

Service Notebook

All Refrigerator All Freezer

VCFB304#/364#

DDFB304#/364#

DFFB304#/364#

VCRB304#/364#

DDRB304#/364#

DFRB304#/364#

SERVICE NOTEBOOK

VCSB304#/364# DDFB304#/364# DFFB304#/364#

VCRB304#/364# DDRB304#/364# DFRB304#/354#



VIKING RANGE CORPORATION ®

DC Compressor – DO NOT CONNECT TO 120VAC

ALERT



VIKING RANGE CORPORATION, P. O. DRAWER 956, GREENWOOD, MS.38930 USA

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WARNINGS

To avoid electrical shock, which can cause severe personal injury or death, disconnect power to the refrigerator using power switch before servicing. Wires removed during disassembly must be replaced on proper terminals to insure correct earthing and polarization. After servicing, reconnect power using power switch.



General Specifications

Model	**FB304#	**RB304#	**FB364#	**RB364#
Internal Volume Capacity (cu. Ft.)	15.9	18.2	19.1	22.8
Electrical Requirements	9.1 amps	5.7amps	9.5amps	6.5amps
	115 VAC, 60 Hz			
Refrigerant Type	HFC-134a			
Refrigerant Charge	See Rating Label			
Overall Width (includes Extrusion)	30in	30in	36in	36in
Overall Depth without Handle (Includes Door Extrusions)	24 inches			
Overall Height (Extended Mobility Legs to Top of Air Grille)	82-3/4 to 84-1/16 inches			

VCC COMPRESSOR SPECIFICATIONS (All Refrigerator)

Viking Application –AR 36/30 VEGY8H

Model # -- AR 36/30 VEGY6H/PM910458

Inverter # -- AR 36/30 PE970449

Nominal BTU/HR –AR 36/30 426

BTU/HR Range – AR 36/30 330/965

Nominal Watts – AR 36/30 125

Watt Range –AR 36/30 97-283

Frequency HZ --
Energy – AR 36/30 75

Pull Down—AR 36/30 114.67

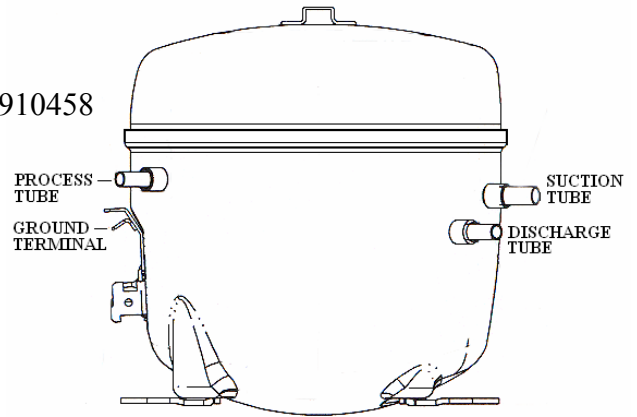
Frequency Range – AR 36/30 53.33 – 150 HZ

Resistance @ 77° F – AR 36/30
Run Winding-- 6.40 Ω
Start Winding-- 6.40 Ω

Amperage – AR 36/30
Lock Motor -- 3.3 amps
Full Load -- 3.3 amps

Oil – AR 36/30
Type-- ICI/RL10H
Fluid OZ. -- 14.54
CC -- 430
Refrigerant Type-- R134a
Motor Type-- 230V

Charged -- Max allowable H2O content I oil is 100 ppm for oil charged compressors. Min allowable oil for pour out is 400.00 CC or 13.5 Fluid oz.



EQUIPMENT AND TOOLS

▲ CAUTION

A separate set of hoses and hand valves must be maintained for use with sealed systems with R134a refrigerant. Equipment used with CFC refrigerants will contaminate R134a (HFC) sealed systems.

EQUIPMENT DESCRIPTION

Tank of Liquid Refrigerant – Care should be taken to be sure the proper refrigerant is available. (Fig. 1)

▲ CAUTION

Handle the tank of liquid refrigerant properly. The contents of the tank are under pressure. Observe the following precautions and **DO NOT:**

- Drop or handle the tank roughly
- Tamper with any installed safety relief valves
- Store the tank in direct sunlight or in a damp location.
- Heat the tank above 125° F.
- Refill the tank

Empty tanks should be disposed of properly.

ILLUSTRATION

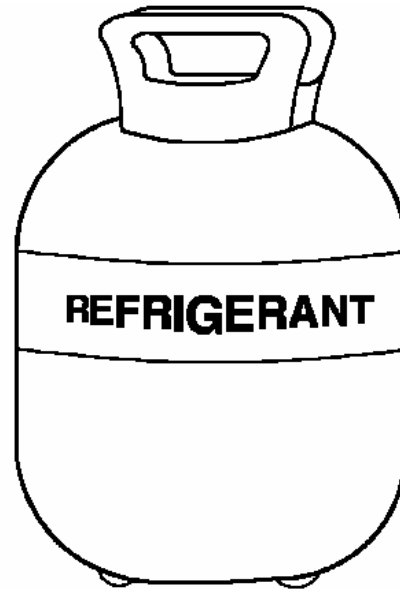


Fig. 1

Charging Scale – An electronic or computerized charting scale measures the amount of liquid refrigerant charge that is dispensed into a sealed system. (Fig. 2)

The amount of refrigerant dispensed into the sealed system is indicated on a Liquid Crystal Display (LCD). The LCD is calibrated in .5 ounces or .01 gram increments or smaller. The charging scale can be used to monitor the amount of refrigerant necessary to back flush a system.

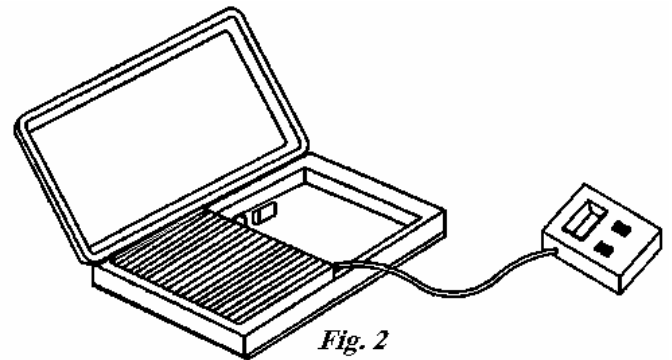


Fig. 2

Charging Hose Configuration – One hose 4 to 6 feet long should be attached to a pigtail consisting of a ball type hand valve with a 45° threaded fitting. A low-loss adapter should be connected to the 45° threaded fitting. (Fig. 3)

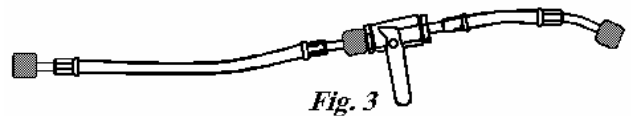


Fig. 3

EQUIPMENT DESCRIPTION

Purging Hose Configuration – This arrangement of three 4' to 6' hoses with low-loss fittings and a ¼" male flare Tee fitting can be used to purge a sealed system for both operating and non-operating compressor situations. No hand valves are required. (Fig. 4)

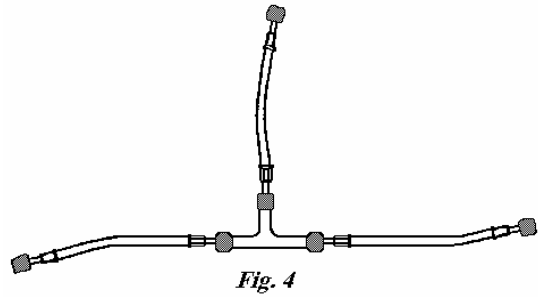


Fig. 4

Piercing Tool with Access Valve – These access valves can be installed without the need for brazing and **will not** remain on the system when repairs are completed. (Fig. 5)

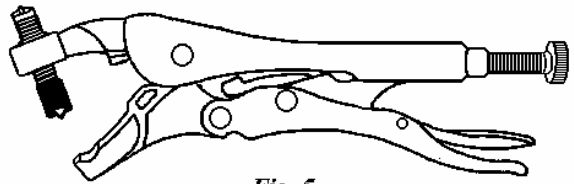


Fig. 5

Process Tube Adaptor Kit – This kit allows the attachment of hand valves to various sizes of exposed tubing ends during back flushing, charging, and/or evacuating a sealed system. (Fig. 6)

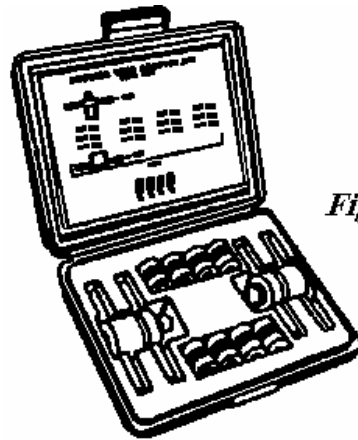


Fig. 6

Bubble Solution or Electronic Leak Detector – Bubble solution is the recommended means of checking for high-side leaks after repairing a pressurized sealed system. (Fig. 7) An electronic leak detector will also detect the presence of any refrigerant escaping from the sealed system. (Fig. 8)

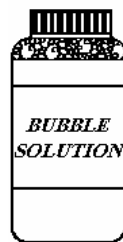


Fig. 7

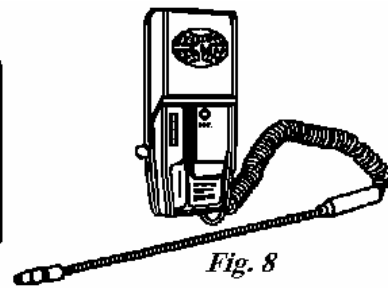


Fig. 8

EQUIPMENT DESCRIPTION

Swaging Kit – A swaging tool kit may be needed to expand system tubing to fit replacement parts. (Fig. 19)

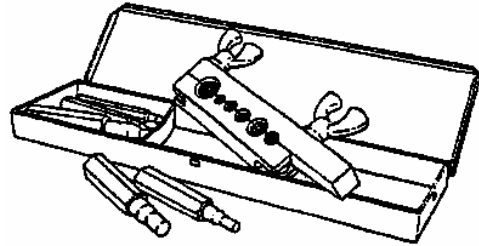


Fig. 9

Heat Gun – A heat gun can be used to heat a non-operating compressor or the evaporator during purge and the refrigerant tank to increase charging pressure. Many heat guns have a stand that allows continuous operation while other repairs are made. A heat gun rated at 1500 watts or greater is recommended. (Fig. 10)

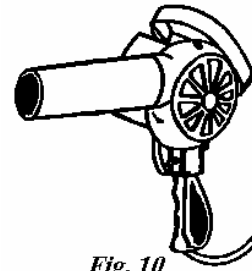


Fig. 10

Single MC-Size Fuel Tank of Acetylene with a Double Tip Torch – The MC-size single fuel tank of acetylene gas is very portable and easy to use. Two torches are acceptable for use: A double-tip torch heats both sides of the joint at the same time and is less likely to scorch the inside of the tubing; A single-tip Turbo-brand torch equipped with a flame reflector will also heat both sides of a joint and provide a hotter flame. A striker is used to light the torch. (Fig.11)

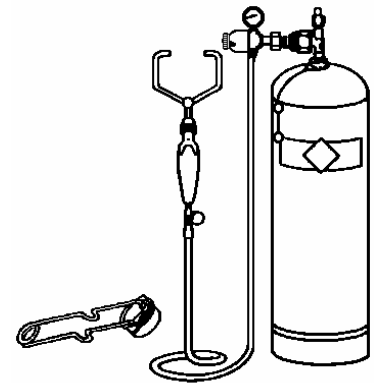


Fig. 11

15% Silver Brazing Alloy (Silfos) – Silfos can be used for all copper to copper sealed system brazing. (Fig. 12) A 45 % silver solder and flux must be used to braze copper to steel. (Fig. 13)

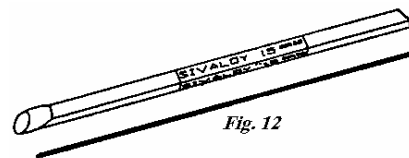


Fig. 12

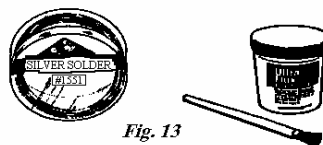
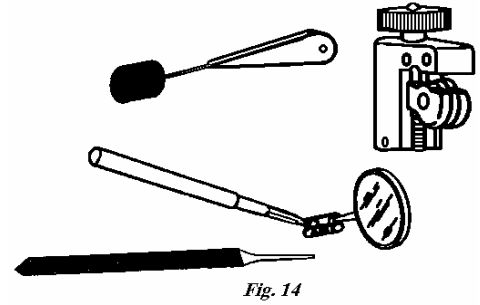


Fig. 13

EQUIPMENT DESCRIPTION

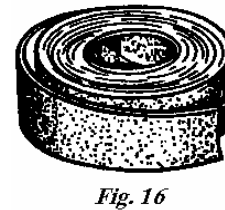
Inspection Mirror, Tubing Cutter, Triangular File and Steel Brush – The inspection mirror should be small enough to inspect in tight spaces around joints. A mini-cutter will be required to cut tubing in tight spaces where a standard cutter will not turn. A triangular file will be needed to score capillary tubing. A steel brush will be required to clean brazed joints. (Fig. 14)



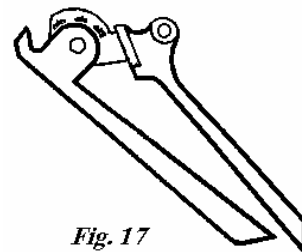
Heat Trap Paste – Heat trap paste should be applied to the tubing between the brazing site and the components or area that must be protected from high heat. (Fig. 15)



Refrigeration Sanding Cloth – Refrigeration sanding cloth will be need to clean all tubing ends and other component parts that will be brazed. **Do Not Use Oil Based Sanding Cloth such as Emery Cloth.** (Fig. 16)



Tubing Bender – Used to form system tubing during repairs. (Fig. 17)





WARNING

To avoid electrical shock which can cause severe personal injury or death, disconnect power to refrigerator using power switch before servicing. Wires removed during disassembly must be replaced on proper terminals to insure correct earth ground and polarization. After servicing, reconnect power using power switch.

Evacuation and Charging



CAUTION: To avoid risk of fire, sealed refrigeration system must be air free. To reduce risk of air contamination, follow evacuation procedures exactly.

NOTE: Before opening any refrigeration system, EPA regulations require refrigerant in system to be captured for safe disposal. Proper evacuation of sealed refrigeration system is an important service procedure. Usable life and operational efficiency greatly depends upon low completely air, moisture and other non-condensables are evacuated from sealed system.

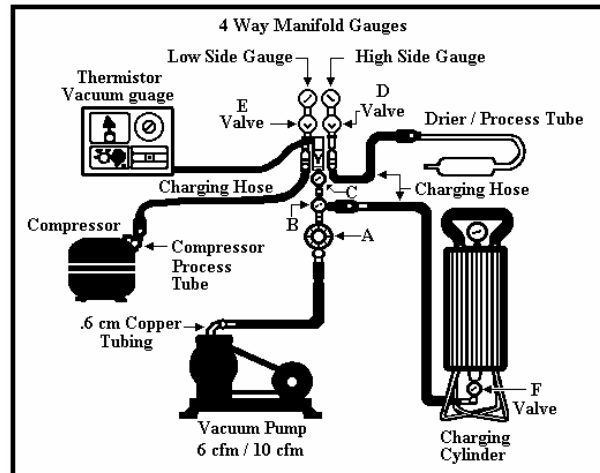
Air in sealed system causes high condensing temperature and pressure, resulting in increased power requirements and reduced performance.

Moisture in sealed system chemically reacts with refrigerant and oil to form corrosive hydrofluoric and hydrochloric acids. These acids attack motor windings and parts, causing premature breakdown.

Before opening system, evaporator coil must be at ambient temperature to minimize moisture infiltration into system.

Evacuation: To evacuate sealed refrigeration system:

1. Connect vacuum pump, vacuum tight manifold set with high vacuum hoses, thermocouple vacuum gauge and charging cylinder as shown in illustration. Evacuation should be done through I.D. opening of tubes not through line piercing valve.
2. Connect low side line to compressor process tube.
3. Connect high side line to drier/process tube.
4. Evacuate both simultaneously. With valve "C" and "F" closed, open all other valves and start vacuum pump.



Equipment Setup For Evacuation and Charging

5. After compound gauge (low side) drops to approximately 29 inches gauge, open valve "C" to vacuum thermocouple gauge and take micron reading.

NOTE: A high vacuum pump can only produce a good vacuum if oil in pump is not contaminated.

6. Continue evacuating system until vacuum gauge registers 200 microns.
7. At 200 microns, close valve "A" to vacuum pump and allow micron reading in system to balance. Micron lever will rise.

- If in 2 minutes, micron level stabilizes at 400 microns or below, system is ready to be charges.
- If micron level rises above 400 microns and stabilizes, open valve "A" and continue evacuating.
- If micron reading rises rapidly and does not stabilize, a leak still exists in system. Close valve "A" to vacuum pump an valve "C" to vacuum gauge. Invert charging cylinder and open charging cylinder valve "F" to add partial charge for leak checking. With leak detector, check manifold connections and system for leaks. after locating leak, capture refrigerant, repair leak, and begin at step 1.



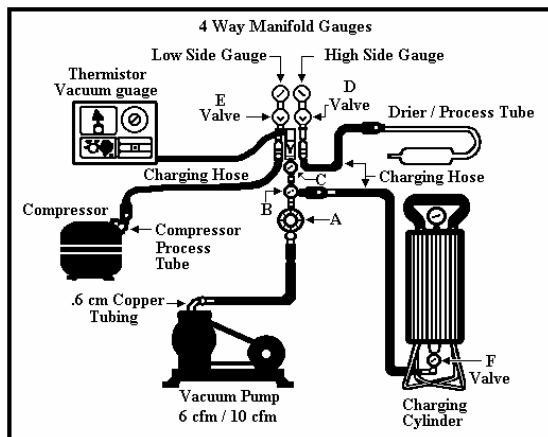
WARNING: To avoid electrical shock which can cause severe personal injury or death, disconnect power to refrigerator using power switch before servicing. Wires removed during disassembly must be replaced on proper terminals to insure correct earth ground and polarization. After servicing, reconnect power using power switch.

Charging:

NOTE: Do not use captured or recycled refrigerant in Viking units. Captured or recycled refrigerant voids any warranty.

NOTE: Charge system with exact amount of refrigerant. See Technical Sheet or refer to unit serial plate for correct refrigerant charge. Inaccurately charged system will cause future problems.

NOTE: No Access Valve are to be left on the system after repairs are made.



To charge system:

1. Close valves “A” to vacuum pump and “C” to vacuum gauge and “E” to low side manifold gauge.
2. Set scale on dial-a-charge for corresponding HFC134a pressure reading.
3. Open valves “F” to charging cylinder and let exact amount of refrigerant flow from cylinder into system. Close valve.

Low side gauge pressure should rise shortly after opening charging cylinder valve as system pressure equalize through capillary tube.

If pressure does not equalize, a restriction typically exists at capillary/drier braze joint.

4. If pressure equalizes, open valve “E” to low side manifold gauge and pinch off high side drier process tube.
5. Start compressor and draw remaining refrigerant from charging hoses and manifold into compressor through compressor process tube.
6. To check high side, pinch off drier process tube. Close valve “D” to high side gauge. If high side pressure rises, repeat high side pinch off and open valve “D”. repeat until high side pinch off does not leak.
7. Pinch off compressor tube and remove charging hose. Braze stub closed while compressor is opening.
8. Disconnect power. Remove charging hose and braze high side drier process tube closed.
9. Recheck for refrigerant leaks.

Refrigerant Charge

Refrigerant charge in all capillary tube systems is critical and exact amount is required for proper performance. Factory charges are shown on serial plate. Do not use refrigerant other than shown on serial plate.

Display Panel Operation

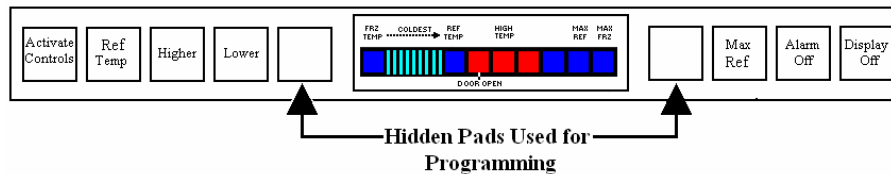
Keyboard Entry Tone	Indicates a pad was pressed, command read and accepted. Turn off entry tone by pressing and holding <i>Activate Controls</i> pad for 3 to 5 seconds.
Command Accepted Tone	Three short tones indicate command accepted.
Activate Controls Pad	<ol style="list-style-type: none">1. Activates control panel. Control panel remains active at least 10 minutes.2. Turns off Power Up Alarm (flashing lights), after power is first plugged in or after power outage. <p>Note: All pads, except <i>Alarm Off</i>, are inactive until <i>Activate Controls</i> is pressed.</p>
Frz Temp Pad (Shown only on All Freezer)	Activates freezer temperature setting mode. <ol style="list-style-type: none">1. Freezer indicator light will glow. Freezer temperature setting will be displayed. Factory setting is 5.2. Change freezer temperature setting by pressing <i>Higher</i> or <i>Lower</i> pad.
Ref Temp Pad (Shown only on All Refers)	Activates refrigerator temperatures setting mode. <ol style="list-style-type: none">1. Refrigerator indicator light will glow. Refrigerator temperature setting will be displayed. Factory setting is 5.2. Press and hold <i>Higher</i> pad to raise temperature setting at a faster rate.
Higher Pad	Raises temperature settings one bar at a time. If entry tone is on, tone will sound at each bar level until top level is reached. <ol style="list-style-type: none">1. Turn on temperature setting function of control panel by pressing <i>Higher</i> pad.2. Press and hold <i>Higher</i> pad to raise temperature setting at a faster rate.
Lower Pad	Lower temperature settings on bar at a time. If entry tone is on, tone will sound at each bar level until bottom level is reached. <ol style="list-style-type: none">1. Turn on temperature setting function of control panel by pressing <i>Lower</i> pad.2. Press and hold <i>Lower</i> pad to lower temperature setting at a faster rate.

Display Panel Operation (Continued)

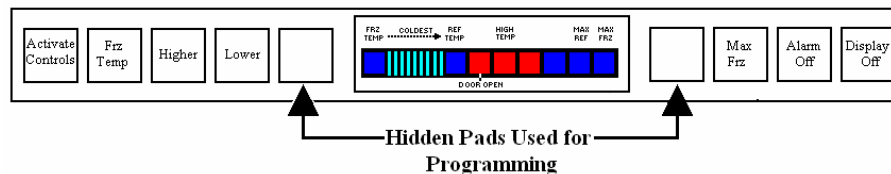
<p>*Hidden Pad*</p> <p>Note: Located between Lower Pad and Display window</p>	<p>To Activate Program Mode.</p> <ol style="list-style-type: none">1. Open refrigerator door.2. Press Activate Controls pad.3. Press Hidden pad.4. Within 6 seconds press the following pads in this sequence; Max Ref, Max Frz, Max Ref, Max Frz.5. Tone will sound 3 times and control will be in program mode A.6. See Program Mode section for description of functions available.
<p>Max Frz Pad</p> <p>Note: This pad is hidden on All Refrigerator. It is located between the Display Window and the MAX REF</p>	<p>Activates Maximum freezer mode, setting freezer temperature to coldest setting. Current factory setting is 24 hours.</p> <ol style="list-style-type: none">1. Max Frz indicator light will glow.2. To turn off Max Frz, press Max Frz again.3. To adjust maximum freezer duration, refer to Program Mode B functions.4. Used to enter Program Mode. See *Hidden Pad*.
<p>Max Ref Pad</p> <p>Note: This pad is hidden on the All Freezer. It is located between the Display window and the Max FRZ pad.</p>	<p>Activates Maximum refrigerator mode, setting refrigerator to coldest setting. Current factory setting is 10 hours.</p> <ol style="list-style-type: none">1. Max Ref indicator light will glow.2. To turn off Max Ref, press Max Ref pad again.3. To adjust maximum refrigerator duration, refer to Program Mode B functions.4. Used to enter Program Mode. See *Hidden Pad*.
<p>Alarm Off Pad</p>	<p>Turn off alarm signals. See Alarms section to interpret alarm signals.</p> <ol style="list-style-type: none">1. Press and hold Alarm Off pad for 3 seconds to deactivate Door Open alarm. To reactivate Door Open alarm, press and hold Alarm Off pad for 3 seconds.2. If Alarm Off pad is pressed and condition causing alarm is not corrected, alarm will reset.
<p>Display Off Pad</p>	<ol style="list-style-type: none">1. Deactivates control panel.2. Deactivates temperature indicator area of control panel.

Electronic Functional Description

Keyboard Layout and Temperature Indicators for All Refrigerator

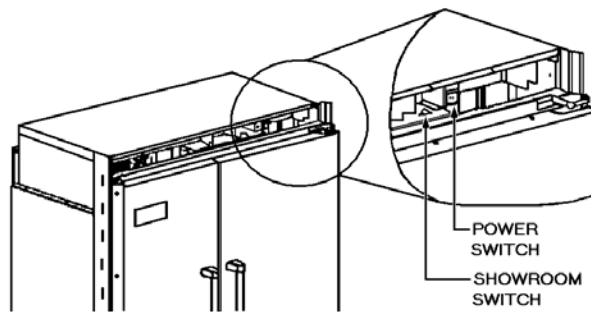


Keyboard Layout and Temperature Indicators for All Freezer



Power Disconnect Switch

Use power disconnect switch to disconnect power without unplugging unit. Power disconnect switch is located behind air grille on top right side of the control box assembly. Unit is shipped with power disconnect switch in the run position.



Showroom Switch

Showroom switch allows electronic controls and interior lights to function independently of refrigeration system. Showroom switch is located behind air grille to left of control panel. Unit is shipped with showroom switch in the unit run position.

Power Up Alarm

After power is initially plugged in, after a power loss, or if power switch is turned off, all temperature indicator lights will flash until *Alarm Off* or *Activate Controls* is pressed.

Door Open Alarm

Alarm tone sounds and indicator lights blink if the door is open more than 3 minutes.

1. Turn off Door Open alarm by pressing *Alarm Off* pad or by closing door.
2. Deactivate Door Open alarm by pressing *Activate Controls* pad and then press hold *Alarm Off* pad for 3 seconds.
3. Door alarm delay can be adjusted in Program Mode B.

High Temperature Alarm

When the controller detects critical temperature in the unit for a duration of 2 hours, an Alarm will sound. A high temperature indicator light and a flashing freezer or refrigerator indicator light will accompany the audible alarm. Alarm tone stops if temperature falls again. (Press ALARM OFF pad to turn off alarm.)

Thermistor Alarm

When the controller detects an open Thermistor circuit, the Alarm sounds, freezer or refrigerator indicator light will be displayed, and temperature indicators 4 through 7 will turn on in sequence.

1. Press *Alarm Off* pad to turn off alarm
2. Alarm will reset for normal operation. If condition has not been corrected, alarm will sound again.
3. Refer to Temperature Control Operation Section and Electronic Testing Section.

Temperature Control Operation

For any temperature setting, outputs will be turned off/on based on cut-in/cut-out temperature determined by resistance levels of freezer or refrigerator thermistors

Refrigerator and Freezer Thermistor

As temperature decreases, resistance increases.

As temperature increased, resistance decreases.

NOTE: Open thermistor or thermistor circuit will result in failure of unit to cool. Shorted thermistor will cause unit to run 100 percent of time except during defrost cycle.

Deg F	Deg C	K-Ohms	Deg F	Deg C	K-Ohms	Deg F	Deg C	K-Ohms
-24	-31	565	10	-12	185	45	7	69
-22	-30	531	12	-11	175	46	8	65
-20	-29	499	14	-10	165	48	9	62
-18	-28	469	16	-9	157	50	10	59
-16	-27	441	18	-8	148	52	11	56
-15	-26	415	19	-7	141	54	12	54
-13	-25	391	21	-6	133	55	13	51
-11	-24	368	23	-5	126	57	14	49
-9	-23	347	25	-4	120	59	15	47
-8	-22	327	27	-3	114	61	16	44
-6	-21	308	28	-2	108	63	17	42
-4	-20	291	30	-1	103	64	18	41
-2	-19	274	32	0	97	66	19	39
0	-18	259	34	1	93	68	20	37
1	-17	245	36	2	88	70	21	35
3	-16	231	37	3	84	72	22	34
5	-15	218	39	4	80	73	23	32
7	-14	206	41	5	76	75	24	31
9	-13	195	43	6	72	77	25	30

- .Unit temperature setting and thermistor value will determine if compressor/condenser fan and evaporator fan switches are open or closed. Compressor/condenser fan switch must be open for 6 minutes before switch can close again (compressor dwell time).
- Cut-in and cut-out temperature values must be reached and maintained for 15 seconds in All Freezer and 30 seconds in All Refrigerator before output will change (digital delay).
- Unit control calibration can be adjusted in Program Mode B.

Factory set freezer and refrigerator settings

Cut-Out °F (°C) ± 1.5°	Cut-In °F (°C) ± 1.5°	Cut-Out °F (°C) ± 1.5°	Cut-In °F (°C) ± 1.5°	Level
-12 (-24)	3 (-16)	25 (-3.9)	37 (2.8)	9
-10 (-23)	5 (-15)	27 (-2.8)	39 (3.9)	8
-8 (-22)	7(-14)	29 (-1.7)	41 (5.0)	7
-7 (-22)	8 (-13)	30 (-1.1)	42 (5.4)	6
-6 (-21)	9 (-13)	31 (-0.6)	43 (6.1)	5
-5 (-21)	10 (-12)	32 (0)	44 (6.6)	4
-4 (-20)	11 (-12)	33 (0)	45 (7.2)	3
-2 (-19)	13 (-11)	35 (1.7)	47 (8.3)	2
0 (-18)	15 (-9)	37 (2.8)	49 (9.4)	1
-12 (-24)	3 (-16)			Max Frz
		25 (-3.9)	37 (2.8)	Max Ref

PROGRAM MODE

Accessing Program Mode

Two programming modes are available. Mode A allows reading unit thermistor temperatures and changing duration of compressor run time between defrosts in Conventional Defrost Mode. Mode B is used for all other programmable functions.

1. Open door.
2. Press *Activate Controls* pad.
3. Press Hidden pad.
4. Press the following sequence of pads within 6 seconds; Max Ref, Max Frz, Max Ref, Max Frz.
5. When access is granted, tone will sound three times and control will be in Program Mode A. Unmarked indicator light will illuminate.
6. Toggle to Program Mode B by pressing *Activate Controls* pad. Unmarked indicator light is off.

EEPROM Update in Control Memory

EEPROM is permanent programmable memory of the control board.

- Entry tone, door audio alarm, Sabbath Mode and status are stored in EEPROM after control panel is deactivated.
- Information stored in EEPROM memory is not affected by power loss.

Mode A Functions

Reading Temperature Display

Temperature display will show the thermistor temperature in binary coded decimal format (BCD). Indicator lights 1 through 4 represent the tens digit with 1 being the most significant bit. Indicator lights 5 through 8 represent one digit with 5 being the most significant bit. Positive and negative are shown by indicator light 9; light glows to show negative value.

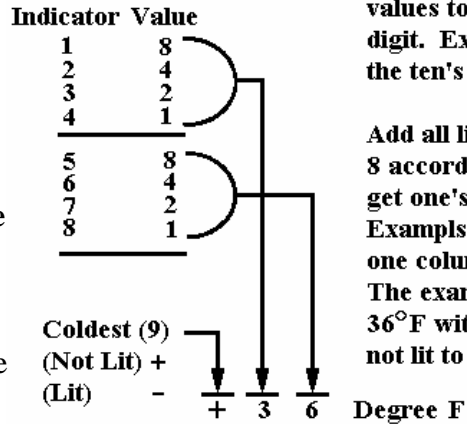
Mode A Functions (con't)

Freezer Thermistor Temperature

1. Choose Freezer temperature display by pressing Frz Temp pad.
2. Freezer thermistor temperature displays.

Refrigerator Thermistor Temperature

1. Choose Refrigerator thermistor Temperature display by pressing Ref Temp pad.
2. Refrigerator thermistor temperature displays.



Add together all lit indicators 1 through 4 according to their values to obtain ten's column digit. Example if 3 and 4 are lit, the ten's column total 3 (2+1=3)

Add all lit indicators 5 through 8 according to their values to get one's column digit. Example if 6 and 7 are lit, the one column total 6 (4+2=6). The example temperature is 36°F with coldest indicator (9) not lit to show a positive value.

Mode B Functions

Automatic Keyboard Functions

Activate and deactivate keyboard by toggling *Activate Controls* pad. If high temperature indicator glows, keyboard will disable after 10 minutes. If high temperature indicator is off, keyboard is always enabled. DO NOT LEAVE KEYBOARD IN ENABLED MODE AFTER PROGRAMMING IS COMPLETE.

Door Alarm Delay

1. Press Alarm Off pad. Door open indicator will glow. One temperature indicator should glow indicating present delay setting in minutes (indicator 1 means 1 minute, 2 means 2 minutes, etc.) Default delay is 3 minutes.
2. Press Higher pad to decrease delay by 1 minute.
3. Press Lower pad to increase delay by 1 minute.

Max Ref Run Time Duration (All Refrigerator Only)

1. Press Max Ref pad. Max Ref light will glow. One temperature indicator should glow indicating present Max Ref run time duration in 2 hour increments (indicator 1 means 6 hours, 2 means 8 hours, etc.). Default delay is 10 hours.
2. Press Higher pad to decrease Max Ref duration by 2 hours.
3. Press Lower pad to increase Max Ref duration by 2 hours.

Max Frz Run Time Duration (All Freezer Only)

1. Press Max Frz pad. Max Frz light will glow. One temperature indicator should glow indicating preset Max Frz run time duration in 4 hours increments (indicator 1 means 8 hours, 2 means 12 hours, etc.). Default delay is 24 hours.
2. Press Higher pad to decrease Max Frz duration by 4 hours.
3. Press Lower pad to increase Max Frz duration by 4 hours.

Temperature Offset Calibration

Offset amounts adjusts temperatures for unit cut-ins and cut-outs by the amount of offset. The chart shows the indicator and the amount of offset from the factory default setting.

INDICATOR	OFFSET
1	+8
2	+6
3	+4
4	+2
5	0
6	-2
7	-4
8	-6
COLDEST	-8

- Setting Refrigerator Temperature Offset (All Refrigerator Only).
Press Ref Temp pad. Refrigerator temperature indicator and one indicator will glow. Press Higher pad to move offset to the next warmer setting. Press Lower pad to move offset to the next colder setting. Factory default setting is 3. The freezer thermistor circuit is simulated. The freezer temperature offset is factory set to 9 and MUST NOT be changed.
- Setting Freezer Temperature Offset (All Freezer Only).
Press FRZ Temp pad. Freezer temperature indicator and one indicator will glow. Press Higher pad to move offset to the next warmer setting. Press Lower pad to move offset to the next colder setting. Factory default setting for the 36" W. All Freezer is 5 and the 30" W. All Freezer is 6.

Defrost Mode Selection

Toggle Hidden Button pad to select adaptive or conventional defrost mode. Hidden Button indicator glows when adaptive defrost has been selected. If Hidden Button indicator is off, conventional defrost is selected. Conventional defrost uses 8 hour CRTD value (4,8,8...hours). The CRTD can be changed in Program Mode A.

Forced Defrost (All Freezer Only)

Defrost can be forced to start by pressing and holding the Alarm Off pad for 3 seconds. Program changes will be saved permanently in EEPROM and program mode will exit to Run Mode A.

Forced Pull Down

Compressor start can be forced by pressing and holding the Alarm Off pad for 3 seconds. Program changes will be saved permanently in EEPROM. Compressor, evaporator fan and condenser fan will come on. **Note:** For All Refrigerators, there is two (2) minute dwell time after the unit has been turned off. A forced pull down will NOT initiate until after the dwell time has been met and the unit is powered on.

Exiting Program Mode

Press Activate Controls pad for 3 seconds to exit Program Mode. Tone will sound three times. Changes made in Program Mode will be permanently saved in EEPROM. **Note:** If no pad is pressed for 10 minutes, Program Mode will be automatically exited. However, no changes will be saved if Program Mode exits automatically.

Electronic Testing

Electronic Testing Mode

Forced Defrost Start (All Freezer Only).

1. Press Activate Controls pad to activate control panel.
2. Simultaneously press and hold Max Ref and Display Off pads for 3 seconds.

Forced Compressor Start

1. Press Activate Controls pad to activate control panel.
2. Simultaneously press and hold Alarm Off pad and Display Off for 3 seconds.

Note: For All Refrigerators, there is a two (2) minute dwell time after the unit has been turned off. A forced compressor start will **NOT** initiate until after the time has been met and the unit is powered on.

Open Thermistor Detect

Alarm sounds and freezer or refrigerator indicator light shows and temperature indicators 4 and 7 will turn on in sequence if either thermistor circuit opens. Refer to Temperature Control Operation Section and Electronic Testing Section.

1. Press alarm Off pad to turn off alarm.
2. Alarm will reset for normal operation. If conditions have not been corrected, alarm will sound again.

Holiday Mode Feature for Sabbath Observance

Before the Holiday Mode is engaged, the bale arm of the ice maker needs to be raised until it clicks into the detent. This turns off the power to the ice maker. (All Freezer Only)

Mode Entry: To enter Holiday Mode the user must press and hold *Activate Controls* and then *Display Off* for 3 seconds. The control shall beep 3 times and light the 3 right blue squares to alert the user that Holiday Mode has been entered. When the control enters Holiday Mode it will disable the interior lights, display (excluding the 3 right hand side lit blue squares), and alarm enunciators.

Power Loss: If in Holiday Mode and the control experiences a Long Power Loss, it will return to Holiday Mode when power is regained.

Exiting Holiday Mode: To exit Holiday Mode the user will again press and hold *Activate Controls* and then *Display Off* for 3 seconds and 3 beeps shall alert the user the Holiday Mode has been exited. The control shall return to Normal Mode Once the unit is back in the Normal Mode, the bale arm of the ice make needs to be pushed downward until it is no longer in the detent. This will restore power to the ice maker. (All Freezer Only)

AF-AR

SPECIAL NOTICE

On

All Viking Electronic Refrigerator Controls with an Adaptor Board

In Normal User Mode

DISPLAY ON key: If activated, the Display Panel will remain on even after the door is closed.

During a Forced Pull Down or Forced Defrost, the single audible sound will not be present. However, after holding 3 seconds, you will still hear the 3 beeps signaling you are entering the mode.

In Showroom Mode

CAUTION: While in Showroom Mode the unit can be turned on by putting it into a forced pull-down using the methods that were intended only for normal and program modes.

In Sabbath Mode

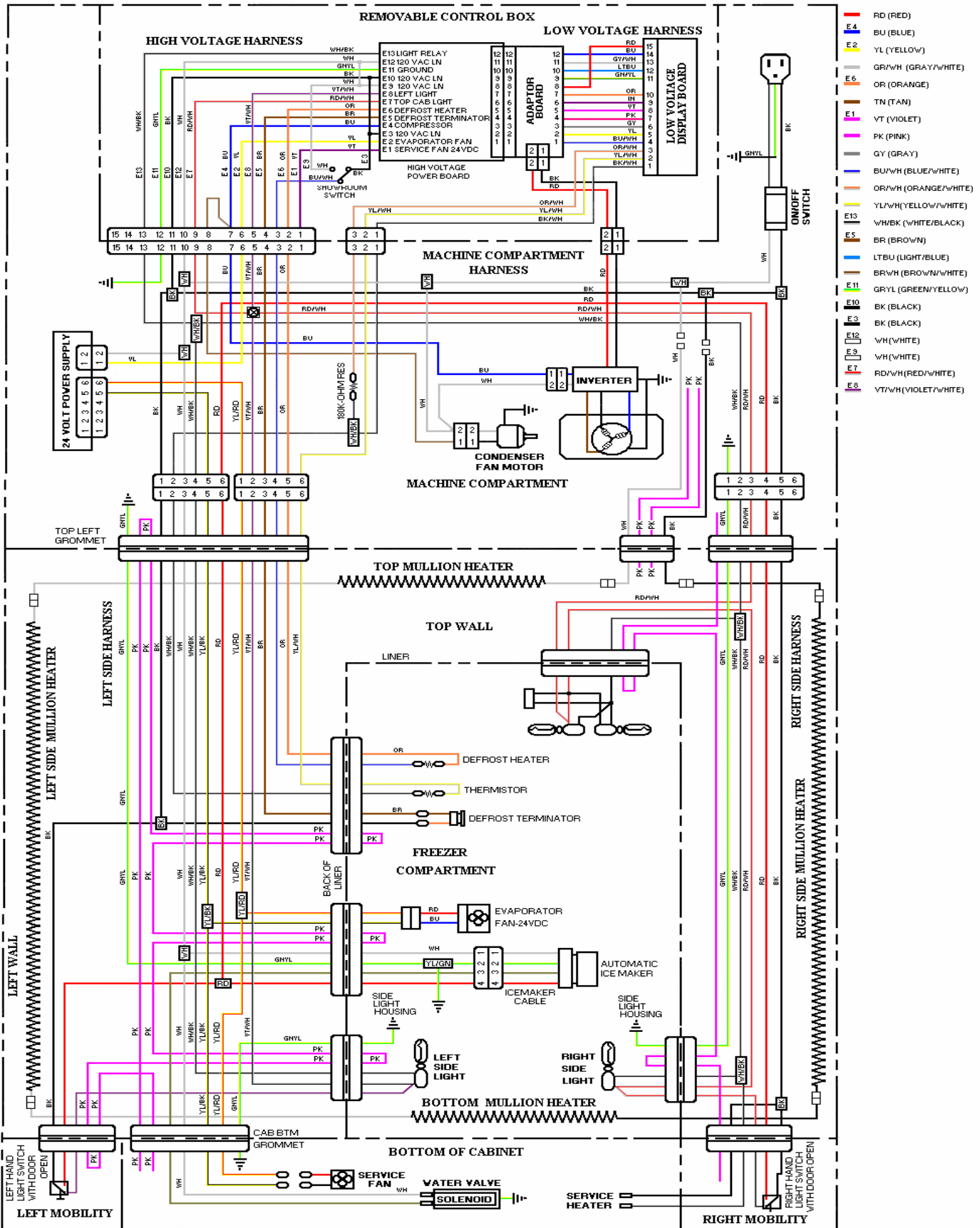
If the door is open and the power is lost, the cabinet lights will blink once during power up.

In Program Mode

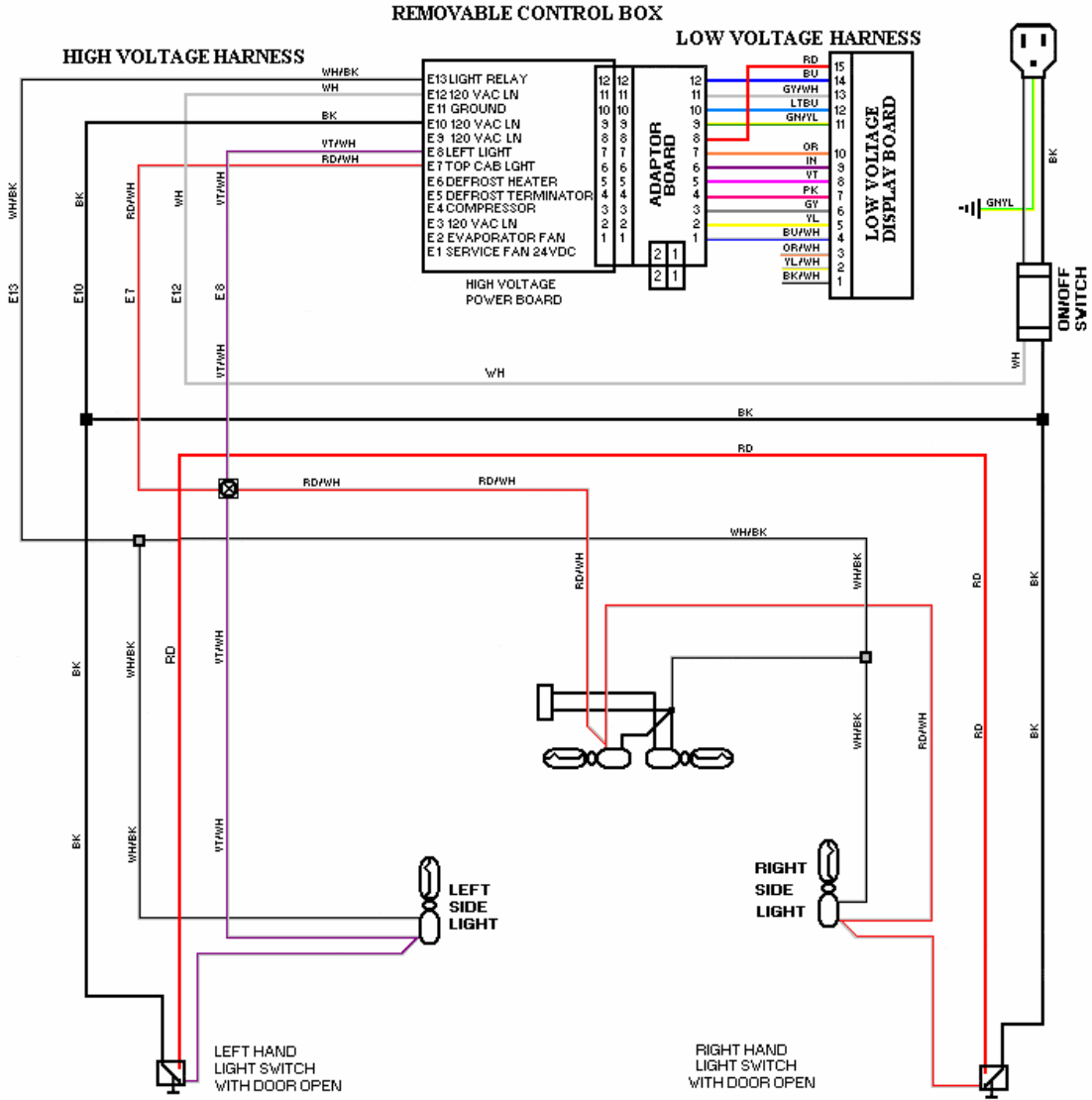
When Program Mode is allowed to time out after 10 minutes, some of the changes may not be saved. It is important to always exit Program Mode by initiating a Forced Defrost or pressing the DISPLAY ON key for three (3) continuous seconds to be sure all the new changes are saved.

When entering Adjustable Compressor Dwell Mode feature it will change the Defrost Algorithm to the opposite state that it was in and not revert back when exiting Programming Mode.

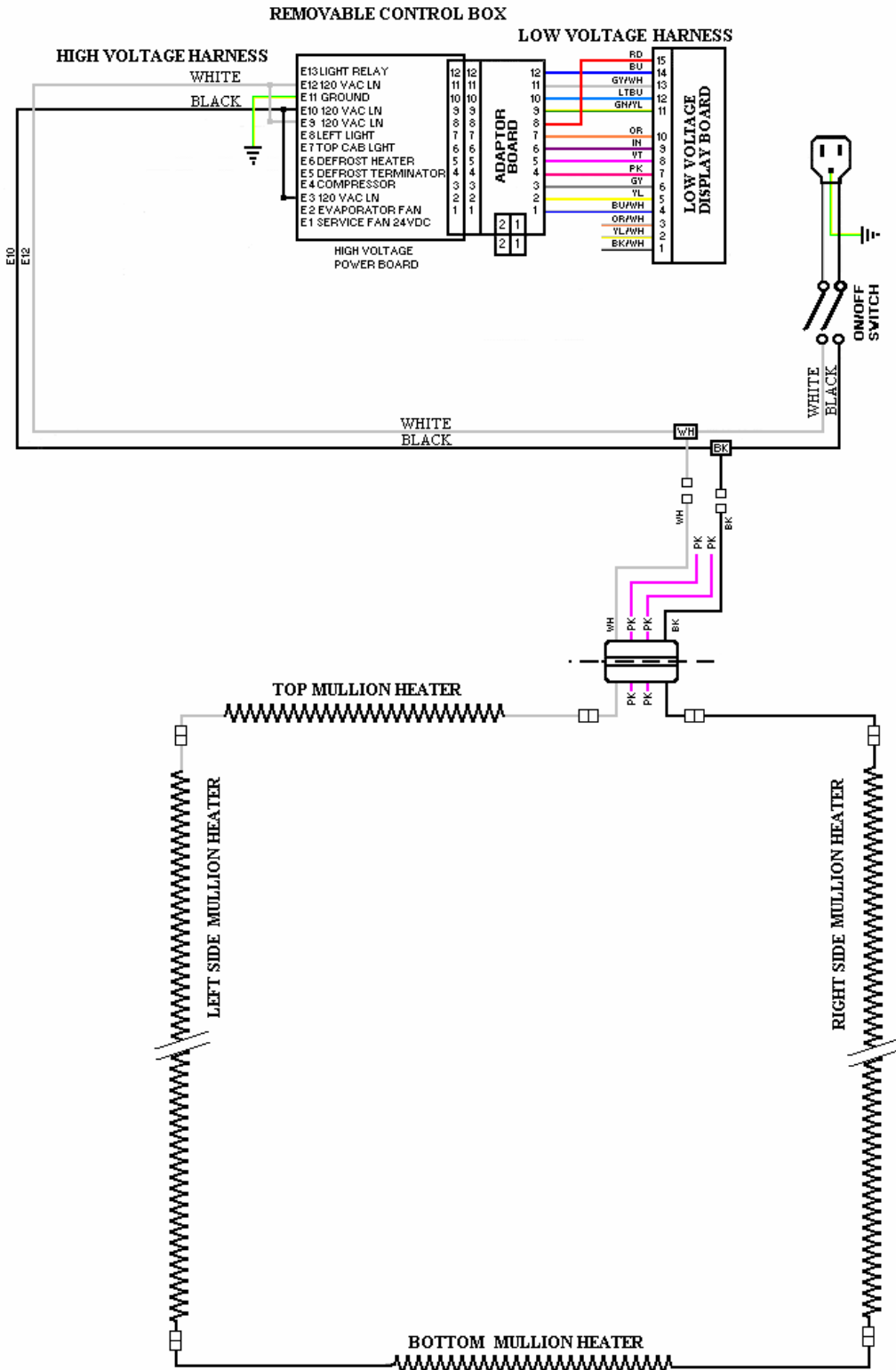
Wiring Schematic 30" W. All Freezer



AF 30 LIGHT CIRCUITS

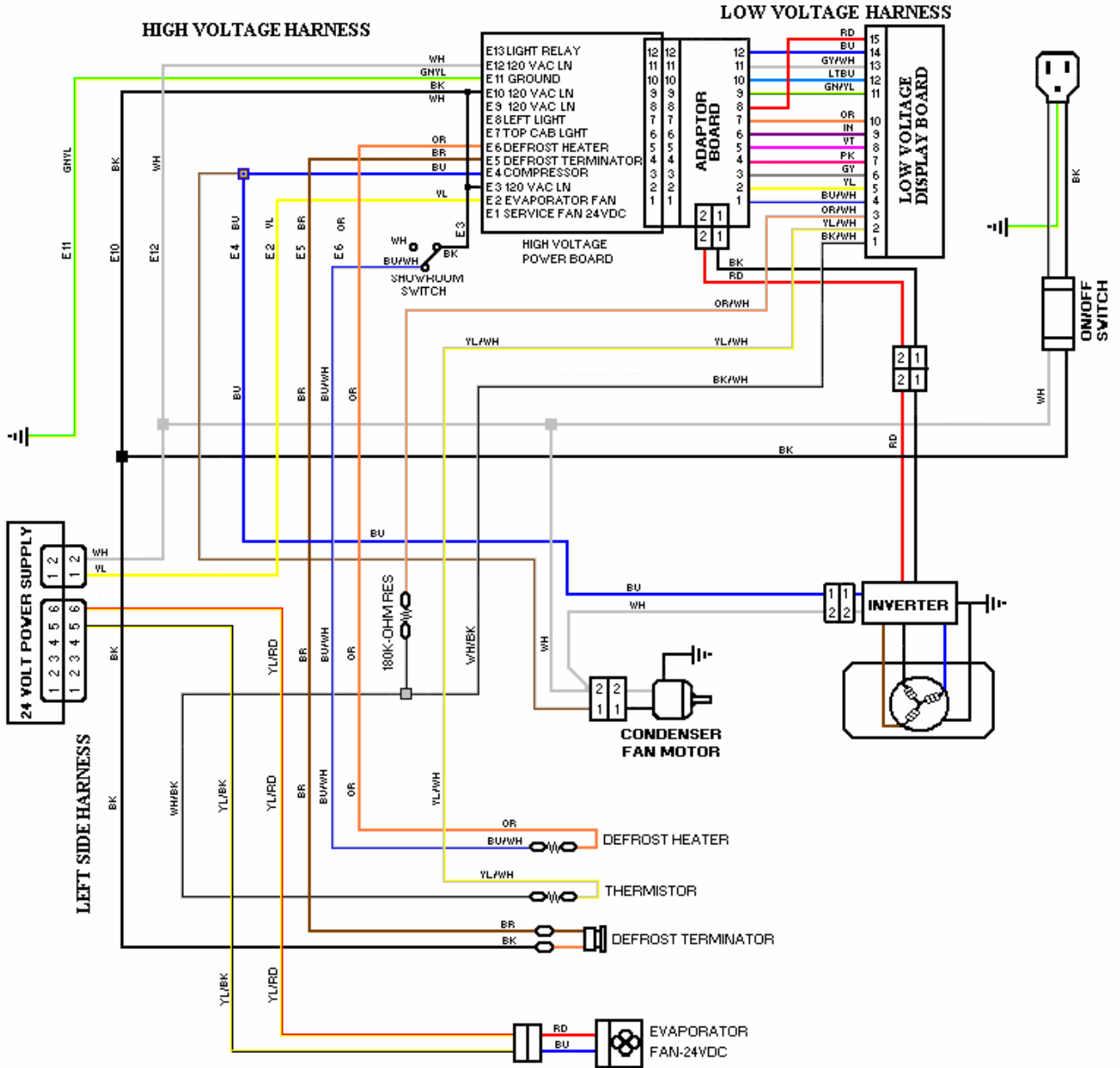


AF 30 120V CIRCUIT

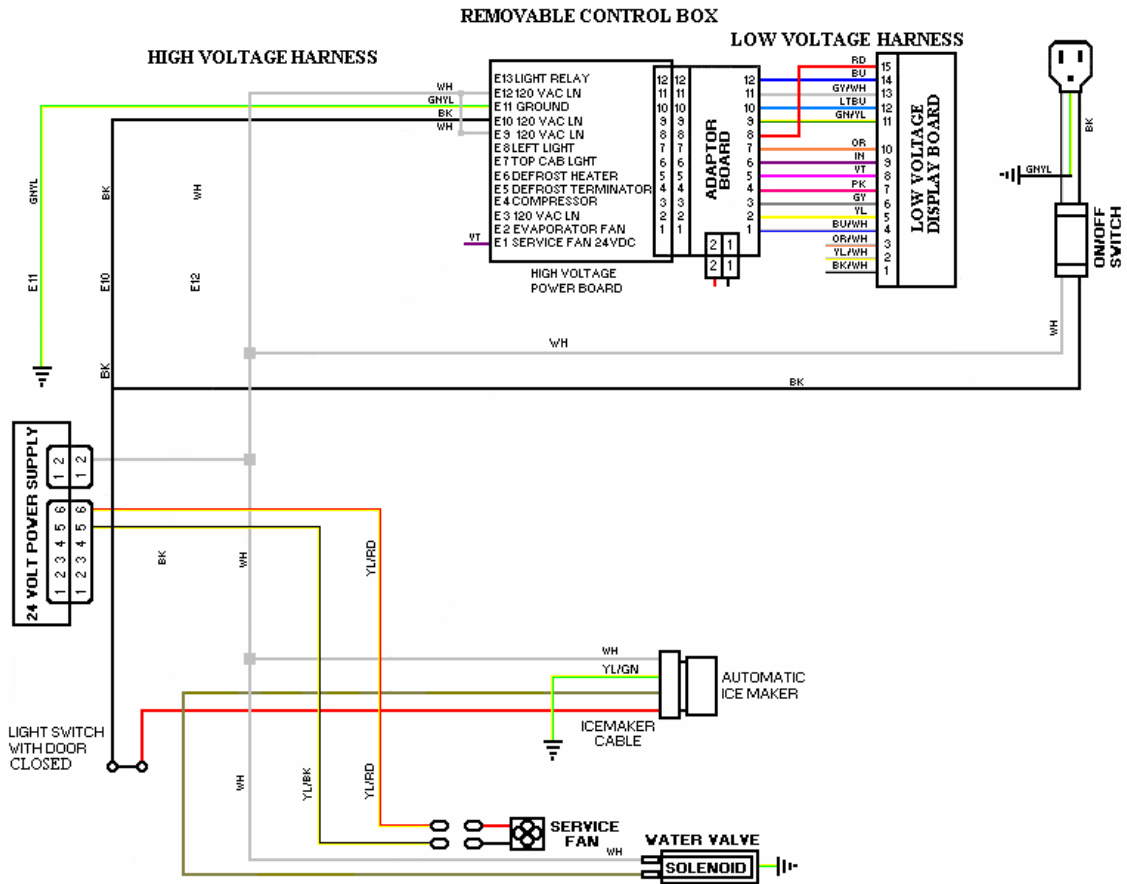


AF 30 SEALED SYSTEM

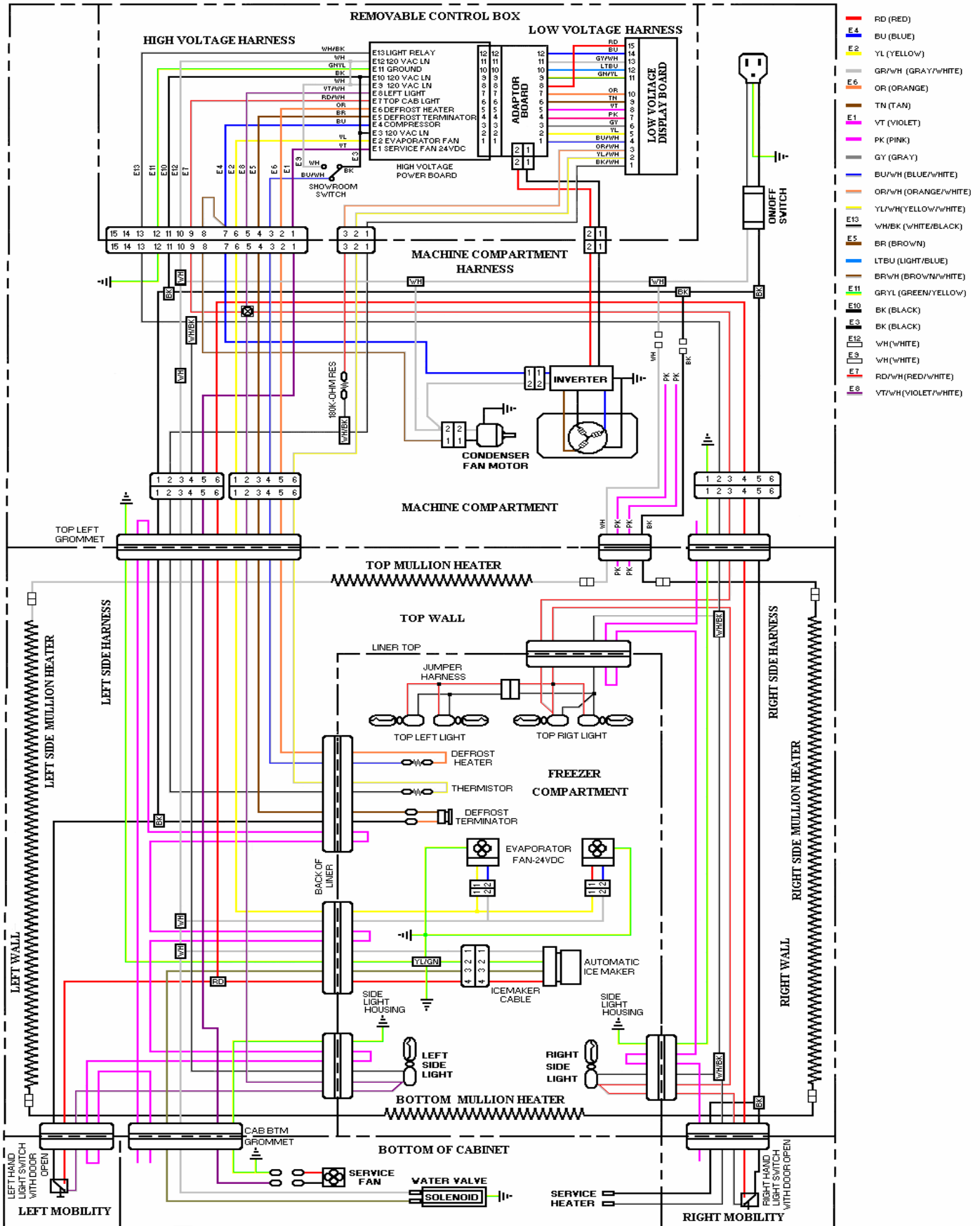
REMOVABLE CONTROL BOX



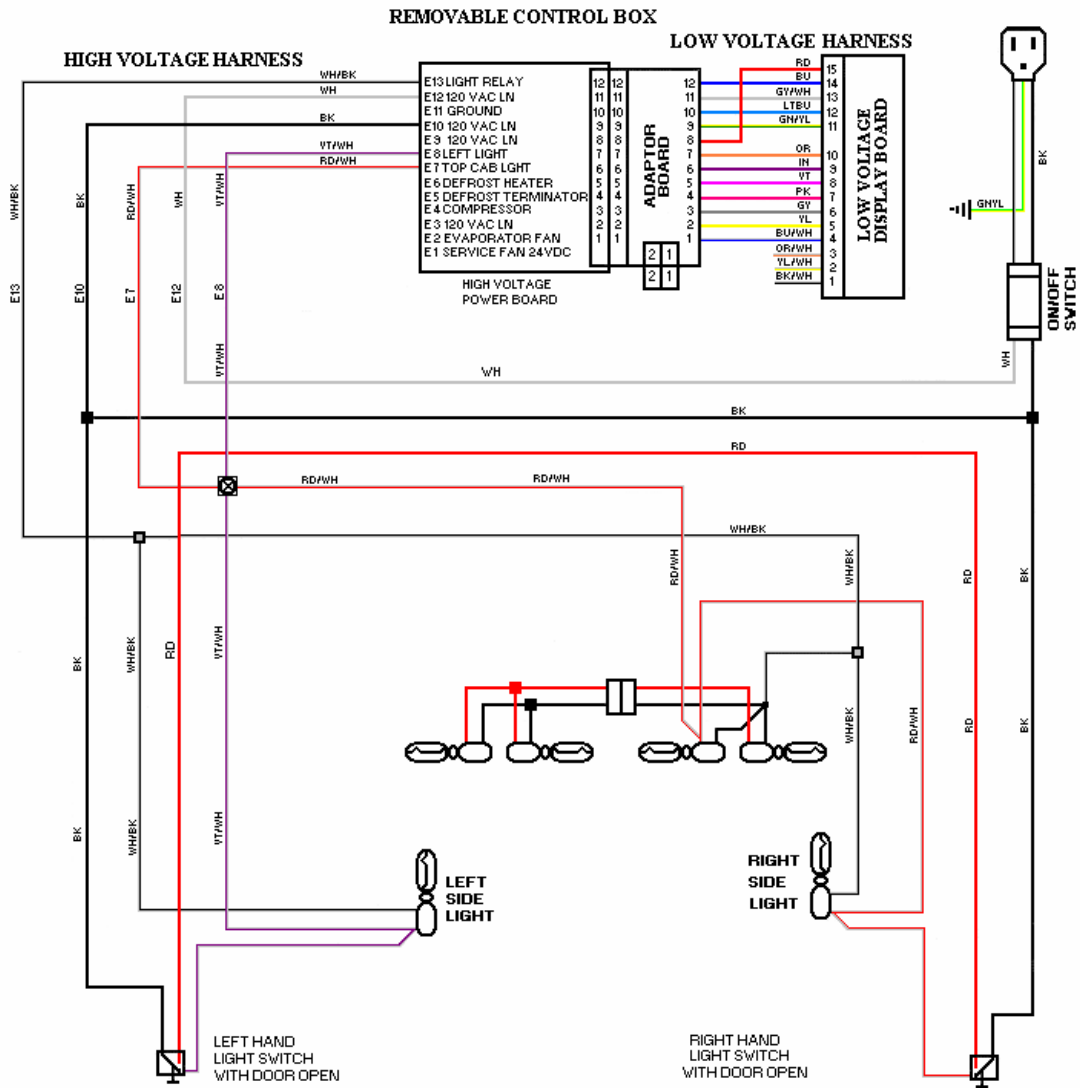
AF 30 ICEMAKER CIRCUIT



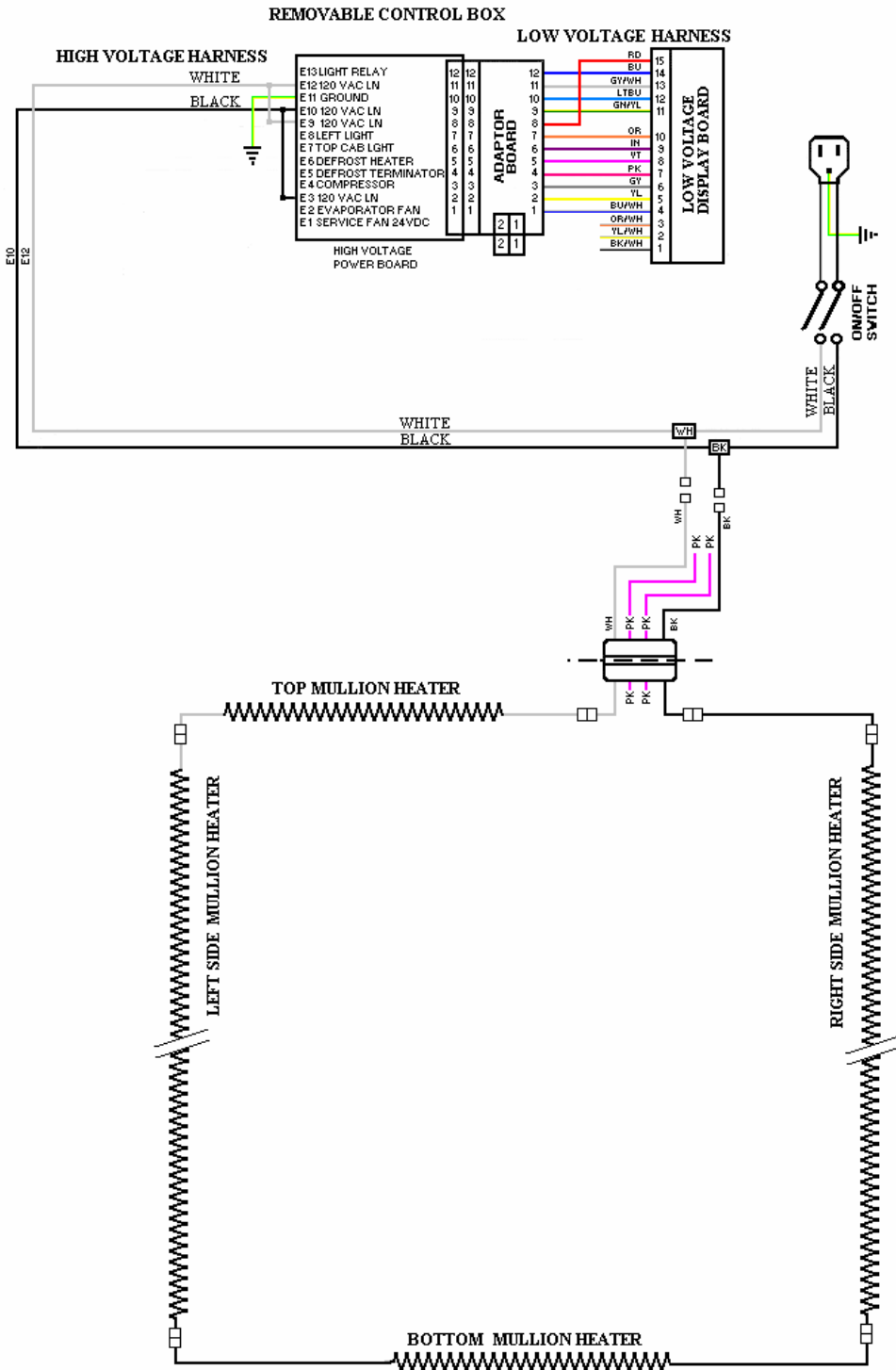
Wiring Schematic 36" W. All Freezer



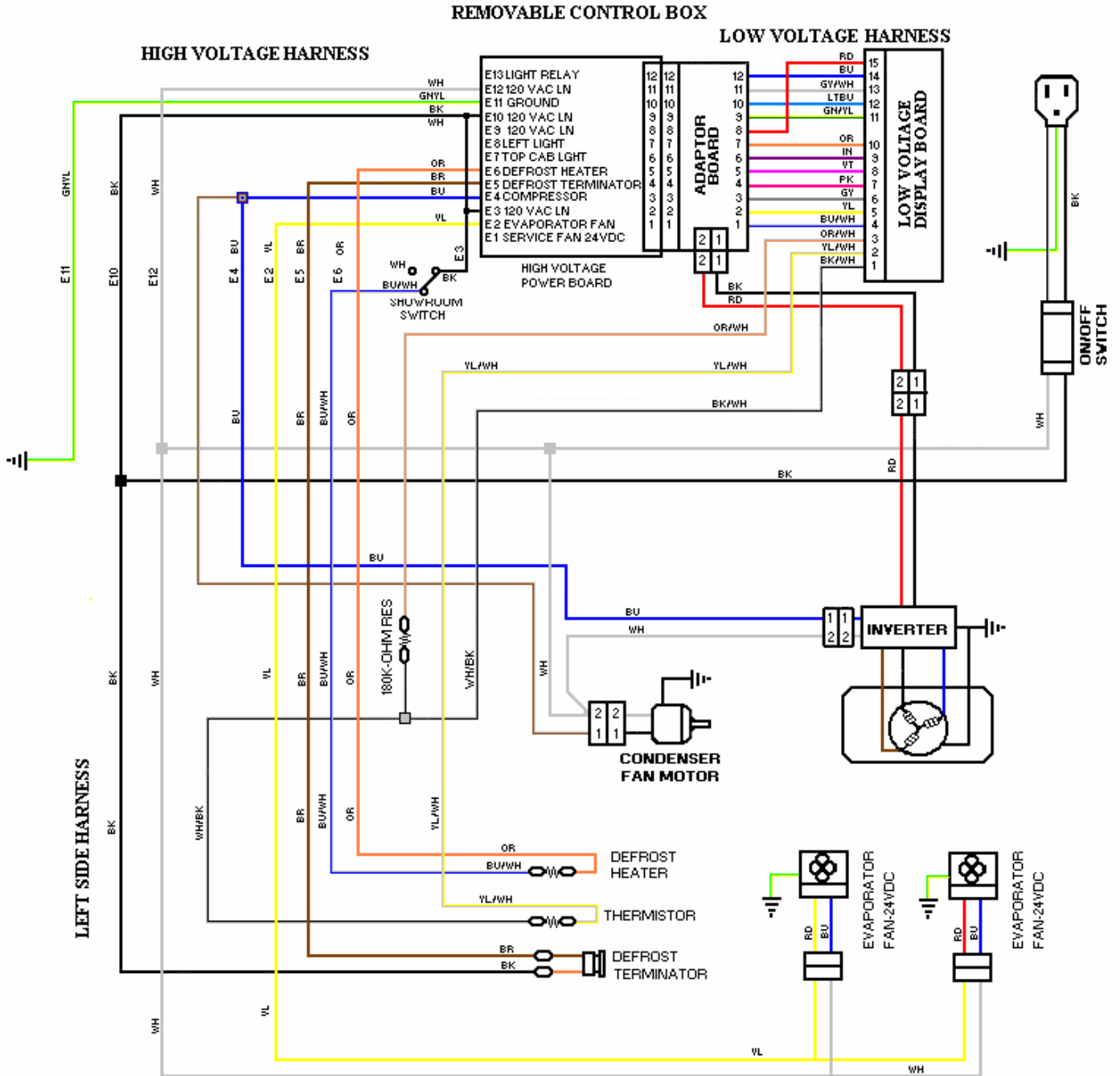
AF 36 LIGHT CIRCUITS



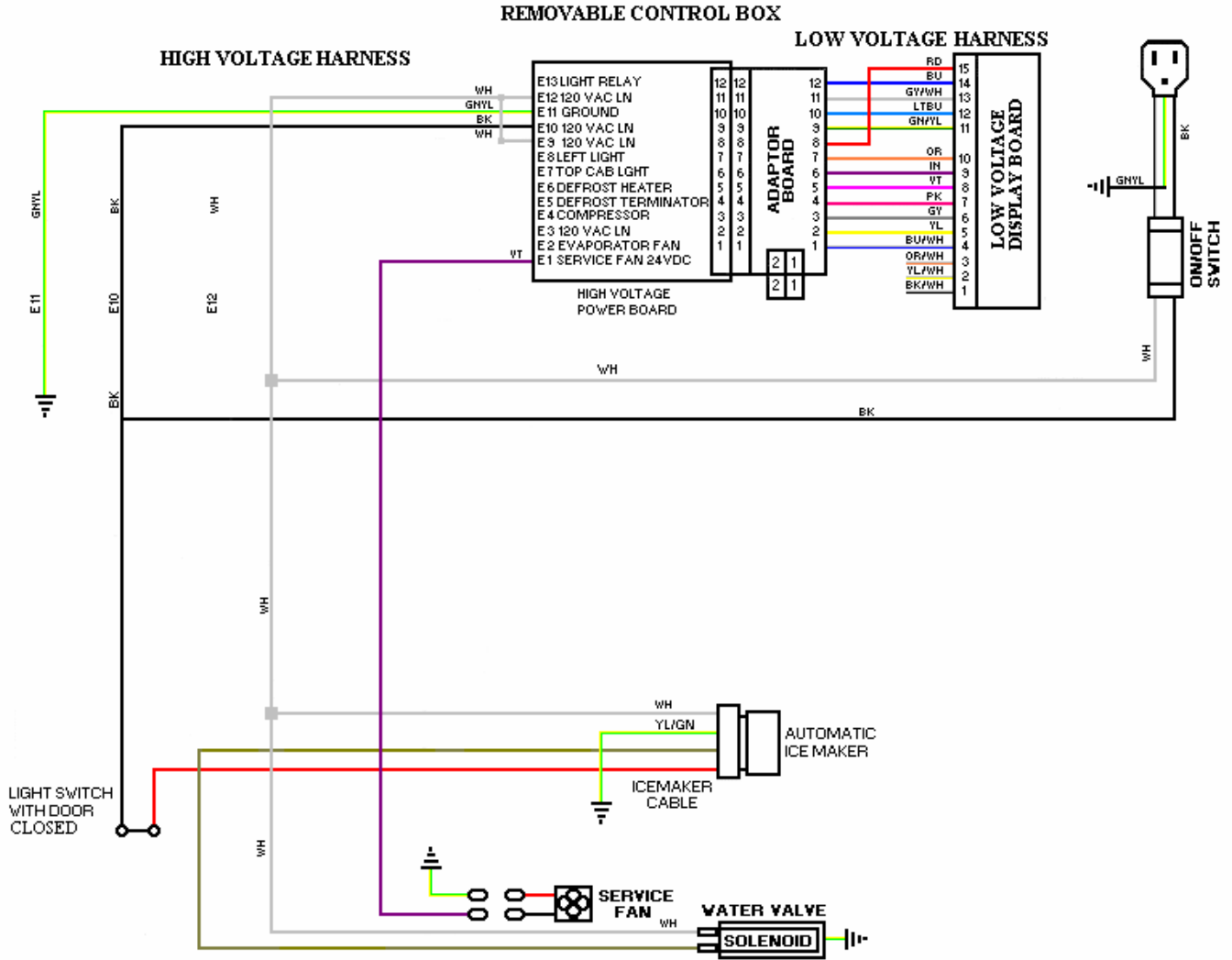
AF 36 120V CIRCUIT



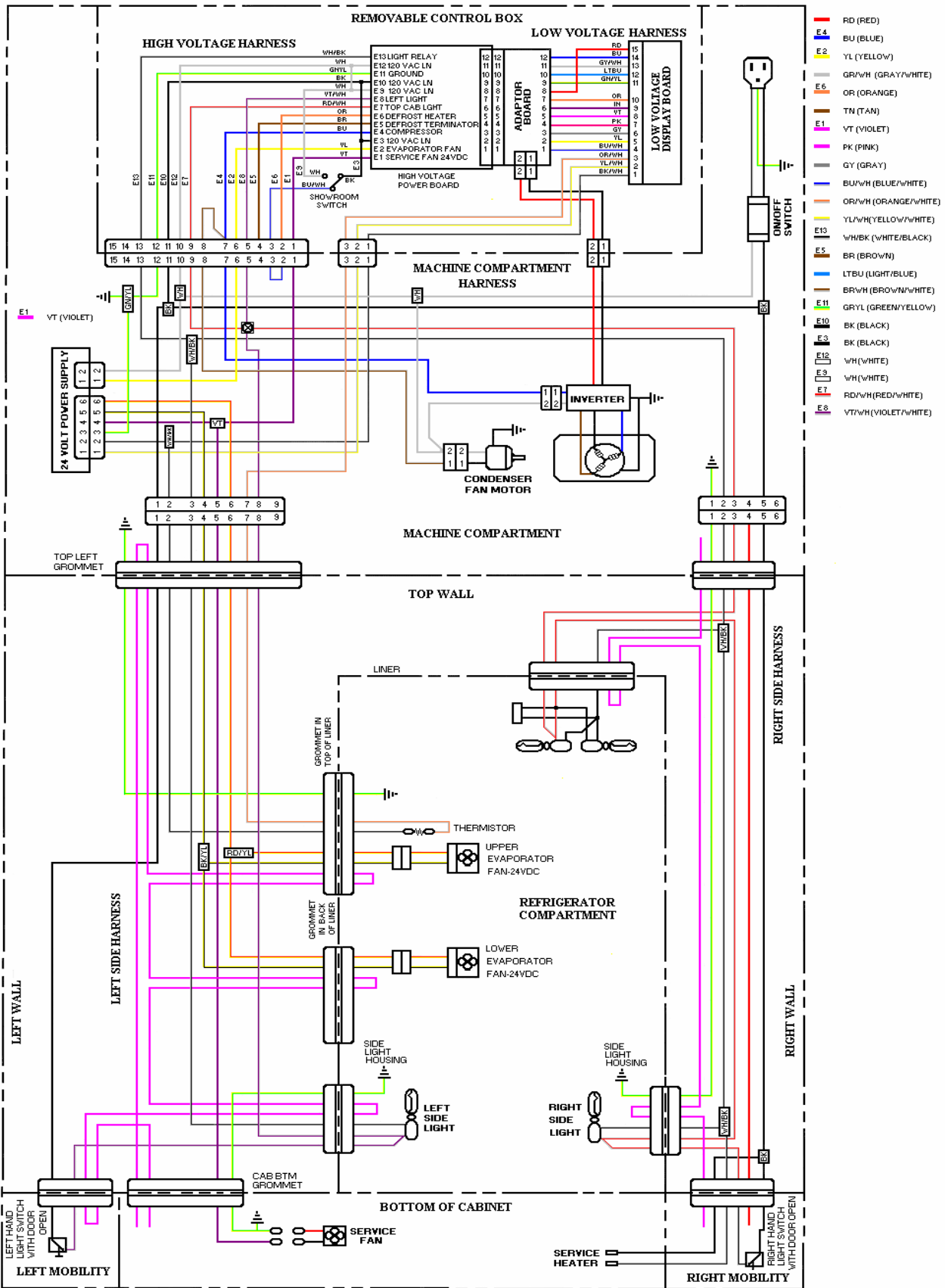
AF 36 SEALED SYSTEM



AF 36 ICEMAKER CIRCUIT

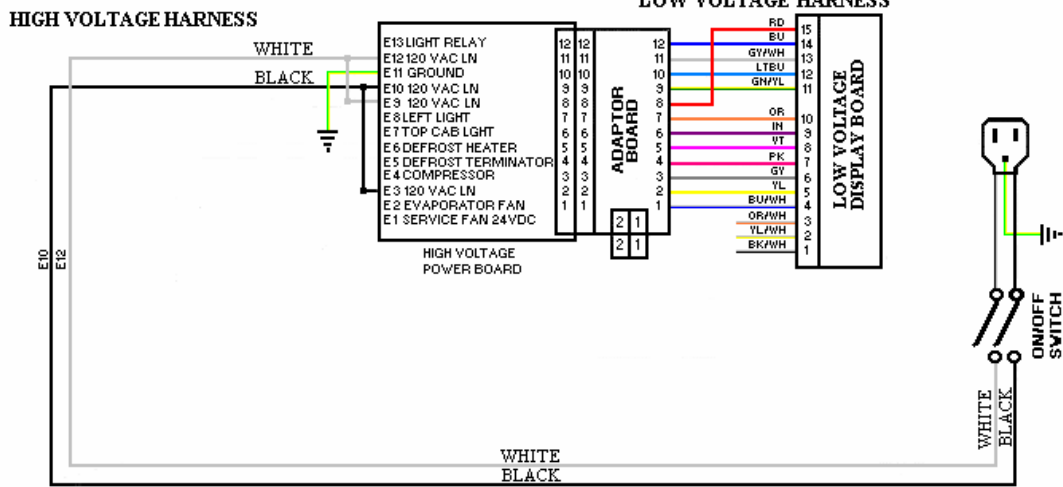


Wiring Schematic 30" W. All Refrigerator



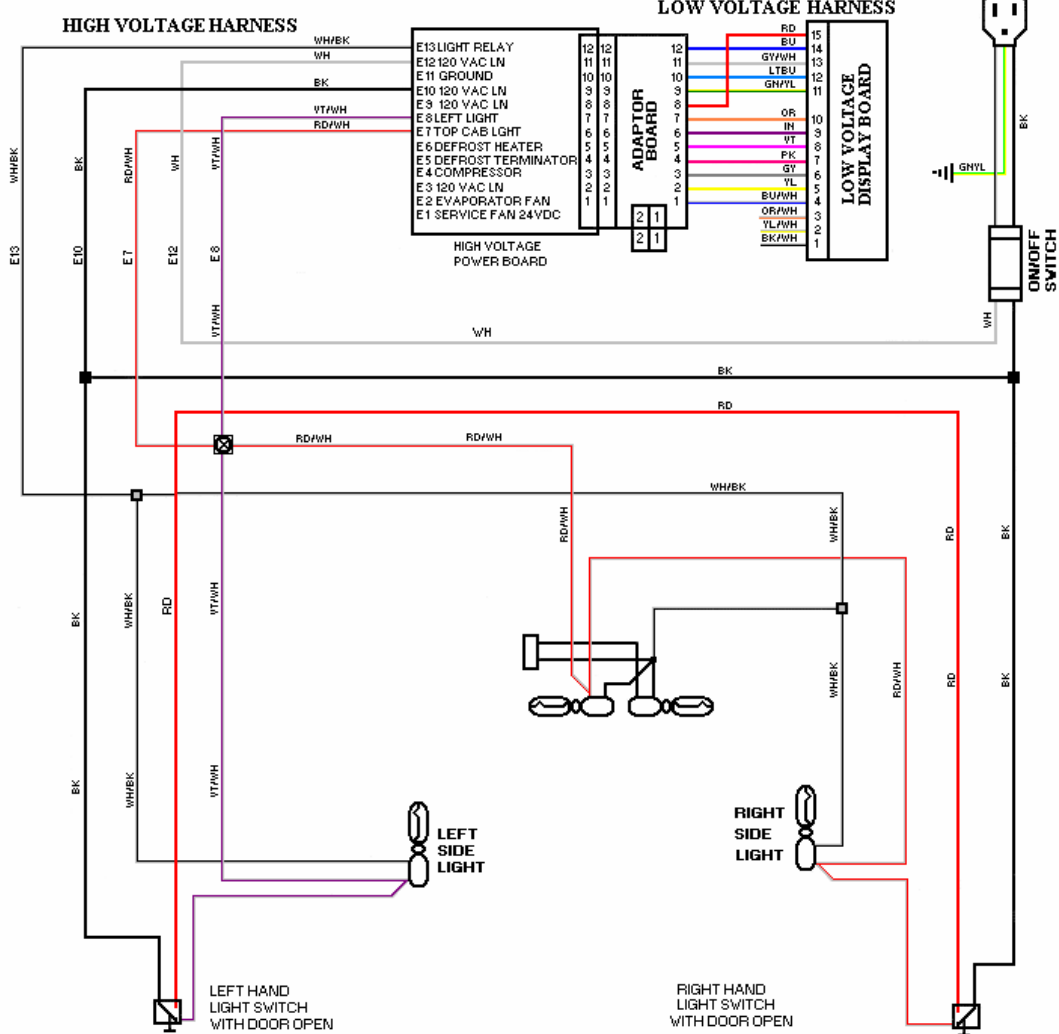
AR 30 120V INPUT

REMOVABLE CONTROL BOX



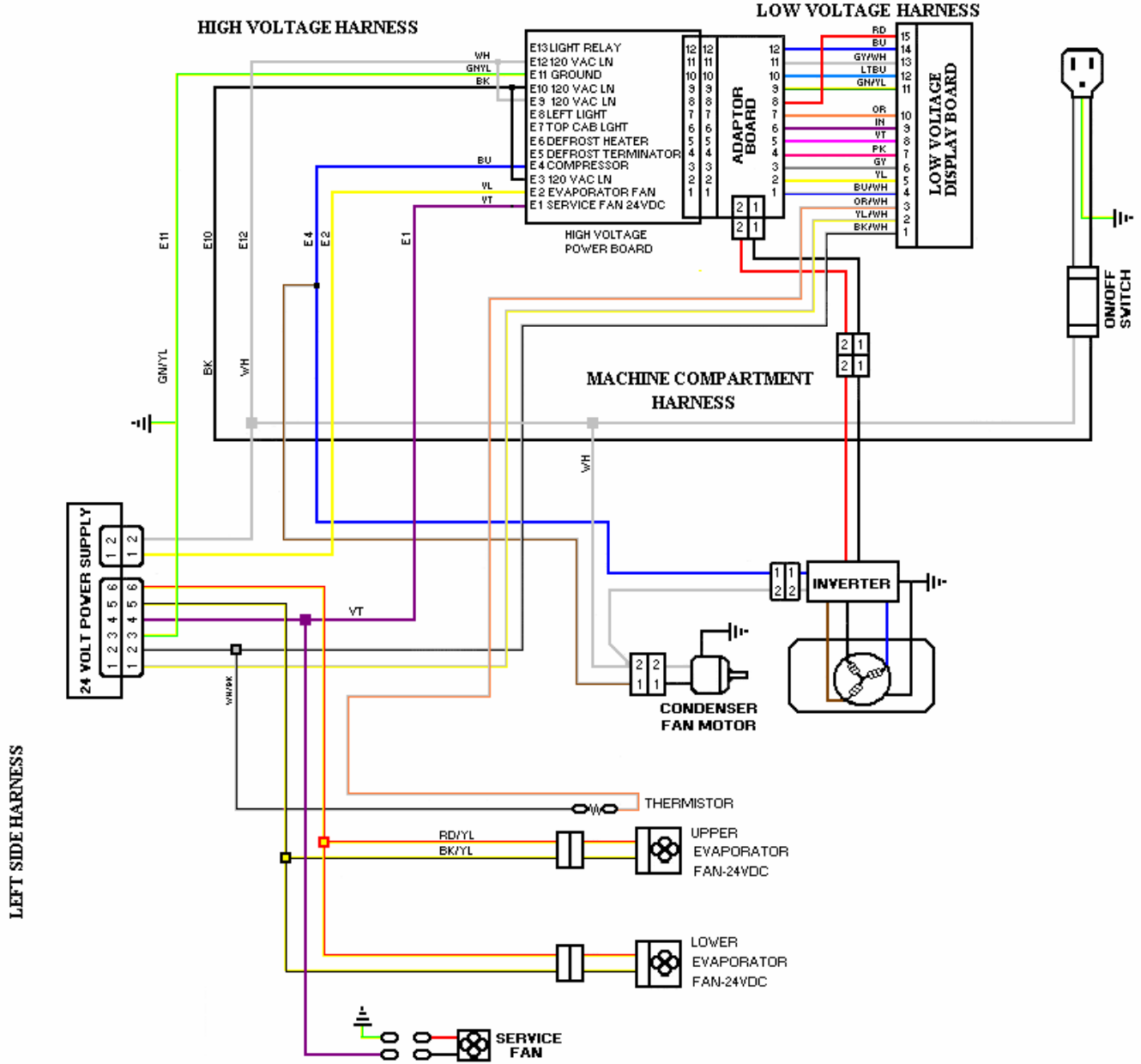
AR 30 LIGHT CIRCUITS

REMOVABLE CONTROL BOX

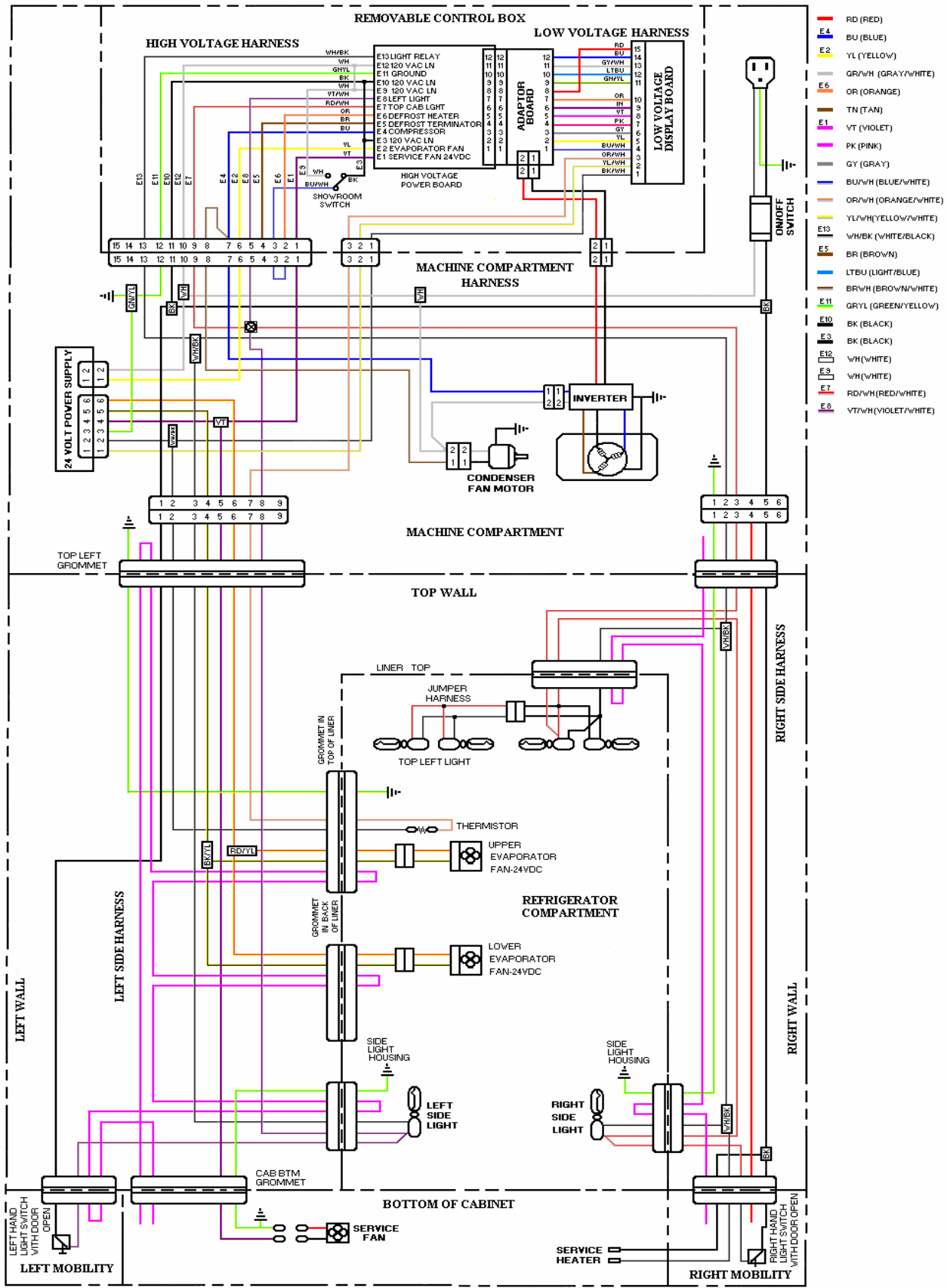


AR 30 SEALED SYSTEM

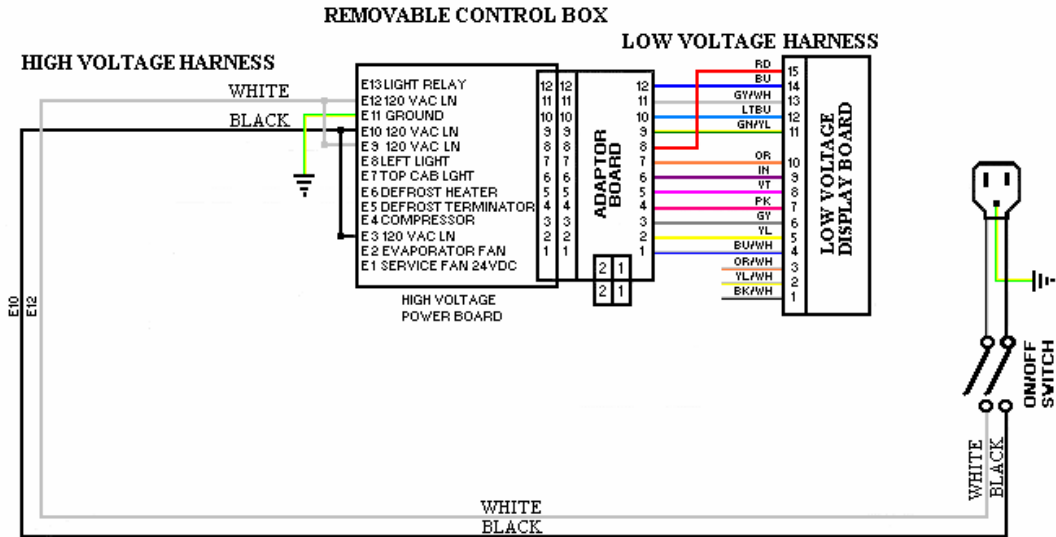
REMOVABLE CONTROL BOX



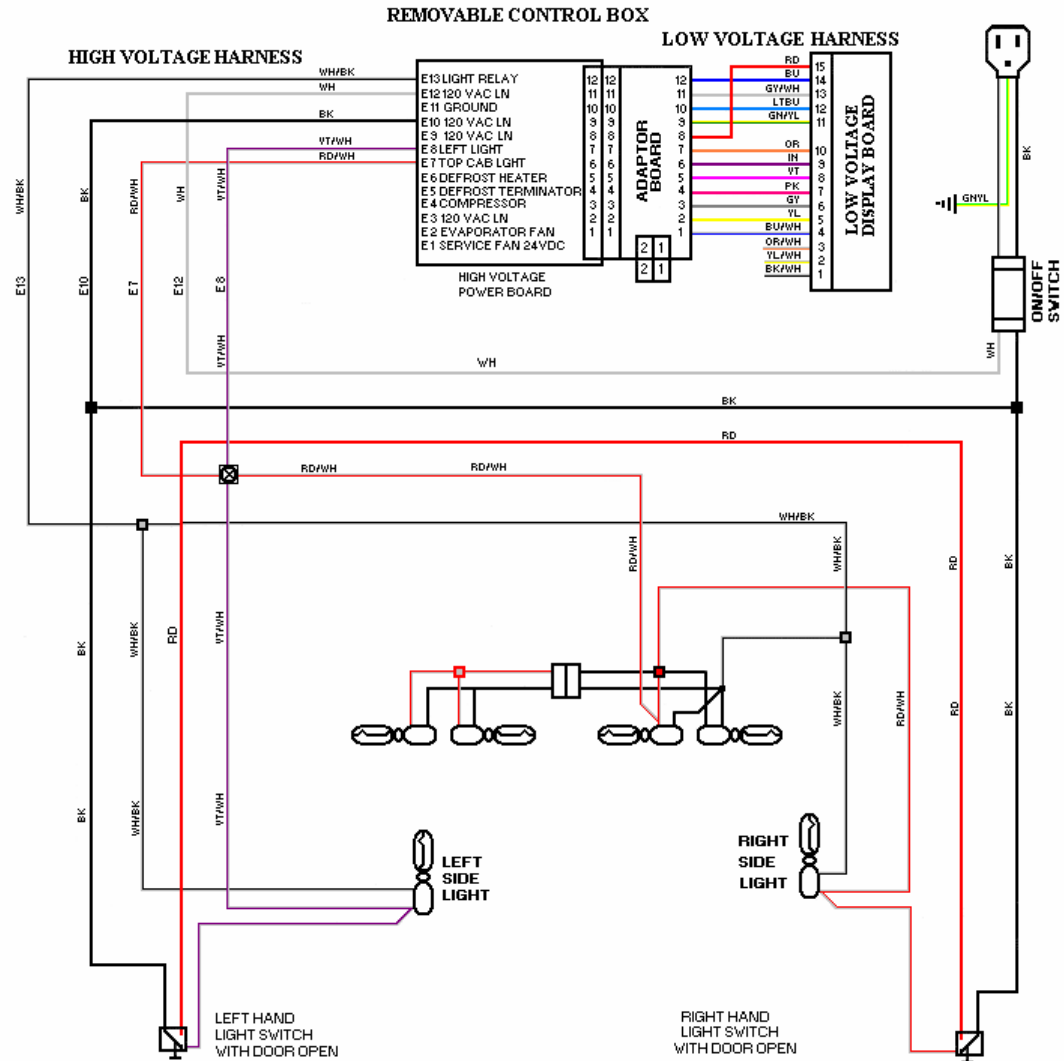
Wiring Schematic 36" W. All Refrigerator



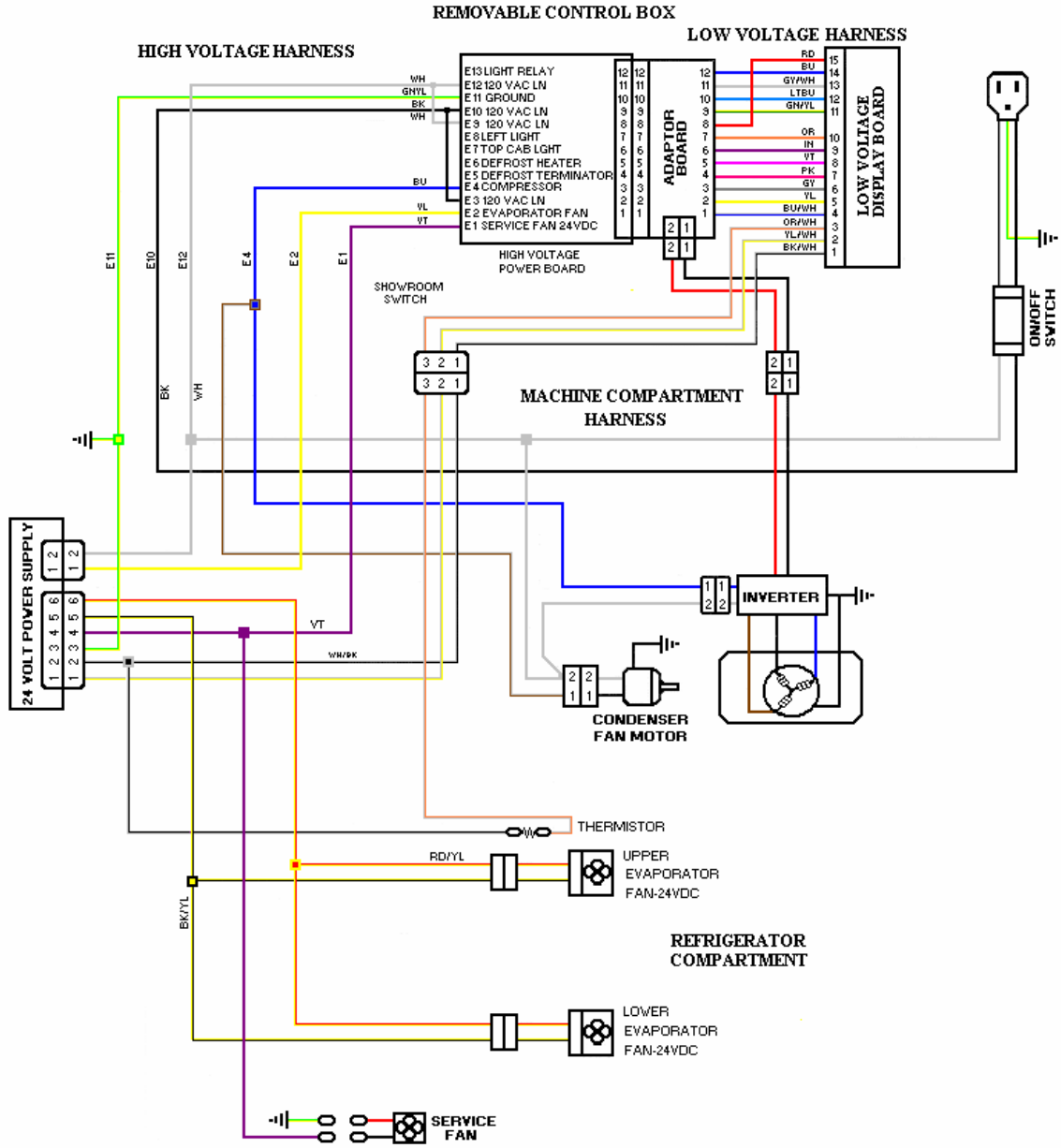
AR 36 120V INPUT



AR 36 LIGHT CIRCUITS



AR 36 SEALED SYSTEM

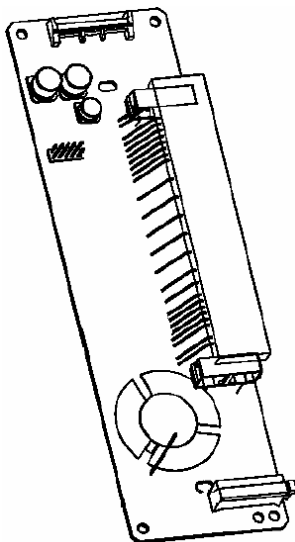


Low Voltage Board Check Points

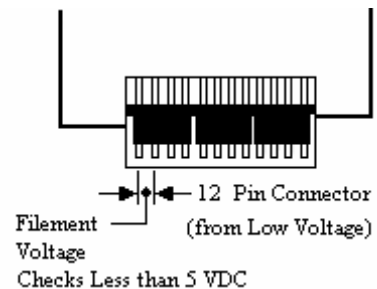
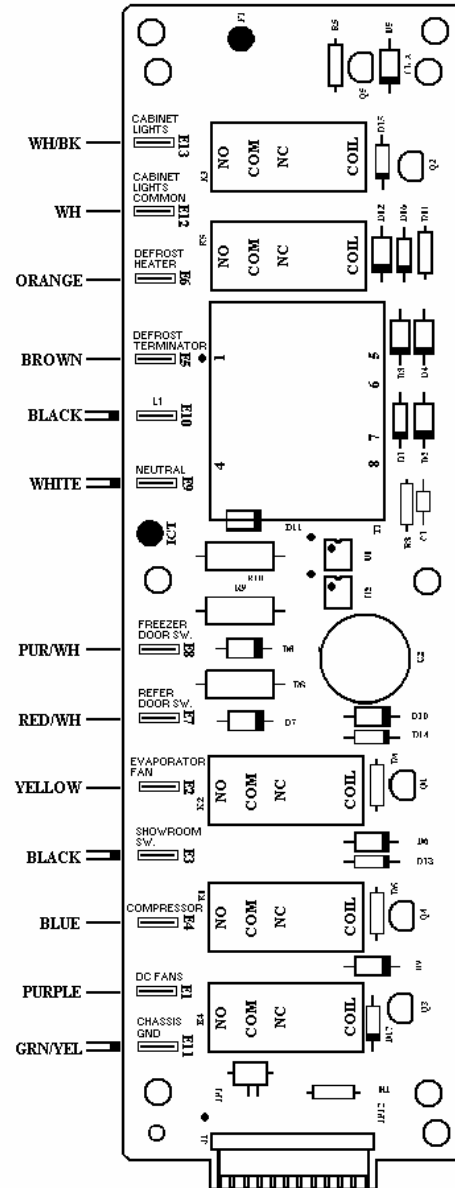


To avoid electrical shock, which can cause severe personal injury or death, disconnect power to unit using power switch before servicing. Wires removed during disassembly must be replaced on proper terminals to insure correct earth ground and polarization. After servicing, reconnect power using power switch.

- **HIGH VOLTAGE BOARD INPUT**
E10 (L1) to E9 NEUTRAL (115VAC)
- **NEUTRAL (L2) E9**
- **DEFROST HEATER**
"ON" E6 to NEUTRAL (115VAC)
"OFF" E6 to NEUTRAL (0V)
- **DEFROST TERMINATOR**
"CLOSED" E5 to E9 NEUTRAL (115VAC)
"OPEN" E5 to E9 NEUTRAL (0V)
- **COMPRESSOR / CONDENSER FAN MOTOR**
"ON" E4 to E9 NEUTRAL (115VAC)
"OFF" E4 to E9 NEUTRAL (0V)
- **EVAPORATOR FAN MOTOR**
"ON" E2 to E9 NEUTRAL (115VAC)
"OFF" E2 to E9 NEUTRAL (0V)
- **DC FAN OUTPUT VOLTAGE FROM HIGH VOLTAGE BOARD TO FRESH FOOD FAN OR CONDENSATE FAN**
"ON" E1 to GROUND (-25VDC)
"OFF" E1 to GROUND (0V)
- **SHOWROOM SWITCH E3**
- **LOW VOLTAGE BOARD INPUT**
W1 to E11 (-25VDC)

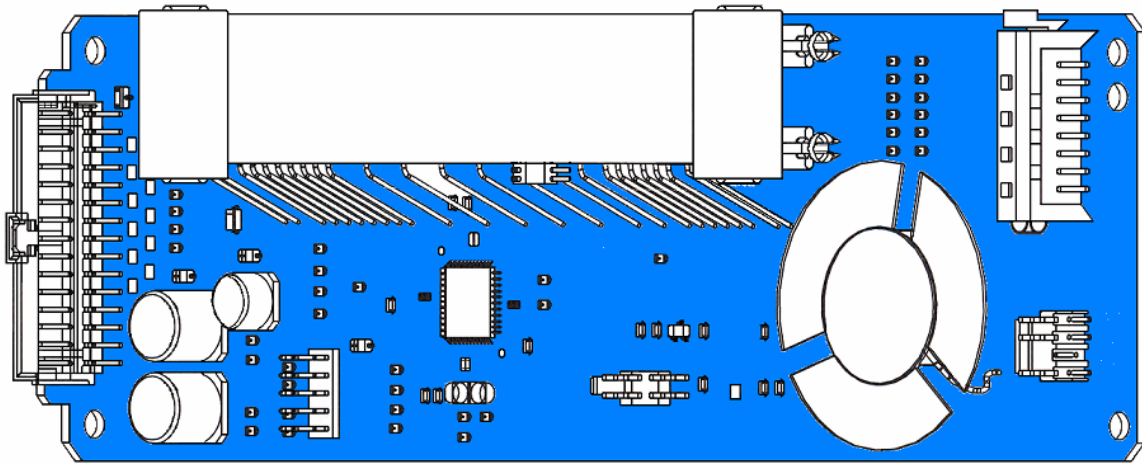


- E13 CABINET LIGHTS
- E12 CABINET LIGHTS COMMON
- E6 DEFROST HEATER
- E5 DEFROST TERMINATOR
- E10 L1
- E9 NEUTRAL
- E8 FREEZER DOOR SW.
- E7 REFRIGERATOR DOOR SW.
- E2 EVAPORATOR FAN
- E3 SHOWROOM SWITCH
- E4 COMPRESSOR
- E1 DC FANS
- E11 CHASSIS GROUND

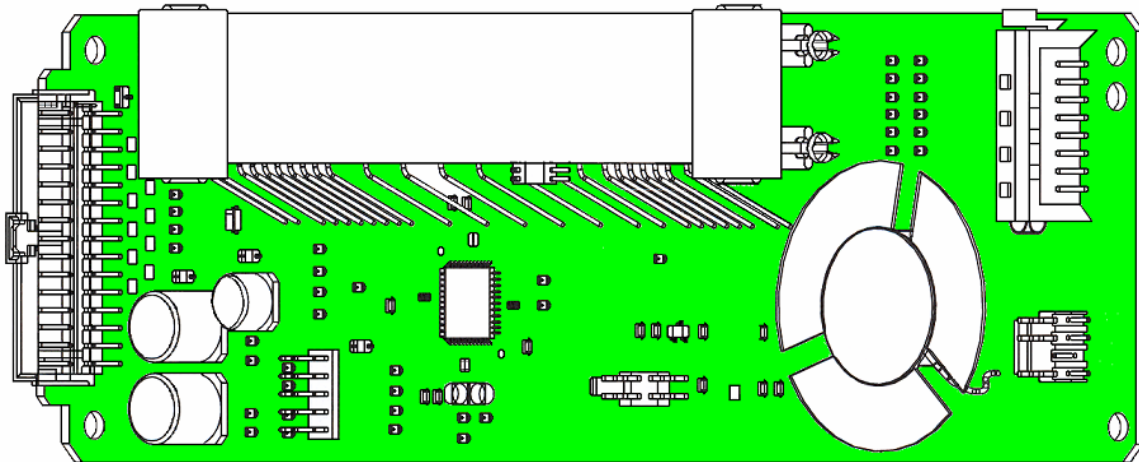


ALL MODELS

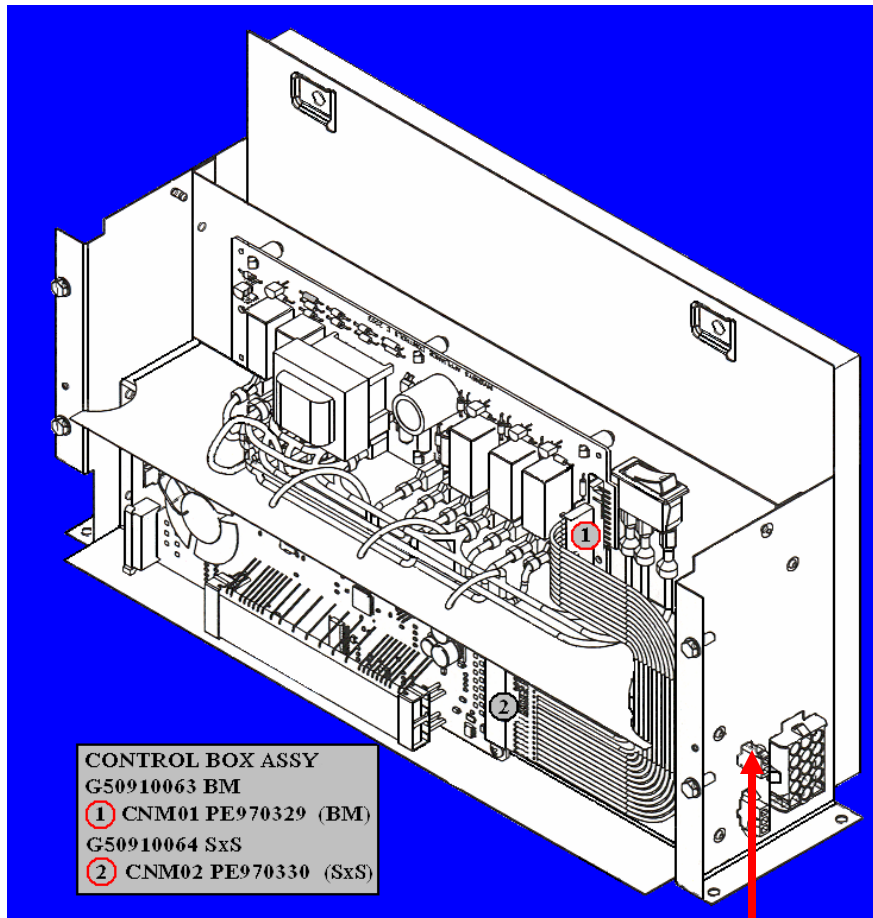
New Control Boards with adapter functionality



PE9070603 SXS (BLUE BOARD)

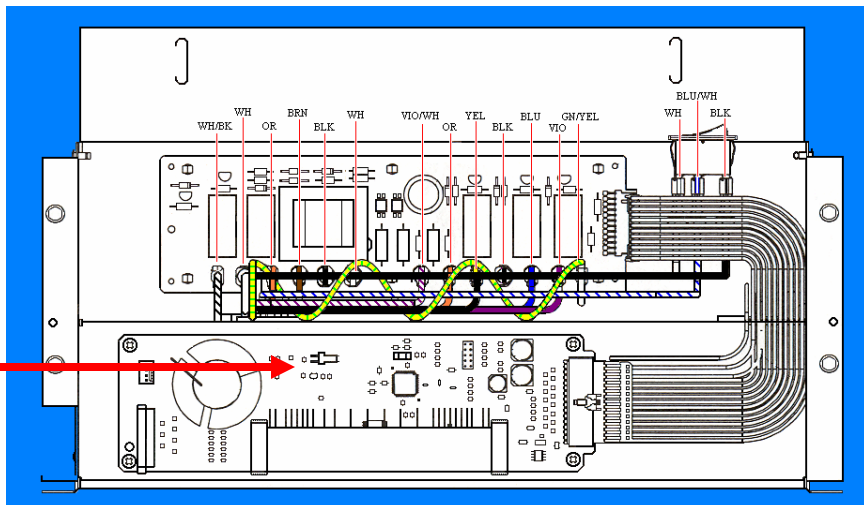
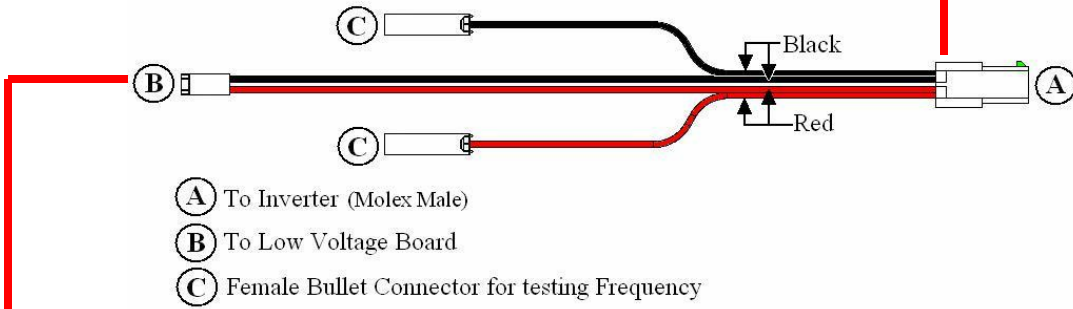


PE970604 BM (GREEN BOARD)



CONTROL BOX ASSY
 G50910063 BM
 ① CNM01 PE970329 (BM)
 G50910064 SxS
 ② CNM02 PE970330 (SxS)

CONTROL BOARD HARNESS



Icemaker (All Freezer Only)

Before replacing icemaker, use this guide to determine if icemaker is defective



To avoid electrical shock, which can cause severe personal injury or death, disconnect power to unit using power switch before servicing. Wires removed during disassembly must be replaced on proper terminals to insure correct earth ground and polarization. After servicing, reconnect power using power switch.

CAUTION: To avoid property damage, test for water leaks after repair or replacement of icemaker, water valve, filter, or supply lines and valves. Do not over tighten connections to household water supply.

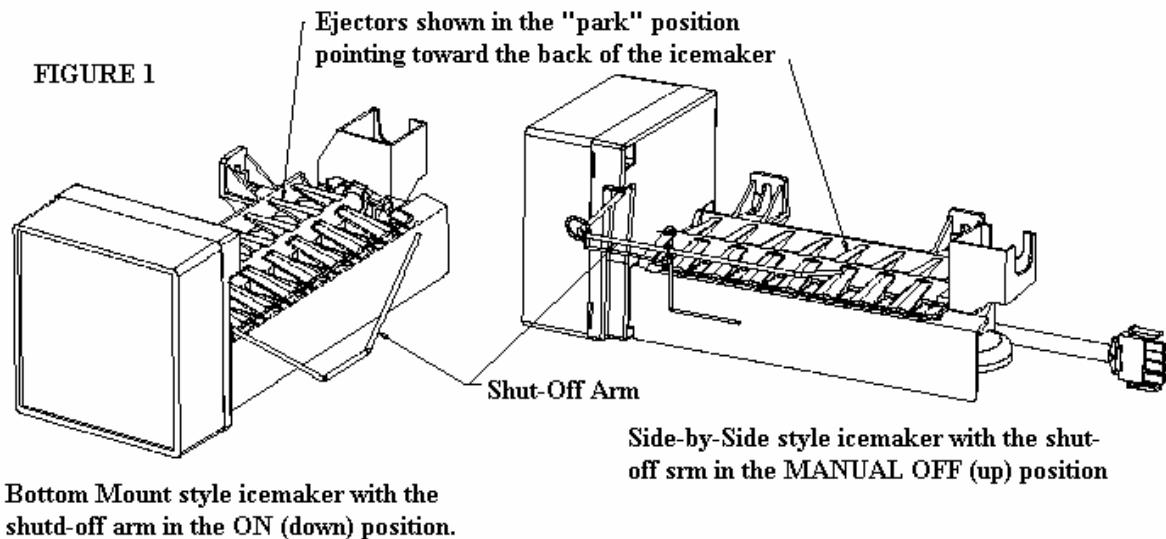
NOTE: THIS INFORMATION IS DESIGNED TO ASSIST QUALIFIED PERSONNEL ONLY. UNQUALIFIED PERSONS SHOULD NOT ATTEMPT REPAIRS DUE TO POSSIBILITY OF ELECTRICAL SHOCK.

Specifications:

- Use SxS Style Icemaker only
- Electrical – 115 VAC, 50/60 HZ
- Mold Heater – 165 Watts, 73-85 ohm
- Water Valve Ohm – 180-200 ohm
- Thermostat – Close: 15 ° F ± 3° F, Open: 48° F ± -6° F
- Water Pressure Needed – 20-120 psi.
- Water Fill Volume – 120cc (4.2 oz.)
- Water Fill Time – 6.6 to 7.2 seconds

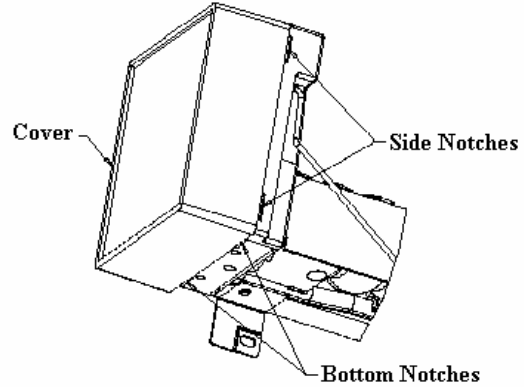
THERMAL CUT-OUT (TCO)

The TCO is a safety device and must NOT be bypassed. If TCO is found to be electrically open, the cause must be found and corrected before replacing Icemaker. The TCO is most likely open if there is no continuity between the black and white wires of the icemaker cable with the ejector in any position other than the park position (ejector blades horizontal pointing toward back of icemaker).



SHUT-OFF ARM AND SWITCH

The shut-off arm operates the shut-off switch. During the harvest cycle, the arm is raised and lowered during each of two revolutions by a cam. If ice in storage keeps arm up, shut-off switch will remain open and stop icemaker at the end of that revolution, shut-off arm can also be manually raised to its locked position to shut off icemaker.



Notch locations for screwdriver to remove cover.

FIGURE 2

TEST CYCLING

Manually rotate the ejector up and forward (clockwise viewed from the motor end) by 1/8 to 1/4 turn or remove the cover and rotate the small motor drive gear counter-clockwise with a screwdriver (See Figure 3). To remove the cover, insert screwdriver in notch at bottom or side and pry cover from housing (See Figure 2). When freezer door is closed, all components of icemaker should function through complete cycle. To observe with freezer door open, the freezer door switch must be held closed. To observe ice being harvested, raise the shut-off arm after the mold has filled with water and the ejector has returned to the park position. Allow one hour for the ice to freeze solid. Lower the shut-off arm and hold the freezer door switch closed. If the thermostat is closed, the ejector will start to move. The icemaker should go through two revolutions. Each revolution will take about three minutes. An internal cam will raise and lower the shut-off arm during each revolution. The mold should refill at the end of the second revolution.

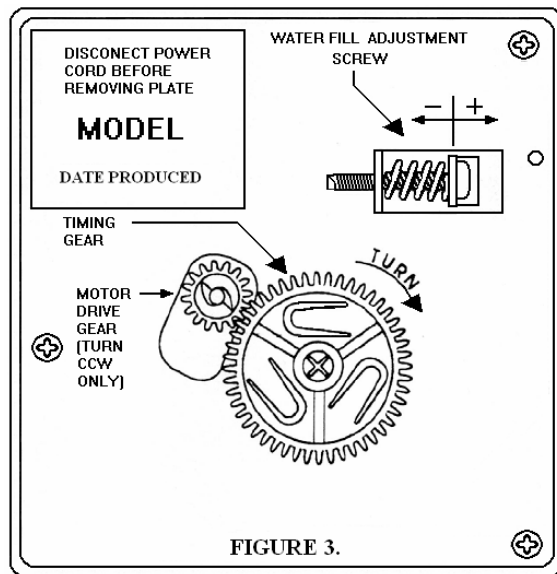


FIGURE 3.

WATER FILL VOLUME

The fill adjustment screw changes fill volume by changing fill time. (See Figure 3)

- Turning screw clockwise decreases the fill time.
- Turning screw counter-clockwise increases the fill time.
- One full turn equals 20 cc (0.70 oz.) or 1.1 to 1.2 seconds.
- Correct fill equals 120 cc (4.2 oz.) or 6.6 to 7.2 seconds.
- Each harvest yields approximately one-quarter pound (1/4 lb.) of ice.
- When water valve is replaced, fill volume must be checked.

To measure fill volume, remove the fill tube from the fill cup and be ready to catch the water in a measuring cup, then start a test cycle as described above.

NORMAL OPERATION

The icemaker always starts from and stops at the “park” position. In the park position the ejector blades are pointing horizontally towards the back of the icemaker. Just before reaching the park position the mold is filled with water. At the park position all electrical components are de-energized, even though the shut-off arm is down, and the icemaker is ready for the next freeze cycle.

The icemaker takes from 30 minutes to one hour to freeze the water. The primary time factors are the temperature in the freezer and the amount of airflow around the icemaker. Colder freezer settings and free air space around the icemaker to let air circulate will help make ice faster.

After the ice forms, the icemaker continues to wait until it reaches 15° F before it starts the harvest cycle. This insures that the ice is solid in all the cavities. At 15° F the thermostat closes, the mold heater turns on, and the ejector blades rotate up and forward until they stall out against the ice. The motor is designed to stall out and is geared to generate a lot of pressure. This minimizes the amount of melting needed to extract the ice. As soon as the ice is loose enough to move, the ejector pushes the ice out of the mold during the second half of the first revolution. During the second revolution the ejector pushes the ice into the bucket. Just before the ejector completes the second revolution the icemaker turns the water valve on for approximately 7 seconds and refills the mold with approximately 4 ounces of water and the freezing cycle is ready to begin again.

TROUBLESHOOTING

Replace if necessary....**BUT DON'T REPLACE UNTIL YOU ARE SURE IT IS THE ICEMAKER.** Here's how to tell: To make ice, an icemaker needs power, water, and sub-freezing temperatures.

ELECTRICAL POWER

NOTE: The freezer door switch turns off power to the icemaker when the freezer door is open. It will be necessary to manually close the freezer door switch for some troubleshooting steps.

1. Check that the shut-off arm is down and instruct customer on its use if necessary.
2. Quick check for power without a test device. Manually rotate the ejector up and forward (clockwise viewed from the motor end) by 1/8 to 1/4 turn or remove the cover and rotate the small motor drive gear counter-clockwise with a screwdriver. With hands clear of the icemaker, manually close the freezer door switch. If the ejector begins to rotate (very slowly) there is power. If the ejector does not rotate, go on to Step 3.
3. Checking for power with a test device: See figure 4. unplug the icemaker and connect a test light or a voltmeter to the top and bottom terminals of the 4-pole connector socket. Manually close the freezer door switch. If there is power, check for water next. If there is not power at the icemaker connector, trace power from the wall socket to the door switch to the connector. (Con't)

Icemaker (Continued)

Repair circuit and connections or replace door switch as needed. When there is power, recheck icemaker operation. If there is still not ice, check for water problems next.

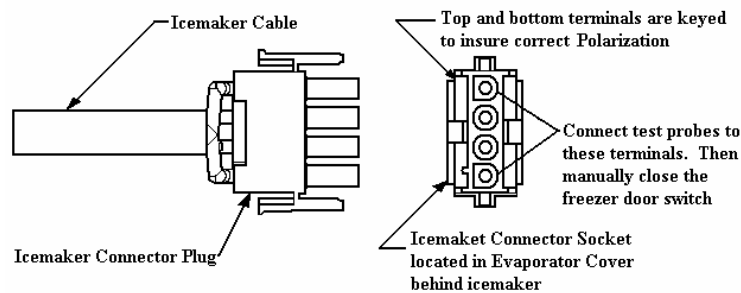


FIGURE 4 Checking for power with a test light or voltmeter.

WATER PROBLEMS

CAUTION: Do not use a Reverse Osmosis Water Filtration System. It reduces the water pressure below 20 psi and the icemaker will not fill. Use of a Reverse Osmosis system will void the warranty.

Poor water quality can cause icemaker to fail or produce unacceptable cubes. Install a water filter to eliminate bad taste, odor, and visible contaminants. Mineral content or sand can restrict screen in water fill valve or particles of sand can keep valve from seating properly. If water valve does not operate properly, the following could occur:

- No ice production
- Small or hollow ice cubes
- Flooding of ice container

Mineral content can cause lime build up in the mold, wicking of water over the mold and poor cube release. Mineral content can also restrict saddle valves.

WATER SUPPLY

1. Water supply is turned OFF. Turn water supply line ON.
2. Water pressure too low (below 20 psi). Check pressure at source. If OK, look for obstructions or restrictions as follows.
3. Saddle valve not fully open. Open valve fully.
4. Saddle valve fully opened but still restricted. Quick fix: Fully close and reopen to dislodge sediment. If necessary, remove valve and enlarge pierced hole to 3/16" diameter with a drill and reinstall saddle valve.
5. Water line to unit pinched/kinked/clogged. Repair water line.
6. Ice in inlet tube blocking water flow. Remove ice from tube.
7. Water pressure too high (above 120 psi). Install pressure regulator.

WATER FILL LEVEL

NOTE: The water fill level adjustment screw is located under the motor cover. See Figures 2 and 3. The icemaker mounting brackets gave built-in differences so that the motor end will be slightly below (1/2°) the water fill end. See Figure 5. The purpose is to help the water fill all the cavities with slight excess at the motor end where the thermostat is located. This insures the motor end is the last to reach 15° F. This prevents early cycling which results in hollow ice cubes.

Icemaker (Continued)

1. Water fill setting too low (less than 6.6 seconds) causing icemaker to cycle too early and is evidenced by hollow ice cubes, ice build-up on the ejector blades, or water freezing in the ice bucket. Increase fill setting by turning the adjustment screw counterclockwise.
2. Water fill setting too high (more than 7.2 seconds) causing water to spill over into the ice bucket or to form around the ejector shaft. Decrease fill setting by turning the adjustment screw clockwise.
3. Water fill is correct but icemaker is not level. Level icemaker. In severe cases the water will spill over the low end. In all cases the high end will produce small cubes which are likely to cause jams and at the low end the cubes will be oversized and may jam the ejector shaft.
4. Icemaker is not level because refrigerator is not level. Level unit first then level icemaker.

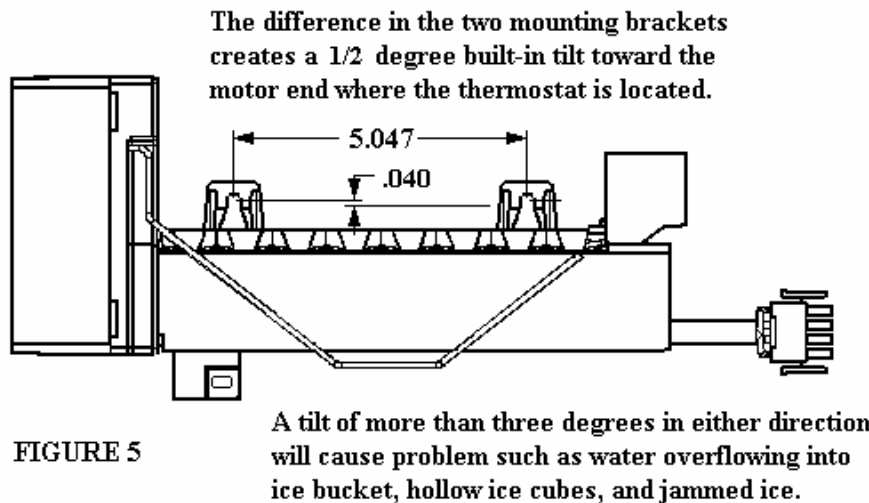


FIGURE 5

WATER FILL VALVE

The amount of water entering the icemaker mold is directly proportional to the length of time the water valve is held open by the timing cam in the icemaker. Proper icemaker fill is 120cc at 6.6 to 7.2 seconds of water fill at an inlet pressure ranging from 20 to 120 psi. A flow washer inside the water valve acts as a water pressure regulator.

1. Check power to water valve. Unplug connector from water valve and connect a test light or voltmeter to the two terminals of the cable supplying the water valve. Manually start a test cycle of the icemaker. Close freezer door to close door switch. At the end of the second revolution (6 minutes) the icemaker should send line voltage to the water valve for approximately 7 seconds.
2. Water valve wire /connections loose/broken. Repair wiring.
3. Defective solenoid. Check solenoid coil (180-200 ohm). If shorted or open, replace valve.
4. Screen water strainer at inlet end is clogged. On valves with threaded fittings, the screen is removable for cleaning. On valves with Guest Fittings (quick connect type) the screen is not accessible for cleaning and the valve must be replaced.

TEMPERATURE PROBLEMS

NOTE: Freezer temperatures above normal, $0^{\circ} \pm 2^{\circ} \text{ F}$ ($-18^{\circ} \pm 1^{\circ} \text{ C}$) will slow down the rate of ice production. Increase ice production by setting freezer to colder setting.

1. The freezer temperature must be below $15^{\circ} \text{ F} \pm 3^{\circ} \text{ F}$. Otherwise the thermostat will not close, even if ice has formed in the mold. Here's a quick check: Manually start a test cycle (see above). If the temperature is above $15^{\circ} \text{ F} \pm 3^{\circ} \text{ F}$, the icemaker will only complete one revolution instead of the normal two. If there is ice in the mold, it will only complete half a revolution and then stall out against the ice.
2. Freezer too warm. Check temperature in freezer. If temperature is appropriate for setting, go to a lower setting (levels 5 through 9).
3. Freezer too warm for setting. Service refrigerator.
4. Poor airflow around icemaker. Remove obstructions.

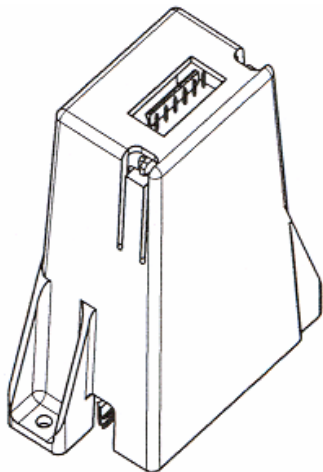
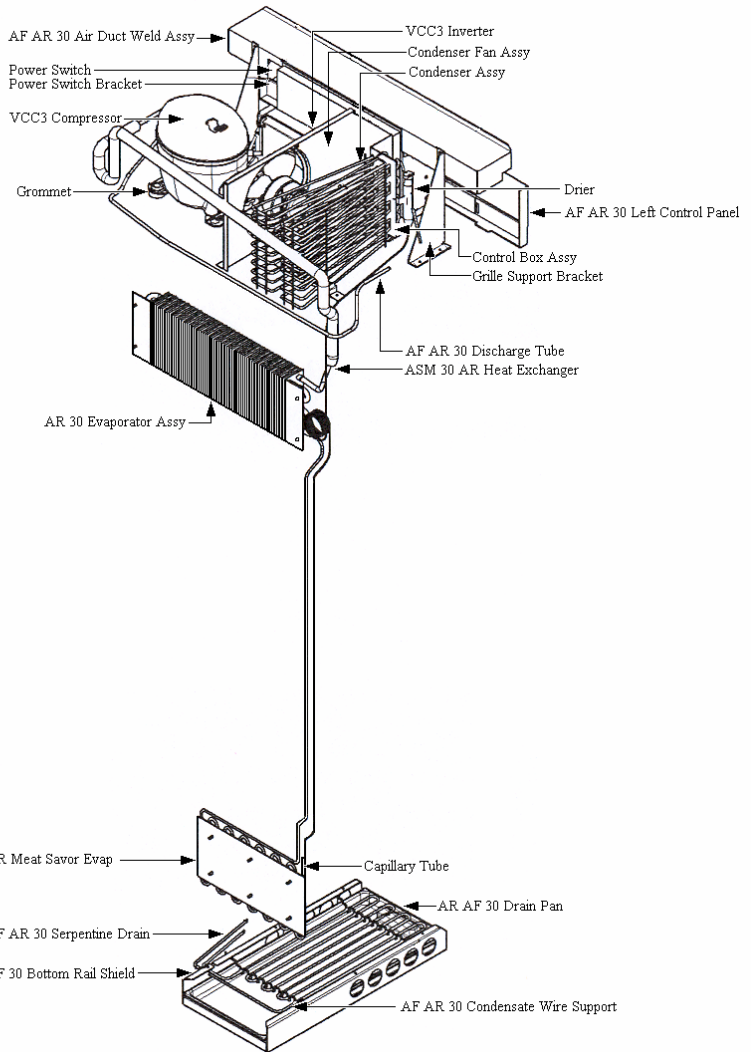
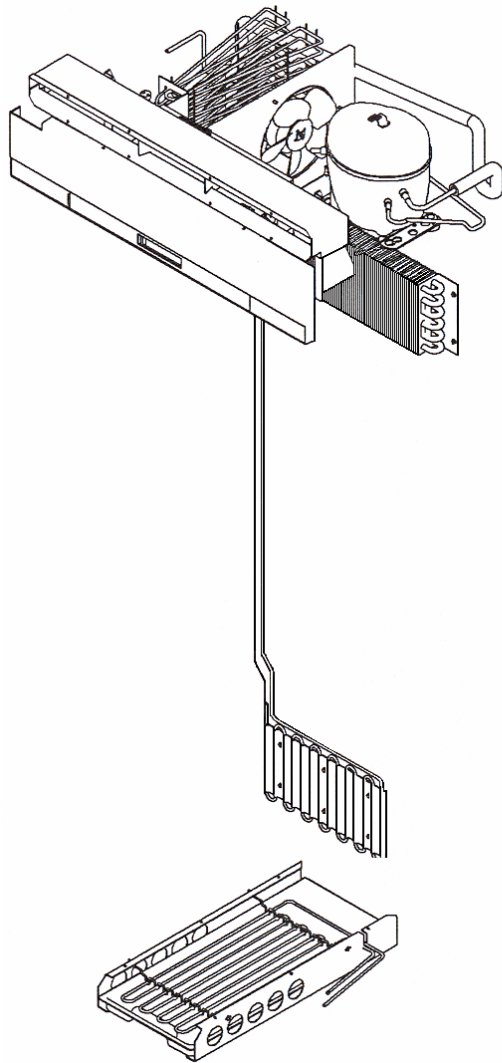
TOO MUCH ICE

1. Shut-off arm or internal linkage is bent or broken. Repair arm if possible, otherwise replace icemaker.
2. Shut-off switch not working. To test, raise shut-off arm to the OFF (up) position. Start a test cycle. The ejector should stop after one revolution when it reaches the park position. If ejector continues to rotate, the icemaker is faulty. Replace the icemaker.

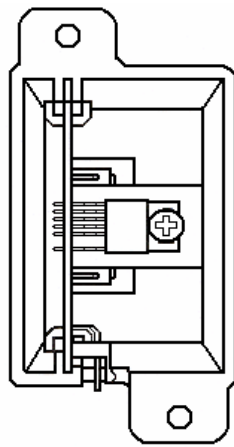
Icemaker Troubleshooting Chart

Ice Problems	Action
Jammed cubes (small or oversized cubes)	Adjust fill level or level icemaker or refrigerator.
Hollow cubes	Adjust for low fill, remove restrictions in supply line or level icemaker or refrigerator. Remove obstructions to air flow at fill end so it freezes first.
Ice build-up on ejector blades	Usually caused by hollow cubes. See hollow cubes above. Remove icemaker to thaw out.
Cubes falling back into mold during ejection	If cubes are small, check fill and level. Check if fill cup is displaced and blocking ice. Fix fill cup or replace icemaker.
Cubes falling over back of icemaker	Check if fill cup is displaced and blocking ice. Fix fill cup or replace icemaker.
Power Problems	Action
No power to icemaker at connector socket	Determine discontinuity by tracing power.
No power to water valve	Determine discontinuity by tracing power.
Water Problems	Action
No water to refrigerator	Turn on supply. Look for obstructions in supply line or valve.
No water to icemaker	Look for obstructions in water valve or fill tube.
Insufficient water to icemaker (with correct fill time)	Check for restrictions in supply line and valve, especially saddle valves.
Clogged water valve	Clean or replace water valve depending on type
Low water pressure at supply	Increase water pressure to 20 - 120 psi
Low water pressure at water valve	Look for restrictions in line
Excessive water pressure	Install pressure regulator and set to 60 psi
Low water fill volume	Adjust water fill screw, clear obstructions in supply line or supply valve, or replace water valve
Excessive water fill volume	Adjust water fill screw, reduce water pressure, or replace water valve
Water overflows fill cup	Reposition fill-tube in fill cup or remove obstruction in fill cup
Water overflows mold	Adjust water fill screw, level icemaker or refrigerator, reduce water pressure, or replace water valve or icemaker
Leaky water valve	Tighten connections or replace water valve
Temperature Problems	Action
Freezer too warm	Adjust freezer setting or repair refrigerator
Icemaker Problems	Action
Raised shut-off arm	Lower shut-off arm to ON position
Broken or bent shut-off arm	Repair arm or replace icemaker
Shut-off arm stuck or obstructed	Remove obstruction
Icemaker not level	Check level of refrigerator first then level icemaker
Can't level icemaker	Level refrigerator first then try again
Open Thermal Cut-Out (no continuity through icemaker with ejector out of park)	Replace icemaker and look for cause
Open thermostat (won't close below 15 F)	Replace icemaker
Closed thermostat (won't open above 48 F)	Replace icemaker
Thermostat out of calibration	Replace icemaker
Heater not staked in mold	Replace icemaker
Won't cycle test with power available	Replace icemaker
Won't eject ice with power available	Replace icemaker

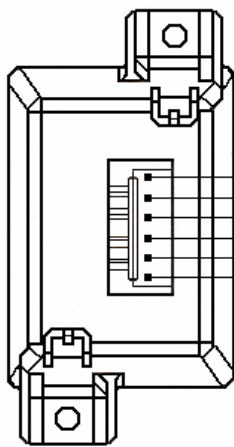
SEALED SYSTEM



24VDC POWER SUPPLY



BOTTOM



TOP

- | | |
|---------------------------|---|
| PIN 6 YL/RD-----(+24 VDC) | } OUTPUT VOLTAGE
TERMINALS |
| PIN 5 YL/BK-----(-24 VDC) | |
| PIN 4 VT----- (RELAY) | } TEMPERATURE
TRANSLATOR
(SEE NOTE) |
| PIN 3 GN/YL----- (RELAY) | |
| PIN 2 BK/WH -- (RESISTOR) | |
| PIN 1 YL/WH -- (RESISTOR) | |

NOTE: TEMPERATURE TRANSLATOR RESISTOR VALUES
 RELAY OFF (NC CIRCUIT) - 560K +/- 5%
 RELAY ON (NO CIRCUIT) - 180K +/- 5%