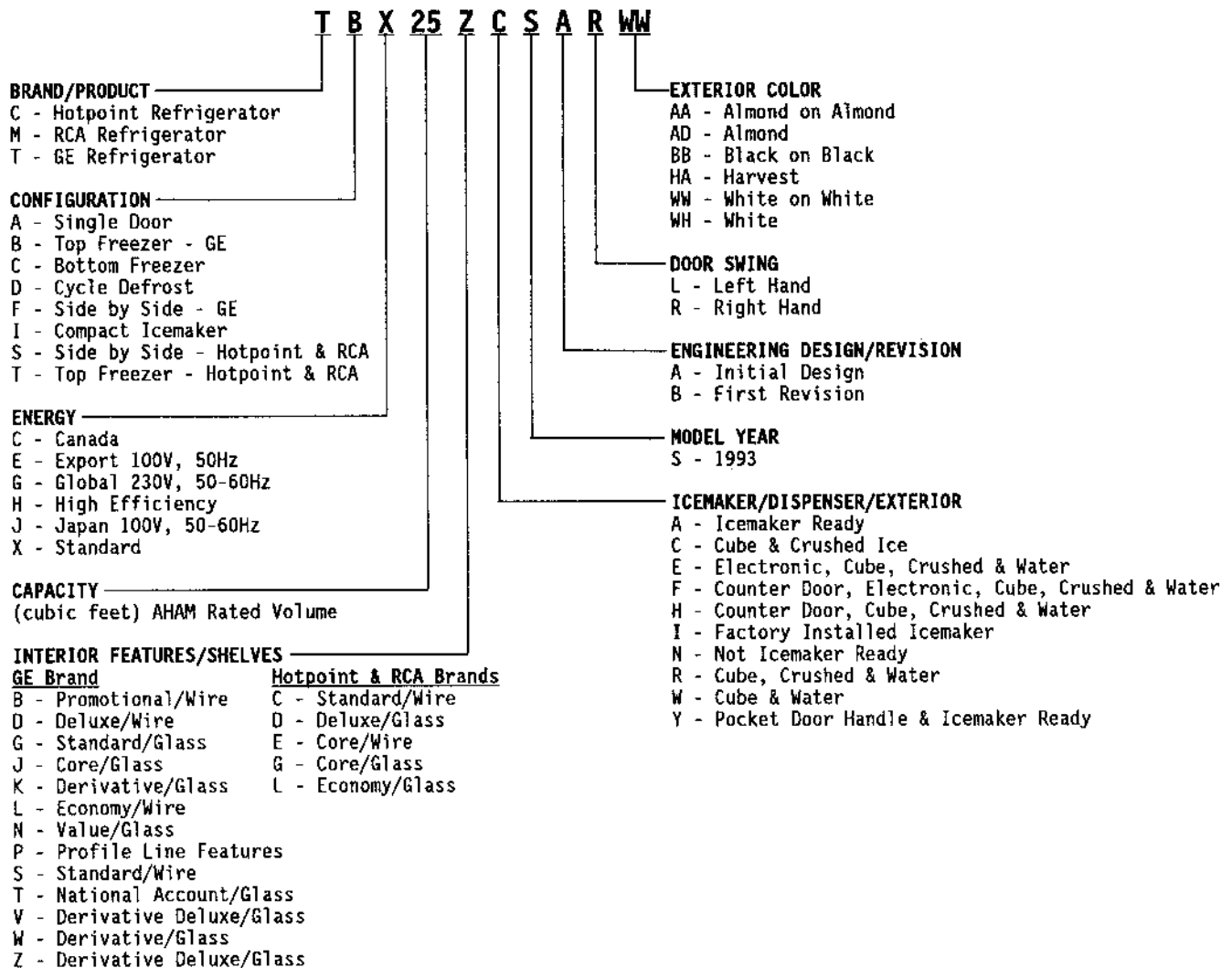
	Page
<b>REFRIGERATOR MODEL NUMBER IDENTIFICATION</b>	1
<b>TMNF 18-25 MODELS</b>	2
<b>SXS 19-27 MODELS</b>	3
<b>SXS DISPENSER OPERATION</b>	4
User Operation - dispenser features	4
User Operation - electronic system	5
Electrical Operation - non-electronic	7
Electrical Operation - electronic	8
<b>SXS DISPENSER SERVICE</b>	9
Pad	9
Pad Support	9
Escutcheon	9
Control Housing	10
Control Module	10
Lamp Socket	11
Pad Switch	11
Pad Switch Actuator	12
Ice Deflector	12
Ice Funnel	12
Duct Door	13
Duct Door Crank	13
Duct Door Solenoid	14
Recess Trim	14
Door Handle	15
Recess Assembly	15
Water Tubing	16
Recess Heater	16
Control Console - electronic models	17
Control Housing - electronic models	17
Light Switch - electronic models	18
Power Module - electronic models	18
Door Alarm Sensor - electronic models	19
Temperature Sensor - electronic models	19
Current Sensors - electronic models	19
<b>ELECTRONIC SYSTEM DIAGNOSIS</b>	20
Resistance/Voltage Measurements	20
Icemaker/Defrost Current Check	21
Power Up Reset	21
Diagnosis Guide	21
<b>MINI-MANUALS (addendum)</b>	
TMNF -25 Dispenser	
SXS -24 Dispenser	
SXS -27 Electronic	
Electronic System	

# 1993 REFRIGERATORS

Several changes have been made to improve the appearance, quality and energy consumption of GE, Hotpoint and RCA refrigerators for 1993. This manual covers only those changes that are significant to serviceability.

## REFRIGERATOR MODEL NUMBER IDENTIFICATION

The model numbers for all 1993 GE, Hotpoint and RCA refrigerators have been revised to provide better feature and appearance identification of the various models produced. All model numbers will begin with three letters followed by one or two numerals to indicate the approximate cubic feet capacity. A letter has been added, following the cubic feet capacity, to designate interior features and shelves for various markets. The next letter identifies icemaker, dispenser and exterior features. The following letters are essentially the same as 1992 models.



# 1993 REFRIGERATORS

## TMNF 18-25 MODELS

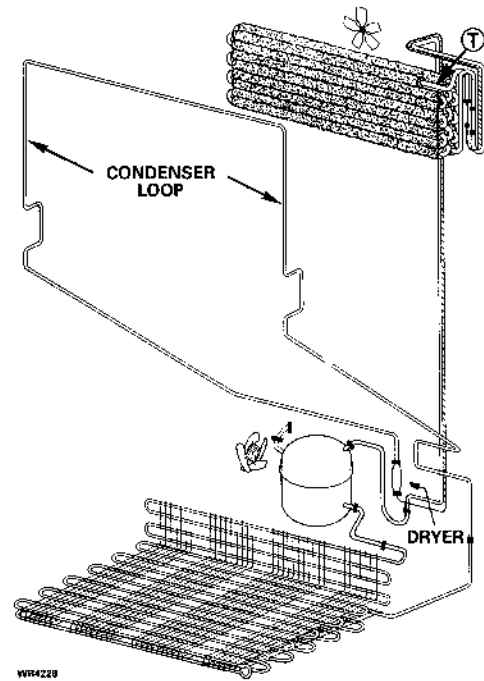
The refrigeration systems of all 1993 top-mount no-frost (TMNF) 18 through 25 cubic feet models have been improved for energy efficiency.

New spine fin evaporators, made of aluminum tubing formed into 3 banks (rows) of coils, are mounted to a metal plate (similar to previous models).

A new defrost thermostat, rated at 68°F, is mounted at the top right side of the evaporator.

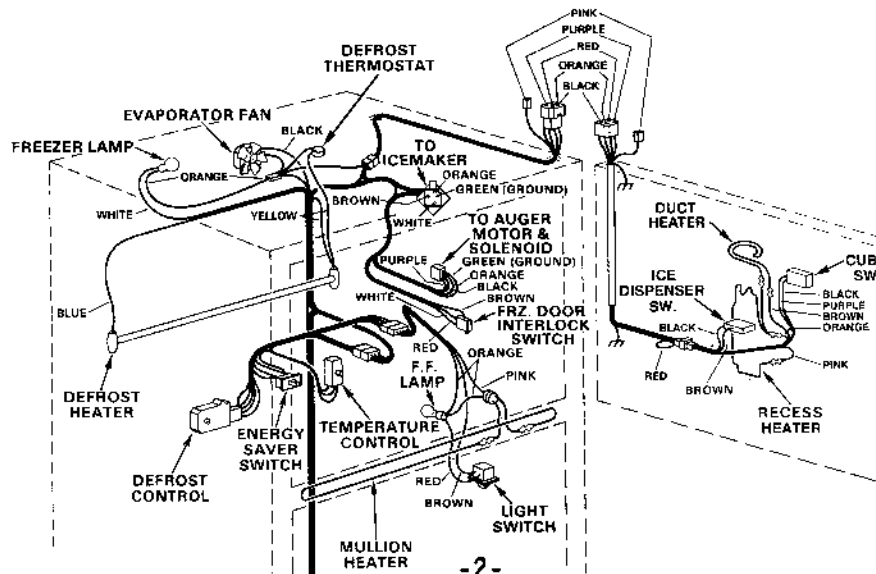
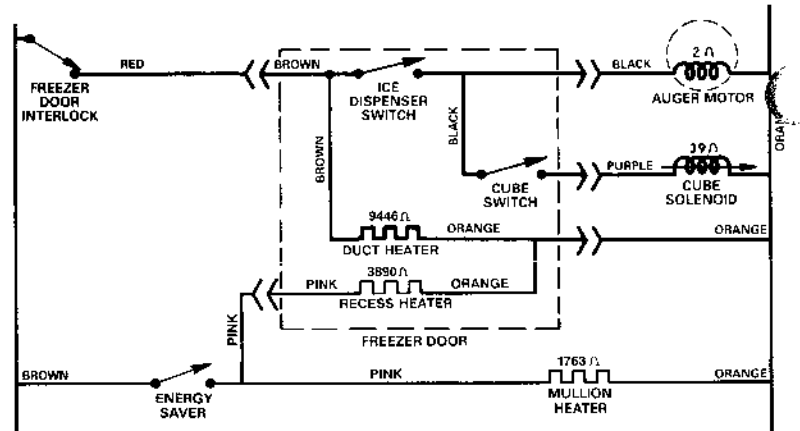
New energy efficient compressors have a lower Btu/hr capacity rating.

Condensers are larger and, on some high efficiency models, have two banks of coils. The refrigerant charge is also increased on all models.



A new recess and duct heater assembly is used on TMNF 22 and 25 dispenser models. The duct heater is continuously energized. However, the recess heater is controlled by the energy saver switch.

A separate single connector is provided at the top of the freezer door for the pink wire that extends from the energy saver switch to the recess heater.



# 1993 REFRIGERATORS

## SXS 19-27 MODELS

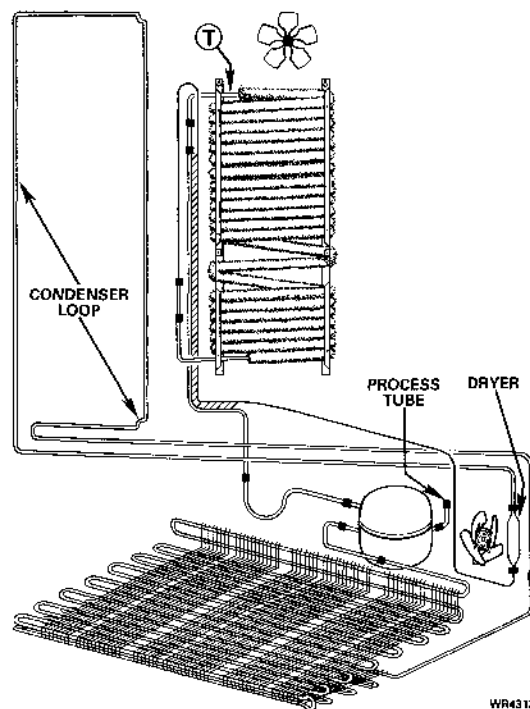
The refrigeration systems for all 1993 side-by-side (SXS) models have also been improved for energy efficiency.

New spine fin evaporators, made of aluminum tubing formed into hair-pin spirals, are mounted to the liner with screws at the top and bottom of the end brackets.

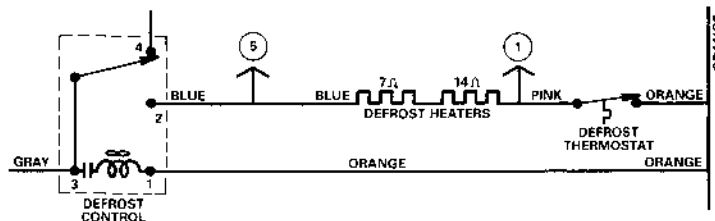
A new defrost thermostat, rated at 60°F, is mounted to the evaporator tube at the top left corner.

New energy efficient compressors are rated approximately 200 Btu/hr lower than on previous models.

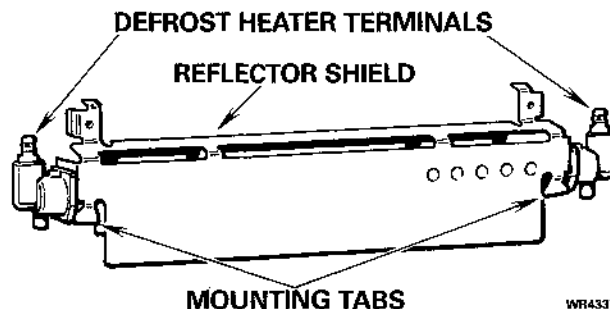
Condensers are larger and folded under at the front to form an additional half-bank. Also, the refrigerant charges are increased on all models.



The defrost heaters and reflector shields (mounting brackets) are new on all 1993 side-by-side models. Two heaters, connected in series, are used on each evaporator. The lower heater, having a higher resistance, consumes two times more wattage than the upper heater. For identification, the heater end caps (terminal insulators) are blue on the upper heater and tan on the lower heater.



Replacement defrost heaters are furnished as a set (one high wattage heater and one low wattage). When one defrost heater fails, both heaters must be replaced. Also, the higher wattage heater must be installed at the bottom of the evaporator due to the heavier frost accumulation that occurs at the lower portion of the evaporator. The heaters can be replaced by bending the mounting tabs below each heater terminal. Always avoid touching the heater glass with bare hands to prevent premature failure of the heater.



# 1993 REFRIGERATORS

## SXS DISPENSER OPERATION

All 1993 side-by-side dispenser model refrigerators, both electronic and non-electronic versions, have a completely new recess assembly in the freezer door. A single pad (rather than cradles) is provided for dispensing either water, crushed ice or cubes. The selection of water, crushed ice and cubes is made at the control console.

### User Operation - dispenser features

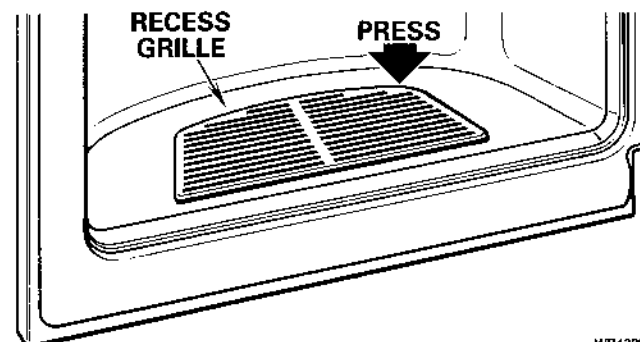
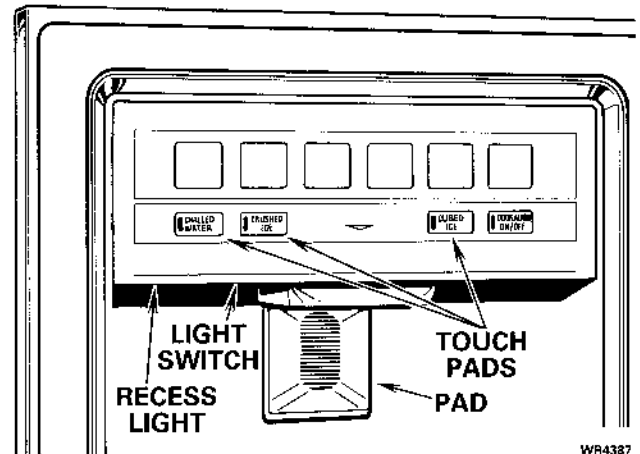
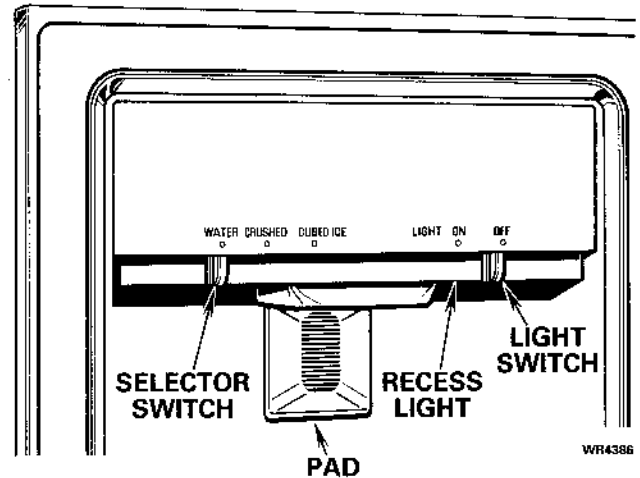
On non-electronic models, water and ice selections are made by positioning the selector switch knob which is located at the lower left side of the console. The switch has a detent at each selection to ensure positive positioning.

On electronic models, water and ice selections are made by touching pads which are located along the lower front of the console. Indicator lights, adjacent to the touch pads, verify the selection that is made.

When dispensing ice, either crushed or cubes, the duct door is opened by an electrical solenoid as a glass is gently pressed against the dispenser pad. After the glass is withdrawn from the pad, the duct door will remain open for 5 to 10 seconds to prevent the entrapment of ice in the duct and chute. An audible "snap" can be heard when the solenoid is energized. Then, when the duct door closes, a soft "pop" may also be heard.

On models that have a light in the recess, the light will automatically be illuminated when the dispenser pad is pressed. The light can also be turned on and off manually. On non-electronic models, the light switch is located at the lower right side of the console. On electronic models, the light switch is located below the console at the left side.

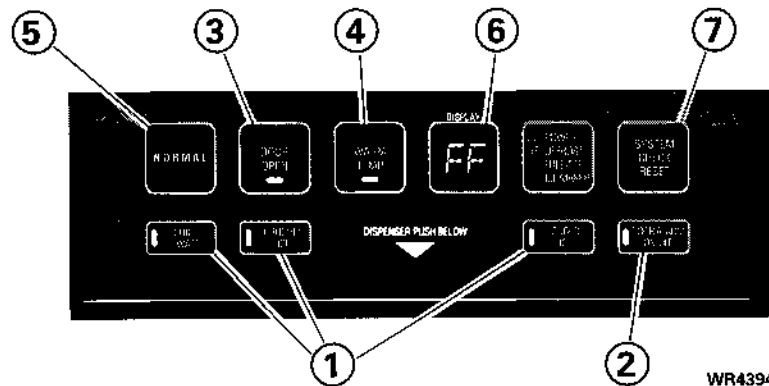
The grille at the bottom of the recess housing can be easily removed by pressing downward at the right rear corner.



# 1993 REFRIGERATORS

## User Operation - electronic system

The control console is new on all 1993 models that have the electronic system. Although, the electronic monitor and diagnostic feature is much the same as on previous models.



- 1 Touch pads provide for the selection of "chilled water", "crushed ice" or "cubed ice". A beep will be sounded each time either pad is touched. A green indicator light verifies the selection that has been made.

- 2 The door alarm can be enabled by touching the "door alarm on/off" pad. A beep will be sounded each time the pad is touched. A green indicator light verifies the alarm is enabled. The beeper will then sound after either the fresh food or freezer door has been open for thirty seconds. The beeper will continue to sound until both doors are closed or the alarm is disabled.

MONITOR/DIAGNOSTIC CODE	CONDITIONS/SPECIFICATIONS	CANCELLATION
DOOR OPEN ALARM BEEPER	FRESH FOOD OR FREEZER DOOR OPEN OR AJAR > 1/4-INCH EITHER DOOR OPEN > 30 SEC.	BOTH DOORS CLOSED BOTH DOORS CLOSED OR ALARM SET OFF
WARM TEMPERATURE	TEMPERATURE > 35°F. > 4 HRS., OR TEMPERATURE > 55°F. > 1 HR., OR TEMPERATURE > 55°F. & PF	TEMPERATURE < 35°F.
CHECK FROZEN FOODS	TEMPERATURE > 35°F. > 6 HRS., OR TEMPERATURE > 55°F. > 2 HRS.	SYSTEM CHECK - RESET AND TEMPERATURE < 35°F.
DEFROST FAULT	NO DEFROST CURRENT > 64 HRS.	DEFROST CURRENT DETECTED
CHECK ICEMAKER	ICEMAKER CURRENT > 5 HRS.	SYSTEM CHECK - RESET OR ICEMAKER CURRENT NO LONGER DETECTED
POWER FAILURE	POWER HAS BEEN OFF > 2 SEC., THEN REAPPLIED	SYSTEM CHECK - RESET

WR4322

- 3 A red signal light will flash any time either the fresh food or freezer door is open or ajar more than 1/4-inch. The signal light will be extinguished when both doors are closed.

## 1993 REFRIGERATORS

- 4 A red signal light will appear when the freezer temperature is above normal. The signal light will be extinguished when the temperature is reduced to normal.

NOTE: The freezer temperature sensor, located on the inner door, quickly responds to changes in air temperature within the freezer compartment. Accordingly, threshold temperatures of 35°F and 55°F are monitored by the electronic system at various time intervals to alert the consumer before frozen foods begin to thaw.

- 5 The green lighted word "normal" indicates that no failure has been detected by the electronic system monitor.
- 6 A flashing green diagnostic code will be displayed when a failure has been detected by the electronic system. The first six flashes will be accompanied by a beep. If more than one coded function requires attention at the same time, the highest priority code will be displayed until erased. The codes, in order of priority, are:

FF - Freezer - check for thawing of frozen foods  
PF - Power - power has been off for more than 2 seconds  
CI - Icemaker - check ice bin for blockage  
dE - Defrost - defrost system has failed.

- 7 The "system check/reset" provides a review of all diagnostic codes in order of priority. Touching the reset pad will initiate the review. If no failure is detected, the review sequence will continue until the system is reset. Touching the "system check/reset" pad will erase the PF and CI codes. However, the electronic system is programmed to prevent the FF and dE codes from being erased unless the condition has been corrected. The FF code can be erased only when the freezer temperature is reduced to normal. The dE code will automatically be erased when defrost current is detected by the electronic system.

### SYSTEM CHECK/RESET

TOUCH:

**SYSTEM CHECK**

OBSERVE:

**DIAGNOSTIC CODE SEQUENCE FF, PF, CI, dE  
& SIMULTANEOUS "NORMAL"**

- "NORMAL" REMAINS LIT
  - IF NO FAULT DETECTED
- DIAGNOSTIC CODE DISPLAYED
  - IF FAULT DETECTED



# 1993 REFRIGERATORS

## Electrical Operation - non-electronic

A new single-pole, double-throw rocker type switch is used for the freezer door interlock. The new switch, located at the lower left front corner of the cabinet, also controls the freezer light. Thus, when the freezer door is opened, the interior lamp is illuminated but no dispenser functions are operational.

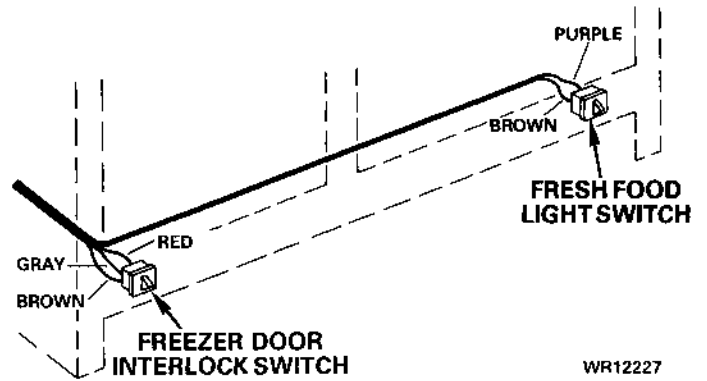
On non-electronic models, slide switches are used to operate the dispenser recess light and to select water, crushed ice or cubes.

When the light switch is set to the "on" position, the recess light will be continuously illuminated. When the light switch is set to the "off" position, the recess light will be automatically illuminated while the pad is pressed (pad switch is closed).

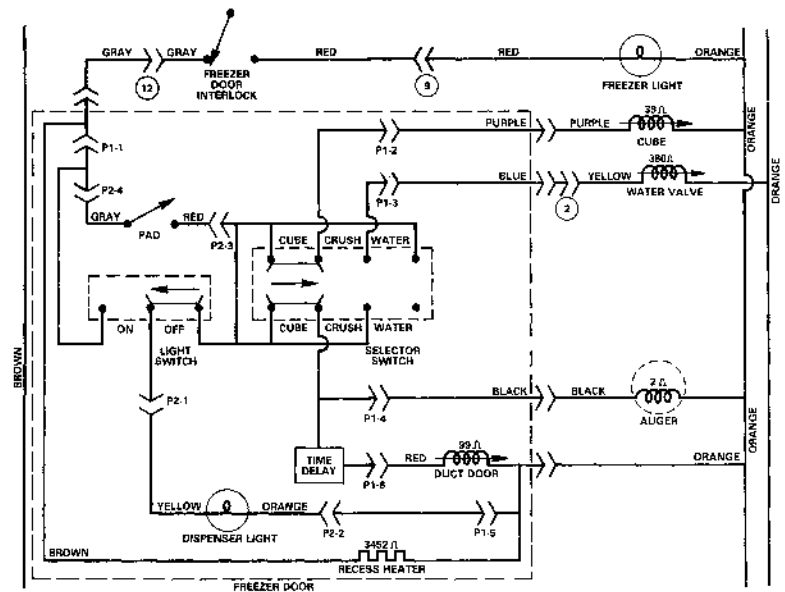
When the selector switch is set to the "cubed ice" position and the pad is pressed, the cube solenoid, auger motor and duct door solenoid are energized. Then, ice cubes will be dispensed in the same manner as on previous models. The time delay circuit will continue to supply line voltage to the duct door solenoid for 5 to 10 seconds after the pad switch is opened.

When the selector switch is set to the "crushed" position, and the pad is pressed, the auger motor and duct door solenoid are energized. Then, crushed ice will be dispensed to the dispenser recess in the same manner as on previous models. As when dispensing ice cubes, the time delay circuit will continue to supply line voltage to the duct door solenoid for 5 to 10 seconds after the pad switch is opened.

When the selector switch is set to the "water" position and the pad is pressed, the water valve is energized. Then, chilled water from the water reservoir will be dispensed in the same manner as on previous models.



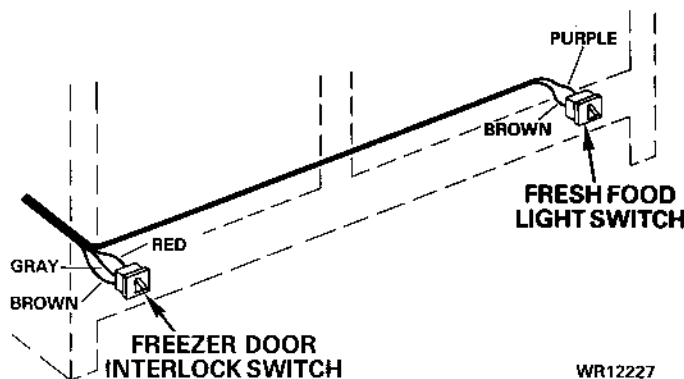
WR12227



# 1993 REFRIGERATORS

## Electrical Operation - electronic

On electronic dispenser models, the freezer door interlock switch is the same as used on non-electronic dispenser models. Although a bypass circuit to the dispenser light, power module and recess heater is provided by a brown wire that enters the freezer door through the top hinge. Thus when the freezer door is opened voltage will be continuously applied, not only to the dispenser light and recess heater, but most importantly to the power module and electronic circuits.

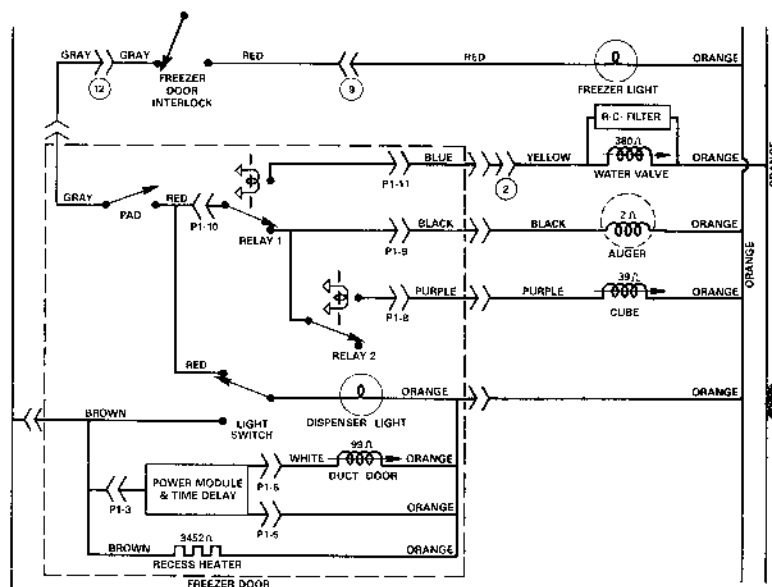


WR12227

A small single-pole, double-throw rocker type switch is used to operate the dispenser recess light.

When the light switch is turned on, the recess light will be continuously illuminated. When the light switch is turned off, the recess light will be automatically illuminated while the pad is pressed (pad switch is closed).

When "chilled water" is selected, Relay 1 closes the circuit to the water valve. Then, when the pad is pressed, the water valve is energized and chilled water will be dispensed in the same manner as on non-electronic models.



When "crushed ice" is selected, Relay 1 closes the circuit to the auger motor. Then, when the pad is pressed, the auger motor is energized and an electronic pad switch sense signal to power module energizes the duct door solenoid. Thus, crushed ice will be dispensed. The time delay circuit will continue to supply line voltage to the duct door solenoid for 5 to 10 seconds after the pad switch is opened.

When "cubed ice" is selected, Relay 1 closes the circuit to the auger motor and Relay 2 closes the circuit to the cube solenoid. Then, when the pad is pressed, the auger motor, cube solenoid and duct door solenoid are energized and ice cubes will be dispensed. The duct door solenoid will remain energized for an additional 5 to 10 seconds after the pad switch is opened.

# 1993 REFRIGERATORS

## SXS DISPENSER SERVICE

All electrical components (except the recess heater) are easily accessible from the front of the door. Accordingly, there is no service opening provided in the freezer inner door. Caution: disconnect the power source to prevent an electrical shock hazard and/or inadvertent dispensing of water or ice while servicing the dispenser.

### Pad

To remove the pad -- grasp it at one edge and pull it forward to disengage the inner lip (grommet) from the opening in the pad support.

To reinstall the pad -- position the inner lip into the opening in the pad support, engaging the rib at the top into the slot. Press the pad firmly at the top, sides and bottom to seat the lip.

### Pad Support

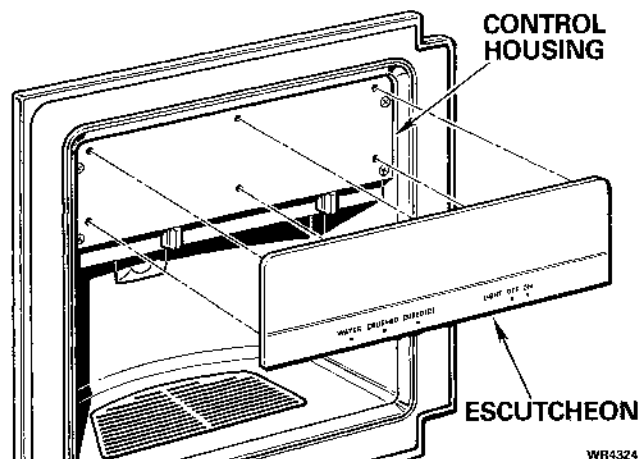
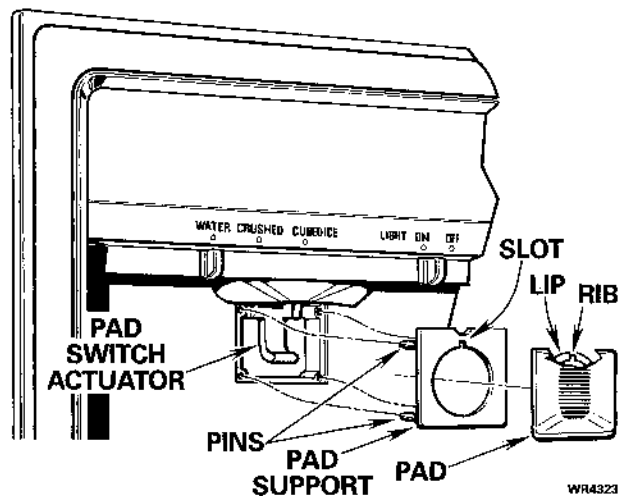
To remove the pad support -- first remove the pad. Then, reach through the opening with fingertips and gradually pull the support forward at each corner to disengage the molded pins from the recess housing. Caution: excessive force applied at one corner may result in breaking a molded pin from the support.

To reinstall the pad support -- first, reinstall the pad on the pad support. Then, position the support so that the slot is at the top of the opening. Engage the molded pins into the mounting holes and gradually press the support at each corner until it is firmly seated.

### Escutcheon

To remove the escutcheon -- insert the blade of a putty knife behind the escutcheon at the bottom. Twist the putty knife to disengage the molded pins from the front of the control housing.

To reinstall the escutcheon -- position the molded pins into the holes in the front of the control housing and press the escutcheon firmly to seat the pins.

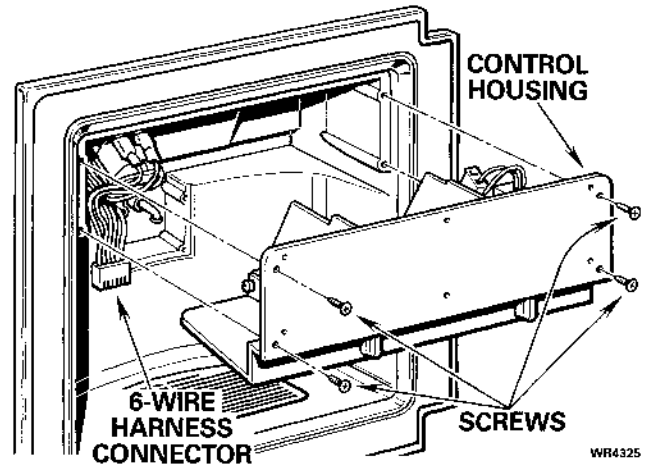


# 1993 REFRIGERATORS

## Control Housing

To remove the control housing -- first remove the pad, the pad support and the escutcheon. Then, remove the screws at the front of the housing. Pull the housing forward about 1-inch and disconnect the 6-wire harness connector from the left end of the control module (printed circuit board).

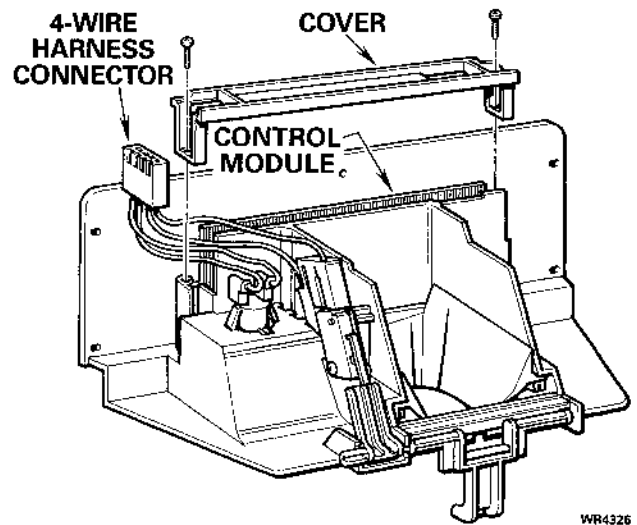
To reinstall the control housing -- reconnect the 6-wire harness connector to the control module. Push the control housing firmly into position and reinstall the screws. Then, reinstall the escutcheon, pad support and pad.



## Control Module

To remove the control module -- first remove the control housing. Then, remove the knobs from the selector switch and light switch by pulling them straight downward. Disconnect the 4-wire harness connector from the control module. Remove the screws at the ends of the cover and lift the cover from the control housing. Grasp the edges of the control module and lift it out of the slots in the control housing.

To reinstall the control module -- position it into the slots in the control housing so that the 4-pin connector is at the end nearest the 4-wire harness connector. Then, reinstall the cover. Reconnect the 4-wire harness connector to the control module and dress the harness downward to prevent pinched wires when the control housing is reinstalled. Reinstall the switch knobs, control housing, escutcheon, pad support and pad.

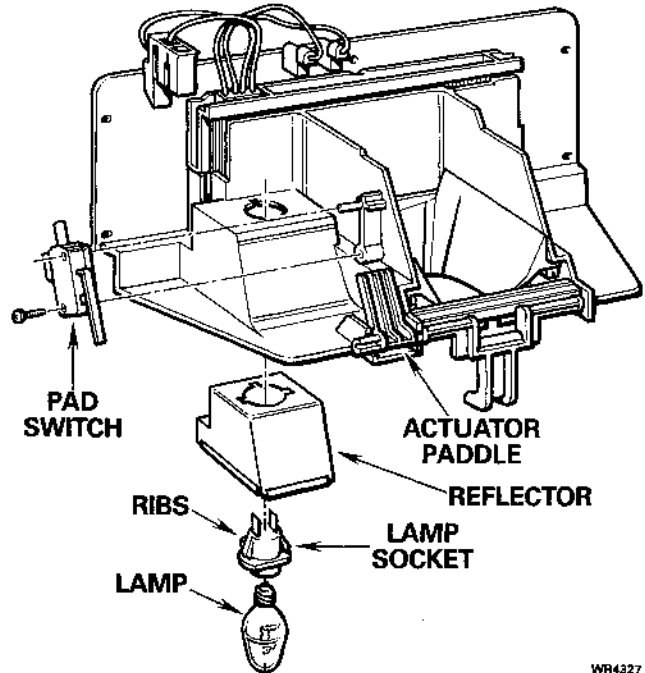


# 1993 REFRIGERATORS

## Lamp Socket

To remove the lamp socket -- first remove the control housing. Then, disconnect the wiring harness from the lamp socket. Compress the tabs at the sides of the socket and withdraw the socket and lamp reflector from the bottom of the control housing.

To reinstall the lamp socket -- position it inside the reflector, aligning the ribs and tabs with the slots in the reflector. Then, position the socket and reflector into the cavity in the control housing and press the socket firmly to lock the tabs. Reinstall the wiring harness, control housing, escutcheon, pad support and pad.



## Pad Switch

To remove the pad switch -- first remove the control housing. Then, disconnect the wiring harness from the switch. Remove the screw at the bottom of the switch and slide the switch off of the mounting pin.

To reinstall the pad switch -- position it on the mounting pin so that the terminals are at the top and the switch lever is toward the rear, but in front of the actuator paddle. Then, reinstall the screw at the bottom of the switch and reconnect the wiring harness. Caution: check the position of the switch lever to verify that it is in front of the actuator paddle by rotating the actuator and observing the operation of the switch. Reinstall the control housing, escutcheon, pad support and pad.

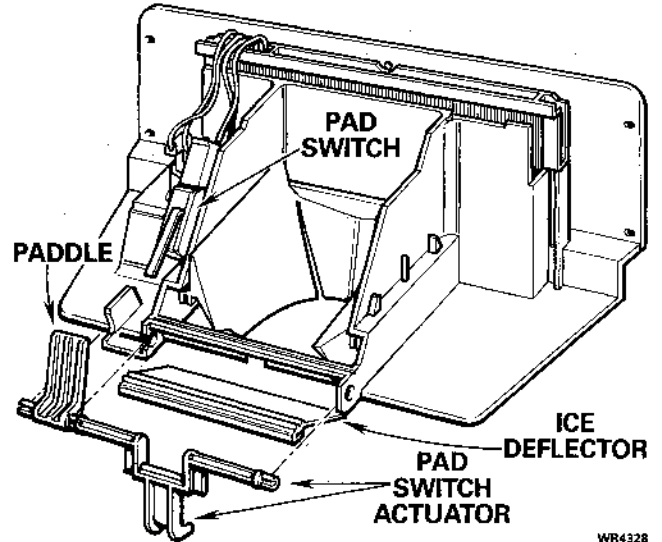
WR4327

# 1993 REFRIGERATORS

## Pad Switch Actuator

To remove the pad switch actuator -- first remove the control housing. Then, press the actuator out of the notch and hole at the rear of the control housing.

To reinstall the pad switch actuator -- position it into the hole and notch at the rear of the control housing so that the actuator paddle is behind the switch lever. Then, press the actuator firmly to seat it into the notch. Caution: verify operation of the switch by rotating the actuator. Reinstall the control housing, escutcheon, pad support and pad.



## Ice Deflector

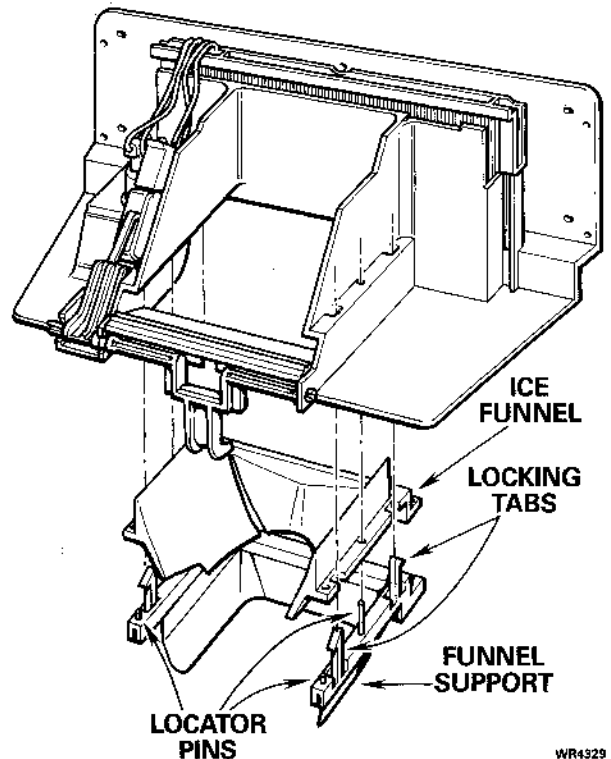
To remove the ice deflector -- first remove the control housing and the pad switch actuator. Then, grasp the rear edge of the ice deflector and pull it from the control housing.

To reinstall the ice deflector -- position the flap below the rear edge of the ice funnel and engage the channel over the rear edge of the control housing. Then, press the deflector until it is firmly seated. Reinstall the pad switch actuator, control housing, escutcheon, pad support and pad.

## Ice Funnel

To remove the ice funnel -- first remove the control housing. Then, using a small blade screwdriver, release the funnel support locking tabs that engage the control housing. When all four tabs are released, withdraw the funnel and support from the bottom of the control housing. Pull the funnel off of the support.

To reinstall the ice funnel -- position it on the funnel support, engaging all of the locator pins into corresponding holes at the edges of the funnel. Then, position the funnel and support into the cavity in the control housing and press the support firmly to lock the tabs. Dress the ice deflector flap below the rear edge of the funnel. Reinstall the control housing, escutcheon, pad support and pad.

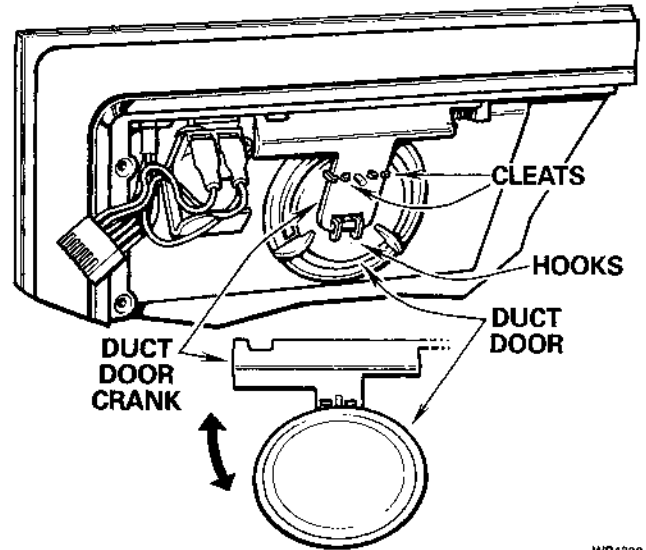


# 1993 REFRIGERATORS

## Duct Door

To remove the duct door -- first remove the control housing. Then, open the duct door and disengage the cleats from the duct door crank by pressing the top of the door toward the rear. Swing the top of the door down and pull it downward to release the hooks from the end of the crank.

To reinstall the duct door -- position it in front of the crank with the hooks at the top and the gasket surface toward the front. Then, pull the duct door crank forward and engage the hooks over the end of the crank. Swing the door up and engage the cleats onto the crank. Reinstall the control housing, escutcheon, pad support and pad.

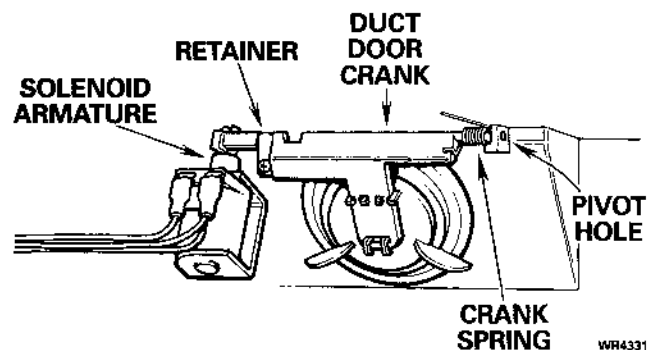


WR4330

## Duct Door Crank

To remove the duct door crank -- first remove the control housing. Then, remove the screw and retainer at the left end of the crank. Grasp the right end of the crank, at the lower end of the crank spring, and disengage the crank from the solenoid armature at the left and from the pivot hole at the right. Withdraw the crank, spring and door. Remove the spring and door.

To reinstall the duct door crank -- position the crank spring over the end of the crank, engaging the hook into the hole in the crank. Grasp the right end of the crank, at the lower end of the crank spring, and engage the crank into the pivot hole at the right. Then, engage the left end into the slot in the solenoid armature and position the crank into the notch at the left. While holding the crank, reinstall the retainer and screw at the left end. Caution: verify that the crank is engaged into the slot of the armature by pushing the armature into the solenoid and observing the operation of the duct door. Reinstall the duct door, control housing, escutcheon, pad support and pad.

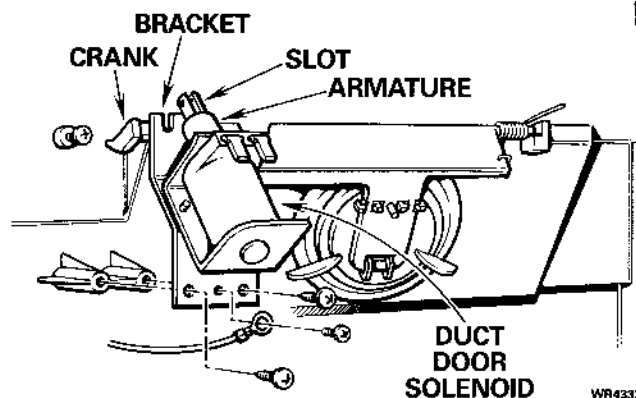


WR4331

# 1993 REFRIGERATORS

## Duct Door Solenoid

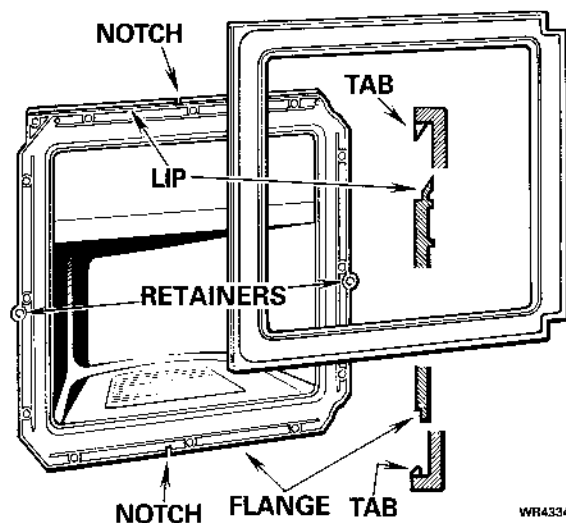
To remove the duct door solenoid -- first remove the control housing. Then, disconnect the wiring harness from the solenoid terminals. Remove the ground screw and two mounting screws at the bottom of the solenoid bracket. While holding the solenoid, loosen the mounting screw at the top of the bracket. Open the duct door and withdraw the solenoid, armature and bracket. Remove two screws at the back of the bracket to dismount the solenoid.



To reinstall the duct door solenoid -- first mount the solenoid to the bracket and position the armature in the solenoid so that the slot is aligned front-to-rear. Then, open the duct door and position the solenoid assembly to engage the upper mounting screw into the slot at the top of the bracket. Close the door and engage the left end of the crank into the slot in the armature. While holding the solenoid, reinstall the lower mounting screws and tighten the upper mounting screw. Reattach the ground wire and the wiring harness. Caution: verify that the crank is engaged into the slot of the armature. Reinstall the control housing, escutcheon, pad support and pad.

## Recess Trim

To remove the recess trim -- insert the blade of a putty knife behind the trim at the bottom left corner and pry it from the recess housing along the bottom. Then, with fingertips, pull the trim at the sides to disengage the pins from the retainers and lift the trim off.



To reinstall the recess trim -- first, twist the retainers at the sides of the recess housing so that the retainer barbs will grip the pins of the trim in new (unscored) locations. Then, position the tabs along the top edge of the trim over the lip of the recess housing and engage the locator guide into the notch in the lip. While holding the trim in position, engage the pins into the retainers and press the trim firmly to seat the pins and tabs along the bottom. Make sure the locator guide engages the notch at the bottom of the housing.



# 1993 REFRIGERATORS

## Door Handle

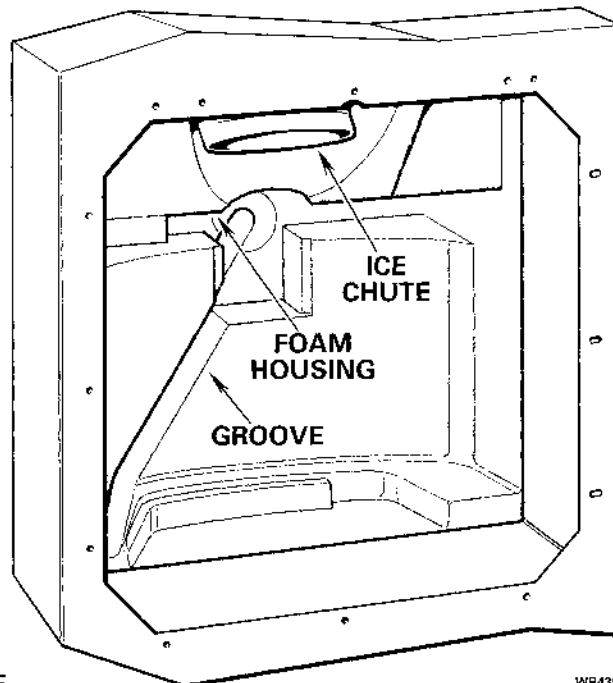
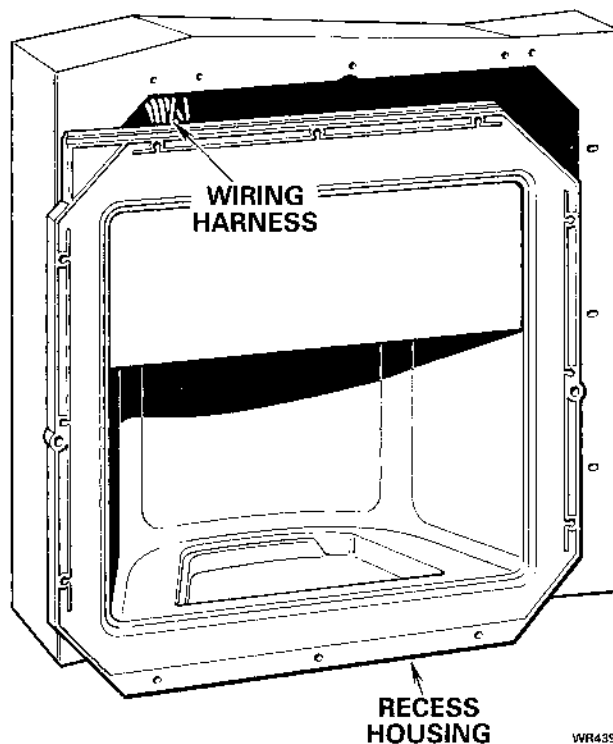
To remove the door handle -- use a small blade screwdriver and, beginning at the bottom, carefully pry one side of the handle insert from the channels. If the handle insert is to be replaced, rather than reinstalled, use slip-joint pliers to crush the insert and thereby avoid possible damage to the channels. Then, remove the screws at the top and bottom of the handle.

To reinstall the door handle -- position it on the door and drive the screws at the top and bottom of the handle. Then, position the handle insert into the channels and gently tap it into the channels with a soft rubber mallet.

## Recess Assembly

To dismantle the recess assembly -- first, remove the recess trim. Then, remove the screws at the perimeter of the recess housing. Gently pull the recess assembly at the left side until it is out of the opening in the freezer door. (The wiring harness, extending above the recess, and the water tubing, extending below the recess, will prevent complete removal of the recess assembly.)

To remount the recess assembly -- position it into the opening in the freezer door, beginning at the top and right side. Position the water tubing behind the recess housing and into the groove in the foam insulation. Caution: unless the tubing is in the groove, it may become pinched and interfere with the installation of the recess assembly. Dress the wiring harness at the upper left side to prevent pinching of wires. Engage the ice chute into the duct opening at the top of the recess housing. Then, Push the recess assembly to firmly seat it in the opening in the freezer door. Reinstall the screws at the perimeter of the recess housing. Reinstall the recess trim.



# 1993 REFRIGERATORS

## Water Tubing

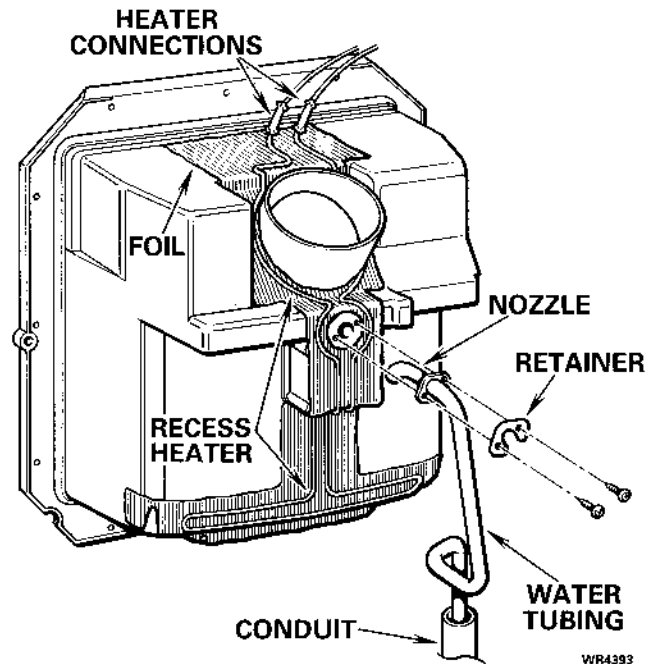
To remove the water tubing -- first, dismount the freezer door from the cabinet and place it on a protected surface so that the outer door is facing upward. Then, dismount the recess assembly. Remove the screws and retainer that secure the water tubing nozzle to the rear of the recess housing and pull the nozzle out of the housing. Pull the tubing out of the freezer door.

To reinstall the water tubing -- first, insert the lower end of the tubing into the conduit and feed it through the door until it exits at the lower hinge thimble. Then, insert the tubing nozzle through rear of the recess housing and secure it with the retainer and screws. Remount the recess assembly. Remount the freezer door and reconnect the tubing at the bottom of the door.

## Recess Heater

To remove the recess heater -- first, dismount the recess assembly. Then, dismount the water tubing nozzle from the rear of the recess housing. Cut the orange and brown wires close to the heater connections and peel the heater foil from the top and rear of the recess housing.

To install a new recess heater -- first, peel the paper backing from the heater foil. Then, carefully, position the foil on the rear of the recess housing, beginning at the hole for the water tubing nozzle. Continue to press the foil onto the rear and top of the recess housing so that it makes good contact along the entire length of heater wire. Reconnect the brown and orange wires to the heater leads, using closed-end connectors for the splices. Remount the water tubing to the rear of the recess housing. Remount the recess assembly.



WR4393

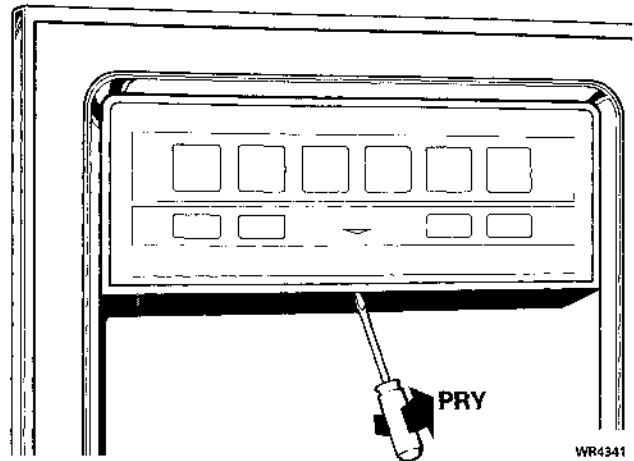
# 1993 REFRIGERATORS

## Control Console - electronic models

To remove the control console -- insert a small blade screwdriver behind the console at the bottom, near the center, and pry forward to disengage the tabs from the control housing. Then, pull the console downward and disconnect the wiring harness connectors from the rear of the control board.

To reinstall the control console -- reconnect the wiring harness connectors to the control board and engage the channel at the top of the console into the slot at the top of the control housing. Then, gently press the lower edge of the console to engage the mounting tabs into the holes in the control housing.

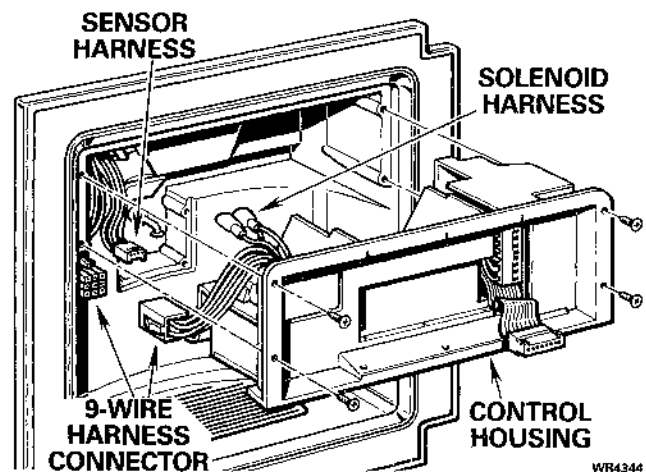
Caution: when handling the control console, care must be taken to prevent damage from electrostatic discharge. Grasp the console by the edges and do not touch the connector pins or circuit paths on the control board. Leave the conductive pad on the replacement board until just before connecting the wiring harness connectors.



## Control Housing - electronic models

To remove the control housing -- first remove the pad, the pad support and the control console. Then, remove the screws at the front of the control housing. Pull the housing forward and disconnect the 9-wire harness connector and the wiring harness from the solenoid terminals.

To reinstall the control housing -- reconnect the 9-wire harness connector and the wiring harness to the solenoid terminals. Position the sensor harness through the opening at the left side of the housing. Dress the wiring harness to prevent pinching of wires. Then, push the control housing firmly into position and reinstall the screws. Reinstall the control console, pad support and pad.

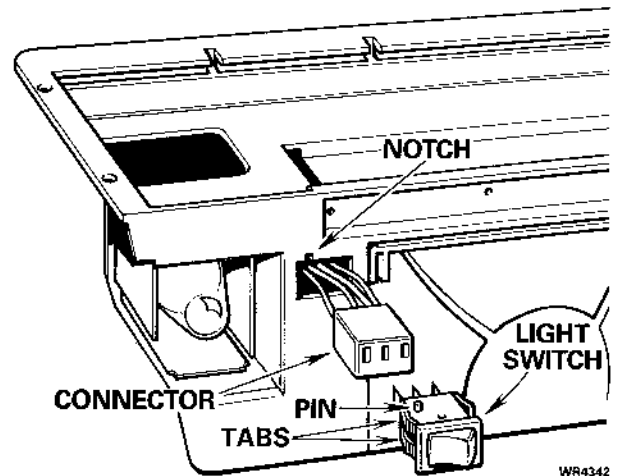


## 1993 REFRIGERATORS

### Light Switch - electronic models

To remove the light switch -- first remove the control console and dismount the control housing. Then, disconnect the wiring harness from the switch. Compress the tabs at the end of the switch and press it out of the control housing.

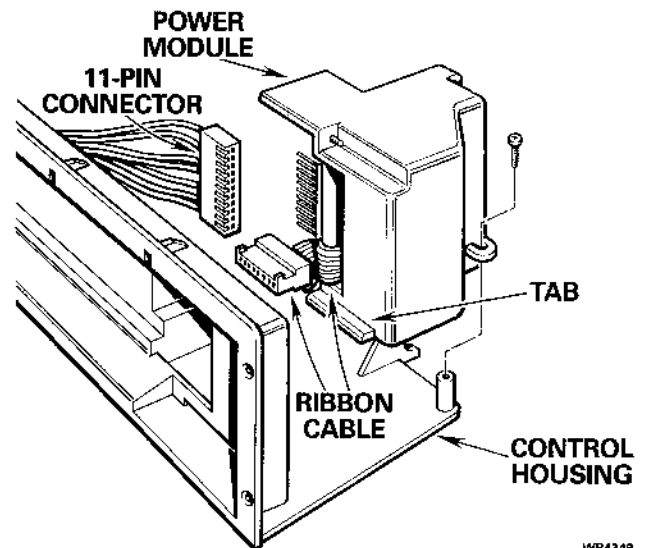
To reinstall the light switch -- press the switch terminals firmly into the wiring harness connector. Align the pin on the front of the switch with the notch in the switch opening and press the switch firmly to lock the tabs. Then, remount the control housing and reinstall the control console.



### Power Module - electronic models

To remove the power module -- first remove the control housing. Then, remove the screw at the rear of the power module. Pull the power module to the rear to disengage the tab from the slot in the control housing. Disconnect the 11-pin connector from the power module board.

To reinstall the power module -- dress the ribbon cable through the opening in the front of the control housing and reconnect the 11-pin connector to the power module board. Engage the tab on the module housing into the slot in the control housing and reinstall the screw at the rear of the module housing. Then, reinstall the control housing, control console, pad support and pad.

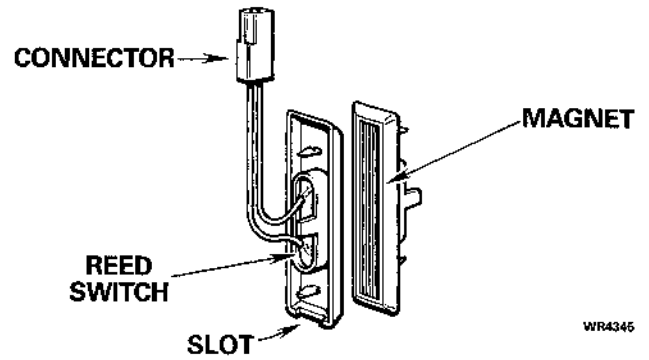


# 1993 REFRIGERATORS

## Door Alarm Sensor - electronic models

The door alarm sensor consists of a reed switch mounted on the right edge of the freezer door and a magnet mounted on the left edge of the fresh food door, (opposite the reed switch). The normally-open contacts of the reed switch are held closed by the magnet when both doors are closed.

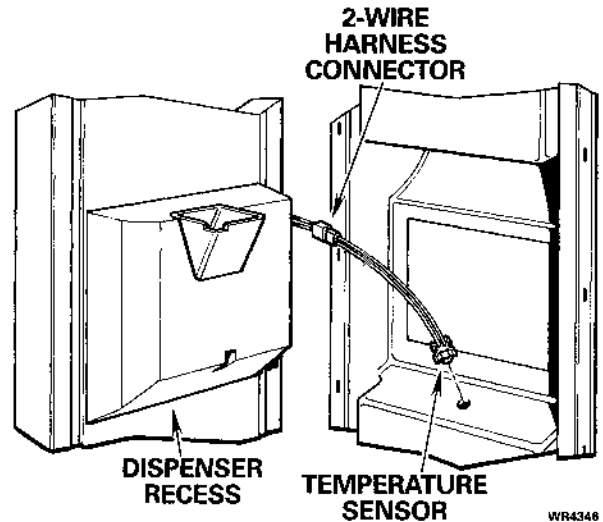
The reed switch and the magnet are both replaceable separately from the outside of the doors. To remove either the reed switch or the magnet, insert the tip of a small blade screwdriver into the slot at the base of the plastic housing and gently pry outward. The reed switch has a 2-wire harness connector to facilitate replacement.



## Temperature Sensor - electronic models

The freezer temperature sensor consists of a thermistor, mounted to the inner door below the dispenser recess. The thermistor has a negative temperature coefficient which results in a high resistance at a low temperature and a low resistance at a high temperature.

To remove the temperature sensor, first remove the freezer inner door. Then, disconnect the 2-wire sensor harness connector at the rear of the dispenser recess. Grip the plastic sensor housing with pliers and firmly pull it out of the mounting hole in the inner door.

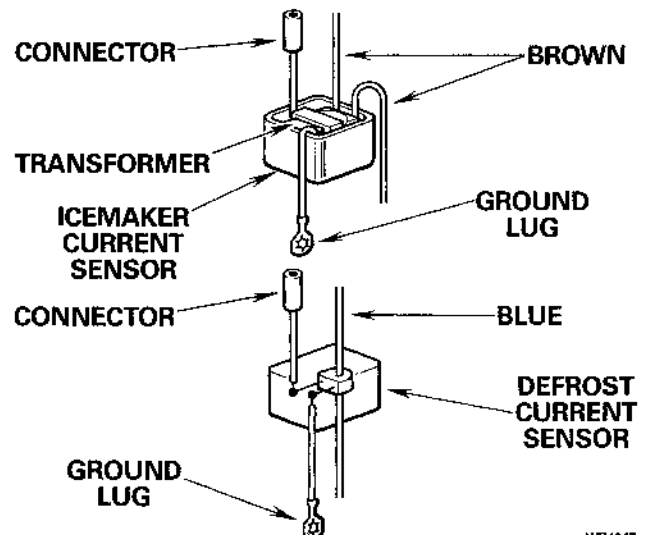


## Current Sensors - electronic models

The icemaker and defrost current sensors are integral components of the cabinet wiring harness. Both sensors are located above the evaporator at the rear of the freezer liner.

The icemaker current sensor consists of a small transformer that has primary and secondary windings. The primary winding is connected to brown wires, in series with the icemaker.

The defrost current sensor consists of a small bobbin (coil of wire) placed over the blue wire to the defrost heaters.



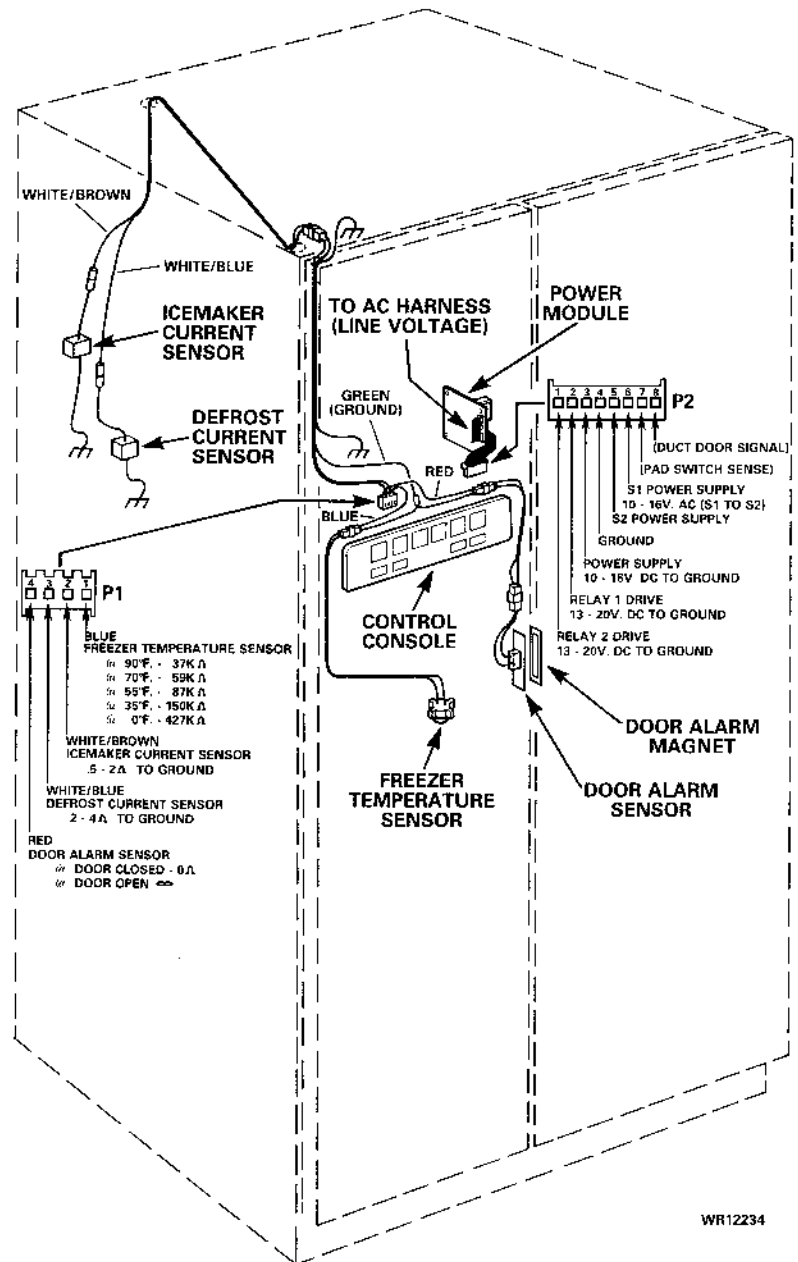
# 1993 REFRIGERATORS

## ELECTRONIC SYSTEM DIAGNOSIS

Any visual or audible response from the control console is an indication that the transformer and a major portion of the power module are functioning. If the power module relays can be heard opening and closing, as the water and ice pads are touched, this indicates the relay coils are being energized.

### Resistance/Voltage Measurements

Resistance and voltage measurements can be conveniently made at the control console by removing the control console and disconnecting the wiring harness connectors. Resistance measurements can be made of all of the sensors from the P1 (4-wire) connector. Also, voltage measurements can be made from the P2 (8-wire) connector to verify the power supply and relay drive voltages from the power module assembly. Use meter lead probes that have a needle point. Refer to the Mini-Manual for the proper voltage and resistance measurements of a particular model.



# 1993 REFRIGERATORS

## Icemaker/Defrost Current Check

The electronic system also provides a means for checking icemaker and defrost current flow by touching and holding the "system check/reset" and "cubed ice" pads simultaneously. If current is detected in either the icemaker or defrost circuits, the corresponding diagnostic code can be observed on the display. If icemaker current is detected, the C code will be displayed. If defrost current is detected, the d code will be displayed. The dC code will be displayed when current is flowing in both the icemaker and defrost circuits.

## Power Up Reset

The electronic system also provides a means for simulating a power up routine without disconnecting the power cord. The power up routine demonstrates that the power module, microprocessor and the timing functions (on the control board) are operative by providing a visual check of the display, the five indicator lights and the "normal" light, plus an audible check of the beeper.

**NOTE:** A power up reset will erase all diagnostic codes and reset the timing function of the electronic system.

To initiate the power up reset, touch the "system check/reset" and "crushed ice" pads simultaneously. Then, observe:

One beep will be sounded then, for five seconds, the "normal" indicator and all other red and green indicators will be illuminated and the display will show 8E.

After five seconds, the display will show a flashing PF, the "normal", "crushed ice" and "door alarm" indicators will remain illuminated. The "door open" indicator will remain illuminated if either door is open. The "warm temperature" indicator will remain illuminated if the freezer temperature is above 55° F. The recess light will not be illuminated.

## Diagnosis Guide

A diagnosis guide, consisting of 6 steps, is provided with the Mini-Manual to assist in quickly detecting an abnormal occurrence in the electronic system. No tools or test equipment will be required if the system is performing normally.

## **ICEMAKER/DEFROST CURRENT CHECK** TOUCH & HOLD SIMULTANEOUSLY:

SYSTEM CHECK

+ CUBED ICE

OBSERVE:

d = DEFROST CURRENT

C = ICEMAKER CURRENT

dC = DEFROST & ICEMAKER CURRENT

## **POWER UP RESET**

TOUCH SIMULTANEOUSLY:

SYSTEM CHECK

+ CRUSHED ICE

OBSERVE:

ONE BEEP,

ALL LED INDICATORS LIT 5 SECONDS,  
8E DISPLAYED, THEN

• FLASHING PF DISPLAYED

• "NORMAL" LIT

• "CRUSHED ICE" LIT

• "DOOR ALARM" LIT

• "DOOR OPEN" LIT & BEEPER BEEPS

- IF DOOR OPEN

• "WARM TEMP" LIT

- IF TEMPERATURE ABOVE 55°F

**SYSTEM CHECK/RESET**

TOUCH:

**SYSTEM CHECK**

- OBSERVE:  
 DIAGNOSTIC CODE SEQUENCE *FF*, *PF*, *CI*, *dE*  
 & SIMULTANEOUS "NORMAL"  
 • "NORMAL" REMAINS LIT  
 - IF NO FAULT DETECTED  
 • DIAGNOSTIC CODE DISPLAYED  
 - IF FAULT DETECTED

**POWER UP RESET**

TOUCH SIMULTANEOUSLY:

**SYSTEM CHECK** + **CRUSHED ICE**

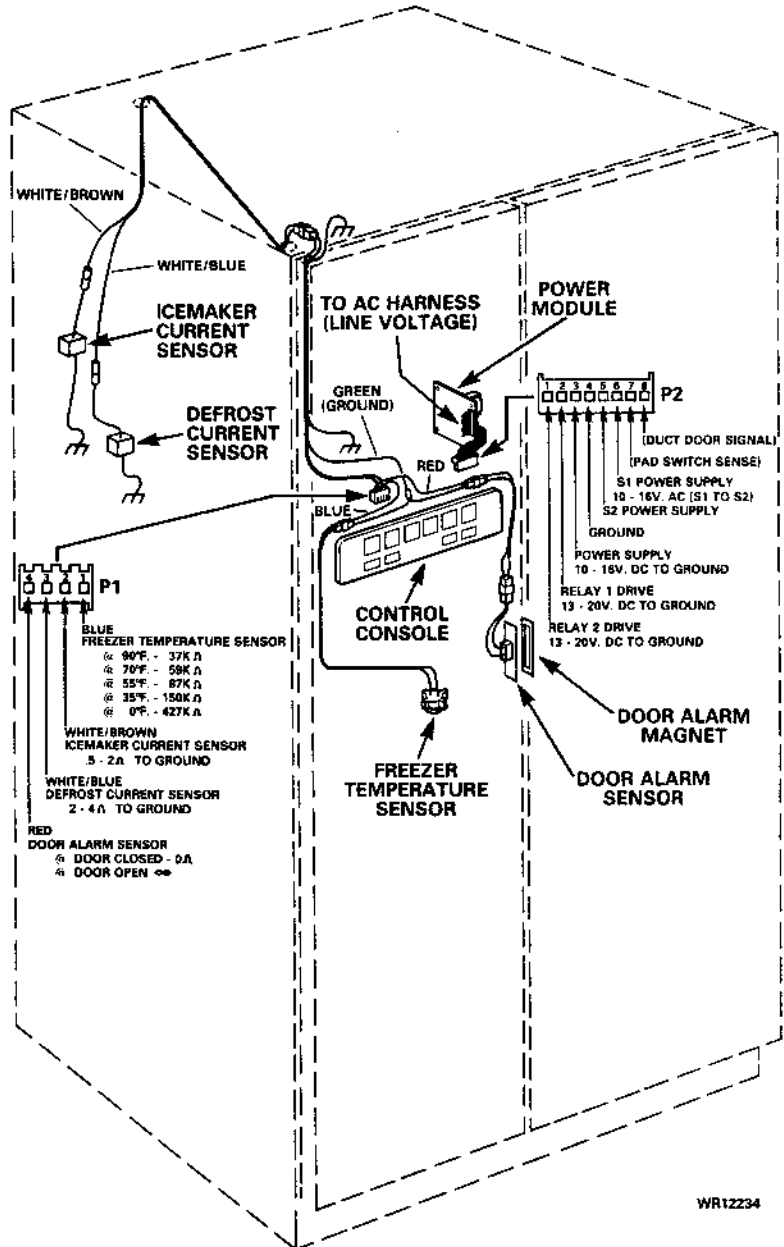
- OBSERVE:  
 ONE BEEP,  
 ALL LED INDICATORS LIT 5 SECONDS,  
*EE* DISPLAYED, THEN  
 • FLASHING *PF* DISPLAYED  
 • "NORMAL" LIT  
 • "CRUSHED ICE" LIT  
 • "DOOR ALARM" LIT  
 • "DOOR OPEN" LIT & BEEPER BEEPS  
 - IF DOOR OPEN  
 • "WARM TEMP" LIT  
 - IF TEMPERATURE ABOVE 55°F

**ICEMAKER/DEFROST CURRENT CHECK**

TOUCH & HOLD SIMULTANEOUSLY:

**SYSTEM CHECK** + **CUBED ICE**

- OBSERVE:  
*d* = DEFROST CURRENT  
*C* = ICEMAKER CURRENT  
*dC* = DEFROST & ICEMAKER CURRENT



WR4333

WR12234



MONITOR/DIAGNOSTIC CODE	CONDITIONS/SPECIFICATIONS	CANCELLATION
DOOR OPEN ALARM BEEPER	FRESH FOOD OR FREEZER DOOR OPEN OR AJAR > 1/4-INCH EITHER DOOR OPEN > 30 SEC.	BOTH DOORS CLOSED BOTH DOORS CLOSED OR ALARM SET OFF
WARM TEMPERATURE	TEMPERATURE > 35°F. > 4 HRS., OR TEMPERATURE > 55°F. > 1 HR., OR TEMPERATURE > 55°F. & PF	TEMPERATURE < 35°F.
CHECK FROZEN FOODS	TEMPERATURE > 35°F. > 6 HRS., OR TEMPERATURE > 55°F. > 2 HRS.	SYSTEM CHECK - RESET AND TEMPERATURE < 35°F.
DEFROST FAULT	NO DEFROST CURRENT > 64 HRS.	DEFROST CURRENT DETECTED
CHECK ICEMAKER	ICEMAKER CURRENT > 5 HRS.	SYSTEM CHECK - RESET OR ICEMAKER CURRENT NO LONGER DETECTED
POWER FAILURE	POWER HAS BEEN OFF > 2 SEC., THEN REAPPLIED	SYSTEM CHECK - RESET

WR4322



**DISCONNECT POWER CORD BEFORE SERVICING  
IMPORTANT - RECONNECT ALL GROUNDING DEVICES**

All parts of this appliance capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

**IMPORTANT SAFETY NOTICE**

This information is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

**ELECTRICAL SPECIFICATIONS**

Temperature Control (Position 5) ..... 30-22°F.  
 Defrost Control ..... 14 hrs. @ 45 min.  
 Defrost Thermostat ..... 68-28°F.  
 Electrical Rating: 115V. AC 60 Hz. .... 10.0 Amp.  
 Maximum Current Leakage ..... 0.50 mA.  
 Maximum Ground Path Resistance ..... 0.14 Ohms  
 Energy Consumption (Humid) ..... 72 KWH/mo.

**NO LOAD PERFORMANCE**

Control Position 5/C  
and Ambient of:

	70°F.	90°F.
Fresh Food, °F. ....	34-40	37-41
Frozen Food, °F. ....	(-1)-5	(-2)-2
Run Time, % .....	27-37	47-63

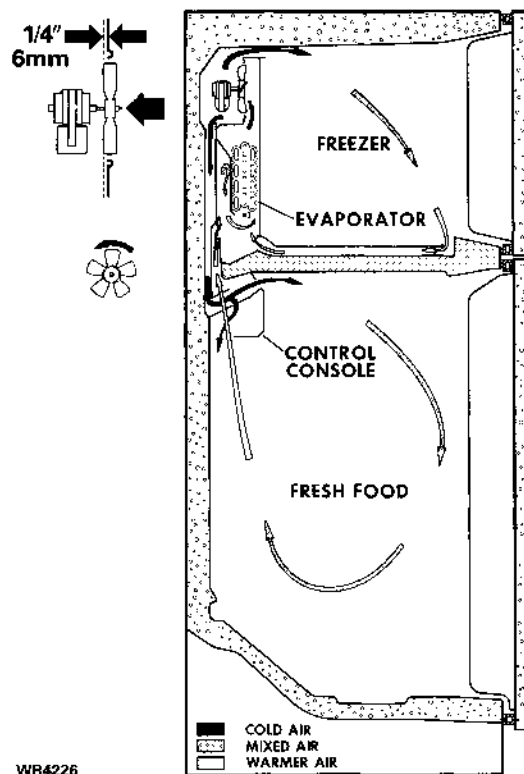
**REFRIGERATION SYSTEM**

Refrigerant Charge (R-12) ..... 8 ounces  
 Compressor ..... 847 BTU/hr.  
 Minimum Compressor Capacity ..... 22 inches  
 Minimum Equalized Pressure  
 @ 70°F. .... 50 PSIG  
 @ 90°F. .... 59 PSIG

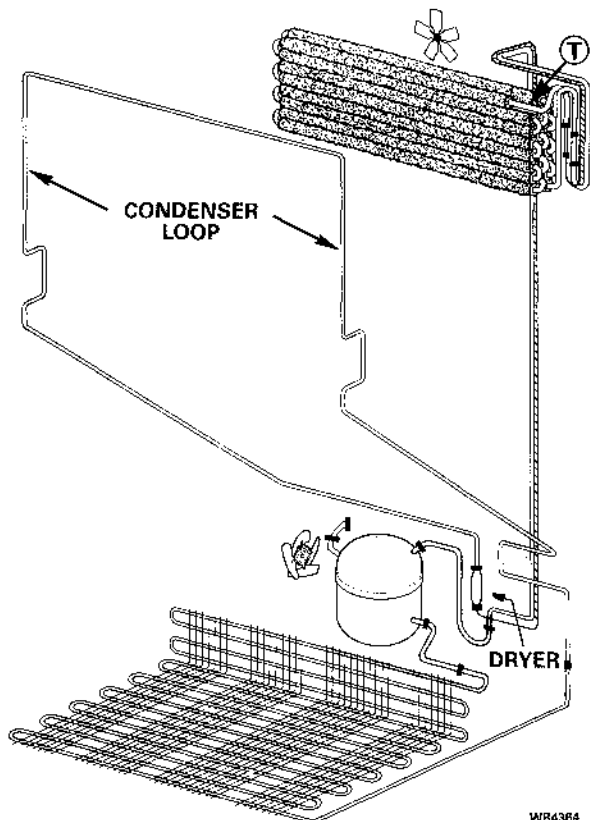
**INSTALLATION**

Clearance must be provided for air circulation:  
 AT TOP ..... 1-inch  
 AT SIDES ..... 3/4-inch  
 AT REAR ..... 1-inch

**AIR FLOW**



WR4226



WR4364

**REPLACEMENT PARTS**

Temperature Control .....	WR09X0517
Relay .....	WR07X0200
Overload .....	WR08X0113
Run Capacitor .....	WR62X0046
Defrost Control .....	WR09X0478
Defrost Thermostat .....	WR50X0119
Defrost Heater .....	WR51X0314
Condenser Fan Motor .....	WR60X0179
Evaporator Fan Motor .....	WR60X0190

**DISCONNECT POWER CORD BEFORE SERVICING**  
**IMPORTANT - RECONNECT ALL GROUNDING DEVICES**

All parts of this appliance capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

**IMPORTANT SAFETY NOTICE**

This information is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

**ELECTRICAL SPECIFICATIONS**

Temperature Control (Position 5)	37-22°F.
Defrost Control	16 hrs. @ 35 min.
Defrost Thermostat	60-28°F.
Electrical Rating: 115V. AC 60 Hz.	11.6 Amp.
Maximum Current Leakage	0.50 mA.
Maximum Ground Path Resistance	0.14 Ohms
Energy Consumption	75 KWH/mo.

**NO LOAD PERFORMANCE**

Control Position 5/C and Ambient of:	<b>70°F.</b>	<b>90°F.</b>
Fresh Food, °F.	33-39	37-41
Frozen Food, °F.	2-8	(-1)-3
Run Time, %	35-45	45-61

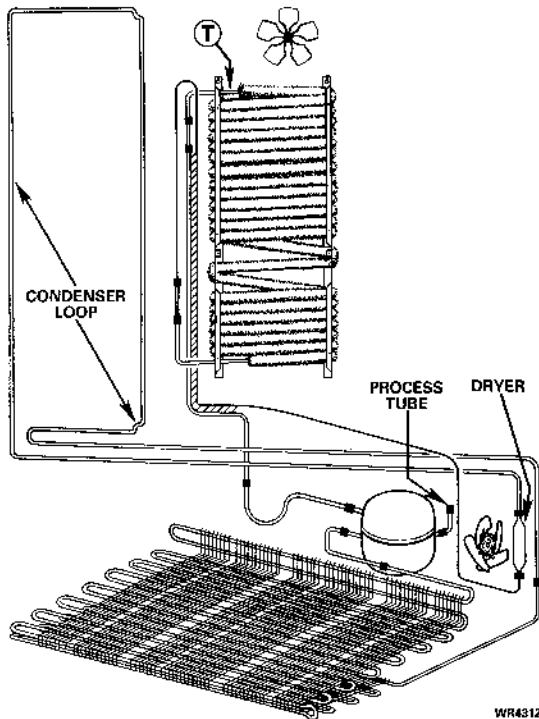
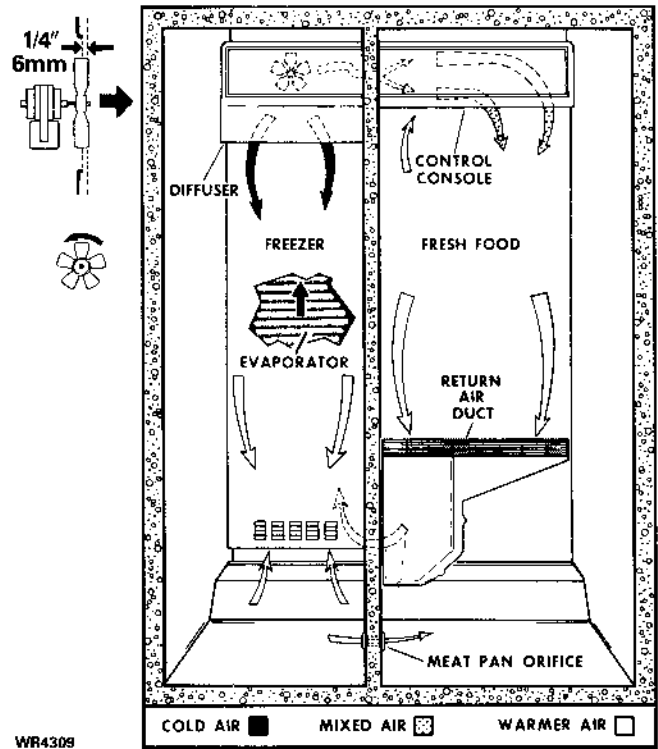
**REFRIGERATION SYSTEM**

Refrigerant Charge (R-12)	9 ounces
Compressor	1042 BTU/hr.
Minimum Compressor Capacity	23 inches
Minimum Equalized Pressure	
@ 70°F.	51 PSIG
@ 90°F.	65 PSIG

**INSTALLATION**

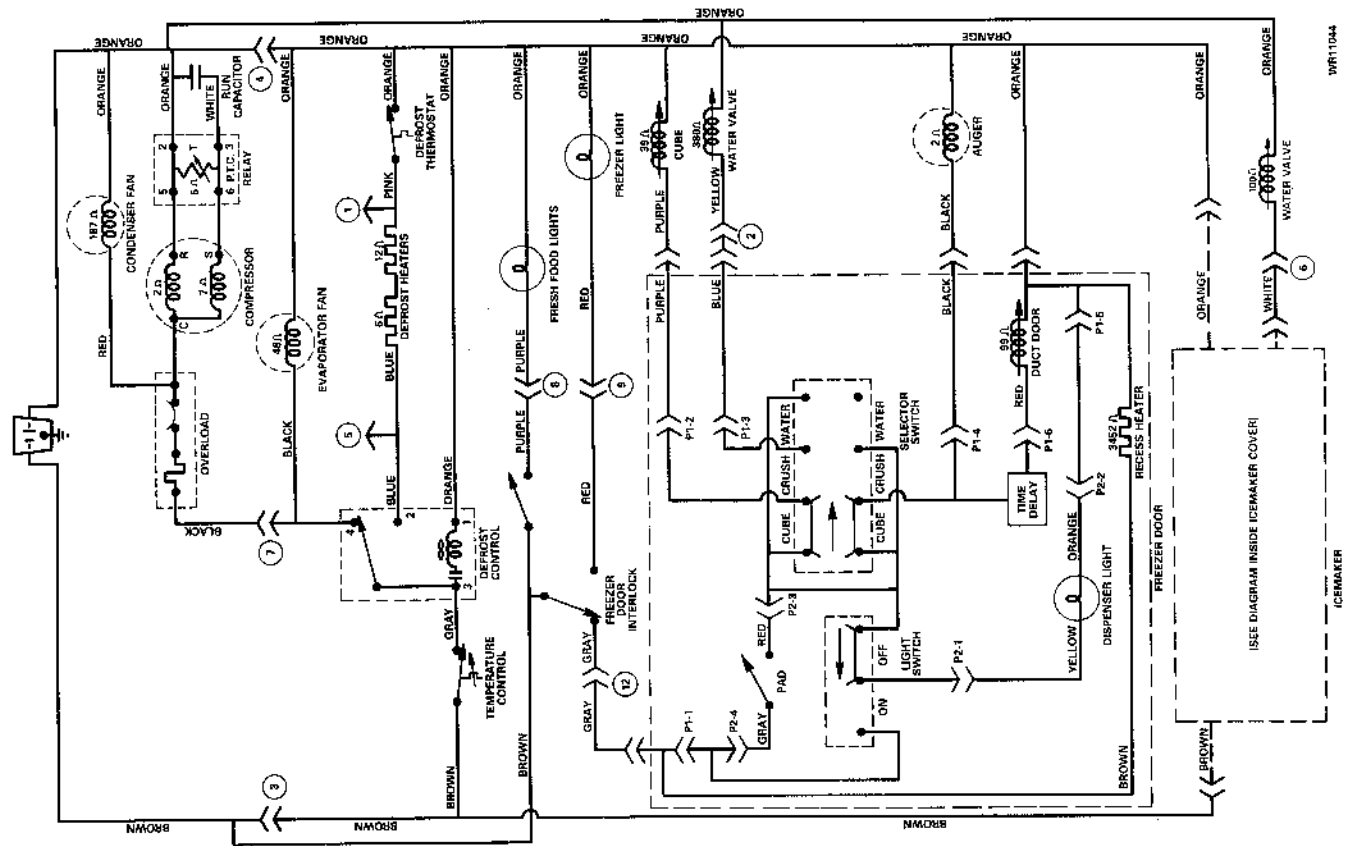
Clearance must be provided for air circulation:  
 AT TOP ..... 1-inch  
 AT SIDES ..... 5/8-inch  
 AT REAR ..... 1-inch

**AIR FLOW**

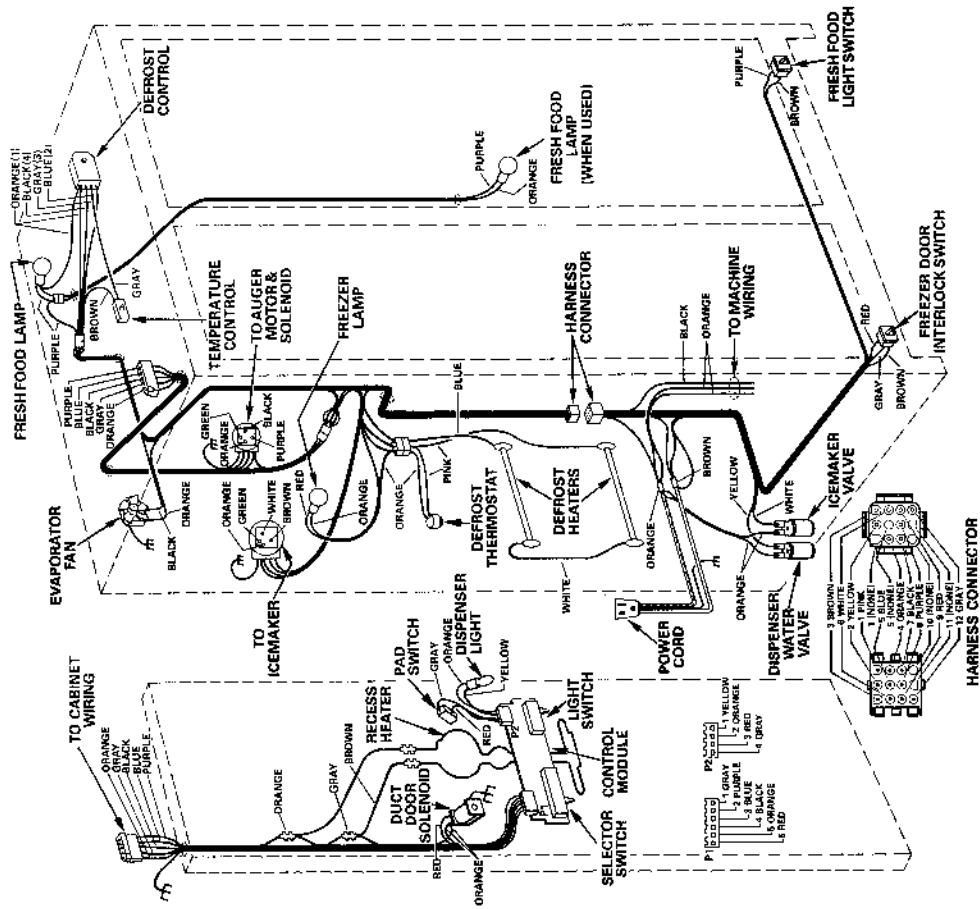


**REPLACEMENT PARTS**

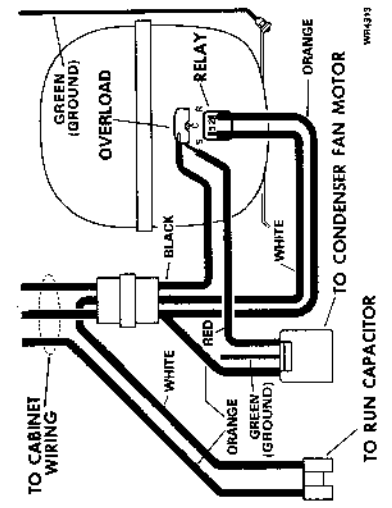
Temperature Control	WR09X0499
Relay	WR07X0190
Overload	WR08X0114
Run Capacitor	WR62X0052
Defrost Control	WR09X0489
Defrost Thermostat	WR50X0122
Defrost Heater-Top	WR51X0344
Defrost Heater-Btm	WR51X0345
Condenser Fan Motor	WR60X0179
Evaporator Fan Motor	WR60X0188



WR11044



WR1227



WR4373

**DISCONNECT POWER CORD BEFORE SERVICING  
IMPORTANT - RECONNECT ALL GROUNDING DEVICES**

All parts of this appliance capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

**IMPORTANT SAFETY NOTICE**

This information is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

**ELECTRICAL SPECIFICATIONS**

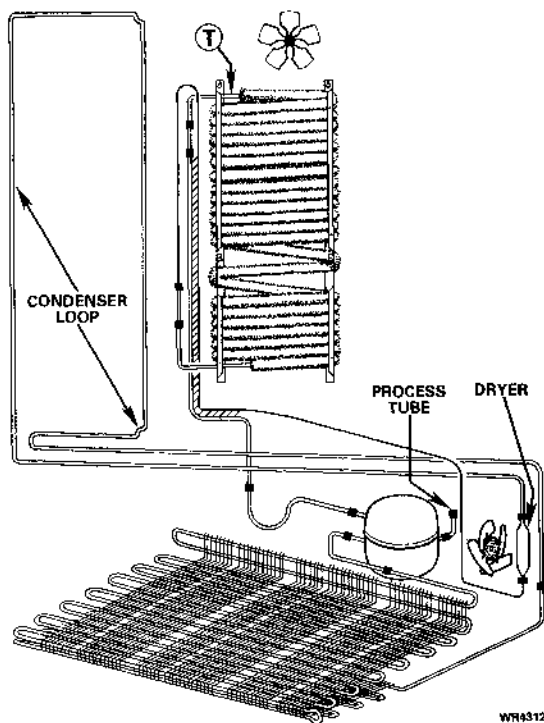
Temperature Control (Position 5) ..... 37-22°F.  
 Defrost Control ..... 16 hrs. @ 35 min.  
 Defrost Thermostat ..... 60-28°F.  
 Electrical Rating: 115V. AC 60 Hz. .... 11.6 Amp.  
 Maximum Current Leakage ..... 0.50 mA.  
 Maximum Ground Path Resistance ..... 0.14 Ohms  
 Energy Consumption ..... 88 KWH/mo.

**NO LOAD PERFORMANCE**

Control Position 5/C and Ambient of:	70°F.	90°F.
Fresh Food, °F. ....	33-39	37-41
Frozen Food, °F. ....	2-8	(-1)-3
Run Time, % .....	36-46	55-71

**REFRIGERATION SYSTEM**

Refrigerant Charge (R-12) ..... 9 ounces  
 Compressor ..... 1042 BTU/hr.  
 Minimum Compressor Capacity ..... 23 inches  
 Minimum Equalized Pressure  
 @ 70°F. .... 51 PSIG  
 @ 90°F. .... 65 PSIG

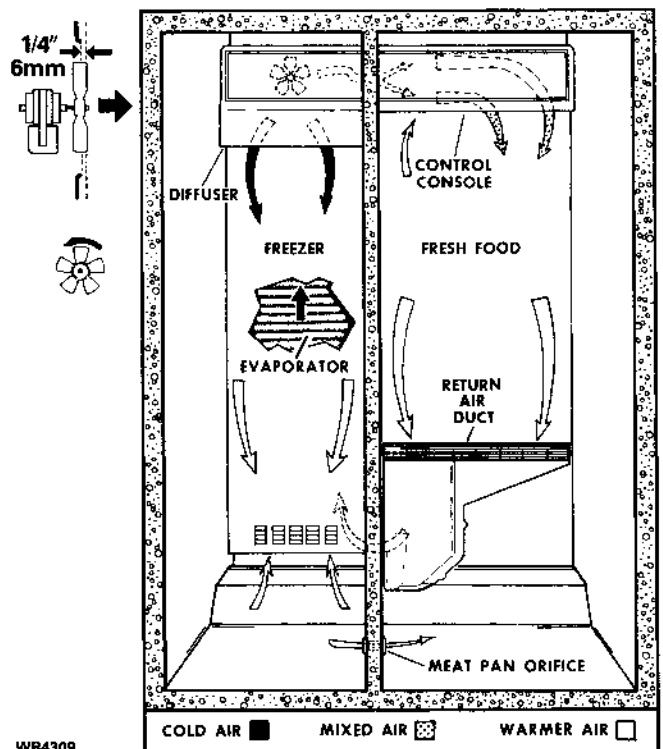


WR6312

**INSTALLATION**

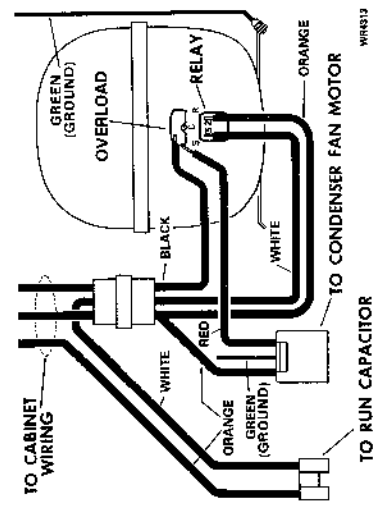
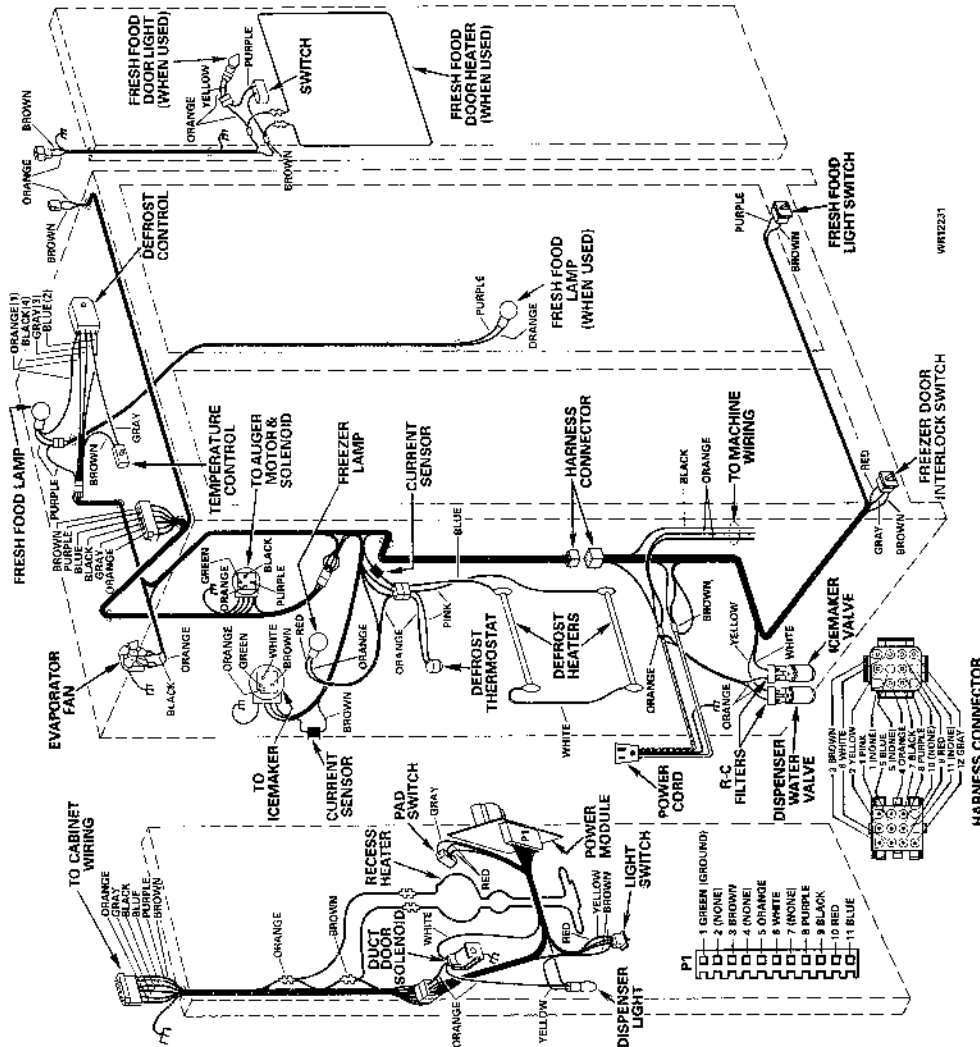
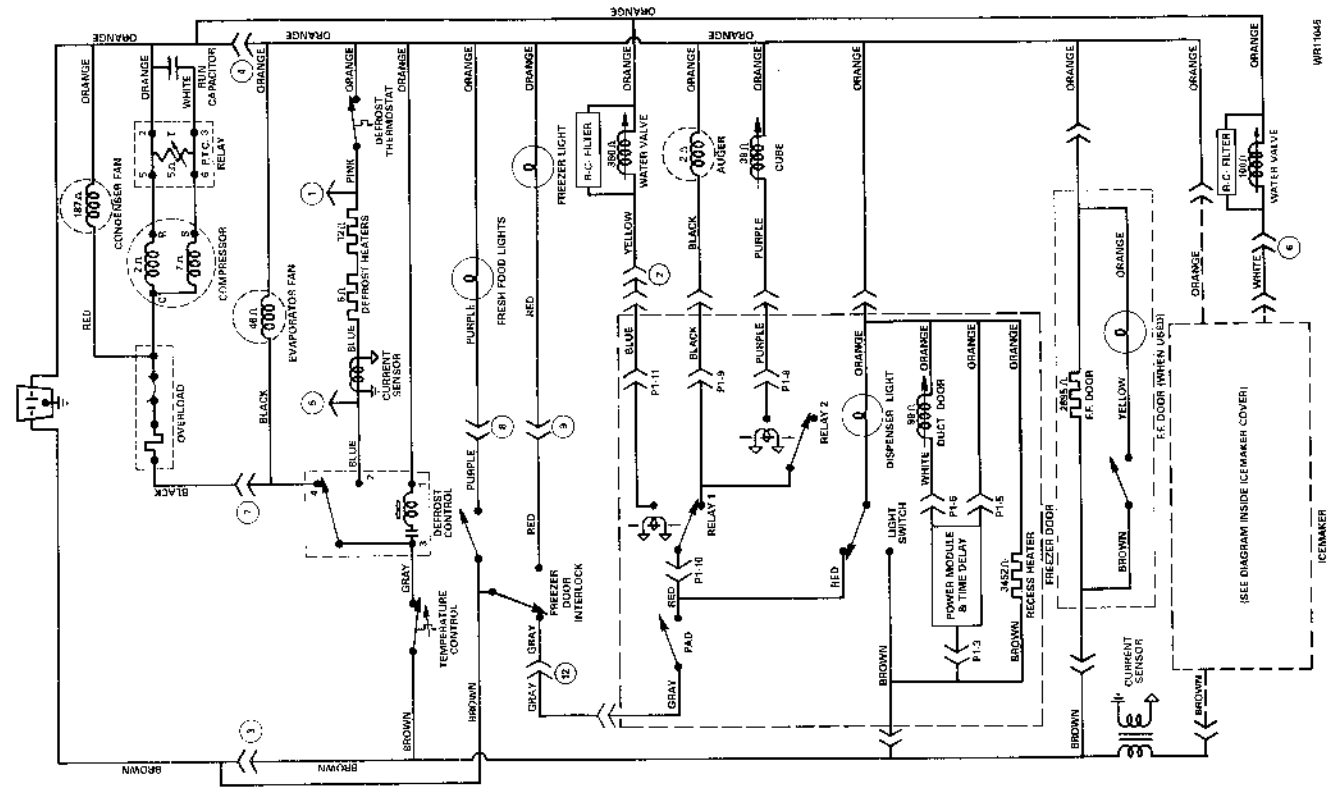
Clearance must be provided for air circulation:  
 AT TOP ..... 1-inch  
 AT SIDES ..... 5/8-inch  
 AT REAR ..... 1-inch

**AIR FLOW**



**REPLACEMENT PARTS**

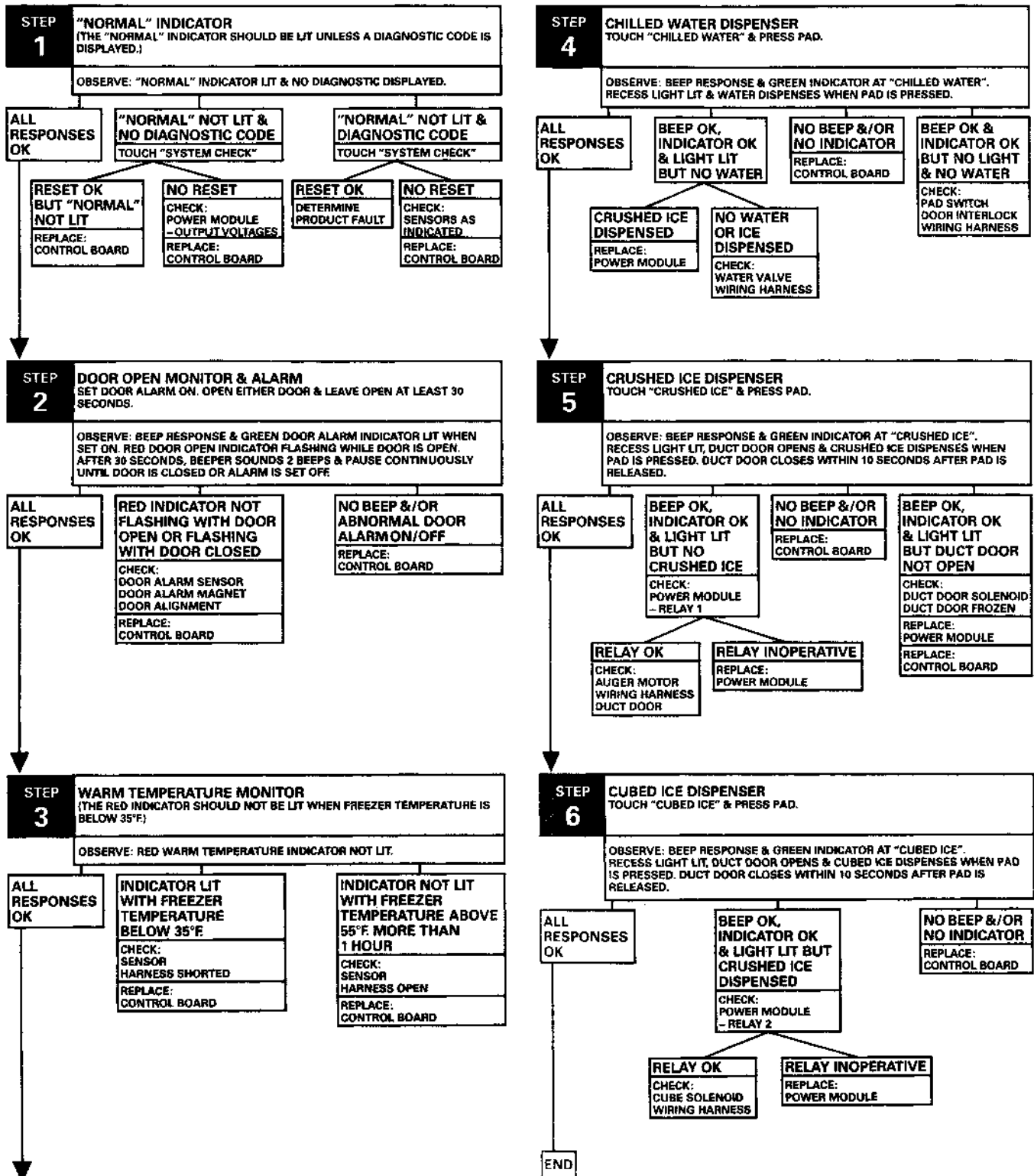
Temperature Control .....	WR09X0499
Relay .....	WR07X0190
Overload .....	WR08X0114
Run Capacitor .....	WR62X0052
Defrost Control .....	WR09X0489
Defrost Thermostat .....	WR50X0122
Defrost Heater-Top .....	WR51X0344
Defrost Heater-Btm .....	WR51X0345
Condenser Fan Motor .....	WR60X0179
Evaporator Fan Motor .....	WR60X0188

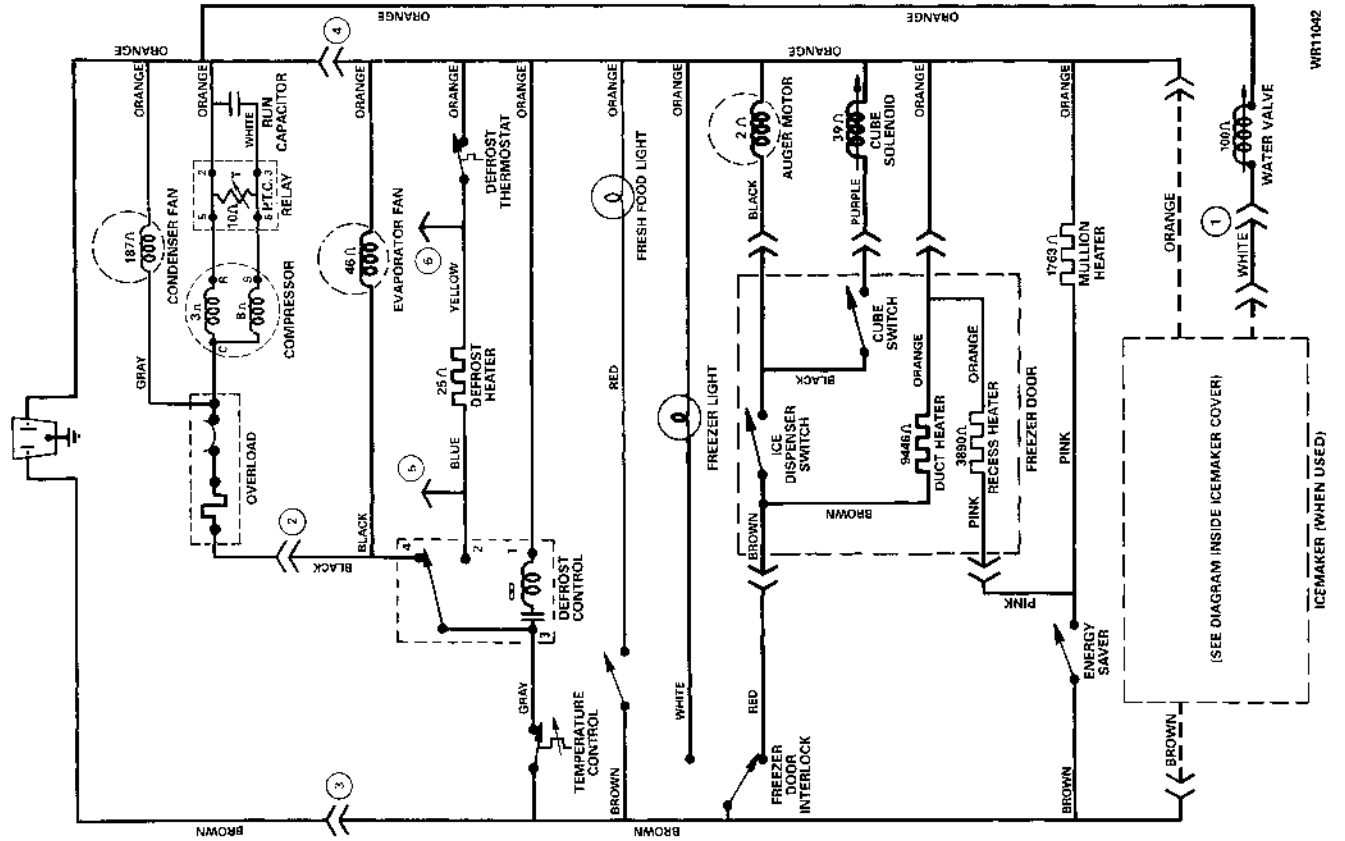


**ELECTRONIC SYSTEM  
DIAGNOSIS GUIDE**

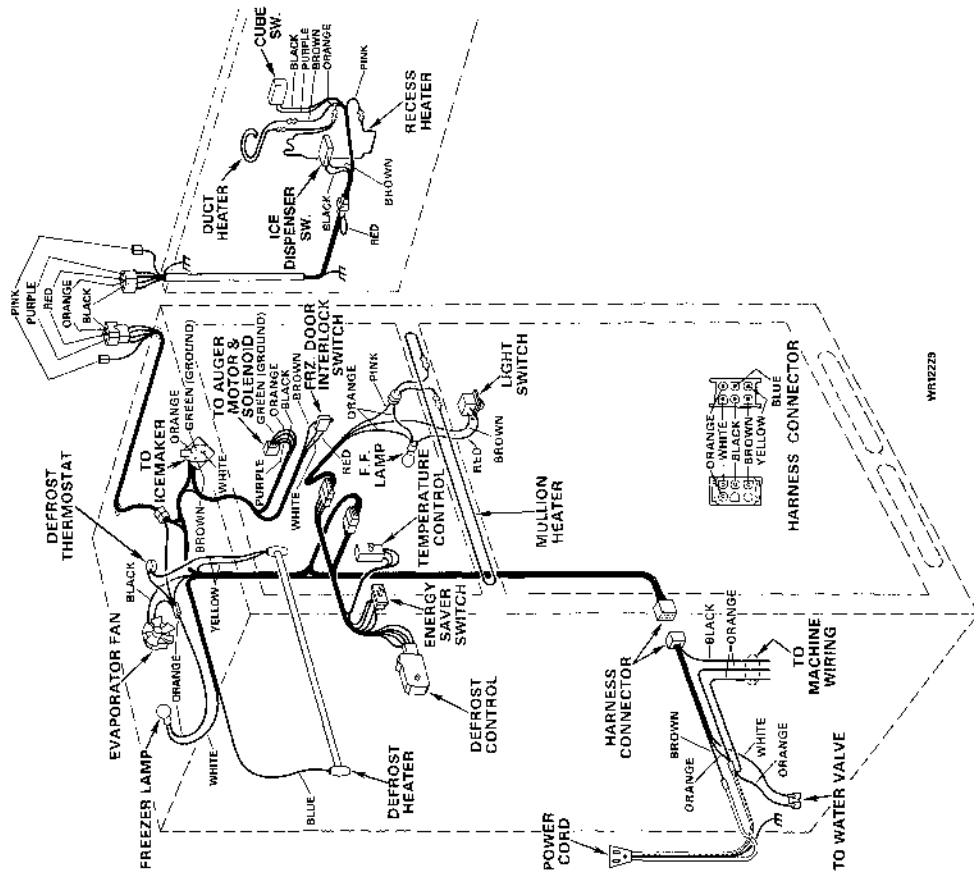
**Technical Data** 162D6979P002

1. Begin with **STEP 1** and proceed through the sequence of steps until an abnormal condition is detected. Do not skip any step.
2. After isolating an abnormal condition, determine the cause and make the repair.
3. After making the repair, begin with **STEP 1** and proceed through the entire sequence of steps to confirm that the system is performing normally.

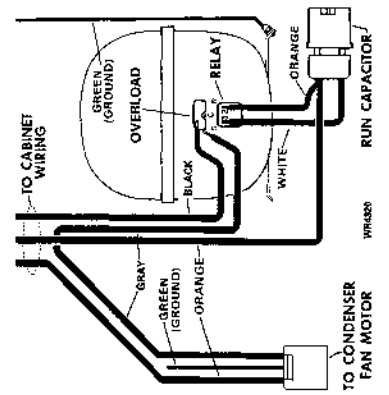




WR11042



WR12229



WR14580