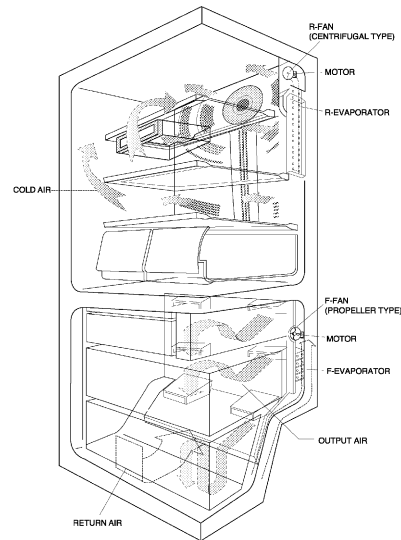
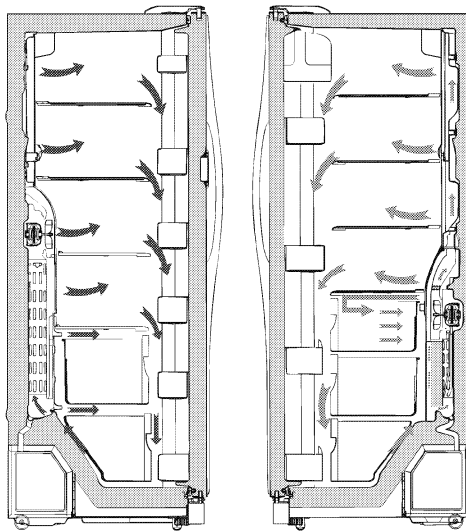
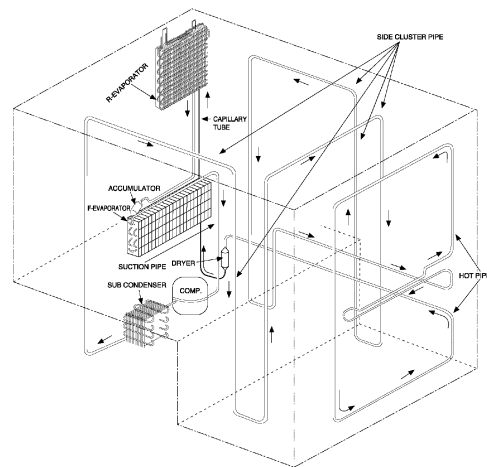
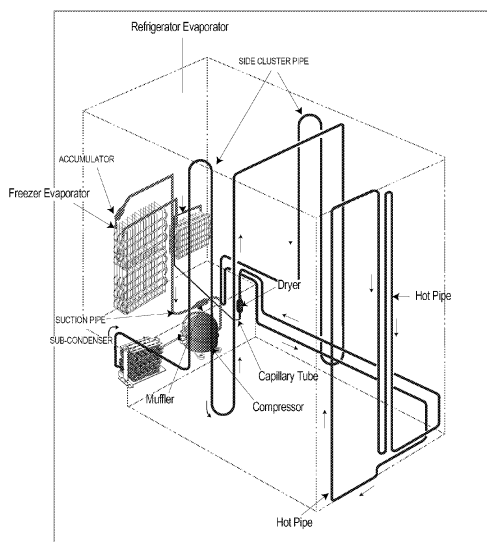


MAYTAG Training SERVICES

Samsung Refrigeration Familiarization

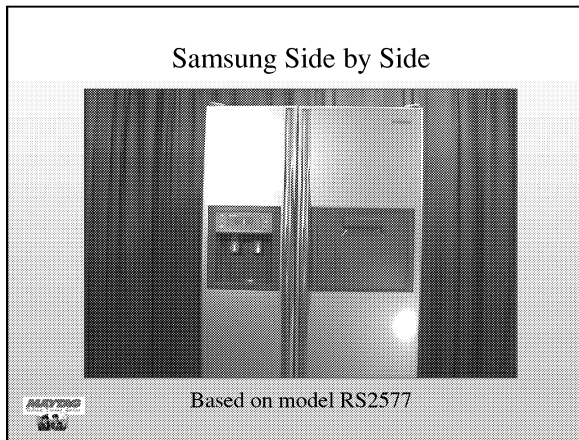


MAYTAG

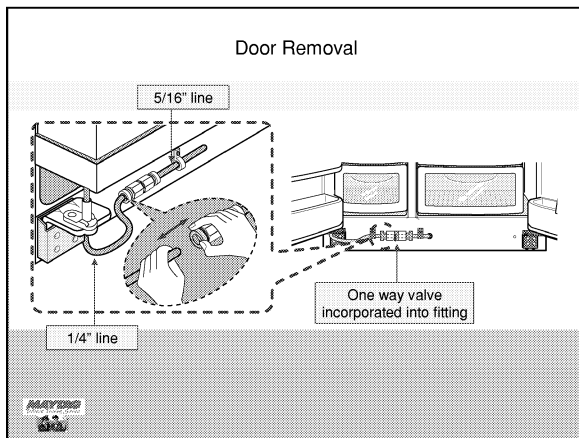
Slide 1



Slide 2

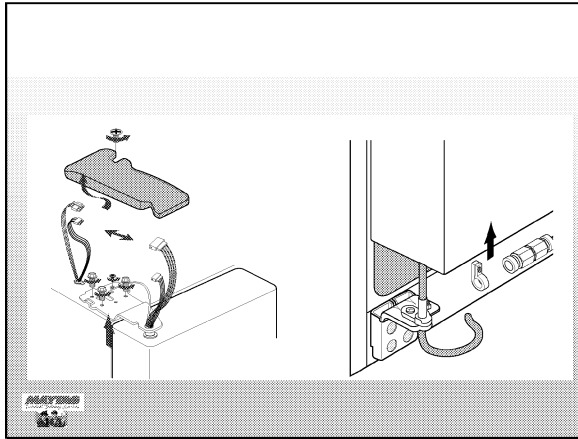


Slide 3



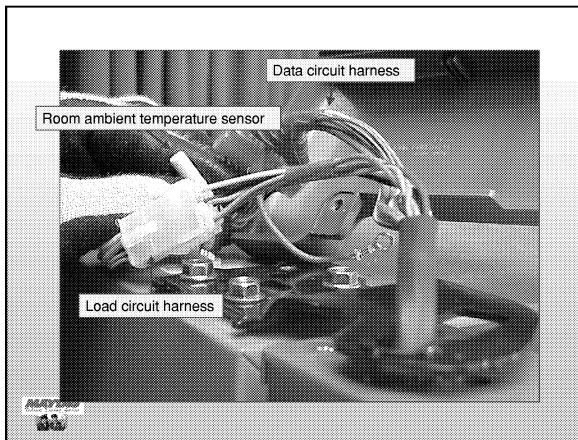
Unit uses John Guest fittings for water connection to dispenser. Make sure that the hose is cut square with no nicks for prevention of leaks at the water connection. The water line fitting incorporates a one-way valve.

Slide 4



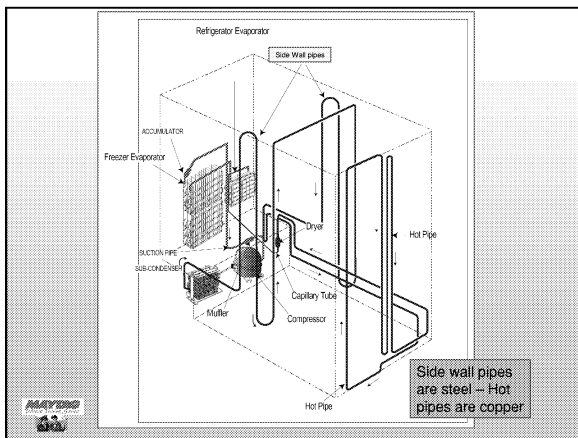
Under the freezer hinge cover are the electrical connections for the front display panel. All electronics and control circuits are in the rear control compartment. The display panel is just data input and display.

Slide 5

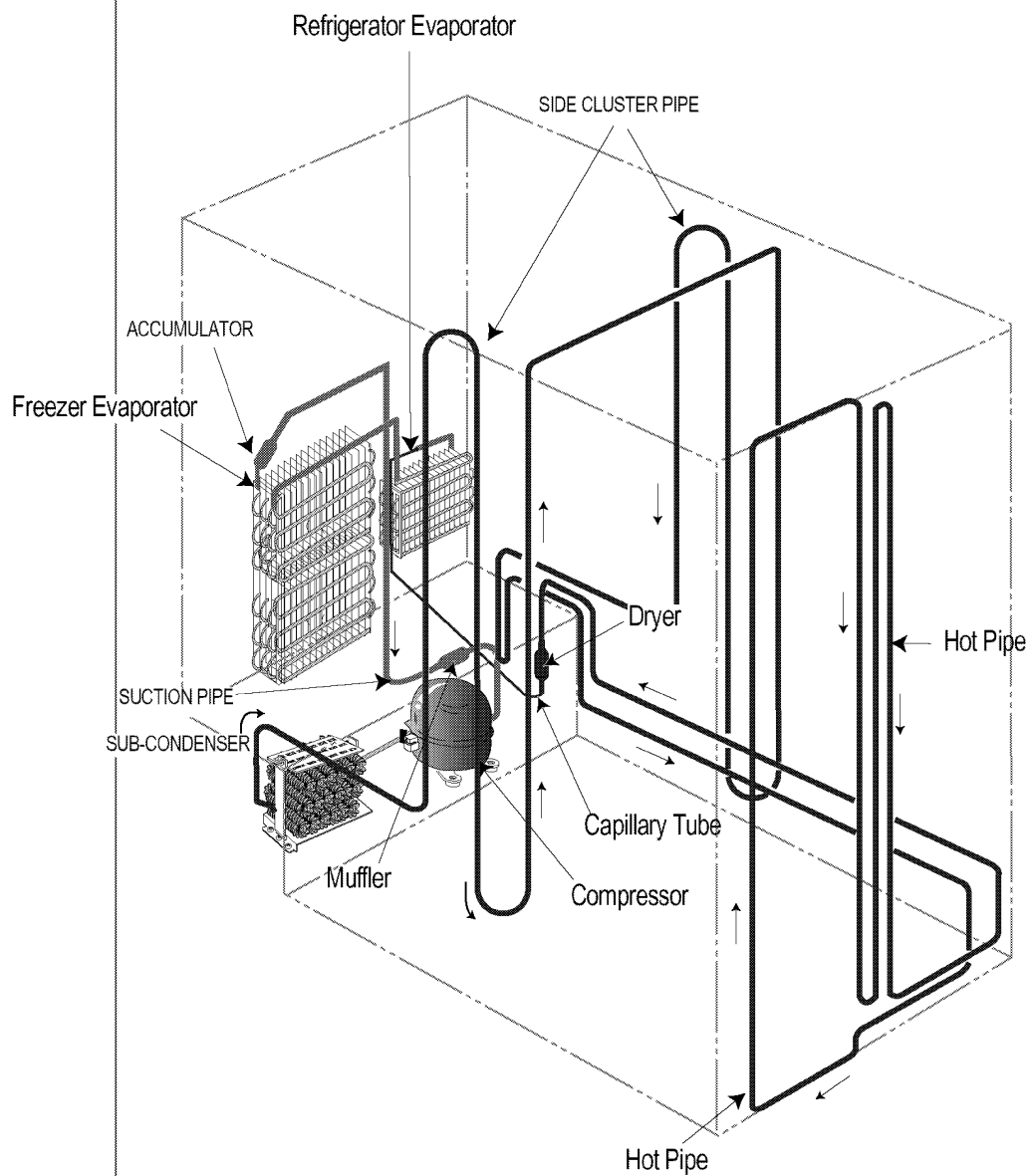


Connections through the upper freezer door hinge. There is also thermistor to monitor the exterior temperature under this hinge cover. The thermistor is on a very short harness.

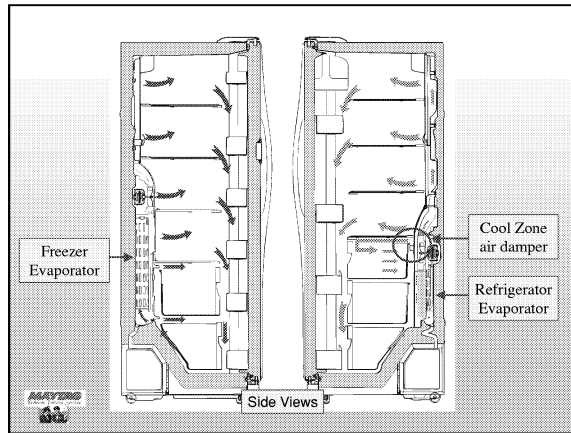
Slide 6



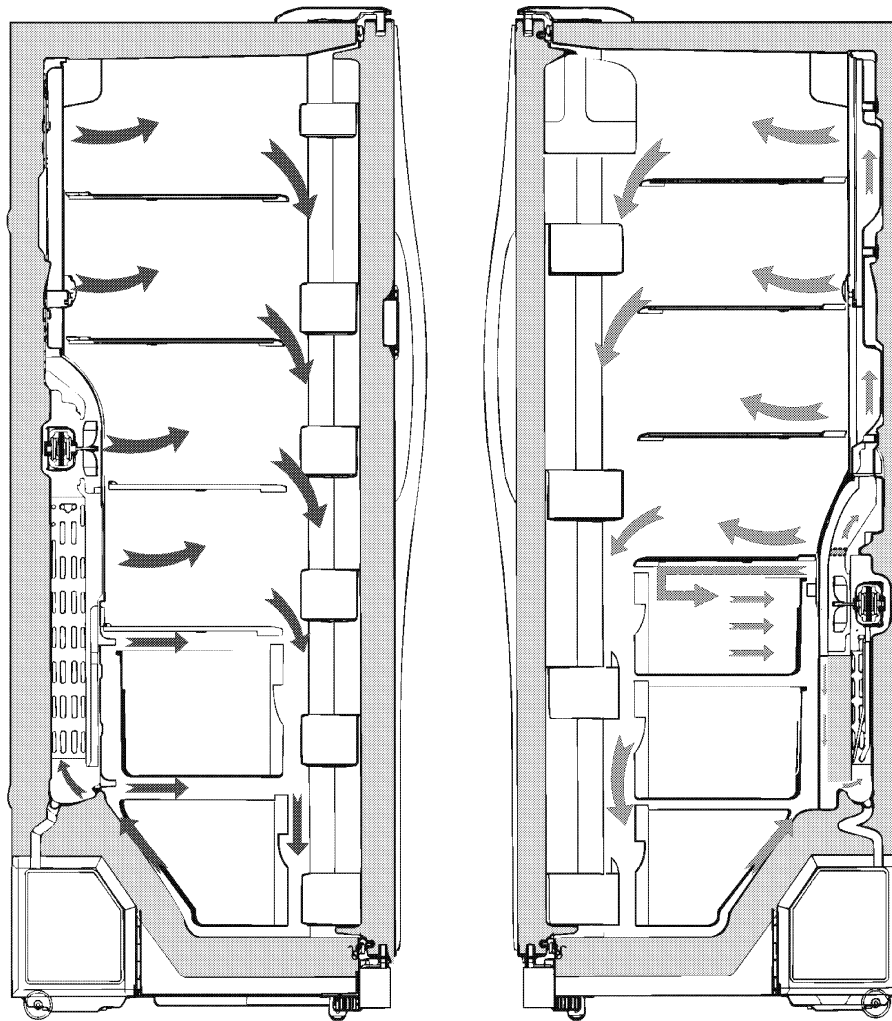
The units use a hot wall condenser in conjunction with a sub-condenser. The hot wall condenser loop is manufactured from steel. The Hot Pipe Post Condenser Loop (Yoder Loop) is constructed from copper tubing. There are two evaporators. The capillary tube feeds into the fresh food evaporator and the outlet from the fresh food evaporator supplies the freezer evaporator.



Slide 7

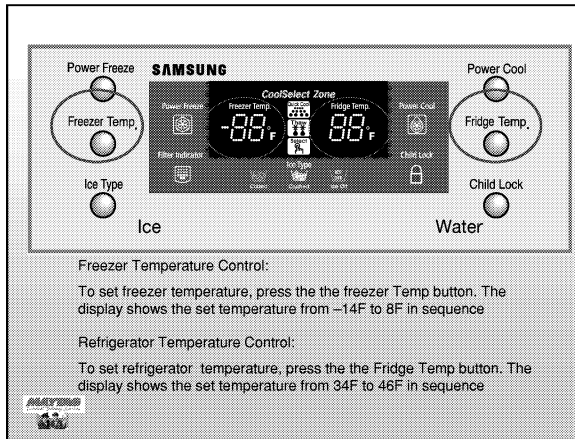


There are multiple evaporator fan outlets distributed throughout each cavity.



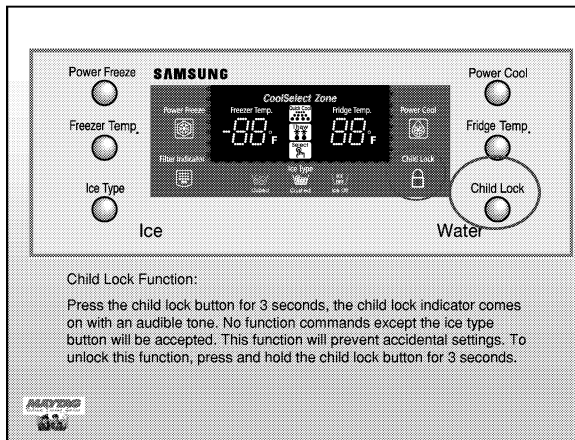
Side Views

Slide 8



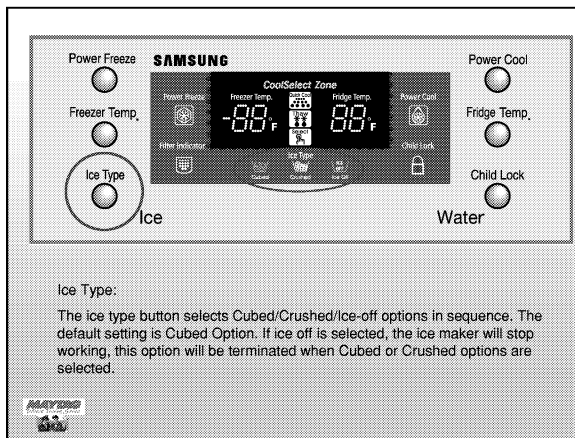
The temperature settings will display the current set-point the first time that the “Fridge Temp” or “Freeze Temp” buttons are pressed. Each subsequent pressing of the controls will decrease the set-point until the minimum is reached. Pressing the control again will cycle the control to the maximum setting.

Slide 9



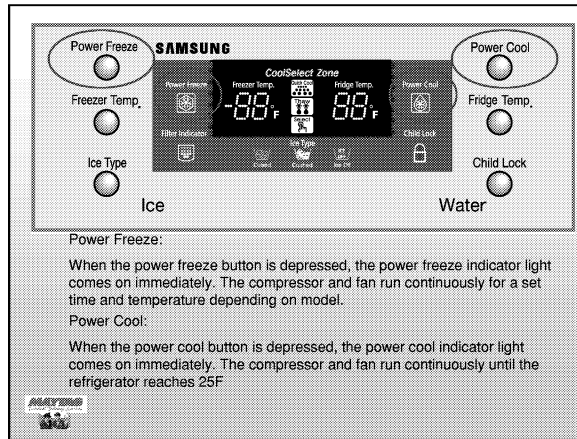
Press the child lock button for 3 seconds, the child lock indicator comes on with an audible tone. No function commands except the ice type button will be accepted. This function will prevent accidental settings. To unlock this function, press and hold the child lock button for 3 seconds.

Slide 10



The ice type button selects Cubed/Crushed/Ice-off options in sequence. The default setting is Cubed Option. If ice off is selected, the ice maker will stop working, this option will be terminated when Cubed or Crushed options are selected.

Slide 11



Power Freeze:

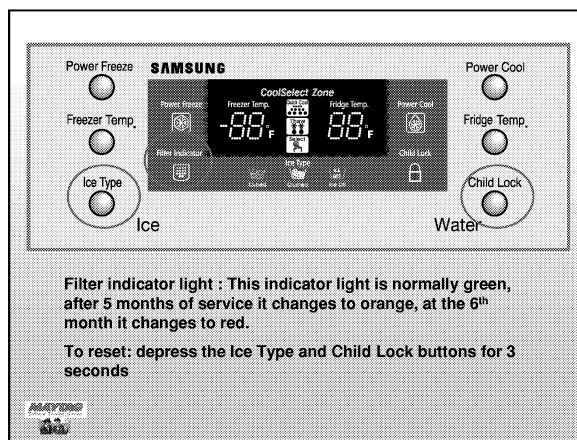
When the power freeze button is depressed, the power freeze indicator light comes on immediately. The compressor and fan run continuously for a set time and temperature depending on model.

Power Cool:

When the power cool button is depressed, the power cool indicator light comes on immediately. The compressor and fan run continuously until the refrigerator reaches 25F.

Refer to the service flash. Pre June 2003 production Power Freeze operation differs from post June 2003 operation.

Slide 12



Filter indicator light : This indicator light is normally green, after 5 months of service it changes to orange, at the 6th month it changes to red.

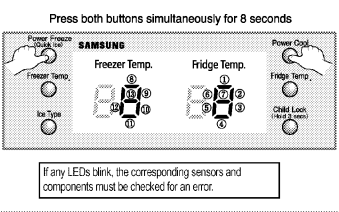
To reset: depress the Ice Type and Child Lock buttons for 3 seconds. This is strictly a time-based function, this does not monitor water usage.

Self-Diagnostic Function

*** Self-diagnostics check list**

NO	Error
①	ICE-MAKER SENSOR
②	R-SENSOR
③	R-DEF-SENSOR
④	R-FAN ERROR
⑤	I/M function error
⑥	CoolSelect Zone™ SENSOR
⑦	R-DEFROST ERROR
⑧	EXIT-SENSOR
⑨	F-SENSOR
⑩	F-DEF ERROR
⑪	F-FAN ERROR
⑫	C-FAN ERROR
⑬	F-DEFROST ERROR

Press both buttons simultaneously for 8 seconds



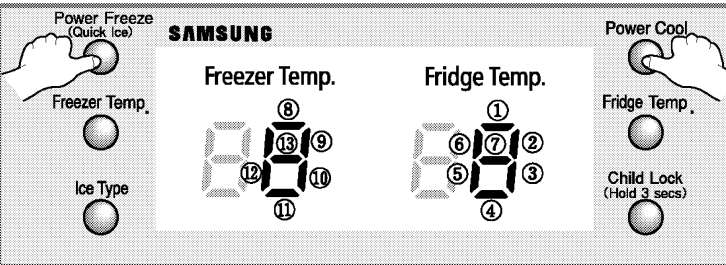
If any LEDs blink, the corresponding sensors and components must be checked for an error.

When power is first applied, the system performs a power-up self check. Any failure of an active component will result in a specific segment of the display illuminating. There are two versions of the self-diagnostic output. On units produced before June 2003 will not display for Refrigerator Defrost errors (7) or Freezer Defrost Errors (13). The self diagnostics can be activated by pressing the “Power Cool” and “Power Freeze” buttons at the same time for eight seconds.

* Self-diagnostics check list

NO	Error
①	ICE-MAKER SENSOR
②	R-SENSOR
③	R-DEF-SENSOR
④	R-FAN ERROR
⑤	I/M function error
⑥	CoolSelect Zone™ SENSOR
⑦	R-DEFROST ERROR
⑧	EXIT-SENSOR
⑨	F-SENSOR
⑩	F-DEF ERROR
⑪	F-FAN ERROR
⑫	C-FAN ERROR
⑬	F-DEFROST ERROR

Press both buttons simultaneously for 8 seconds



If any LEDs blink, the corresponding sensors and components must be checked for an error.

Load Operation Check Function

*** Table of Load Mode Check List**

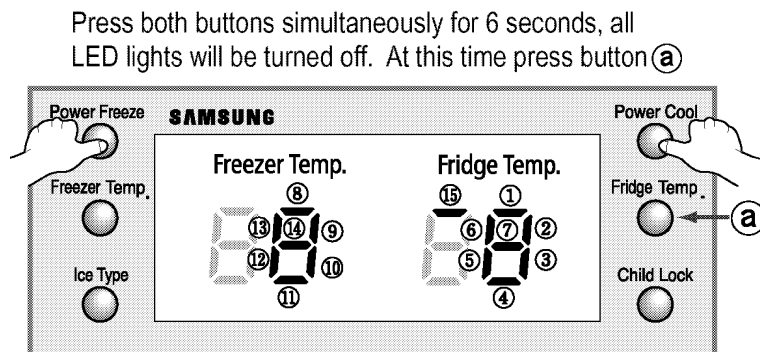
NO.	Contents
①	R-FAN High or AC motor operation
②	R-FAN Low
③	R-DEF heater
④	Start mode
⑤	Overload mode
⑥	Low-temperature mode
⑦	Exhibition mode
⑧	COMP
⑨	F-FAN High
⑩	F-FAN Low
⑪	F-DEF Heater
⑫	C-FAN High
⑬	C-FAN Low
⑭	Dispenser-Heater
⑮	Damper
-	Normal condition

Press both buttons simultaneously for 6 seconds, all LED lights will be turned off. At this time press button ⑧

All currently powered (active) components can be displayed by holding down both the “Power Freeze” and “Power Cool” buttons for six seconds followed immediately by the “Fridge Temp” button. The display will indicate everything that is currently energized. There is a twenty second time-out on this function.

* Table of Load Mode Check List

NO	Contents
①	R-FAN High or AC motor operation
②	R-FAN Low
③	R-DEF heater
④	Start mode
⑤	Overload mode
⑥	Low-temperature mode
⑦	Exhibition mode
⑧	COMP
⑨	F-FAN High
⑩	F-FAN Low
⑪	F-DEF-Heater
⑫	C-FAN High
⑬	C-FAN Low
⑭	Dispenser-Heater
⑮	Damper
-	Normal condition



Slide 15

Set Point Shift Function

Press both buttons simultaneously for 12 seconds

- 1) Initially, all products set the code, "0"
- 2) After 20 seconds from adjustment, a new setting will be stored in EEPROM and return to the normal display.
- 3) Freezer Temp., Fridge Temp., Ice maker water supply, ice tray temperature, and CoolSelect Zone™ temperature can be adjusted with this function.

Offsets are included that will allow for adjusting to the characteristics of the thermistors. Hold the Freezer Temp and Power Cool buttons for twelve seconds. It is highly recommended that these adjustments are avoided.

Slide 16

Example) If you are lowering the current temperature of the freezer by -6.0°F

The Fridge Temp display shows which mode the adjustment is being made to. There are four different thermistors that can be adjusted. Freezer offset is mode "0". Fresh Food offset is mode "1". Ice Maker thermistor offset is mode "4". CoolSelect zone is mode "20". Icemaker fill time can be adjusted when in mode "3". It is strongly suggested that the icemaker fill time should not be adjusted.

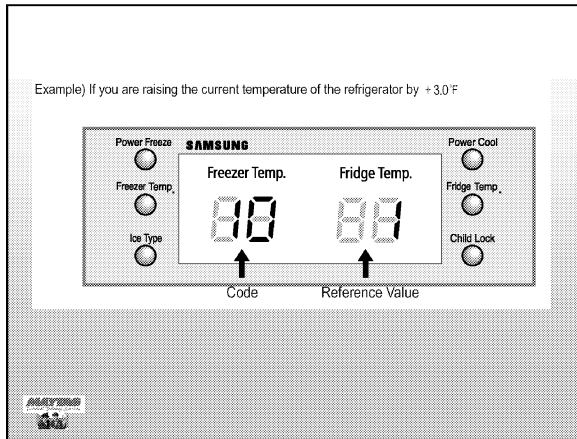
The Freezer Temp display indicates the amount of the offset based upon memory tables. It is imperative that the reference tables be used when making an offset adjustment. The values displayed in the Freezer Temp display are not the actual offset temperatures.

In this example, the freezer thermistor is being offset by -6 degrees.

Freezer Temp Sensor Shift			
Reference Value		0	
Code	Temp. shift	Code	Temp. shift
0	0	8	1.0°F
1	-1.0°F	9	2.0°F
2	-2.0°F	10	3.0°F
3	-3.0°F	11	4.0°F
4	-4.0°F	12	5.0°F
5	-5.0°F	13	6.0°F
6	-6.0°F	14	7.0°F
7	-7.0°F	15	8.0°F

Reference Value	0
-----------------	---

Code	Temp. shift	Code	Temp. shift
0	0	8	1.0°F
1	-1.0°F	9	2.0°F
2	-2.0°F	10	3.0°F
3	-3.0°F	11	4.0°F
4	-4.0°F	12	5.0°F
5	-5.0°F	13	6.0°F
6	-6.0°F	14	7.0°F
7	-7.0°F	15	8.0°F



In this example, the fresh food thermistor is being offset by +3.0 degrees.

Refrigerator Temp Sensor Shift			
Reference Value		1	
Code	Temp. shift	Code	Temp. shift
0	0	8	1.0°F
1	-1.0°F	9	2.0°F
2	-2.0°F	10	3.0°F
3	-3.0°F	11	4.0°F
4	-4.0°F	12	5.0°F
5	-5.0°F	13	6.0°F
6	-6.0°F	14	7.0°F
7	-7.0°F	15	8.0°F

Reference Value	1
-----------------	---

Code	Temp. shift	Code	Temp. shift
0	0	8	1.0°F
1	-1.0°F	9	2.0°F
2	-2.0°F	10	3.0°F
3	-3.0°F	11	4.0°F
4	-4.0°F	12	5.0°F
5	-5.0°F	13	6.0°F
6	-6.0°F	14	7.0°F
7	-7.0°F	15	8.0°F

Slide 20

Water Supply Time Shift	
Reference Value	3
Code	Time to supply water
0	5 sec
1	4 sec
2	3 sec
3	6 sec
4	7 sec
5	8 sec
6	9 sec
7	10 sec
8	12 sec
9	13 sec
10	15 sec
11	17 sec
12	19 sec
13	21 sec
14	23 sec
15	25 sec

It is strongly recommended that the icemaker fill time should not be adjusted.

Slide 21

Icemaker Temp Sensor Shift	
4) Shift the Ice maker temperature sensor	4) Shift the Ice maker temperature sensor
Reference Value	4
Reference Value	4
Code	Ice maker temperature sensor
0	19°F
1	21°F
2	17.5°F
3	16°F
4	14°F
5	12°F
6	10.5°F
7	8.5°F
Pre June, 2003	Post June, 2003

Two different sets of icemaker thermistor offset adjustments have been used. One set is for pre-June 2003 production.

4) Shift the Ice maker temperature sensor

Reference Value	4
Code	Ice maker temperature sensor
0	19°F
1	21°F
2	17.5°F
3	16°F
4	14°F
5	12°F
6	10.5°F
7	8.5°F

Pre June, 2003

4) Shift the Ice maker temperature sensor

Reference Value	4
Code	Ice maker temperature sensor
0	14°F
1	12°F
2	10.5°F
3	8.5°F
4	16°F
5	17°F
6	19°F
7	21°F

Post June, 2003

CoolSelect Temp Sensor Shift

Reference Value	20
Code	CoolSelect Zone™ temperature sensor
0	0°F
1	-1.0°F
2	-2.0°F
3	-3.0°F
4	1.0°F
5	2.0°F
6	3.0°F
7	4.0°F



Reference Value	20
Code	CoolSelect Zone™ temperature sensor
0	0°F
1	-1.0°F
2	-2.0°F
3	-3.0°F
4	1.0°F
5	2.0°F
6	3.0°F
7	4.0°F

Thermistor Spec Chart

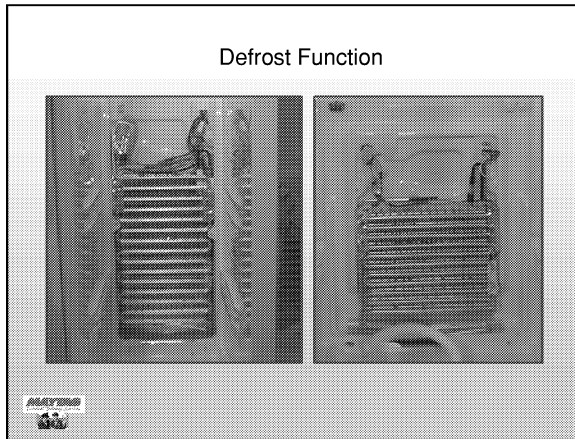
Temp (°F)	Res (K Ω)	Volt (V)	Temp (°F)	Res (K Ω)	Volt (V)	Temp (°F)	Res (K Ω)	Volt (V)
-43.6	98.870	4.541	12.2	21.410	3.408	68.0	6.013	1.878
-41.8	93.700	4.518	14.0	20.480	3.360	69.8	5.792	1.834
-40.0	88.850	4.494	15.8	19.580	3.310	71.6	5.581	1.791
-38.2	84.150	4.469	17.6	18.730	3.260	73.4	5.379	1.749
-36.4	79.800	4.443	19.4	17.920	3.209	75.2	5.185	1.707
-34.6	75.670	4.416	21.2	17.160	3.159	77.0	5.000	1.667
-32.8	71.800	4.389	23.0	16.430	3.108	78.8	4.821	1.626
-31.0	68.150	4.360	24.8	15.740	3.057	80.6	4.650	1.587
-29.2	64.710	4.331	26.6	15.080	3.006	82.4	4.487	1.549
-27.4	61.480	4.301	28.4	14.450	2.955	84.2	4.329	1.511
-25.6	58.430	4.269	30.2	13.860	2.904	86.0	4.179	1.474
-23.8	55.550	4.237	32.0	13.290	2.853	87.8	4.033	1.437
-22.0	52.840	4.204	33.8	12.740	2.801	89.6	3.894	1.401
-20.2	50.230	4.170	35.6	12.220	2.750	91.4	3.760	1.366
-18.4	47.770	4.134	37.4	11.720	2.698	93.2	3.631	1.332
-16.6	45.450	4.098	39.2	11.250	2.647	95.0	3.508	1.298
-14.8	43.260	4.061	41.0	10.800	2.596	96.8	3.390	1.266
-13.0	41.190	4.023	42.8	10.370	2.545	98.6	3.276	1.234
-11.2	39.240	3.985	44.6	9.959	2.495	100.4	3.167	1.203
-9.4	37.390	3.945	46.4	9.569	2.445	102.2	3.062	1.172
-7.6	35.650	3.905	48.2	9.195	2.395	104.0	2.962	1.143
-5.8	33.990	3.863	50.0	8.839	2.346	105.8	2.864	1.113
-4.0	32.430	3.822	51.8	8.494	2.296	107.6	2.770	1.085
-2.2	30.920	3.778	53.6	8.166	2.248	109.4	2.680	1.057
-0.4	29.500	3.734	55.4	7.852	2.199	111.2	2.593	1.030
1.4	28.140	3.689	57.2	7.552	2.151	113.0	2.510	1.003
3.2	26.870	3.644	59.0	7.266	2.104	114.8	2.429	0.977
5.0	25.650	3.597	60.8	6.992	2.057	116.6	2.352	0.952
6.8	24.510	3.551	62.6	6.731	2.012	118.4	2.278	0.928
8.6	23.420	3.504	64.4	6.481	1.966	120.2	2.206	0.904
10.4	22.390	3.456	66.2	6.242	1.922			

Thermistors are all the same sensor with different harnesses attached depending on the mounting. It is possible to either check the resistance of the sensor with the connection unplugged, or check the DC voltage of the sensor.

Temp (°F)	Res (K Ω)	Volt (V)
-43.6	98.870	4.541
-41.8	93.700	4.518
-40.0	88.850	4.494
-38.2	84.150	4.469
-36.4	79.800	4.443
-34.6	75.670	4.416
-32.8	71.800	4.389
-31.0	68.150	4.360
-29.2	64.710	4.331
-27.4	61.480	4.301
-25.6	58.430	4.269
-23.8	55.550	4.237
-22.0	52.840	4.204
-20.2	50.230	4.170
-18.4	47.770	4.134
-16.6	45.450	4.098
-14.8	43.260	4.061
-13.0	41.190	4.023
-11.2	39.240	3.985
-9.4	37.390	3.945
-7.6	35.650	3.905
-5.8	33.990	3.863
-4.0	32.430	3.822
-2.2	30.920	3.778
-0.4	29.500	3.734
1.4	28.140	3.689
3.2	26.870	3.644
5.0	25.650	3.597
6.8	24.510	3.551
8.6	23.420	3.504
10.4	22.390	3.456

Temp (°F)	Res (K Ω)	Volt (V)
12.2	21.410	3.408
14.0	20.480	3.360
15.8	19.580	3.310
17.6	18.730	3.260
19.4	17.920	3.209
21.2	17.160	3.159
23.0	16.430	3.108
24.8	15.740	3.057
26.6	15.080	3.006
28.4	14.450	2.955
30.2	13.860	2.904
32.0	13.290	2.853
33.8	12.740	2.801
35.6	12.220	2.750
37.4	11.720	2.698
39.2	11.250	2.647
41.0	10.800	2.596
42.8	10.370	2.545
44.6	9.959	2.495
46.4	9.569	2.445
48.2	9.195	2.395
50.0	8.839	2.346
51.8	8.494	2.296
53.6	8.166	2.248
55.4	7.852	2.199
57.2	7.552	2.151
59.0	7.266	2.104
60.8	6.992	2.057
62.6	6.731	2.012
64.4	6.481	1.966
66.2	6.242	1.922

Temp (°F)	Res (K Ω)	Volt (V)
68.0	6.013	1.878
69.8	5.792	1.834
71.6	5.581	1.791
73.4	5.379	1.749
75.2	5.185	1.707
77.0	5.000	1.667
78.8	4.821	1.626
80.6	4.650	1.587
82.4	4.487	1.549
84.2	4.329	1.511
86.0	4.179	1.474
87.8	4.033	1.437
89.6	3.894	1.401
91.4	3.760	1.366
93.2	3.631	1.332
95.0	3.508	1.298
96.8	3.390	1.266
98.6	3.276	1.234
100.4	3.167	1.203
102.2	3.062	1.172
104.0	2.962	1.143
105.8	2.864	1.113
107.6	2.770	1.085
109.4	2.680	1.057
111.2	2.593	1.030
113.0	2.510	1.003
114.8	2.429	0.977
116.6	2.352	0.952
118.4	2.278	0.928
120.2	2.206	0.904



Since there are two evaporators in the system, there are two evaporator defrost heaters.

Defrost is adaptive and will terminate based upon the evaporator thermistor temperature readings.

The system is designed to defrost the fresh food section twice as often as the freezer section. This compensates for the fact that the fresh food section is accessed more frequently than the freezer section.

The fresh food section can defrost independent of the freezer section, but the freezer section will always defrost at the same time as the fresh food section. The fresh food section will defrost once for every six to eight hours of compressor run time while the freezer section will defrost every twelve to sixteen hours of compressor run time.

When started from room temperature, the first defrost cycle will begin after four hours of compressor run time.

The defrost temperature is monitored at the bottom right of the freezer evaporator and at the top left outlet of the refrigerator evaporator.

Forced Operation Function

- 1) Compressor Check
- 2) Refrigerator Defrost Heater Check
- 3) Ref and Freezer Defrost Heater Check
- 4) Cancellation of function

Used to Test Sealed System Components

Note: Unit will beep continuously as long as the unit remains in forced operation function

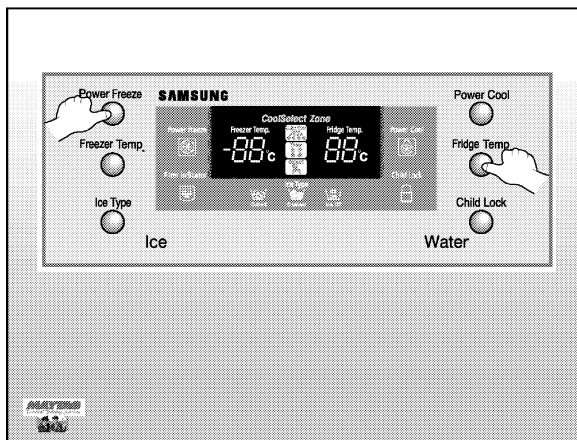


The forced operation check allows a forced check of the cooling system. Each mode will operate until the next mode is selected or until the test is cancelled. The forced mode cannot be activated if the unit is defrosting either of the evaporator coils.

The compressor will run for 24 hours and then begin cycling at -14 degrees in the freezer and 34 degrees in the fresh food compartment.

Loss of power will also cancel this function. There is no delay in compressor start so if there is high head pressure, an overload condition can be encountered.

The three individual tests are; Forced compressor pull-down, Refrigerator defrost check and refrigerator and freezer defrost check.



To enter the forced operation mode, depress the Power Freeze and the Fridge Temp buttons for eight seconds.

Forced Operation Function

Press any button except "ICE TYPE" or "CHILD LOCK" to enter the Pull-Down Mode.
(Compressor Check)

Wait approx. 5 seconds before pressing another button to enter the Refrigerator-Defrost Mode.
(Ref Heater Check)

Wait approx. 5 seconds before pressing another button to enter the Ref-Freezer-Defrost Mode.
(Ref & Freezer Heater Check)

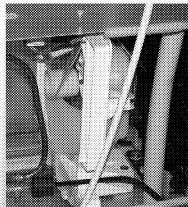
Cancellation: Wait approx. 5 seconds before pressing another button to Cancel or unplug the unit.



Pressing the "Ice Type" or "Child Lock" buttons will cancel this mode of operation.

During each test the timing of the beeps will vary.

Condenser Fan Delay



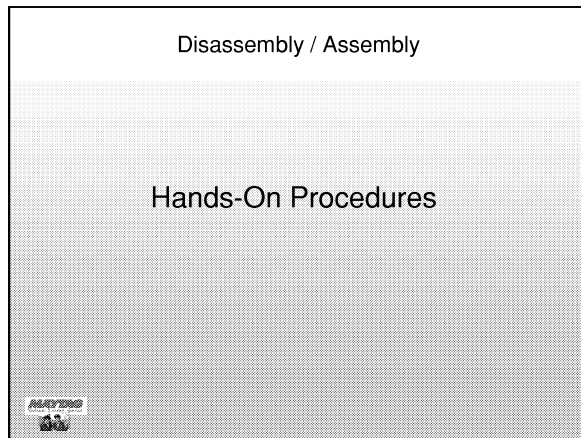
	Ranges of ambient temp.	Operation
C-FAN Delay function	Above 66 °F	C-FAN is ON as soon as the compressor is on.
	61 °F ~ 65 °F	C-FAN is ON with 5 minutes delay from the compressor on.
	Below 60 °F	C-FAN is OFF regardless of the compressor operation.



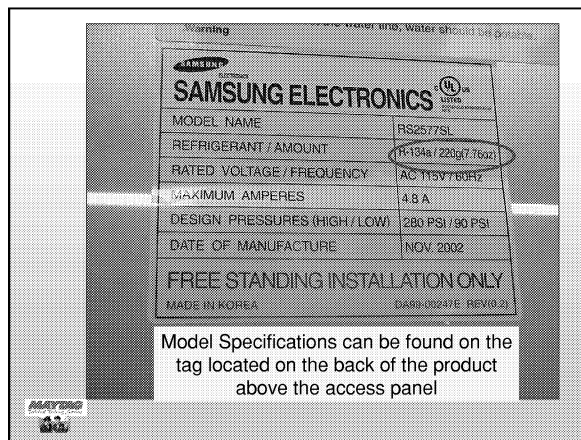
The condenser fan operation will change depending on the ambient temperature. Above 65 degrees Fahrenheit, the condenser fan will begin operation with the compressor. Between 61 and 65 degrees, the condenser fan energizes five minutes after the compressor energizes. Below 60 degrees, the condenser fan will not operate. This function is used to promote good oil distribution within the compressor.

	Ranges of ambient temp.	Operation
C-FAN Delay function	Above 66 °F	C-FAN is ON as soon as the compressor is on.
	61 °F ~ 65 °F	C-FAN is ON with 5 minutes delay from the compressor on.
	Below 60 °F	C-FAN is OFF regardless of the compressor operation.

Slide 29

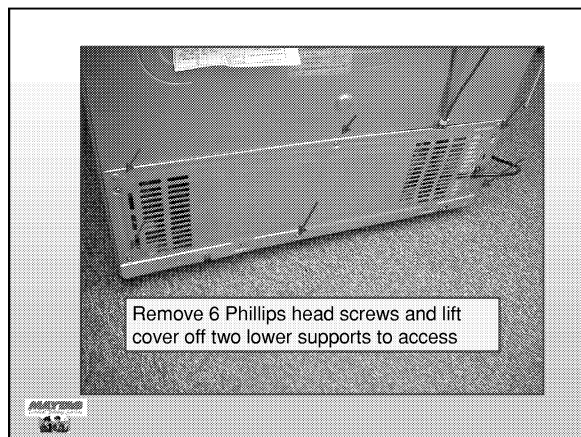


Slide 30



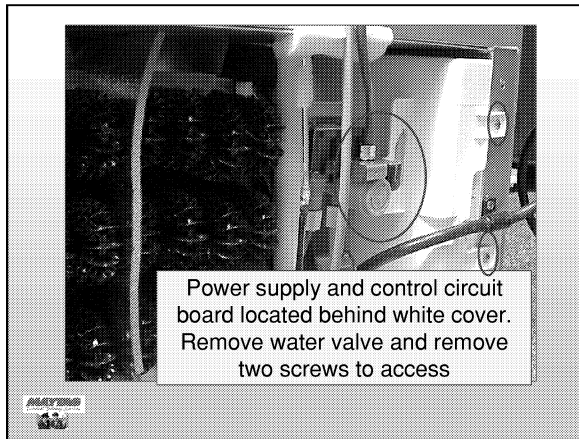
Model number and specifications are located on rear of cabinet.

Slide 31



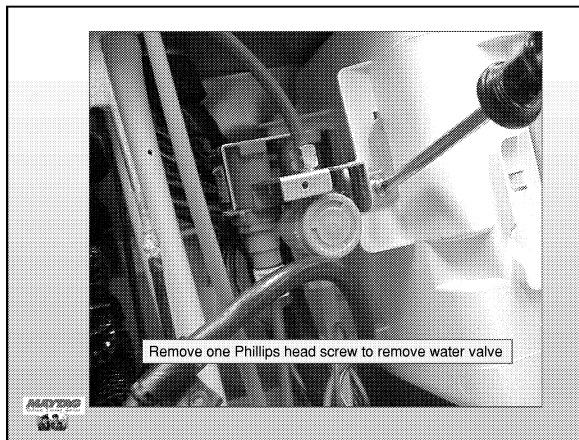
Rear compartment cover is held in place with six Phillips screws.

Slide 32

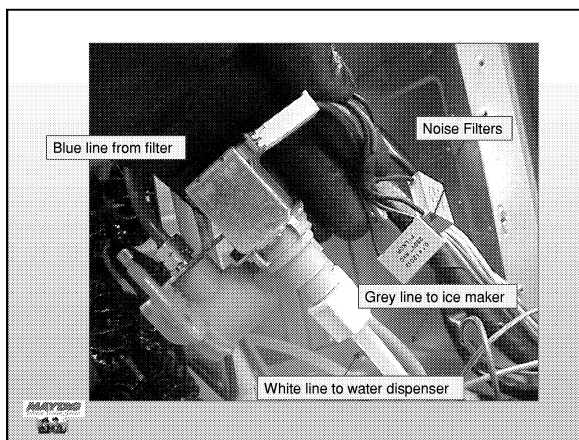


The water valve must be removed to access the control board.

Slide 33

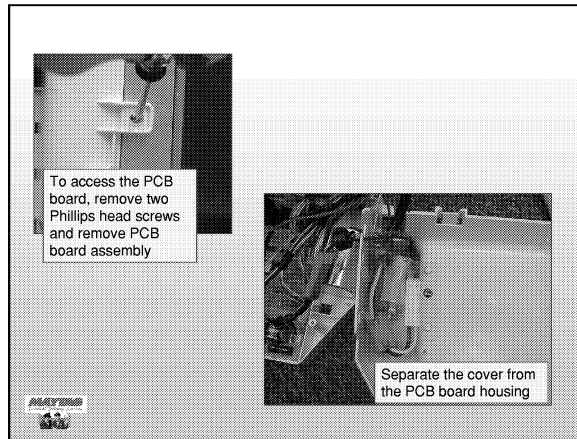


Slide 34

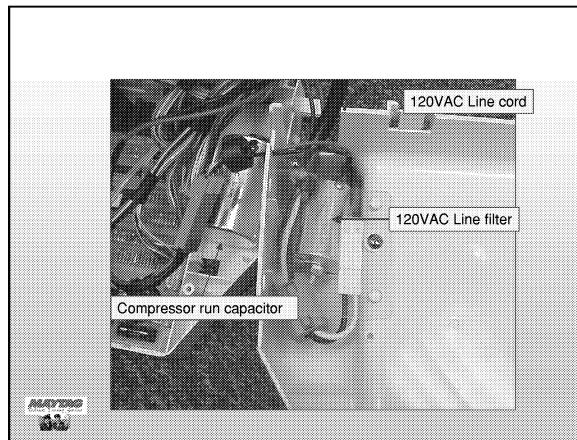


There are electrical noise filters connected in parallel with the water valves.

Slide 35

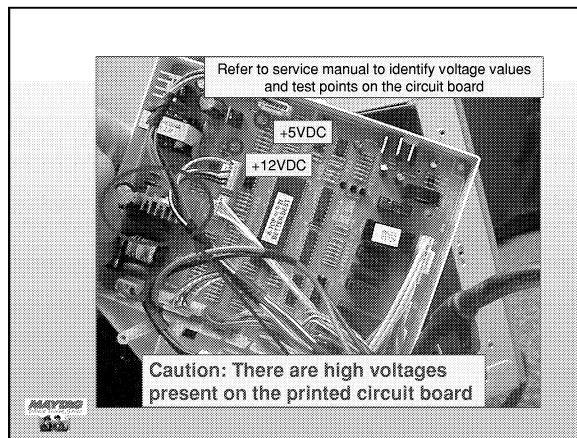


Slide 36



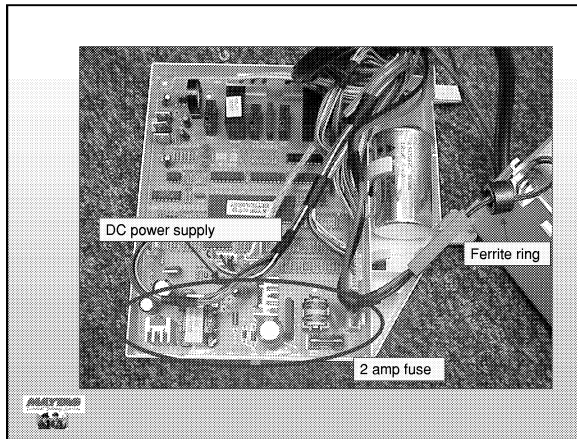
The compressor run capacitor and an AC line filter are located in the control panel housing. The red input wire is L1 and the black wire is neutral.

Slide 37



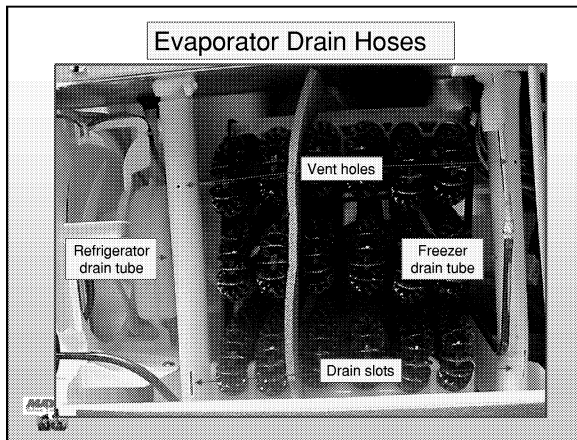
There are high voltages present on the larger heat sink mounted to the board.

Slide 38



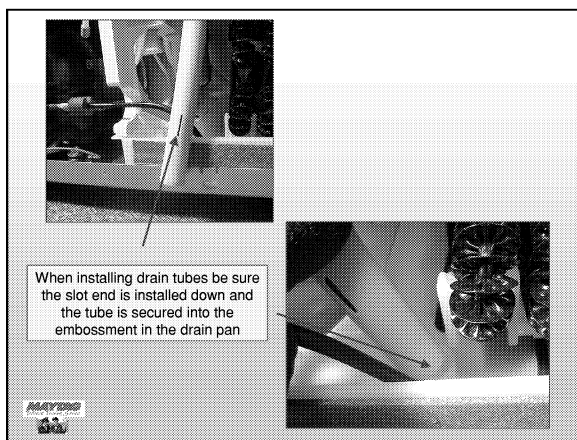
The board uses a high efficiency, high frequency power supply to convert the line voltage to +12 and +5 volts DC. If this supply does not provide the correct DC voltages, the thermistors will all sense temperature incorrectly.

Slide 39



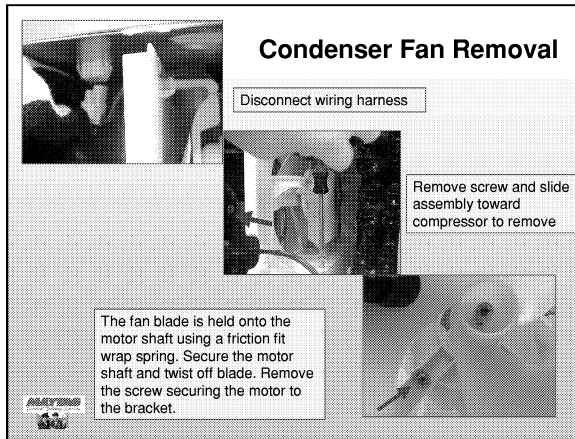
Each evaporator has it's own drain hose. Make sure that these hoses are installed with the slots near the bottom.

Slide 40



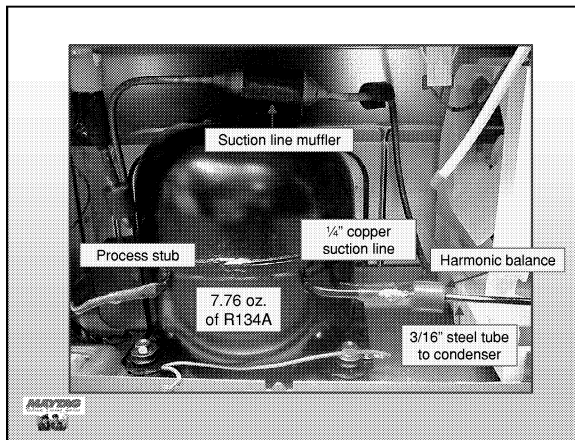
When installing drain tubes be sure the slot end is installed down and the tube is secured into the embossment in the drain pan

Slide 41



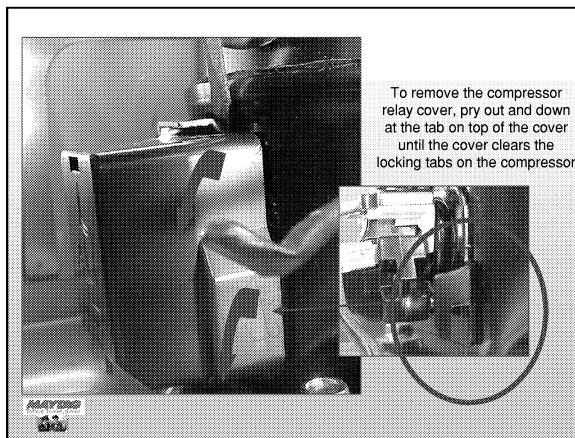
Disconnect wiring harness. Remove screw and slide assembly toward compressor to remove. The fan blade is held onto the motor shaft using a friction fit wrap spring. Secure the motor shaft and twist off blade. Remove the screw securing the motor to the bracket.

Slide 42



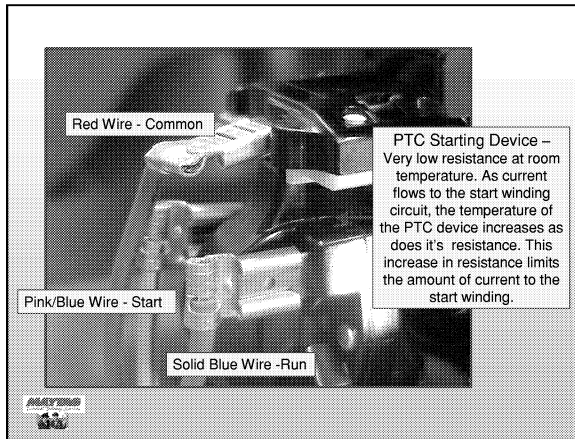
Compressor component routing. The rubber grommet on the discharge tube is for noise reduction.

Slide 43



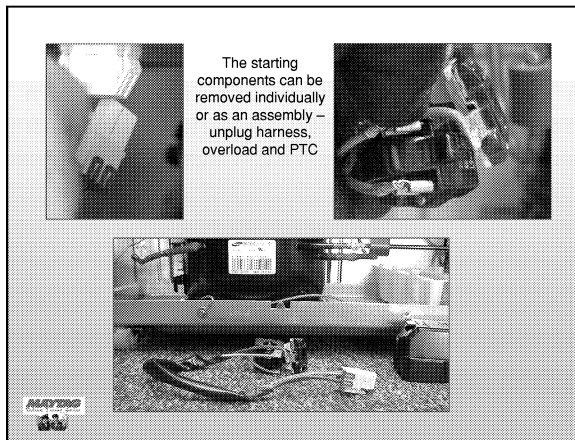
The compressor relay cover pries out and down from the compressor housing.

Slide 44



The compressor uses a PTC starting device.

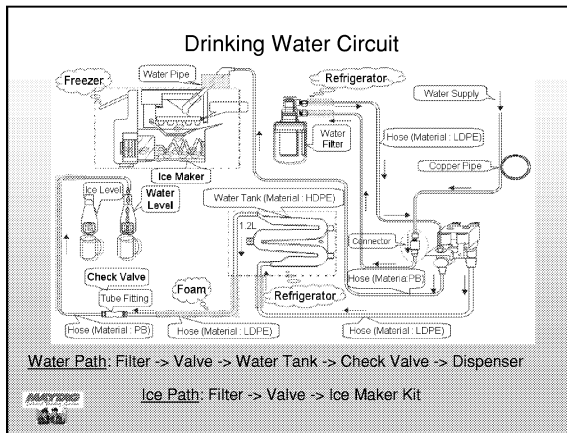
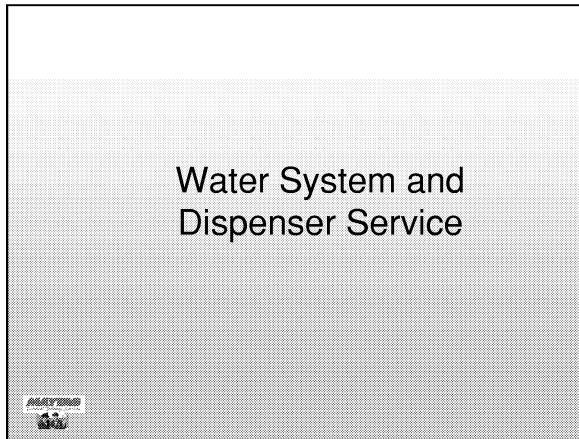
Slide 45



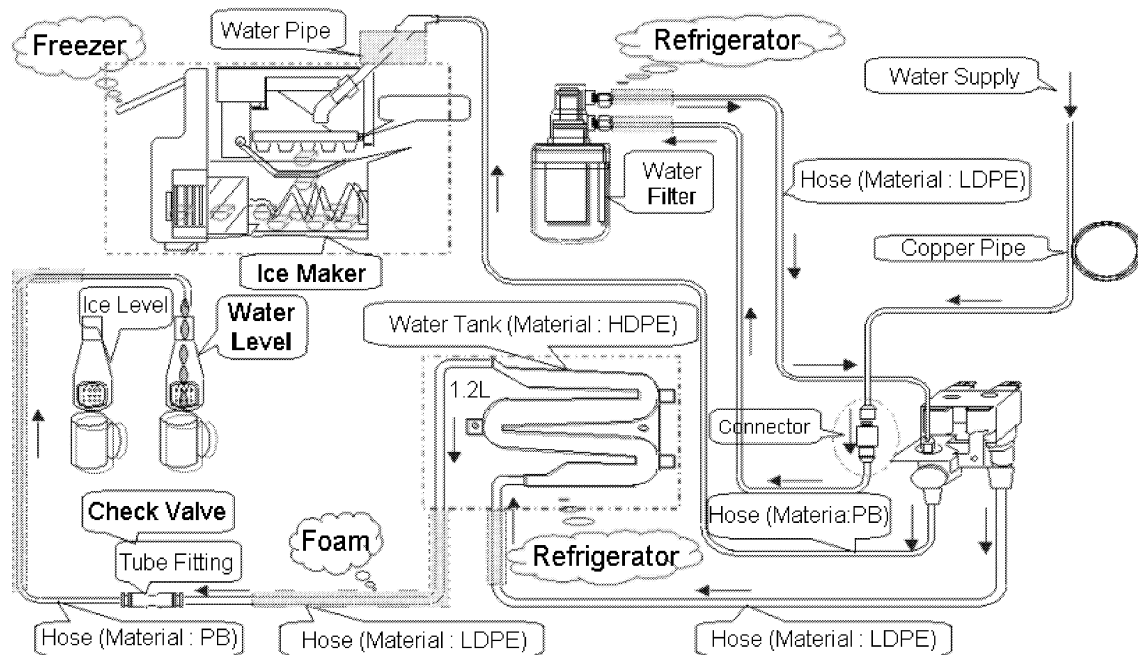
The compressor harness and PTC can be removed either separately or as an assembly.

Slide 46

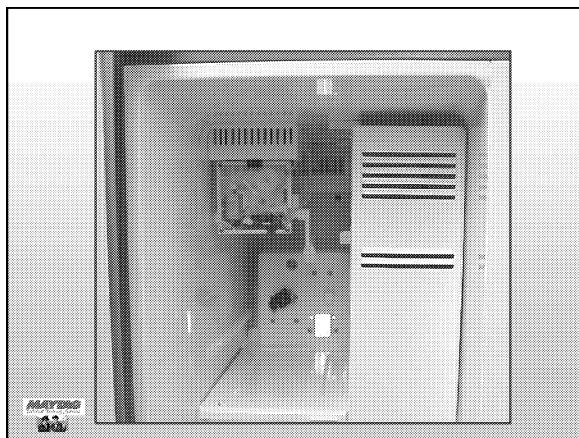




Water system routing. The water filter is under supply pressure. There is a built-in shut off valve to stop flow if the filter is removed. All filter heads in units manufactured before June 2003 should be replaced.

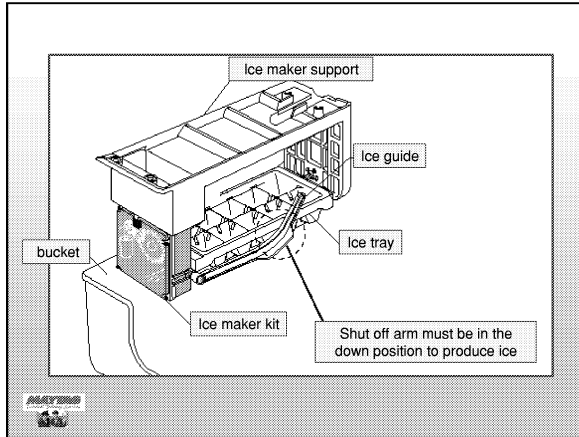


Slide 49



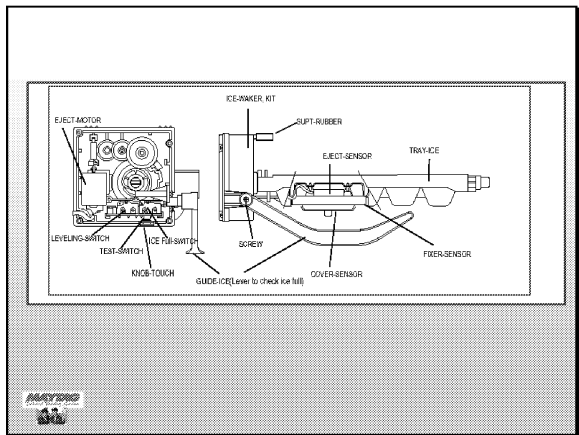
Icemaker, auger motor and cube solenoid locations.

Slide 50

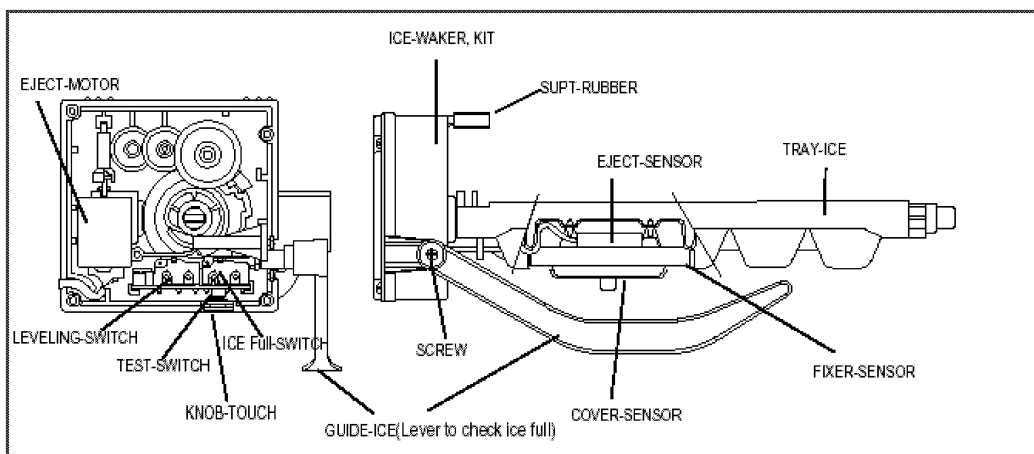


Icemaker overall view.

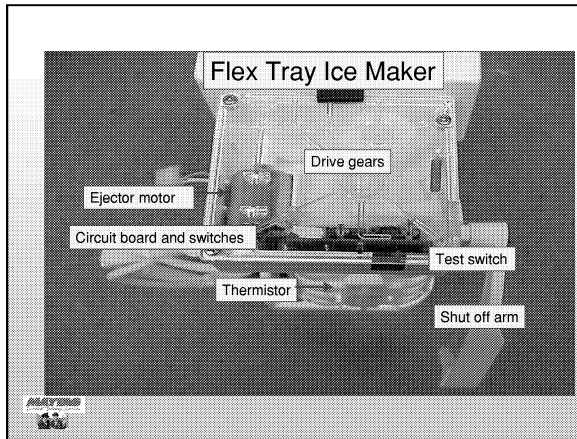
Slide 51



Icemaker components.
The icemaker is serviced as a complete assembly except for the sensing thermistor.

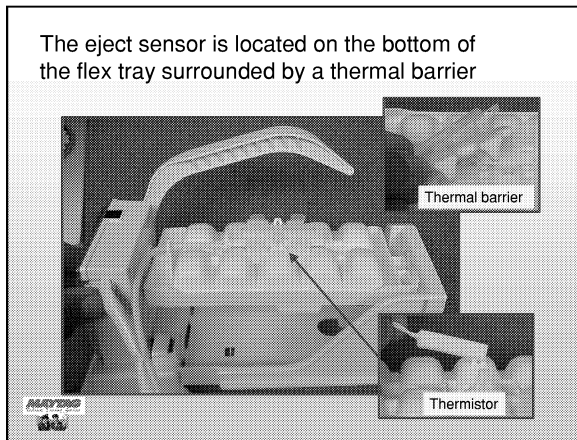


Slide 52



View of the bottom front of the icemaker. The icemaker uses a DC motor to drive the flex action. The tray will twist in the clockwise direction to release the ice and the reversing motor will return the tray to the fill position in the counter-clockwise direction.

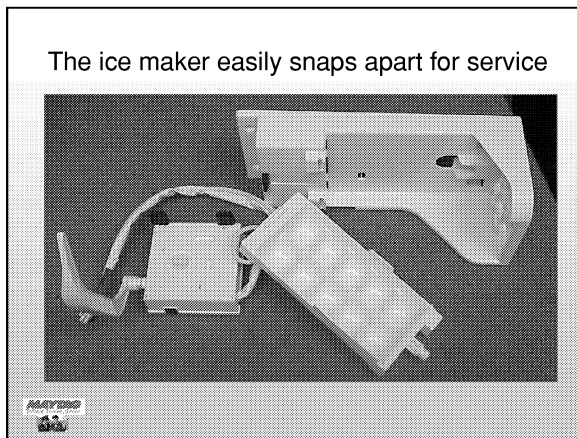
Slide 53



The eject sensor is located on the bottom of the flex tray surrounded by a thermal barrier

Completion of an ice cycle is determined by the temperature of the ice tray as sensed by the thermistor mounted to the bottom of the tray.

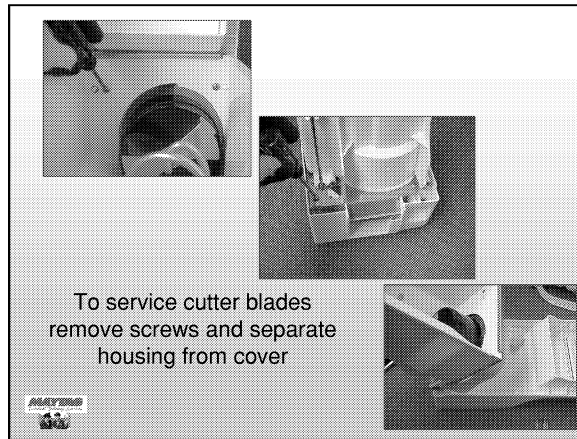
Slide 54



The ice maker easily snaps apart for service

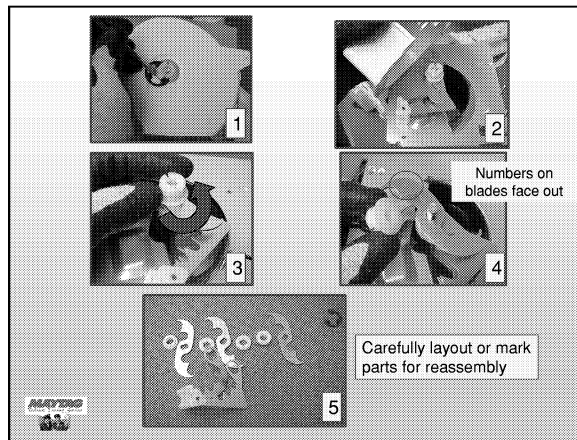
No tools are necessary to disassemble the icemaker components.

Slide 55



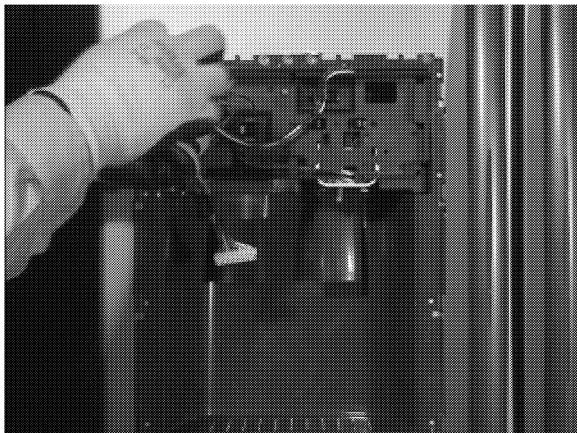
Crusher blades are accessed by removing the front housing from the auger bucket.

Slide 56



The cutter blades are retained by a nylon nut. The nut and shaft have right-hand threads.

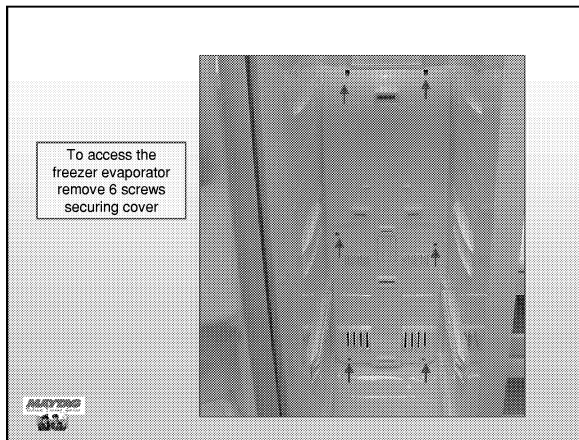
Slide 57



Slide 58

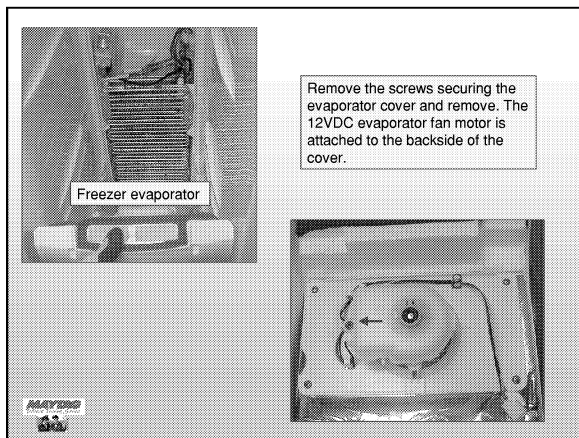


Slide 59



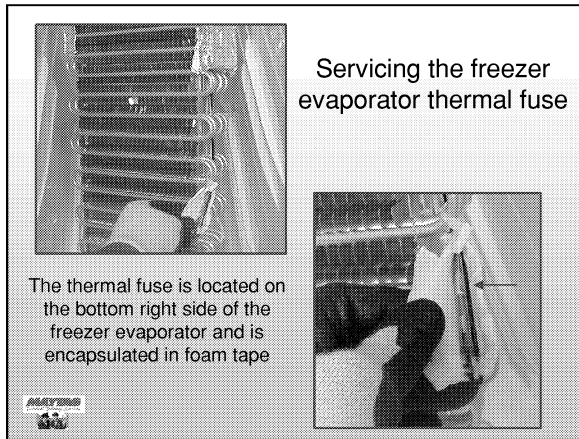
The freezer evaporator cover is held in place with six screws.

Slide 60



Access to the freezer evaporator.

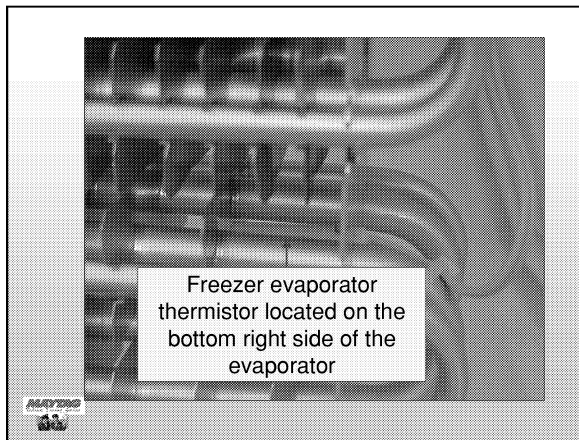
Slide 61



The thermal fuse (safety) is located on the lower right side of the evaporator.

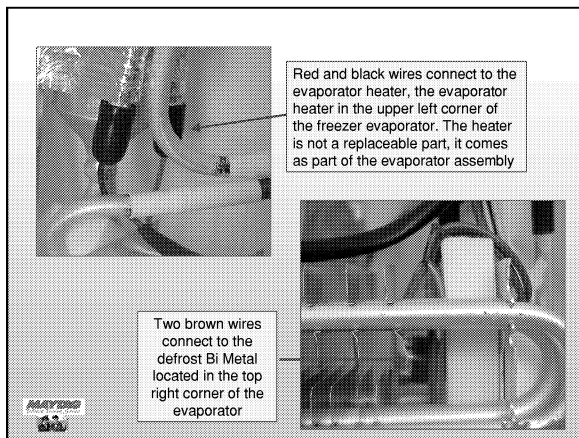
If this fuse is open, the appliance will operate for four hours or compressor run time, attempt the first defrost and fail to return to normal operation.

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The freezer evaporator thermistor is mounted in the lower right section of the evaporator coil.

Slide 63

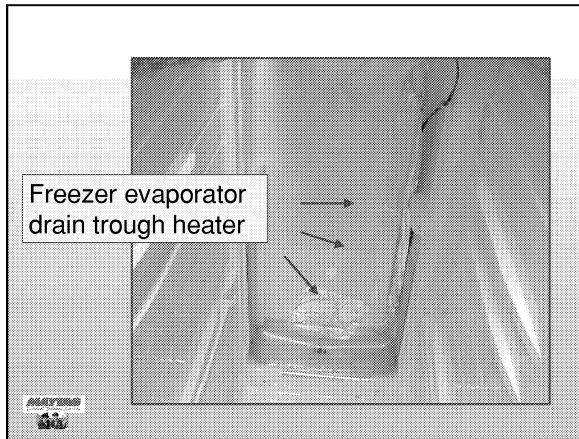


The evaporator heaters are not replaceable separate from the evaporator itself.

The bimetal mounted in the top of the freezer evaporator in product manufactured before June 2003. The bimetal effectively bypasses the evaporator thermistor at temperatures below 23 degrees. The bimetal opens at 54 degrees and the thermistor will provide actual evaporator temperature data to the system control.

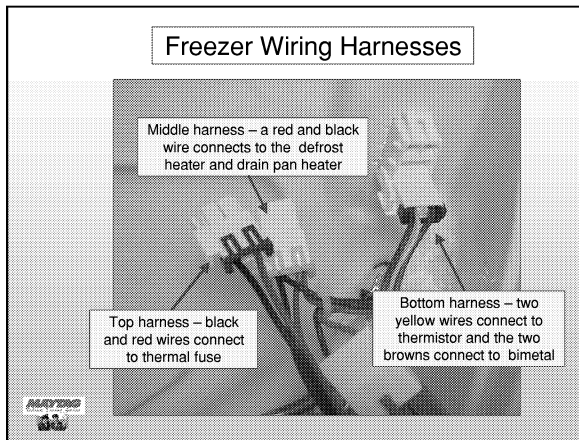
Production after June 2003 should not include the bi-metal.

Slide 64



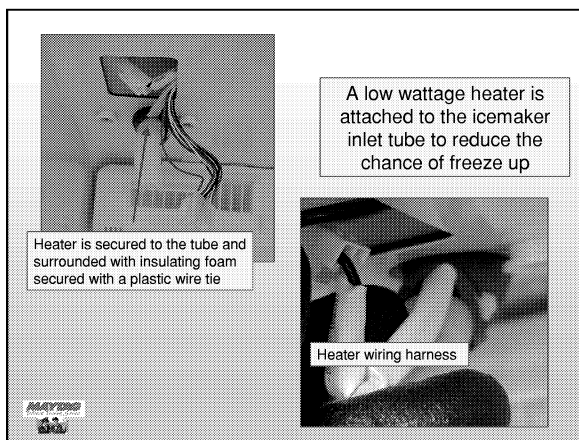
There is a drain trough heater to prevent drain freeze-ups.

Slide 65



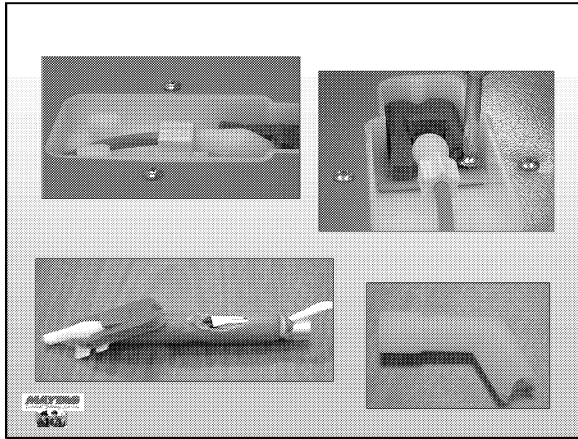
All plugs are color coded and keyed to prevent improper insertion.

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A fill tube heater is used to prevent icemaker fill tube freeze-ups.

Slide 67

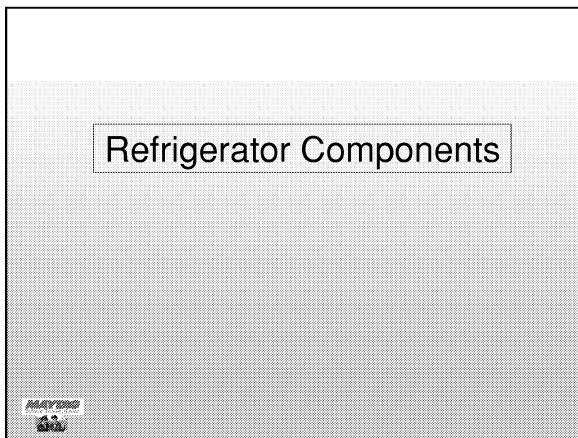


Access to the fill tube and heater. First, unplug the heater inside of the freezer compartment. Remove the access cover on the top of the refrigerator to remove the fill tube.

Slide 68



Slide 69



Slide 70



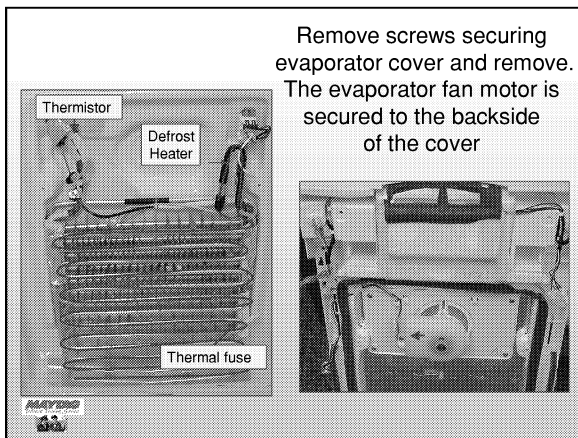
Three drawers. The upper drawer provides for independent temperature control. This is called the CoolSelect zone. One of the independent modes of operation is a thaw function that uses the refrigerator defrost heater to provide increased temperature for a set period of time, after the set time period elapses, the CoolSelect zone returns to normal operation. The CoolSelect zone can also provide for reduced temperature.

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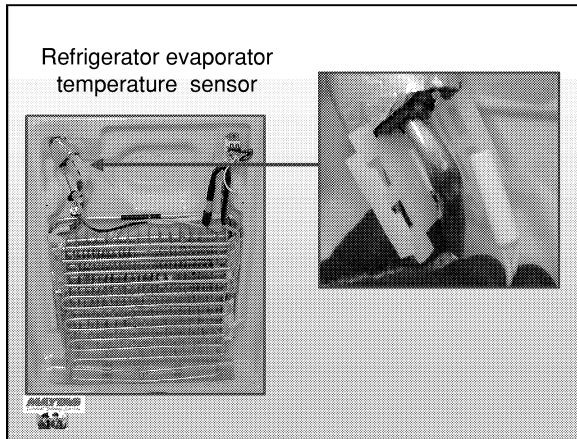
When used in the thaw mode, the display will show the remaining time set in the mode. The Quick Cool mode provides for 100% cooling for up to 60 minutes. The display will show the remaining time in that mode. The temperature selector provides for independent temperature control including a soft freeze at 23 degrees.

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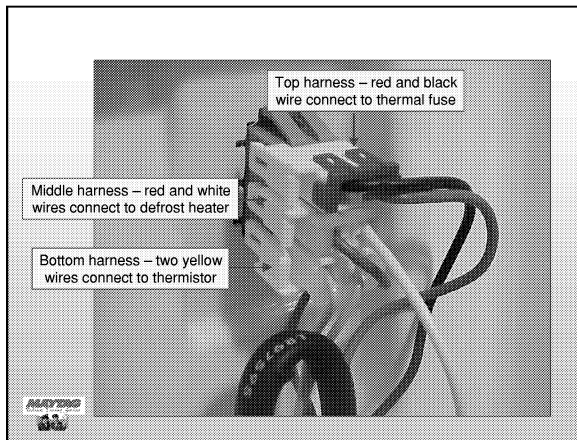
The fresh food evaporator uses a loop of the defrost heater as a drain pan defrost. The evaporator cover includes the mounts for the evaporator fan and the CoolSelect damper..

Slide 73



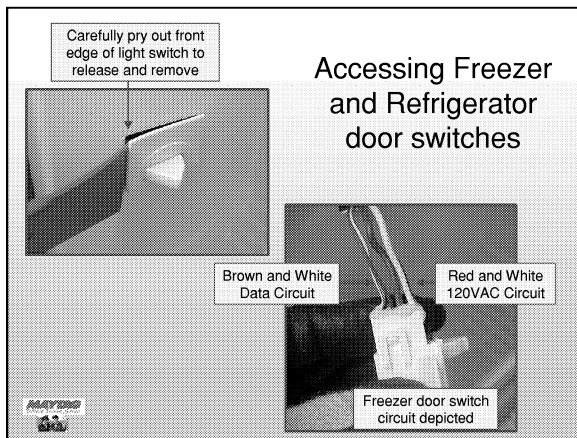
The fresh food evaporator thermistor is clamped to the outlet tube of the evaporator.

Slide 74



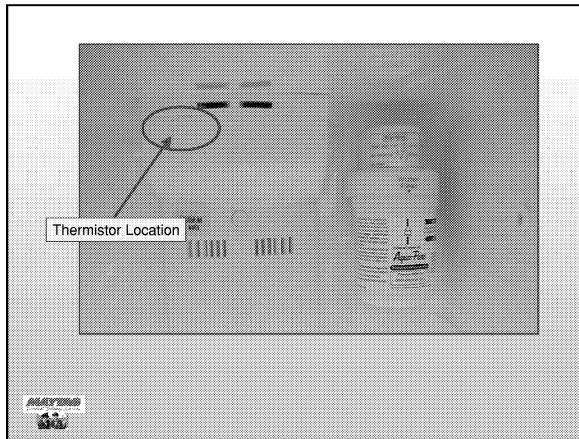
Connections are keyed to prevent incorrect power routing.

Slide 75



Door switches are double pole, double throw switches. Low voltage contacts are used to inform system control when a door is open. High voltage contacts are used to route power to the interior lamps.

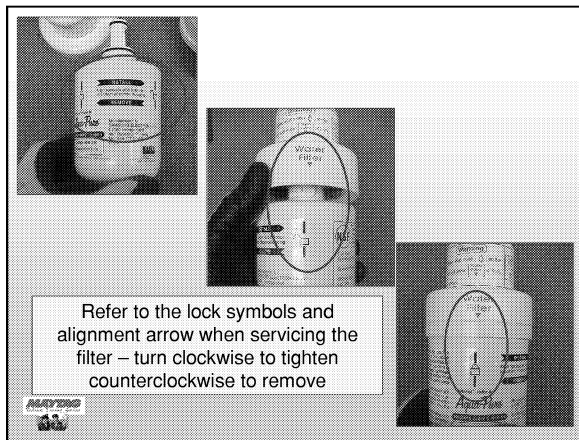
Slide 76



Water filter and air distribution duct are mounted to the upper rear fresh food cabinet.

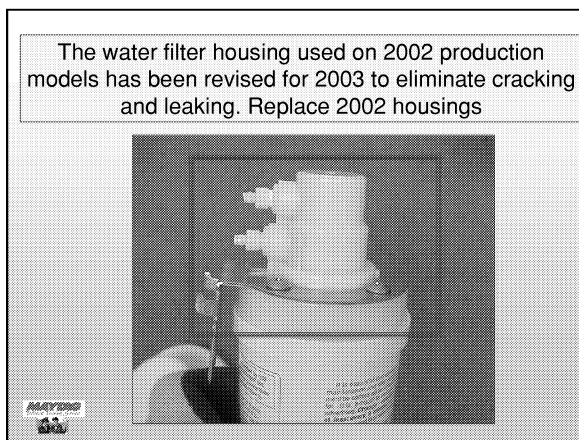
The fresh food cabinet temperature thermistor is located in the upper portion of the air duct.

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Filters remove in the unlock position and are secured in the locked position. The filter head has a built in by-pass system to prevent water leakage when removed. The filter is under positive pressure. It is connected directly to the incoming water supply.

Slide 78

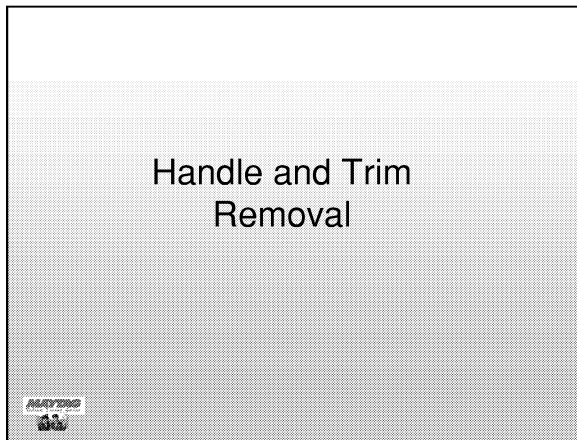


All pre 2003 filter housings should be replaced for increased reliability.

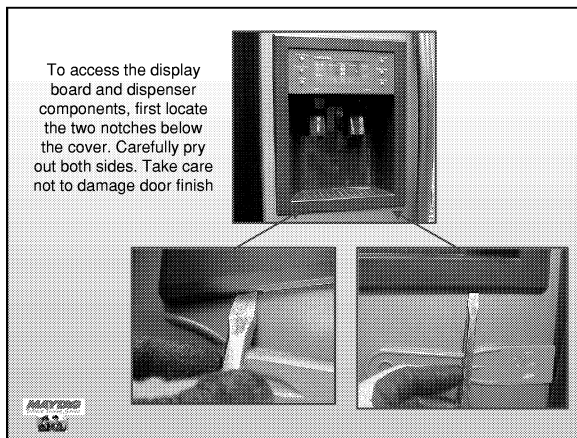
Slide 79



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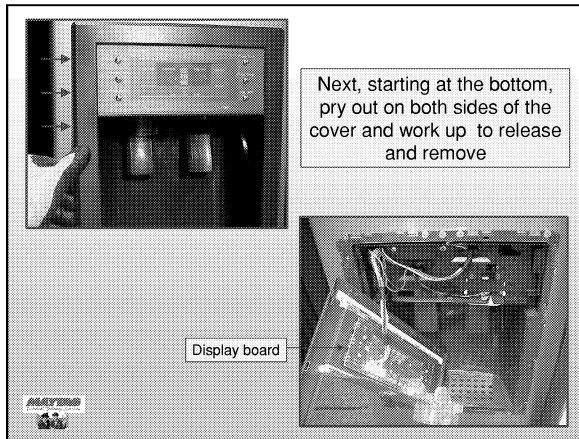


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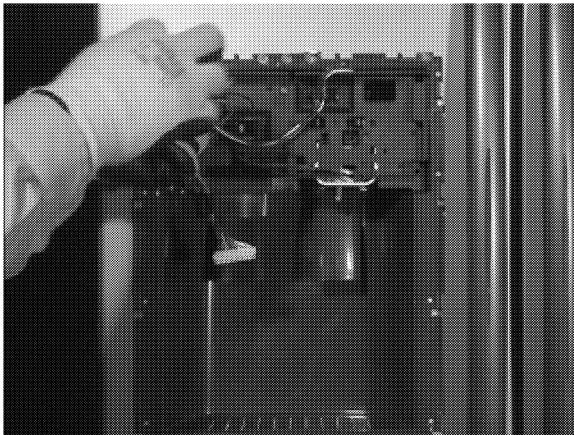


To remove the dispenser façade, there is one screw located in the roof of the dispenser opening. This screw is located between the paddles. Once the screw is removed, gently pry the façade out starting at the bottom. There are slots for inserting a screwdriver to begin the removal.

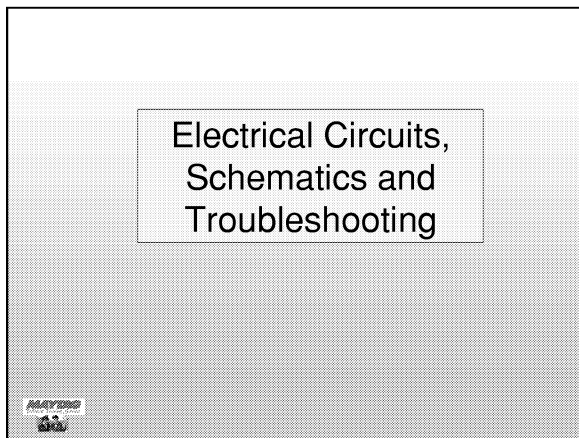
Slide 82



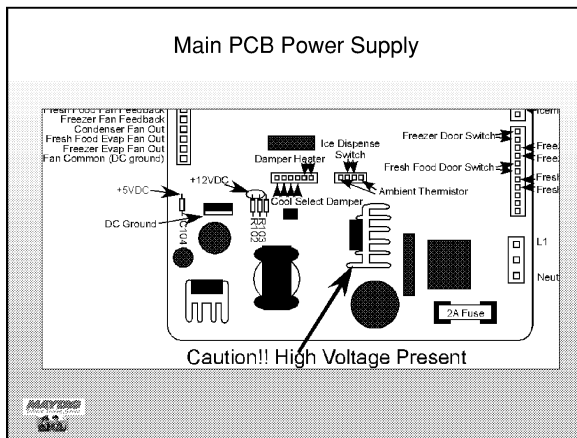
Slide 83



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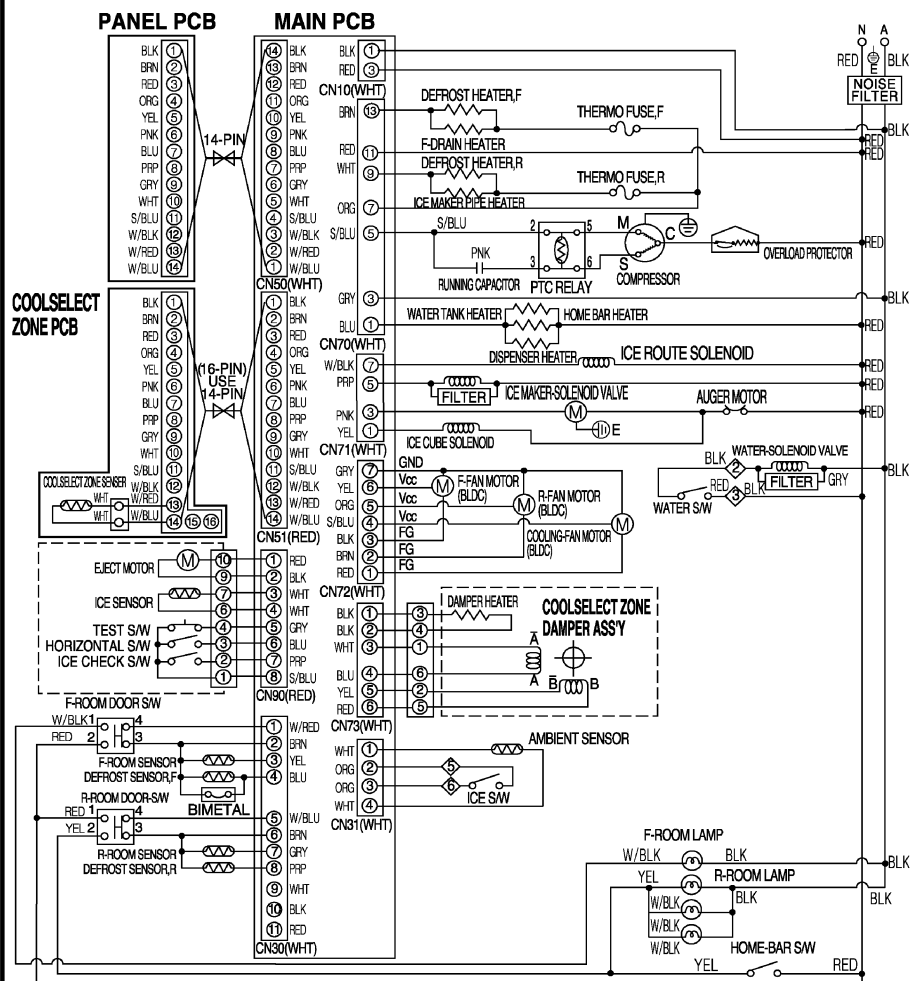


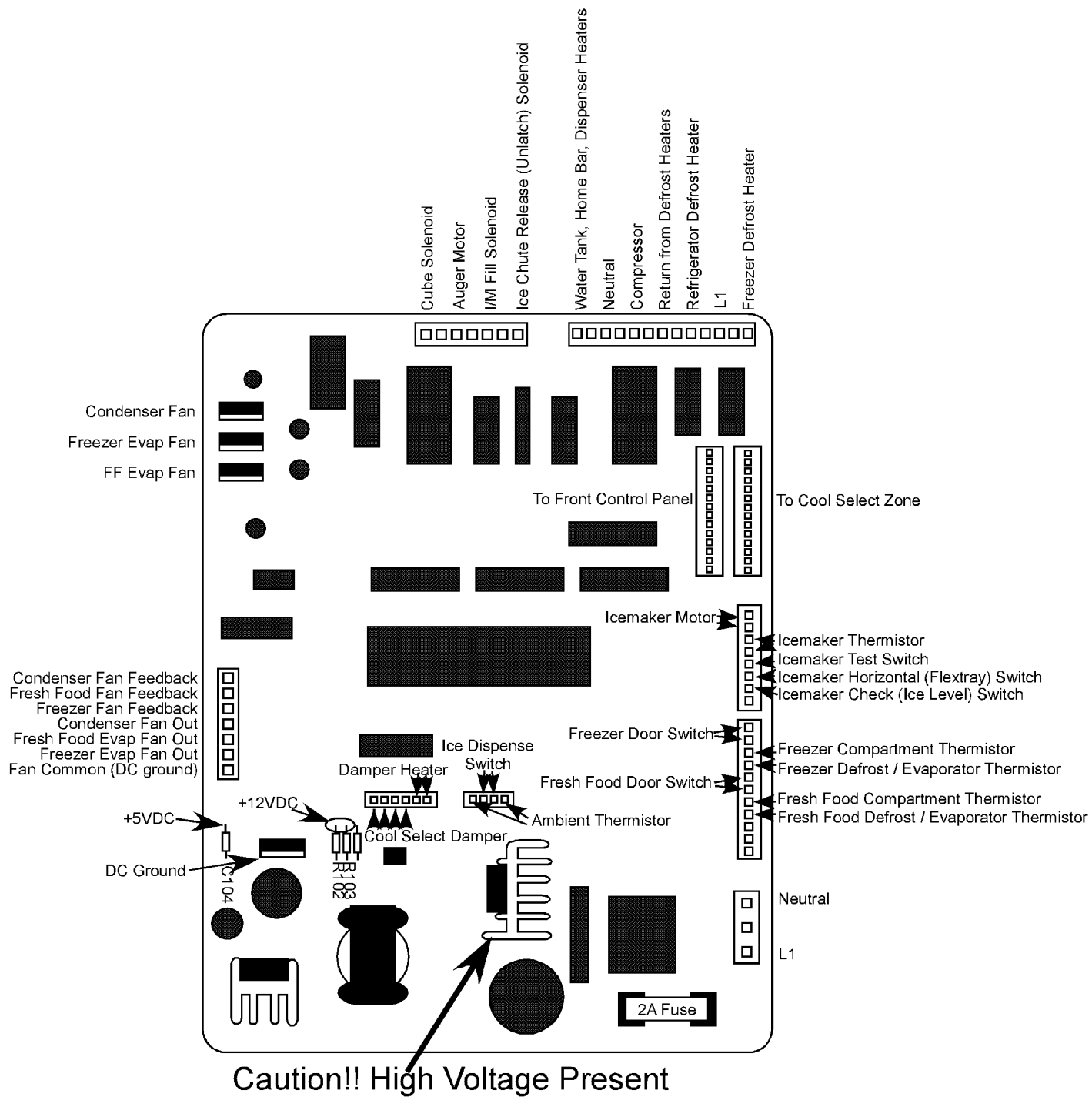
Slide 87



+12VDC and +5VDC supplies are critical for proper operation. If the +12VDC is below +11.9VDC there is a strong possibility that compartment temperatures will be abnormal. There is no repair of the power supply, just replacement of the complete control board.

CIRCUIT-DIAGRAM





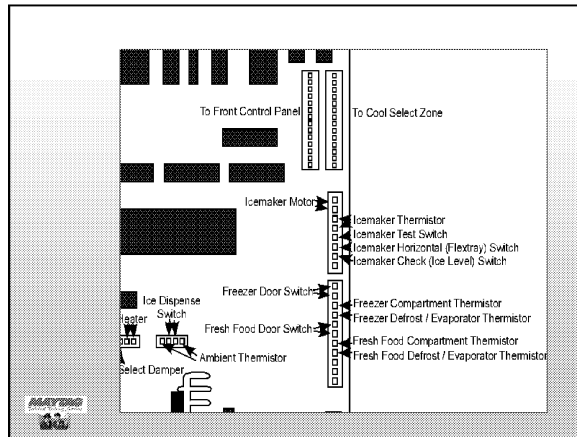
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Thermistor Spec Chart

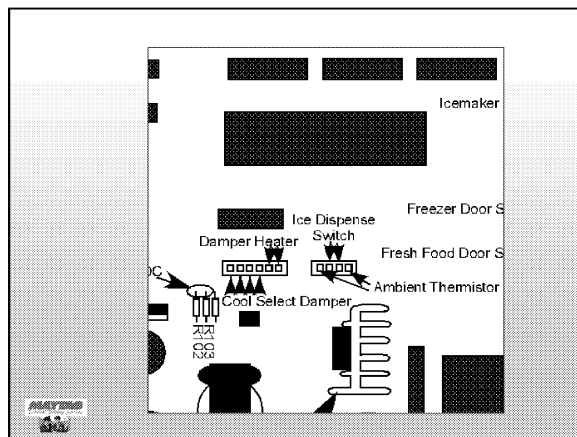
Temp (°F)	Res (KΩ)	Volt (V)	Temp (°F)	Res (KΩ)	Volt (V)	Temp (°F)	Res (KΩ)	Volt (V)
-43.6	98 970	4.541	12.2	21 410	3 408	88.0	6 013	1 878
-41.8	93 700	4.615	14.0	20 180	3 360	88.8	5 922	1 834
-40.0	88 950	4.694	15.8	19 280	3 310	71.6	5 581	1 791
-38.2	84 150	4.769	17.6	18 730	3 260	73.4	5 379	1 748
-36.4	79 300	4.843	19.4	17 920	3 205	75.2	5 155	1 707
-34.6	75 670	4.916	21.2	17 160	3 155	77.0	5 000	1 667
-32.8	71 800	4.989	23.0	16 430	3 109	78.8	4 821	1 626
-31.0	68 150	5.060	24.8	15 740	3 067	80.6	4 650	1 587
-29.2	64 710	5.131	26.6	15 080	3 006	82.4	4 487	1 549
-27.4	61 480	5.201	28.4	14 450	2 955	84.2	4 329	1 511
-25.6	58 300	5.269	30.2	13 850	2 904	86.0	4 176	1 474
-23.8	55 550	5.337	32.0	13 290	2 853	87.8	4 033	1 437
-22.0	52 840	5.404	33.8	12 740	2 801	89.6	3 894	1 401
-20.2	50 230	5.470	35.6	12 220	2 750	91.4	3 760	1 366
-18.4	47 770	5.534	37.4	11 720	2 699	93.2	3 631	1 332
-16.6	45 450	5.599	39.2	11 250	2 647	95.0	3 508	1 298
-14.8	43 200	5.661	41.0	10 800	2 596	96.8	3 390	1 266
-13.0	41 180	5.723	42.8	10 370	2 545	98.6	3 276	1 234
-11.2	39 240	5.785	44.6	9 959	2 495	100.4	3 167	1 203
-9.4	37 390	5.845	46.4	9 568	2 445	102.2	3 062	1 172
-7.6	35 650	5.905	48.2	9 185	2 395	104.0	2 962	1 143
-5.8	33 980	5.963	50.0	8 819	2 346	105.8	2 864	1 113
-4.0	32 390	6.022	51.8	8 464	2 296	107.6	2 770	1 085
-2.2	30 820	6.078	53.6	8 116	2 248	109.4	2 680	1 057
-0.4	29 300	6.134	55.4	7 782	2 199	111.2	2 593	1 030
1.4	28 140	6.189	57.2	7 462	2 151	113.0	2 510	1 003
3.2	26 870	6.244	59.0	7 166	2 104	114.8	2 429	977
5.0	25 590	6.297	60.8	6 892	2 057	116.6	2 352	952
6.8	24 510	6.351	62.6	6 631	2 012	118.4	2 278	928
8.6	23 420	6.404	64.4	6 381	1 966	120.2	2 206	904
10.4	22 390	6.456	66.2	6 142	1 922			

Thermistors are all the same sensor with different harnesses attached depending on the mounting. It is possible to either check the resistance of the sensor with the connection unplugged, or check the DC voltage of the sensor.

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Slide 91

Main PCB Fan Motor Circuitry

Voltage of Motor			
	Test Point b (F-Fan)	Test Point c (R-Fan)	Test Point d (C-Fan)
High	11.1V	10V	10V
Low	10V	10V	8.3V

CN72	Resistance
Pin 6	2K
Pin 5	1.6K
Pin 4	1.2K

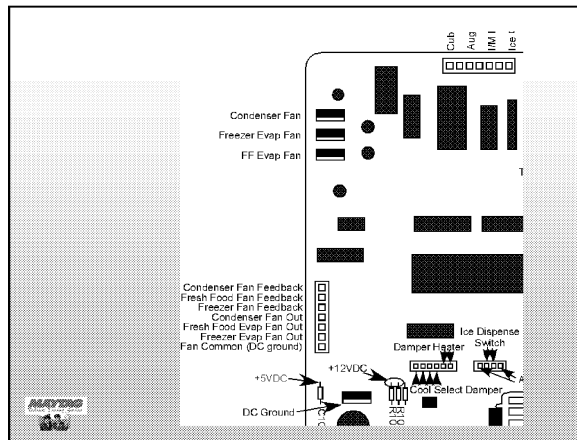
CN72	Resistance
Pin 3	17.7K
Pin 2	18.2K
Pin 1	7.6K

All Fans will operate at two speeds.

Resistance checks of the Fans are with connector CN72 disconnected.

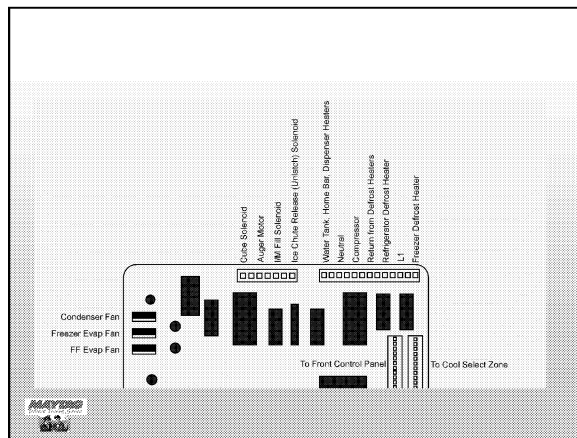
The Freezer and condenser fan operate in two speed modes. The fresh food evaporator fan is only operated at the lower speed.

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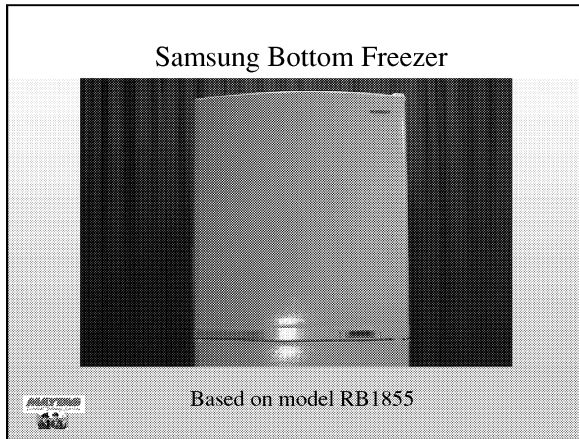


Evaporator and condenser fan output voltages can be checked at the metal tab of the output transistors. Reference to DC ground which is the tab of the +5VDC regulator.

Slide 93



Slide 94



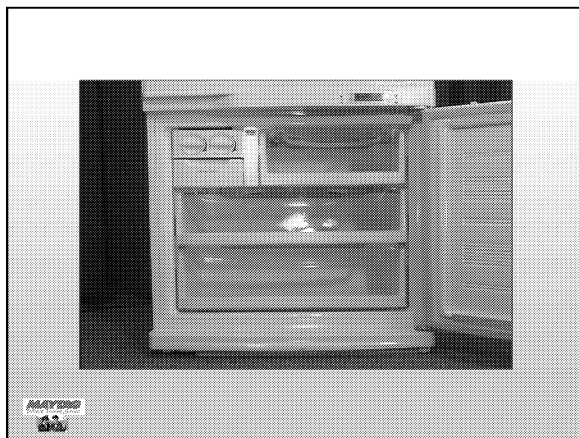
The bottom freezer incorporates electronic control.

Slide 95



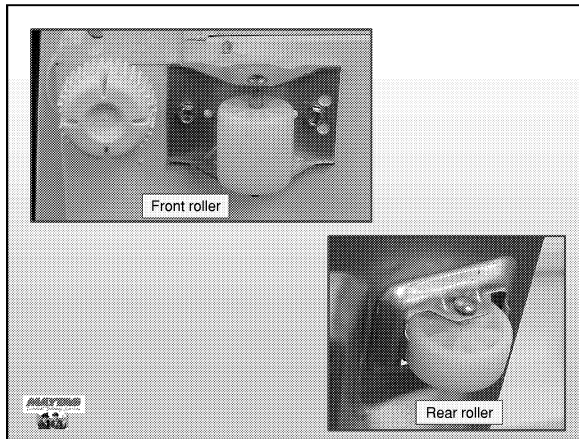
Typical compliment of interior components.

Slide 96

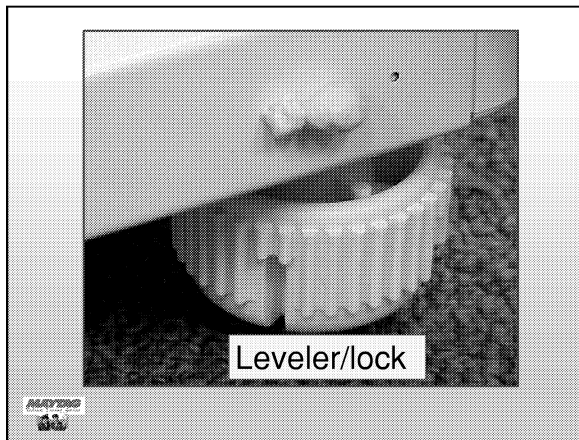


The icemaker is a manual fill and release.
The freezer section uses pull-out drawers for product storage.

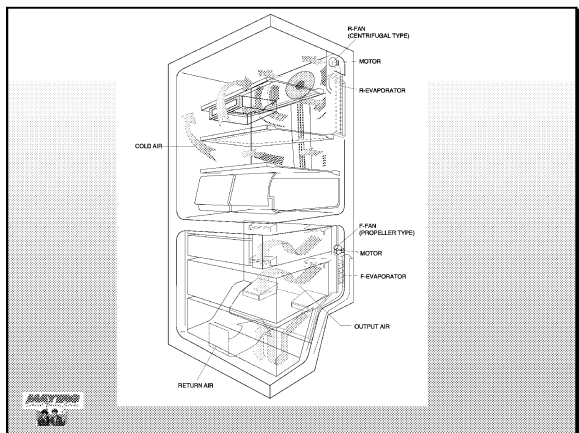
Slide 97



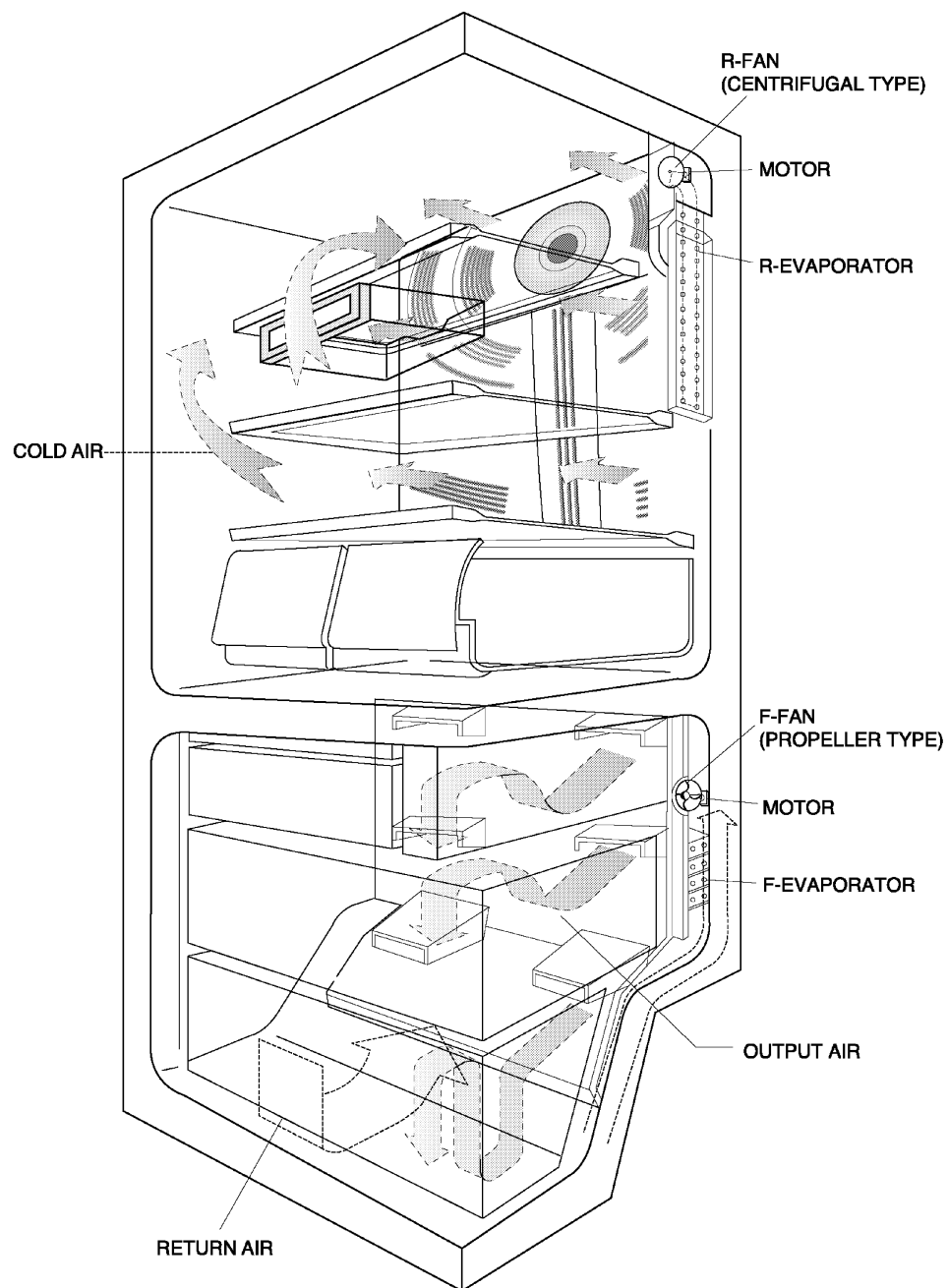
Slide 98

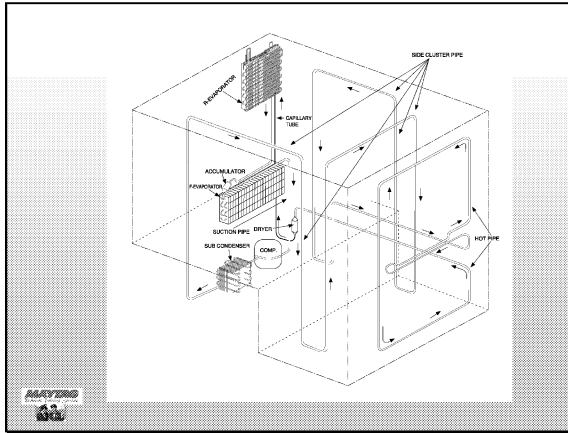


Slide 99



Each compartment uses multiple air outlets for even temperature control.



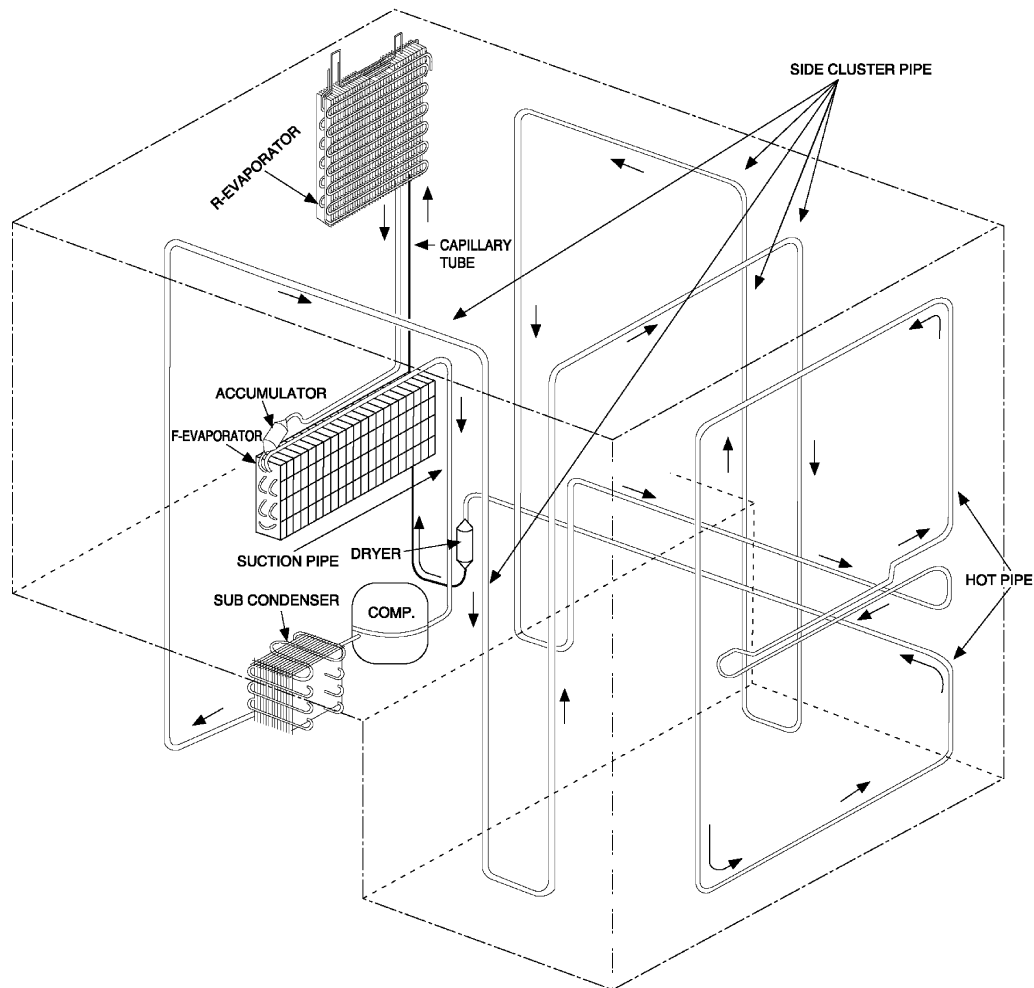


There are two evaporators, one in each compartment.

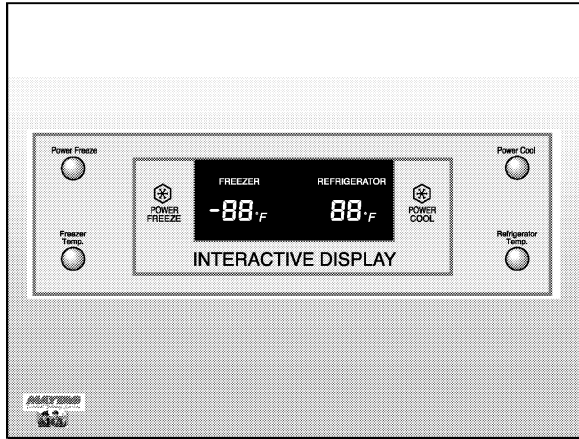
This is a hot-walled refrigerator and requires one inch of clearance around the installation.

The Sub-condenser empties into a steel hot-wall condenser that feeds a copper hot gas loop around the door openings.

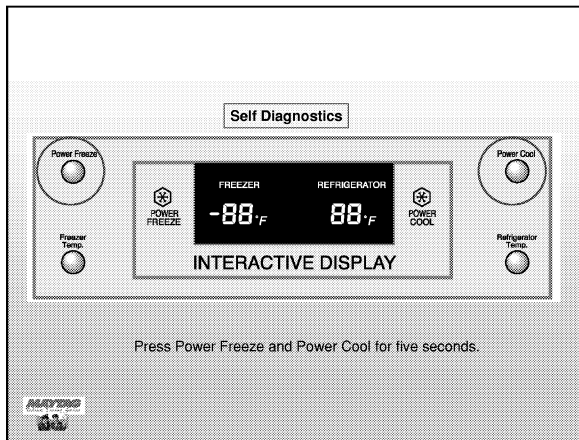
The hot gas loop supplies the fresh food evaporator and the refrigerant flows to the freezer evaporator before returning to the compressor.



Slide 101



Slide 102



To enter the self diagnostics function, press the Power Freeze and Power cool buttons for five seconds.

Slide 103

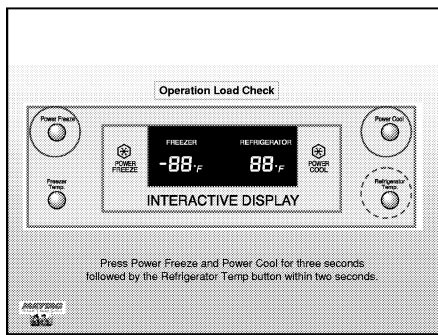
Table 1. Display table of self diagnosis.

No.	Item	LED Display	Details	Remarks
1	R-sensor	REFRIGERATOR 5	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F
2	R-defroster sensor	REFRIGERATOR d	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F
3	Outer sensor	FREEZER ES	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F
4	F-sensor	FREEZER FS	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F
5	F-defroster sensor	FREEZER dS	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F

Table 1. Display table of self diagnosis.

No	Item	LED Display	Details	Remarks
1	R-sensor	REFRIGERATOR 5	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F
2	R-defroster sensor	REFRIGERATOR d	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F
3	Outer sensor	FREEZER ES	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F
4	F-sensor	FREEZER FS	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F
5	F-defroster sensor	FREEZER dS	• Connector contact failure • Short-circuit	• Suspected to be below -58 °F • Suspected to be over 150 °F

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To enter the Operation Load Check, press the Power Freeze and Power cool buttons for three seconds followed by the Refrigerator Temp button within two seconds.

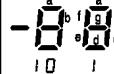
Table 2. Display table of the presently operating parts.

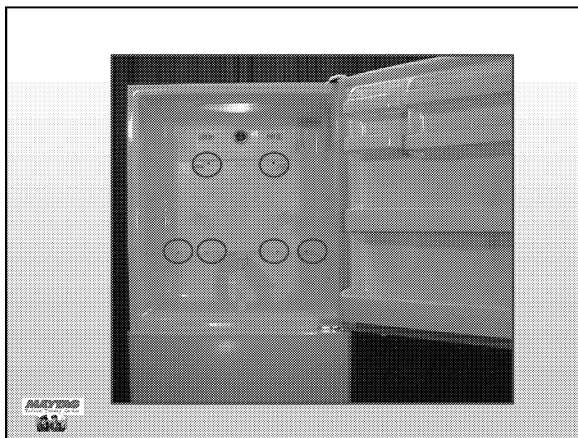
No	Content	Display LED	Operation	Remark
1	R-fan	a : REFRIGERATOR 1 digit	Induce R fan activation	Ref. Extension available models 
2	R-defrost heater	c : REFRIGERATOR 1 digit	Defrost heater activation	
3	Initial start mode	d : REFRIGERATOR 1 digit	Initial power is activated ON	
4	Over load mode	e : REFRIGERATOR 1 digit	Outer temperature is over 95 °F	
5	Low temp. mode	f : REFRIGERATOR 1 digit	Outer temperature is below 68 °F	
6	Exhibition mode	g : REFRIGERATOR 1 digit	Exhibition mode is operated together	
7	Comp	a : FREEZER 1 digit	Led ON when COMP activation is included	
8	F-fan	b : FREEZER 1 digit	Led ON when F-fan activation is included	
9	F-defrost heater	d : FREEZER 1 digit	Led ON when F-heater activation is included	
10	F-Lamp	a : FREEZER 10 digit	Led ON when F-lamp activation is included	
11	R-Lamp	b : FREEZER 10 digit	Led ON when R-lamp activation is included	

During the operation load check, the illuminated digits will indicate the currently powered components as well as indicate special modes of operation.

The display LED listed refers to the two digit display for either the refrigerator or freezer temperature. Each display has a tens digit as well as a ones digit. The tens digit is the left-hand seven segment display (8) and the ones digit is the right-hand seven segment (8) display.

Table 2. Display table of the presently operating parts.

No	Content	Display LED	Operation	Remark
1	R-fan	a : REFRIGERATOR 1 digit	Include R-fan activation	Ref. 6.button scan and display circuitry 
2	R-defrost heater	c : REFRIGERATOR 1 digit	Defrost heater activation	
3	Initial start mode	d : REFRIGERATOR 1 digit	Initial power is activated ON	
4	Over load mode	e : REFRIGERATOR 1 digit	Outer temperature is over 95 °F	
5	Low temp. mode	f : REFRIGERATOR 1 digit	Outer temperature is below 68 °F	
6	Exhibition mode	g : REFRIGERATOR 1 digit	Exhibition mode is operated together	
7	Comp	a : FREEZER 1 digit	Led ON when COMP activation is included	
8	F-fan	b : FREEZER 1 digit	Led ON F-fan activation is included	
9	F-defrost heater	d : FREEZER 1 digit	Led ON when F-heater activation is included	
10	F-Lamp	a : FREEZER 10 digit	Led ON when F-lamp activation is included	
11	R-Lamp	b : FREEZER 10 digit	Led ON when R-lamp activation is included	



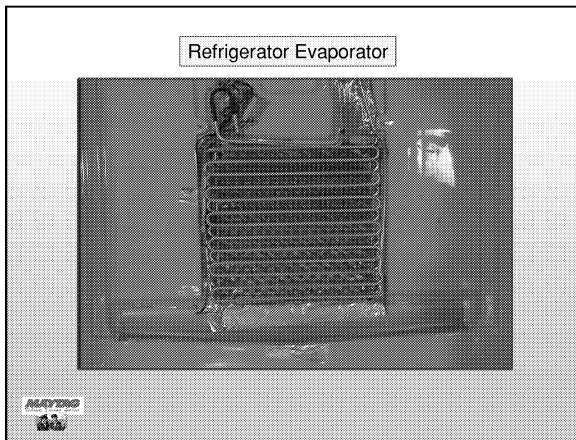
Six screws must be removed to access the fresh food evaporator.

Slide 107



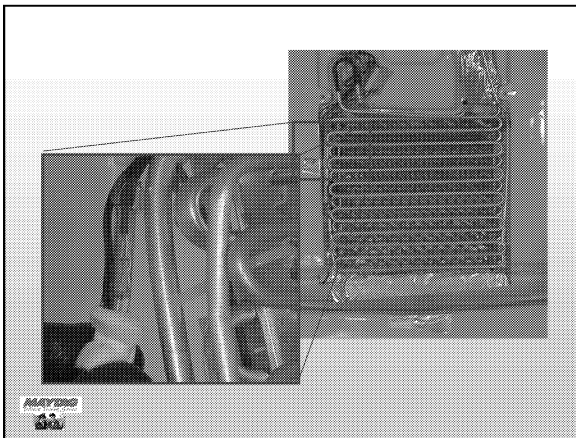
The fresh food evaporator fan is a blower wheel design.

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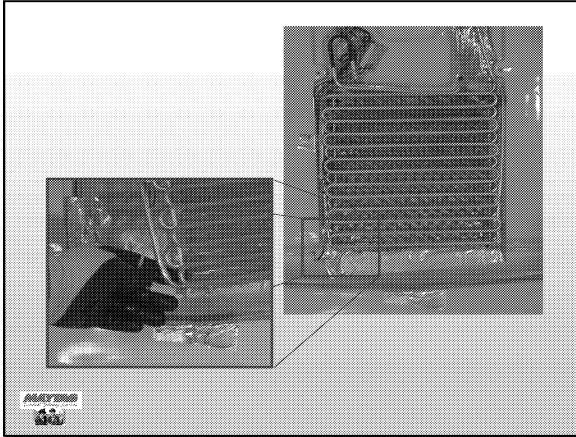
The fresh food evaporator has an integrated defrost heater loop.

Slide 109



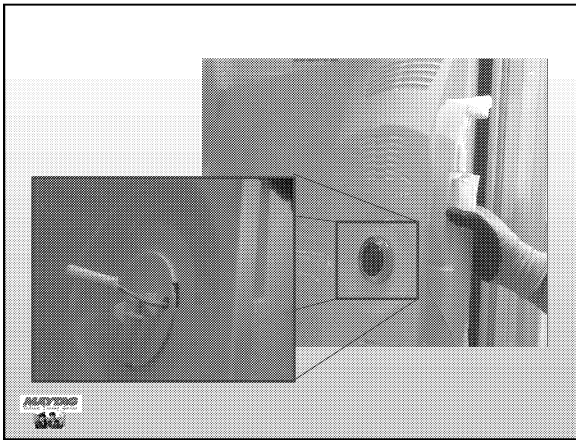
The fresh food thermal fuse is located on the upper left side of the evaporator coil.

Slide 110



The fresh food evaporator thermistor is located in the lower left hand corner of the evaporator.

Slide 111



The fresh food compartment thermistor is located behind a decorative badge in the upper middle of the compartment.

Slide 112

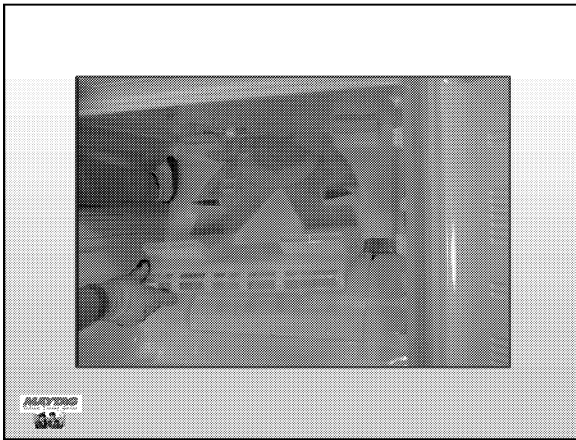


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The light / thermistor housing must be removed to access the freezer evaporator. There are two screws securing the housing to the top of the compartment. The housing slides forward to release.

Slide 114



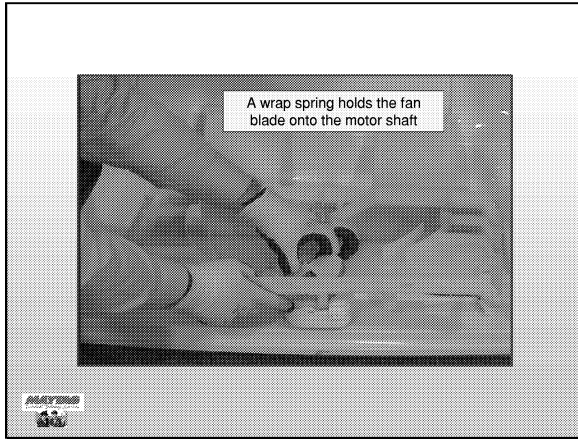
The air duct snaps into place over the evaporator cover. Pull gently to remove.

Slide 115



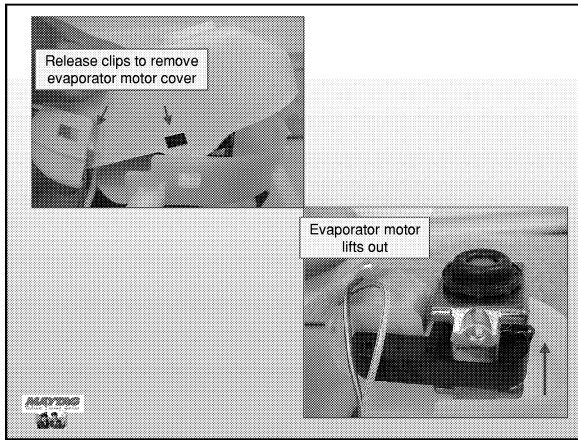
Two screws secure the evaporator cover and fan mount.

Slide 116

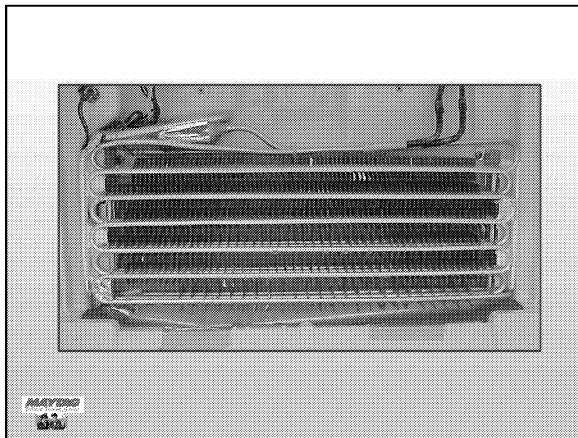


Propeller type fan with a tension spring clamp.

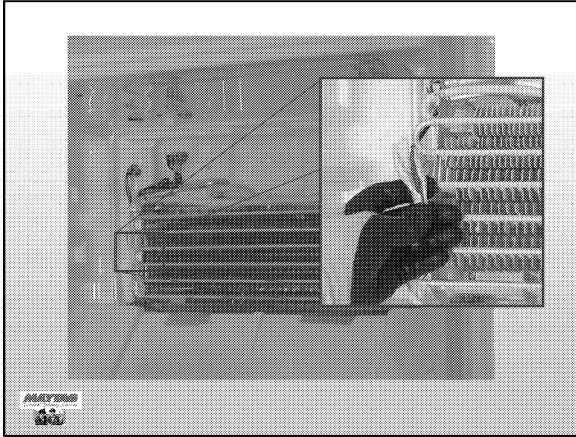
Slide 117



Slide 118

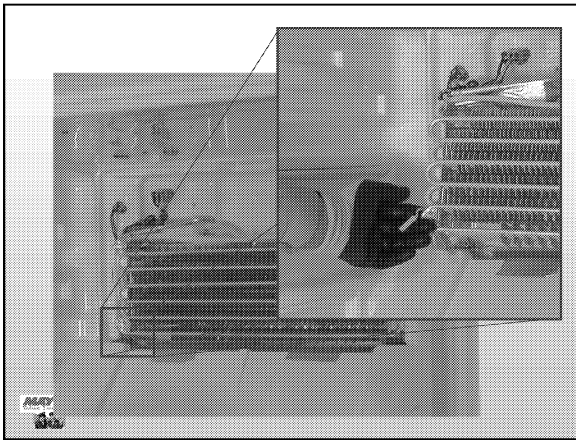


Slide 119



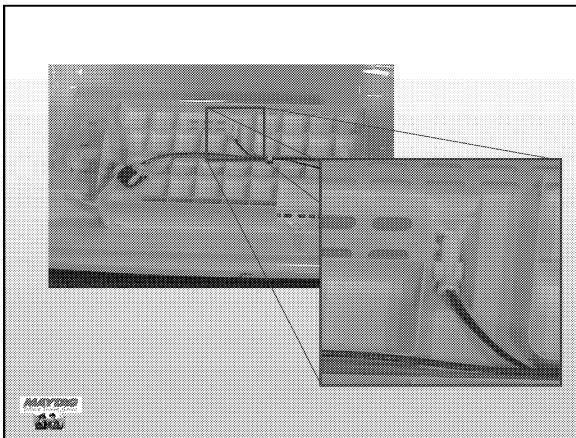
The freezer evaporator thermal fuse is located on the lower left side of the evaporator.

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The freezer evaporator thermistor is located in the lower left corner of the evaporator.

Slide 121

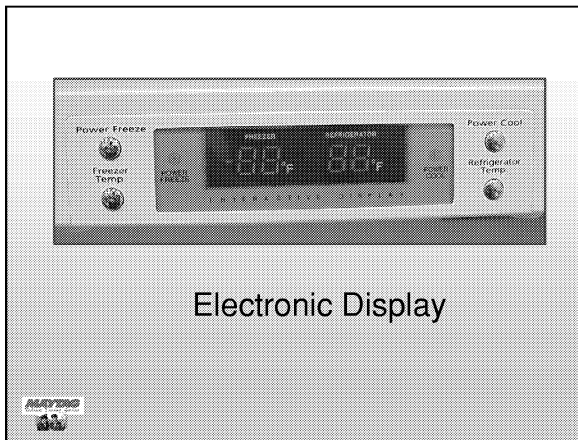


The freezer compartment thermistor is located in the light housing.

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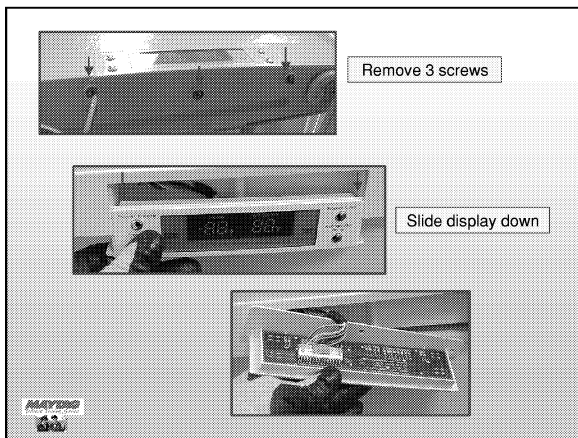


Slide 123



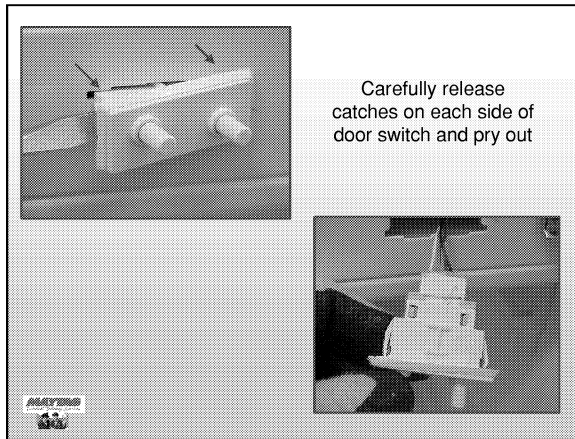
Electronic Display

Slide 124



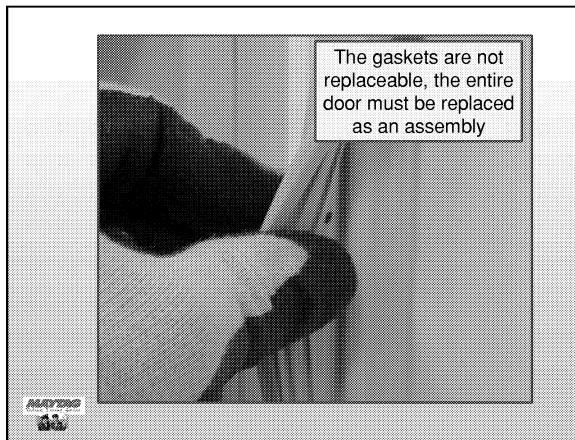
The temperature control panel is secured with three screws.

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To remove the door switch assembly, gently pry out on the housing.

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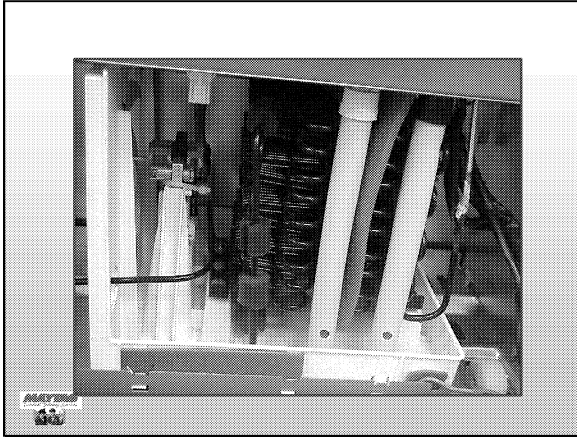


Door gaskets on the current bottom freezer models are not replaceable.

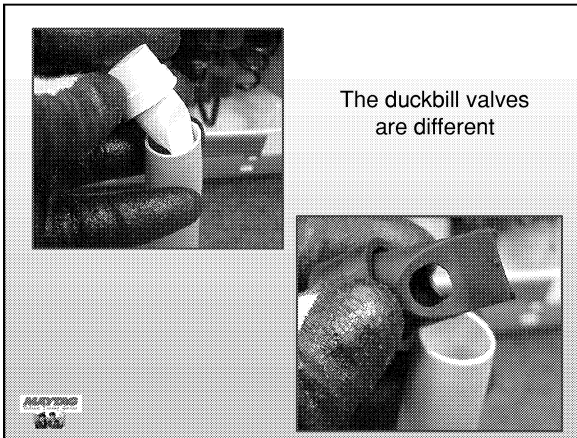
Slide 127



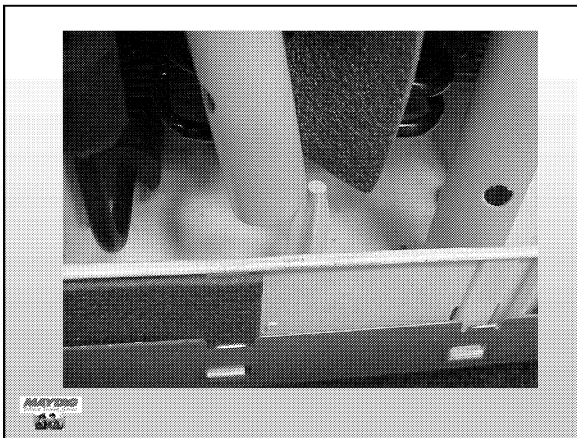
Slide 128



Slide 129

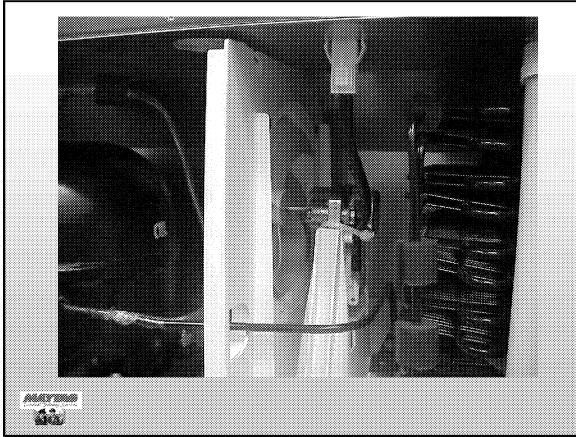


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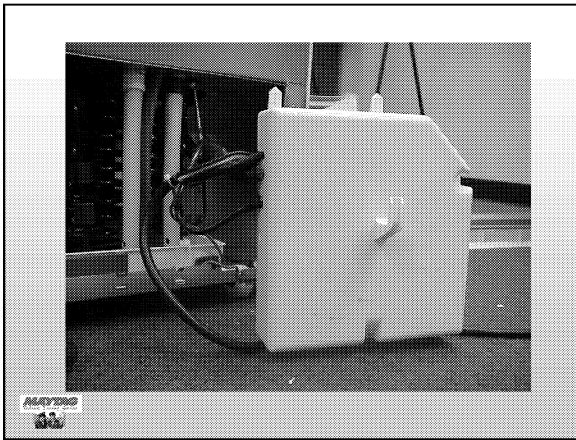
Make sure drain tubes are installed over the guides in the condensate pan.

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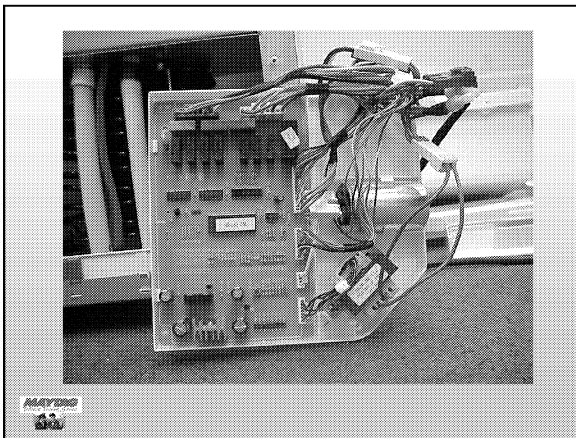


Condenser motor connection.

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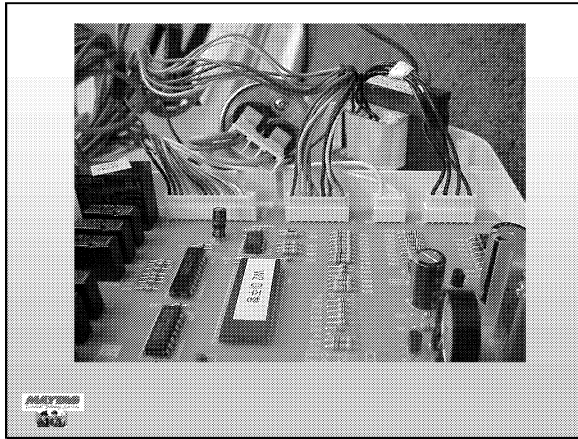


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View of bottom freezer control board.

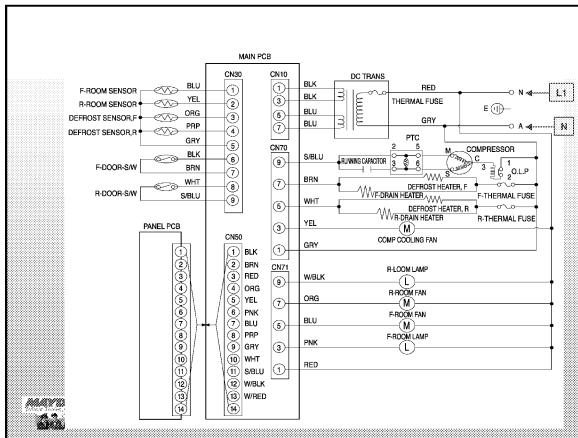
Slide 134

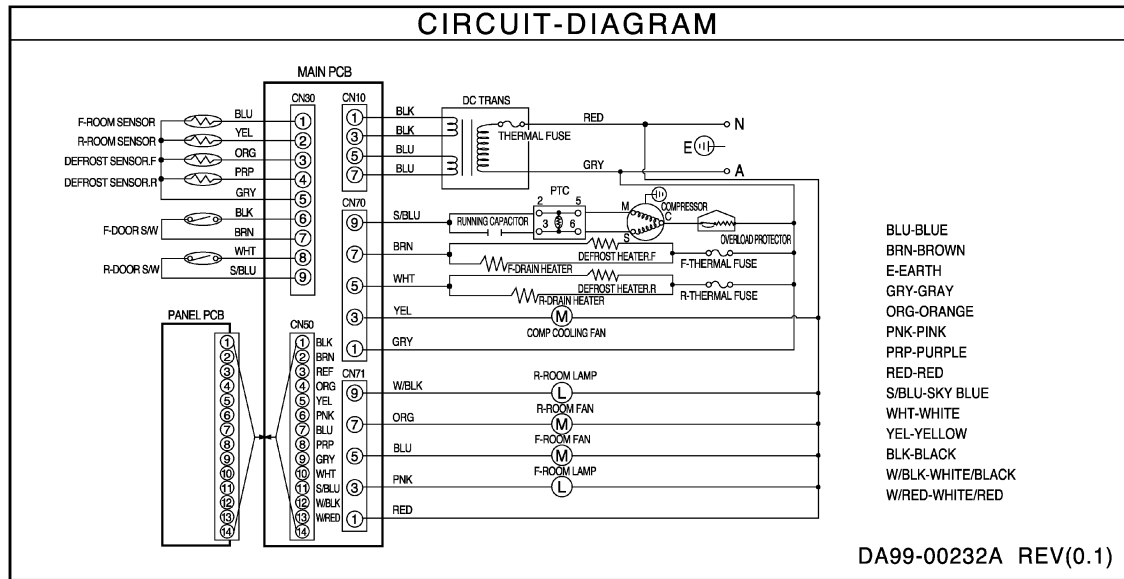


Slide 135

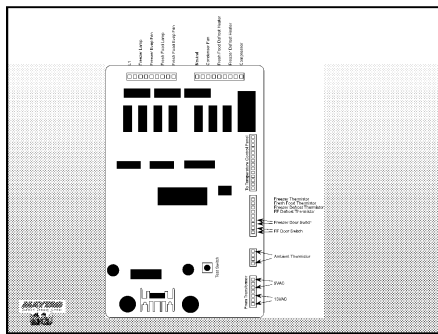


Slide 136



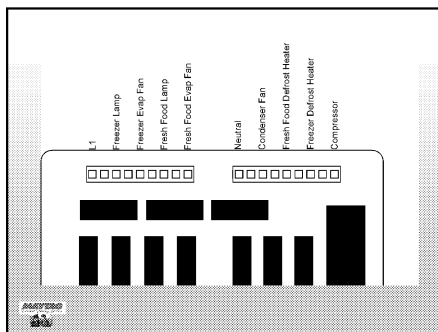


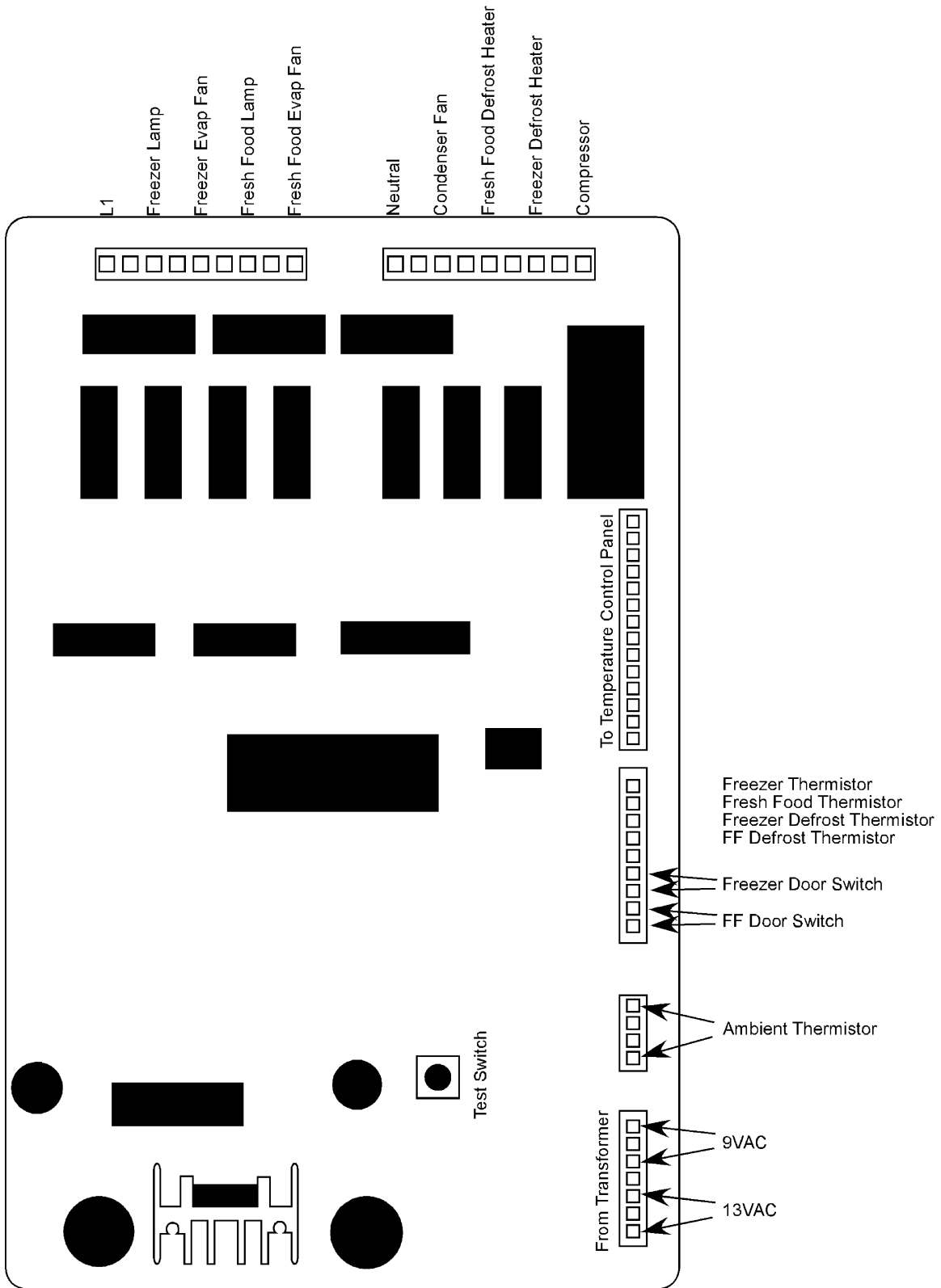
Slide 137



The bottom freezer uses a more simplified control board. All loads are 120VAC components.

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Thermistor Spec Chart

Temp (°F)	Res (K Ω)	Volt (V)	Temp (°F)	Res (K Ω)	Volt (V)	Temp (°F)	Res (K Ω)	Volt (V)
-43.6	98.870	4.518	-12.2	21.410	3.408	68.0	6.013	1.878
-41.8	93.700	4.518	-10.4	20.480	3.360	69.8	5.792	1.834
-40.0	88.850	4.494	-8.6	19.580	3.310	71.6	5.581	1.791
-38.2	84.150	4.469	-6.8	18.730	3.260	73.4	5.379	1.749
-36.4	79.800	4.443	-5.0	17.920	3.209	75.2	5.185	1.707
-34.6	75.670	4.416	-3.2	17.160	3.159	77.0	5.000	1.667
-32.8	71.800	4.389	-1.4	16.430	3.108	78.8	4.821	1.626
-31.0	68.150	4.360	0.4	15.740	3.057	80.6	4.650	1.587
-29.2	64.710	4.331	2.2	15.080	3.006	82.4	4.487	1.549
-27.4	61.480	4.301	4.0	14.450	2.955	84.2	4.329	1.511
-25.6	58.430	4.269	5.8	13.860	2.904	86.0	4.179	1.474
-23.8	55.550	4.237	7.6	13.290	2.853	87.8	4.033	1.437
-22.0	52.840	4.204	9.4	12.740	2.801	89.6	3.894	1.401
-20.2	50.230	4.170	11.2	12.220	2.750	91.4	3.760	1.366
-18.4	47.770	4.134	13.0	11.720	2.698	93.2	3.631	1.332
-16.6	45.450	4.098	14.8	11.250	2.647	95.0	3.508	1.298
-14.8	43.260	4.061	16.6	10.800	2.596	96.8	3.390	1.266
-13.0	41.190	4.023	18.4	10.370	2.545	98.6	3.276	1.234
-11.2	39.240	3.985	20.2	9.959	2.495	100.4	3.167	1.203
-9.4	37.390	3.945	22.0	9.569	2.445	102.2	3.062	1.172
-7.6	35.650	3.905	23.8	9.195	2.395	104.0	2.962	1.143
-5.8	33.990	3.863	25.6	8.839	2.346	105.8	2.864	1.113
-4.0	32.430	3.822	27.4	8.494	2.296	107.6	2.770	1.085
-2.2	30.920	3.778	29.2	8.166	2.248	109.4	2.680	1.057
-0.4	29.500	3.734	31.0	7.852	2.199	111.2	2.593	1.030
1.4	28.140	3.689	32.8	7.552	2.151	113.0	2.510	1.003
3.2	26.870	3.644	34.6	7.266	2.104	114.8	2.429	0.977
5.0	25.650	3.597	36.4	6.992	2.057	116.6	2.352	0.952
6.8	24.510	3.551	38.2	6.731	2.012	118.4	2.278	0.928
8.6	23.420	3.504	40.0	6.481	1.966	120.2	2.206	0.904
10.4	22.390	3.456	41.8	6.242	1.922			

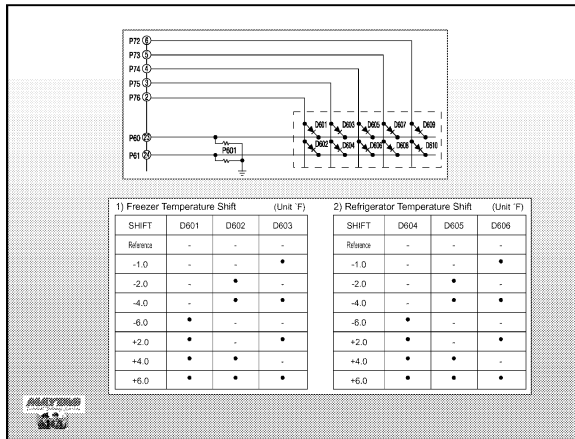
Thermistors are all the same sensor with different harnesses attached depending on the mounting. It is possible to either check the resistance of the sensor with the connection unplugged, or check the DC voltage of the sensor. On the bottom freezer refrigerator there is no offset adjustment of the thermistors.

Temp (°F)	Res (K Ω)	Volt (V)
-43.6	98.870	4.541
-41.8	93.700	4.518
-40.0	88.850	4.494
-38.2	84.150	4.469
-36.4	79.800	4.443
-34.6	75.670	4.416
-32.8	71.800	4.389
-31.0	68.150	4.360
-29.2	64.710	4.331
-27.4	61.480	4.301
-25.6	58.430	4.269
-23.8	55.550	4.237
-22.0	52.840	4.204
-20.2	50.230	4.170
-18.4	47.770	4.134
-16.6	45.450	4.098
-14.8	43.260	4.061
-13.0	41.190	4.023
-11.2	39.240	3.985
-9.4	37.390	3.945
-7.6	35.650	3.905
-5.8	33.990	3.863
-4.0	32.430	3.822
-2.2	30.920	3.778
-0.4	29.500	3.734
1.4	28.140	3.689
3.2	26.870	3.644
5.0	25.650	3.597
6.8	24.510	3.551
8.6	23.420	3.504
10.4	22.390	3.456

Temp (°F)	Res (K Ω)	Volt (V)
12.2	21.410	3.408
14.0	20.480	3.360
15.8	19.580	3.310
17.6	18.730	3.260
19.4	17.920	3.209
21.2	17.160	3.159
23.0	16.430	3.108
24.8	15.740	3.057
26.6	15.080	3.006
28.4	14.450	2.955
30.2	13.860	2.904
32.0	13.290	2.853
33.8	12.740	2.801
35.6	12.220	2.750
37.4	11.720	2.698
39.2	11.250	2.647
41.0	10.800	2.596
42.8	10.370	2.545
44.6	9.959	2.495
46.4	9.569	2.445
48.2	9.195	2.395
50.0	8.839	2.346
51.8	8.494	2.296
53.6	8.166	2.248
55.4	7.852	2.199
57.2	7.552	2.151
59.0	7.266	2.104
60.8	6.992	2.057
62.6	6.731	2.012
64.4	6.481	1.966
66.2	6.242	1.922

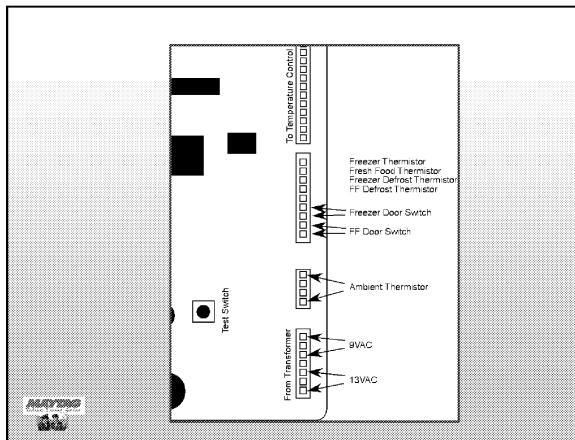
Temp (°F)	Res (K Ω)	Volt (V)
68.0	6.013	1.878
69.8	5.792	1.834
71.6	5.581	1.791
73.4	5.379	1.749
75.2	5.185	1.707
77.0	5.000	1.667
78.8	4.821	1.626
80.6	4.650	1.587
82.4	4.487	1.549
84.2	4.329	1.511
86.0	4.179	1.474
87.8	4.033	1.437
89.6	3.894	1.401
91.4	3.760	1.366
93.2	3.631	1.332
95.0	3.508	1.298
96.8	3.390	1.266
98.6	3.276	1.234
100.4	3.167	1.203
102.2	3.062	1.172
104.0	2.962	1.143
105.8	2.864	1.113
107.6	2.770	1.085
109.4	2.680	1.057
111.2	2.593	1.030
113.0	2.510	1.003
114.8	2.429	0.977
116.6	2.352	0.952
118.4	2.278	0.928
120.2	2.206	0.904

Slide 140

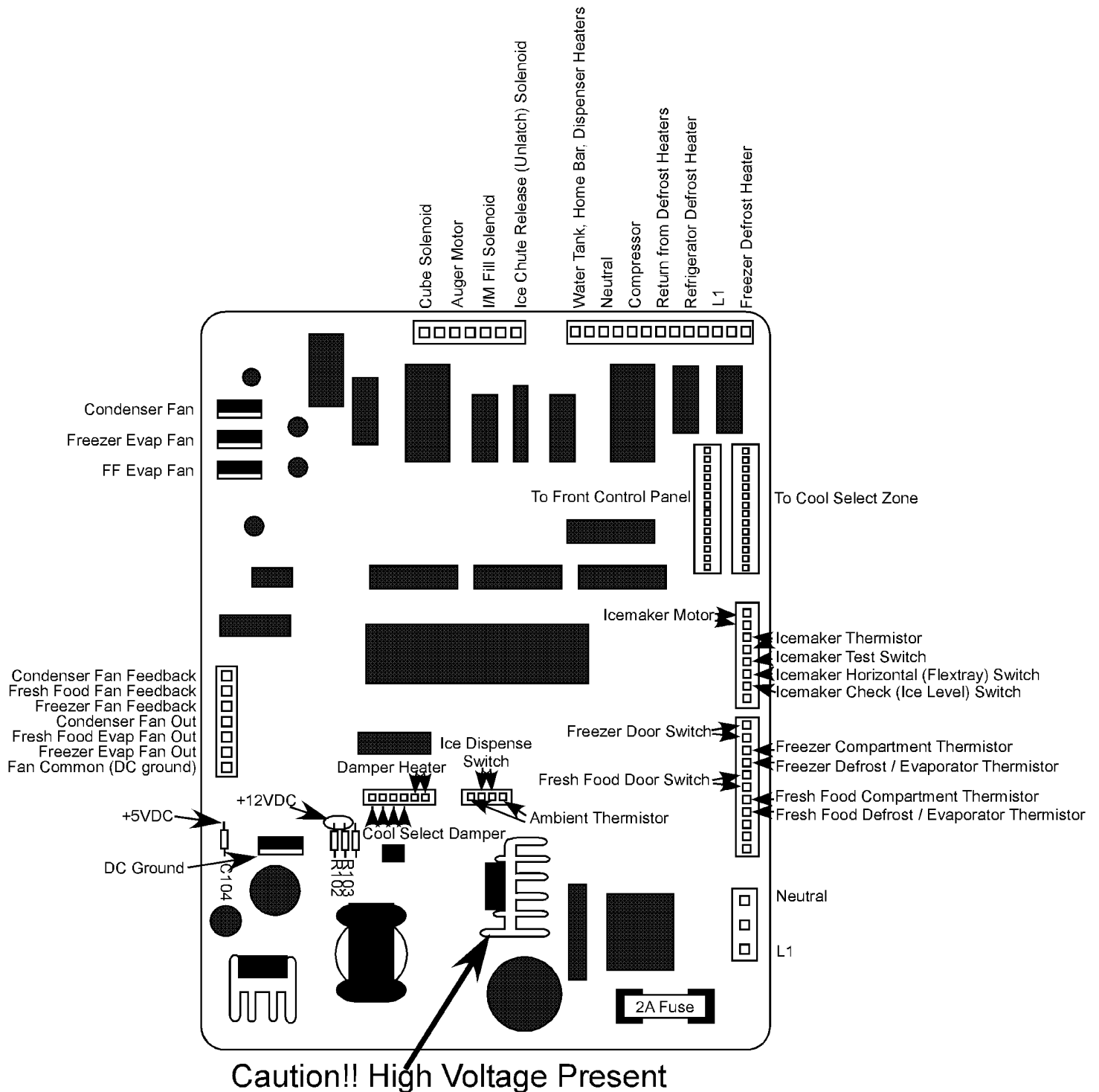


The fresh food and freezer thermistors can be adjusted by clipping out diodes on the main board. It is suggested that this approach not be used. Either replace the thermistor that is out of range or replace the main control board depending on the fault condition.

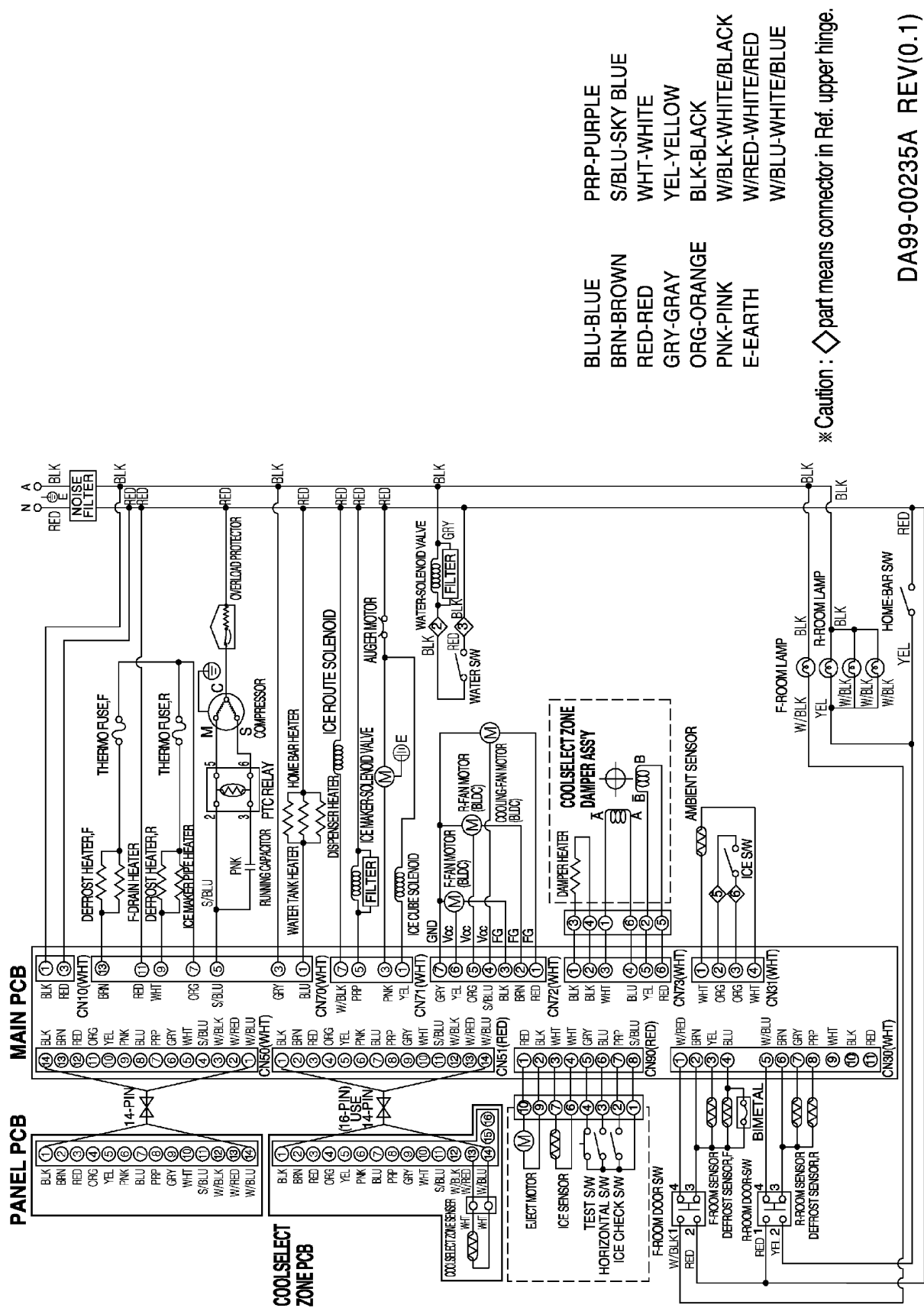
Slide 141



There is a low voltage transformer that supplies 9VAC and 13VAC. The test switch will initiate a defrost cycle. The first press will initiate a forced pull-down. The second time it is pressed, the fresh food section defrosts independent of the freezer section. Pressing a third time will initiate a combined fresh food and freezer defrost. Pressing the test button again will cancel the forced defrost.

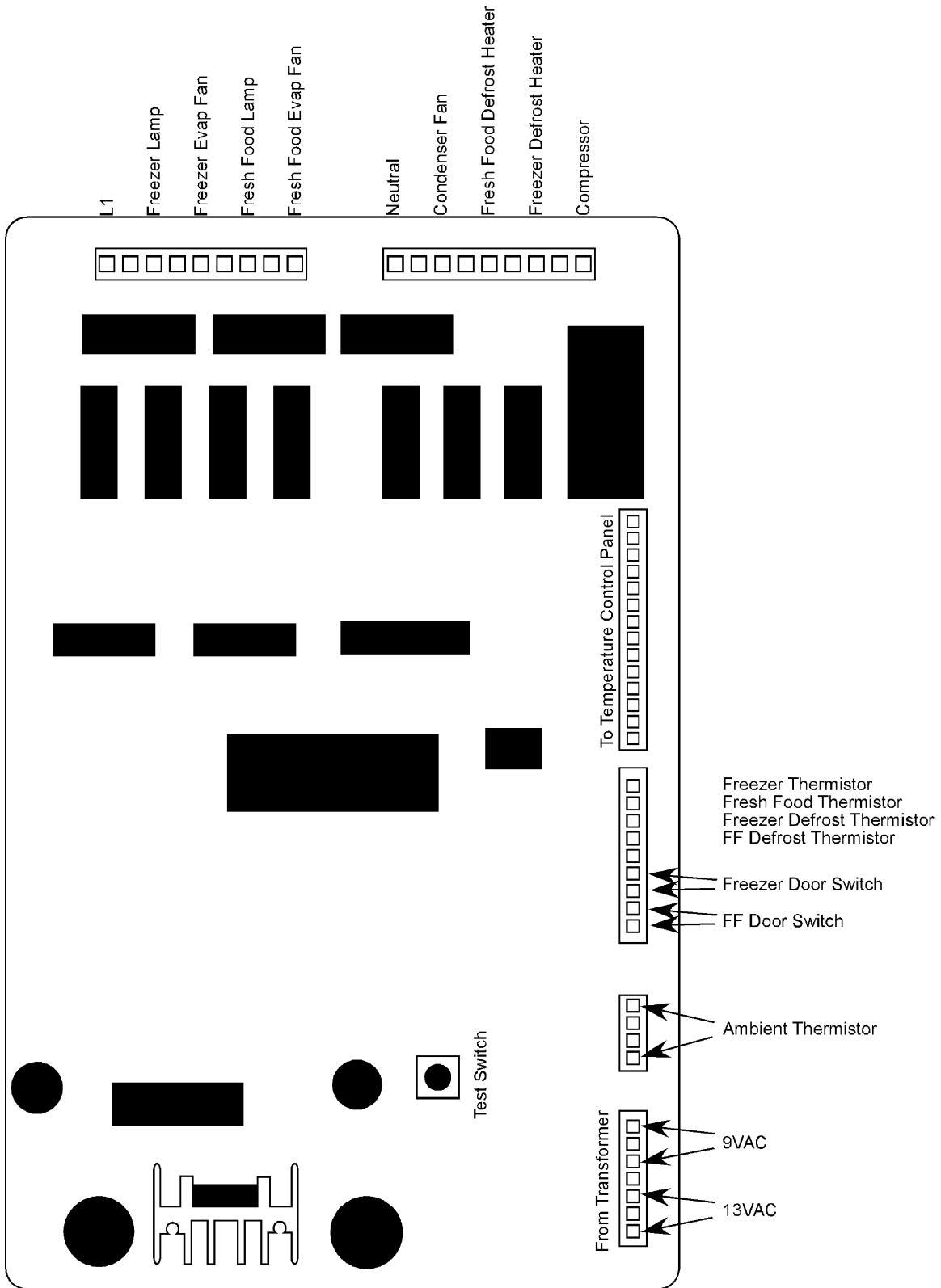


CIRCUIT-DIAGRAM

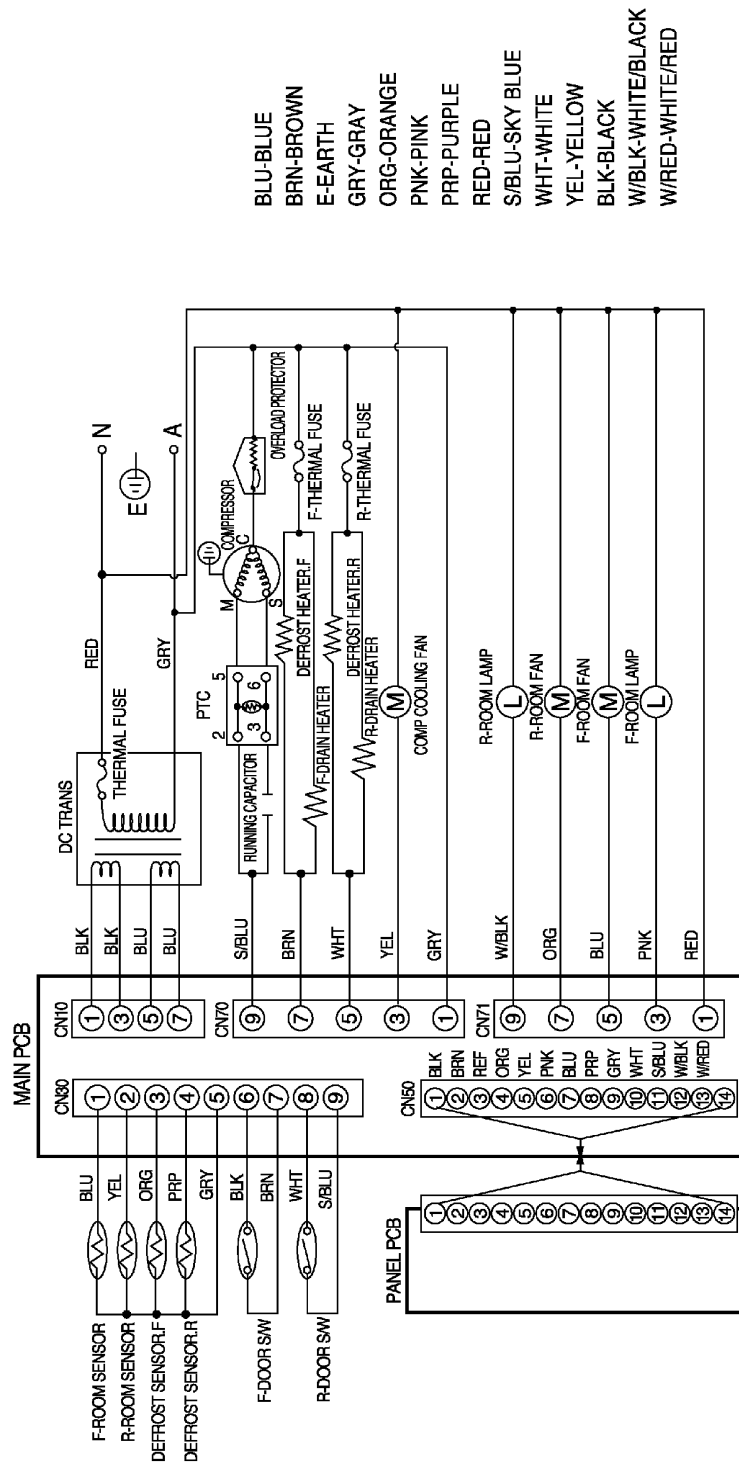


※ Caution :  part means connector in Ref. upper hinge.

DA99-00235A REV(0.1)



CIRCUIT-DIAGRAM



DA99-00232A REV(0.1)



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