

**KitchenAid®**

TECHNICAL EDUCATION

**SIDE-BY-SIDE  
REFRIGERATOR  
ELECTRONIC CONTROLS**



**JOB AID 4317324**

**Introductory models:  
KSRA22FK  
KSRA25FK**

**KitchenAid®**  
FOR THE WAY IT'S MADE.®

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**For technical assistance while at the customer's home, call the Technical Assistance Line: 1-800-253-2870.**

Have your store number ready to identify you as an Authorized Servicer.

**For product specifications, and warranty information, call 1-800-422-1230.**

We recommend that you only use factory specified replacement parts. Factory specified replacement parts will fit right and work right because they are made with the same precision used to build every new KITCHENAID® appliance.

Whirlpool Corporation assumes no responsibility for any repairs made on our products by anyone other than Authorized Service Technicians.

# SAFETY FIRST

## Your safety and the safety of others are very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol.

This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word "DANGER" or "WARNING." These words mean:

**⚠ DANGER**

You can be killed or seriously injured if you don't immediately follow instructions.

**⚠ WARNING**

You can be killed or seriously injured if you don't follow instructions.

All safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what can happen if the instructions are not followed.

## Electrical Power Supply Connections

**⚠ WARNING**



### Electrical Shock Hazard

Disconnect power before servicing.

Replace all panels before operating.

Failure to do so can result in death or electrical shock.

**⚠ WARNING**



### Electrical Shock Hazard

Plug into a grounded 3 prong outlet.

Do not remove ground prong.

Do not use an adapter.

Do not use an extension cord.

Failure to follow these instructions can result in death, fire, or electrical shock.

## OVERVIEW

The electronic control for 2001 KitchenAid Side-by-Side refrigerators combines several functions previously used in separate components: Adaptive Defrost Control (ADC), Independent Temperature Control (ITC) and Water Filter Indicator Control (WFI). Two new technologies, pulsed defrost and evaporator fan delay, are incorporated into this control.

The numeric display can be set for Fahrenheit or Celsius and will display customer temperature settings. Available features will include: Max Cool and Over Temperature Alarm.



## THEORY OF OPERATION

The control runs a 13 second self-diagnostic routine prior to starting a cooling cycle every time it is plugged into a wall outlet. The compressor will start approximately 10 seconds into the self-diagnostic routine.

### Refrigerator Temperature Control

A motorized air baffle is used to regulate air flow from the freezer into the refrigerator compartment. The air baffle operation is controlled by input from the refrigerator thermistor. The refrigerator control allows the customer to select a temperature range of 33°F (1°C) to 41°F (9°C). When the refrigerator thermistor senses a temperature above the customer setting, the baffle opens and the evaporator fan motor begins to run. The compressor may or may not be running at this time based on the temperature in the freezer. The baffle closes when the refrigerator temperature setting is reached.

### Freezer Temperature Control

Input from the freezer thermistor is used by the control to determine compressor run time. The freezer thermistor allows the customer to select a temperature setting of -5°F (-21°C) to +5°F (-15°C). When the freezer thermistor senses a temperature above the customer setting, the control immediately energizes the compressor. The evaporator fan motor is energized after a 40-second delay. This delay allows the evaporator to begin to cool before air is circulated. If the evaporator fan is already running to cool the refrigerator section, it will continue without delay. The compressor turns off when the proper freezer temperature is reached, but the evaporator fan continues to run for 2 minutes. To protect the compressor, the control will not allow the compressor to restart for a minimum of 6 minutes.

### Failure Defaults

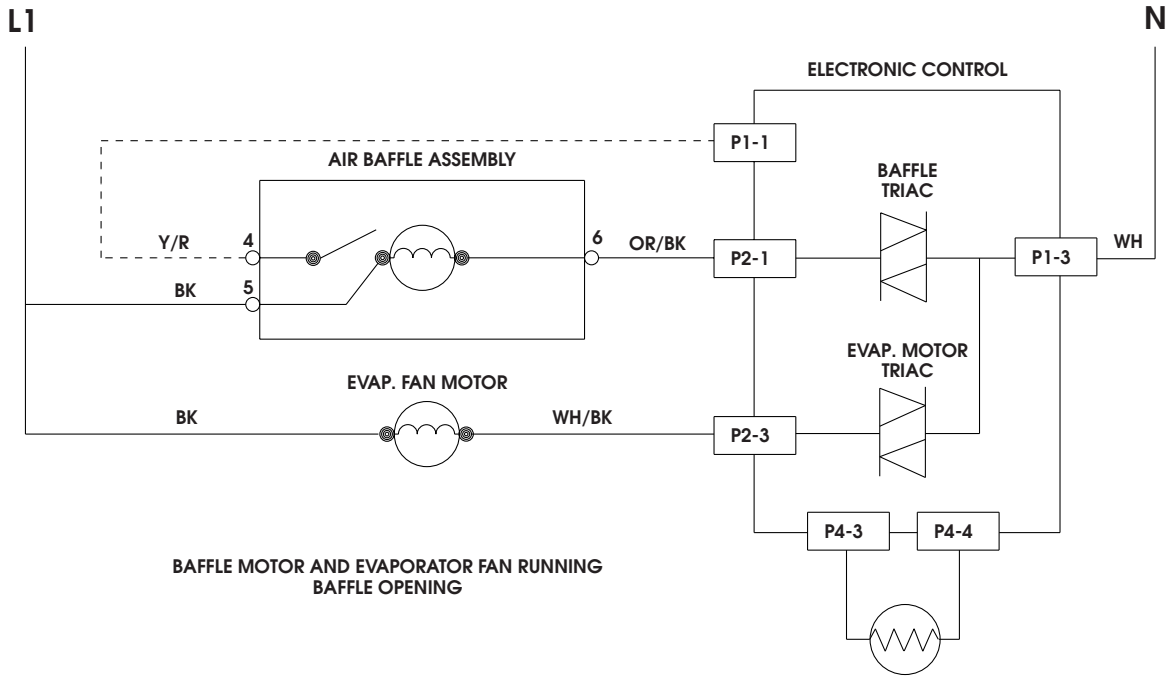
To provide a measure of customer satisfaction in the event of a thermistor or keypad failure, the control will use one of the following default modes. The default mode continues until the failure is corrected.

- **Refrigerator Thermistor:** If the refrigerator thermistor fails, the control will cycle the baffle open for 10 minutes, closed for 10 minutes. The evaporator fan will run when the baffle is open.
- **Freezer Thermistor:** If the freezer thermistor fails, the compressor and evaporator fan will cycle on and off together in 15-minute intervals.
- **Keypad Failure Mode:** If the control detects that the keypad is not working, it will default to temperature regulation of 0°F (-18°C) for the freezer and 37°F (3°C) in the refrigerator.

## Baffle Operation

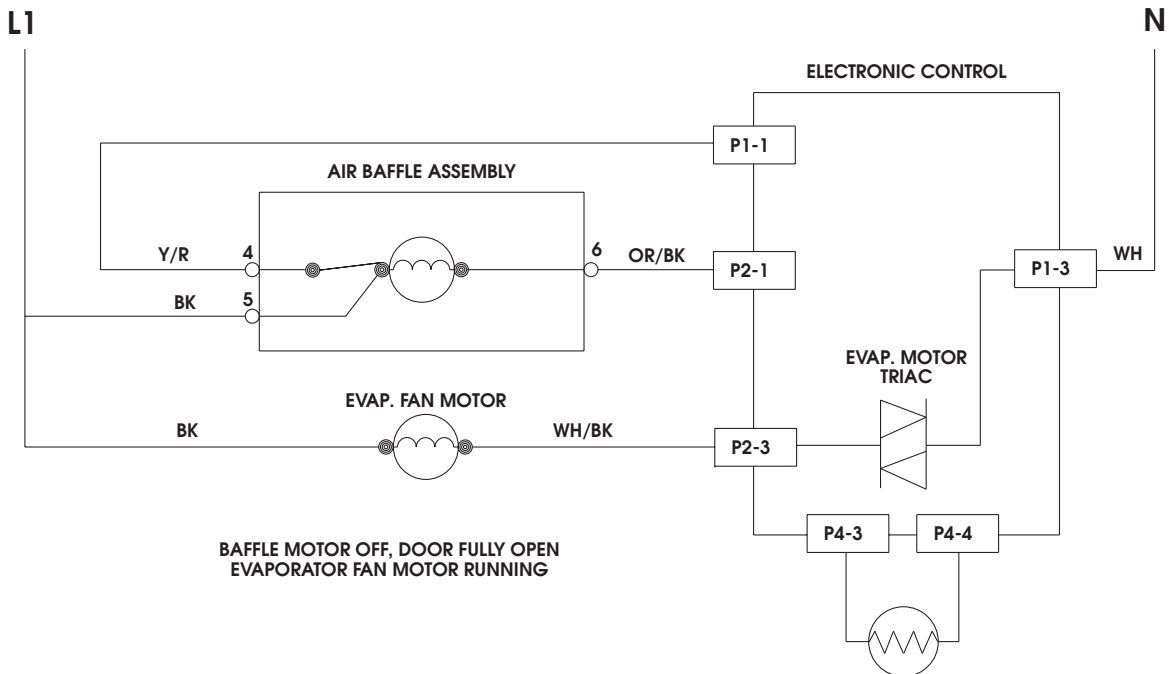
The baffle assembly consists of a 120vac motor, a baffle door and a feedback switch. The switch provides a sensing circuit to the control to let it know the position of the baffle door. When the refrigerator thermistor senses a temperature above the customer setting, the motor runs to open the baffle door.

### Refrigerator thermistor calling for cooling - Baffle opening



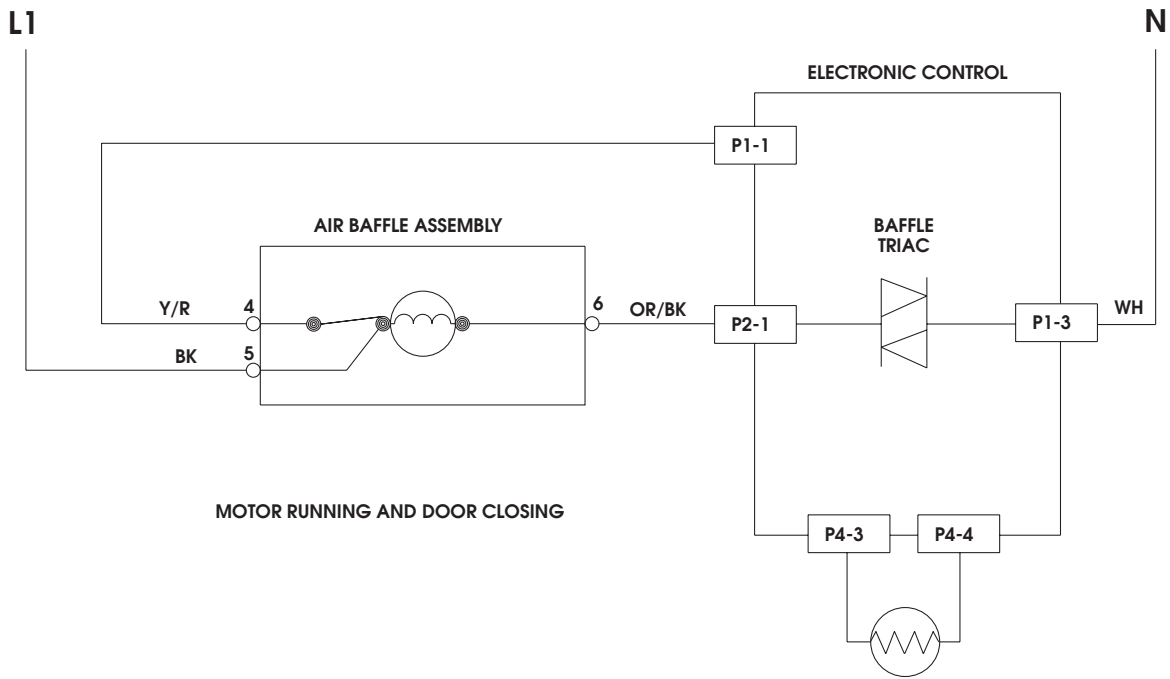
When the baffle door is fully open, the switch closes sending 120vac out pin 4 (Y/R wire) on the baffle door assembly to pin P1-1 on the control. When the control senses 120vac at P1-1, the motor stops with the door fully open.

### Refrigerator thermistor calling for cooling - Baffle open



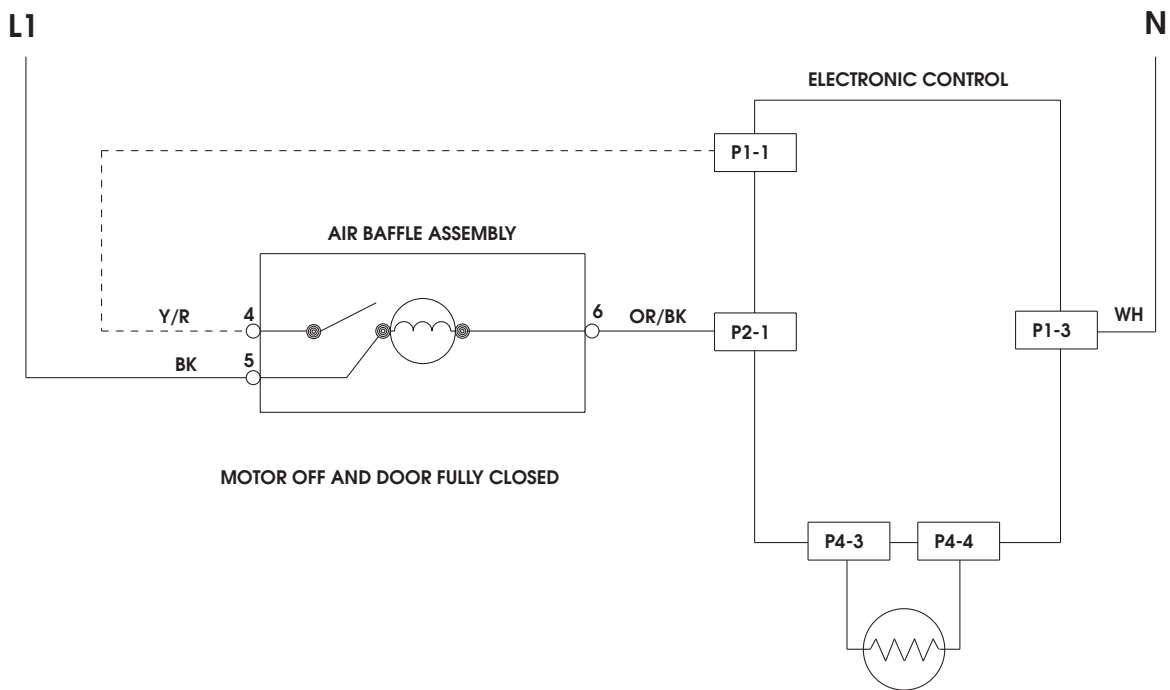
When the refrigerator thermistor reaches the cutout temperature, the control energizes the baffle motor to close the door.

### Refrigerator thermistor satisfied - Baffle closing



When the baffle is fully closed, the switch opens interrupting power to P1-1. This signals the control to stop the baffle motor with the door fully closed.

### Refrigerator thermistor satisfied - Baffle closed



## Adaptive Defrost Control

The Adaptive Defrost Control allows the unit to enter a defrost mode only when it is needed. When powered up for the first time, the control will initiate a defrost cycle after 8 hours of compressor run time. By monitoring the duration of defrost heating time and compressor run time, the control will continuously adapt the time between defrosts to optimize efficiency. Time between defrost periods will vary from 8 to 100 hours.

## Pulsed Defrost

For the first 5 minutes of defrost, the heater is on continuously. It then cycles off for 1 minute and back on for 2 minutes. It continues to cycle at this ratio until the bi-metal opens or 25 minutes have elapsed. At this point heat is discontinued, and a 3-minute “drip time” begins. This allows the water to drain before the refrigerator returns to the cooling mode. Maximum defrost time (heat time plus drip time) is 28 minutes.

## Evaporator Fan Delay

The evaporator fan motor will start 40 seconds after the compressor is energized and continue for 2 minutes when it cycles off.

After defrost, fan delay prevents unnecessary movement of warm moist air through the refrigerator by chilling the evaporator prior to starting the fan. Immediately after the defrost drip time the compressor starts, but the evaporator fan is delayed by 4 minutes 15 seconds. The baffle will be closed during defrost and remain closed for 10 minutes after defrost.

## Over Temperature Alarm



The Over Temperature Alarm sounds and the indicator light flashes when either the refrigerator temperature exceeds 48°F (9°C) or the freezer temperature exceeds 15°F (-9°C) for over 1.5 hours. The Alarm stops if the temperature(s) return to normal, but the indicator continues to flash. Pushing the Over Temperature Reset button turns off the Alarm and/or Indicator.

**NOTE:** When the refrigerator is first started, it may take longer than 1.5 hours to reach the customer selected settings. It is normal for the Over Temperature Alarm to sound/flash.

## Water Filter Indicator

Filter Indicator

- Good
- Order
- Change



The Water Filter Indicator displays the condition of the filter. Both dispenser usage and time elapsed are monitored to determine the filter’s status. A green light indicates a good filter, yellow means order a replacement filter and red means replace the filter. To reset the counter, press and hold the reset button for two seconds.

LED color	Description	Gallons	Time (days)
Green	Good Filter	0-449	0-327
Yellow	Order Filter	450-499	328-364
Red	Change Filter	500+	365+

## Max Cool



When selected, Max Cool changes the refrigerator setting to 34°F (1°C) and the freezer to -10°F (-23°C) for 24 hours. The control will return to the previous user setting after 24 hours or at any time the customer changes the settings.

## COMPONENT LOCATION AND ACCESS

### **IMPORTANT:** Electrostatic Discharge (ESD) Sensitive Electronics

Do not open the package containing the service replacement electronic board until it is time to install it. ESD conditions are present everywhere. ESD may damage or weaken the electronic boards. The new board may appear to work well after repair is finished, but failure may occur at a later date due to ESD stress.

- Use an anti-static wrist strap. Connect wrist strap to green ground connection point or unpainted metal in the appliance.

- If anti-static wrist strap is not available, touch your finger repeatedly to a green ground connection point or unpainted metal in the appliance.
- Before removing the board from its package, touch the anti-static bag to a green ground connection point or unpainted metal in the appliance.
- Avoid touching electronic parts or terminal contacts.
- Handle electronic boards by their edges only.

## Replacing the Control Board



### **! WARNING**

#### Electrical Shock Hazard

**Disconnect power before servicing.**

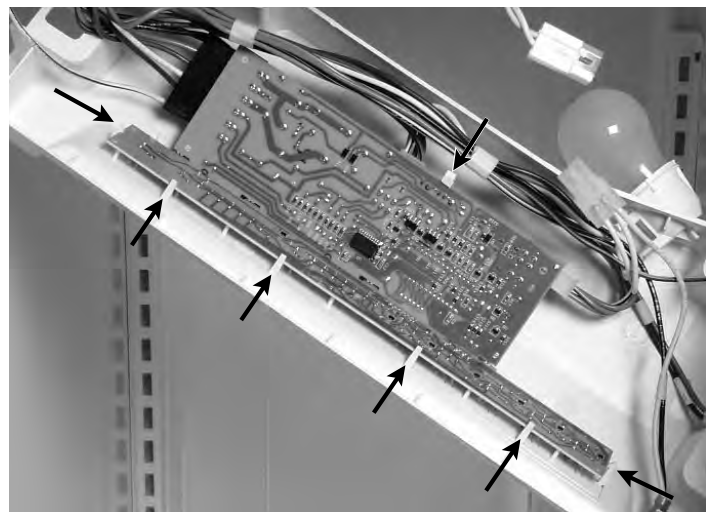
**Replace all panels before operating.**

**Failure to do so can result in death or electrical shock.**

1. Unplug refrigerator or disconnect power.
2. Remove the mounting screws and drop the control panel.



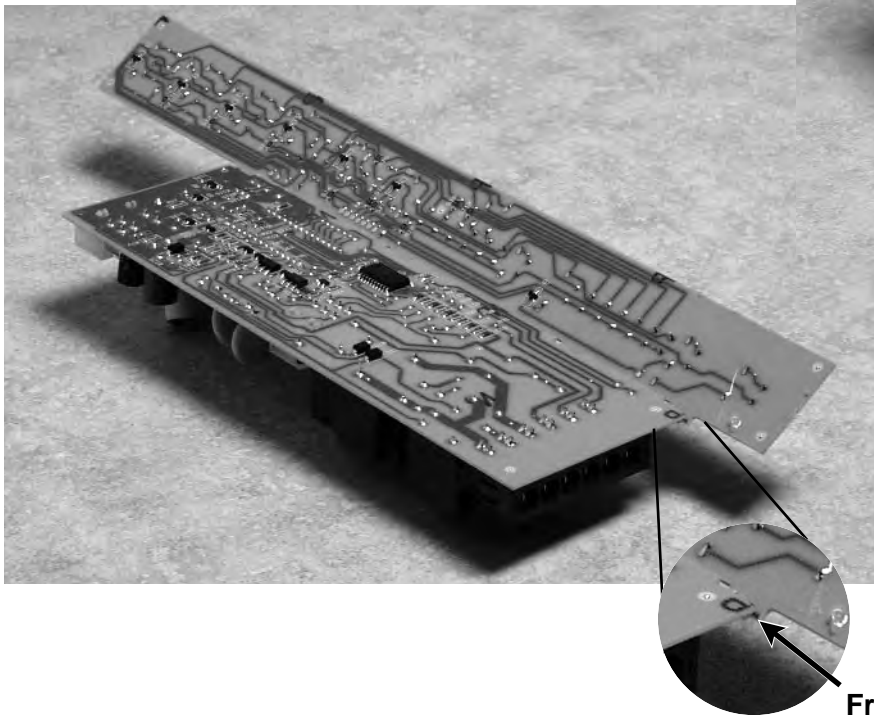
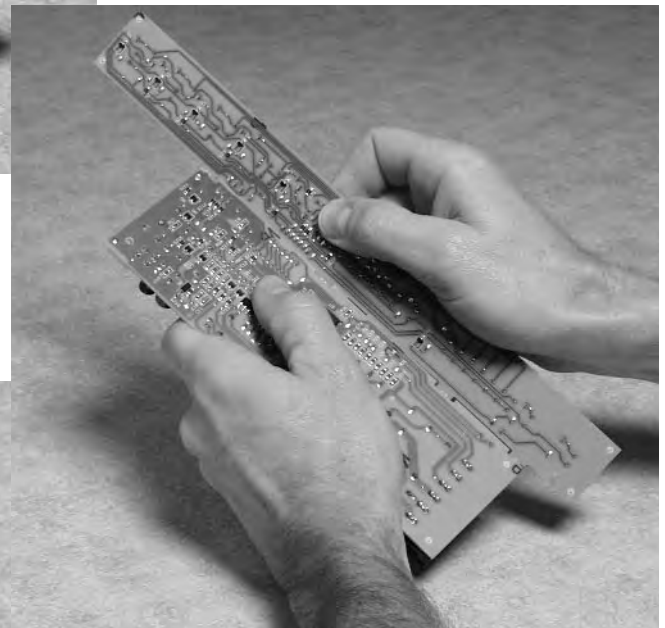
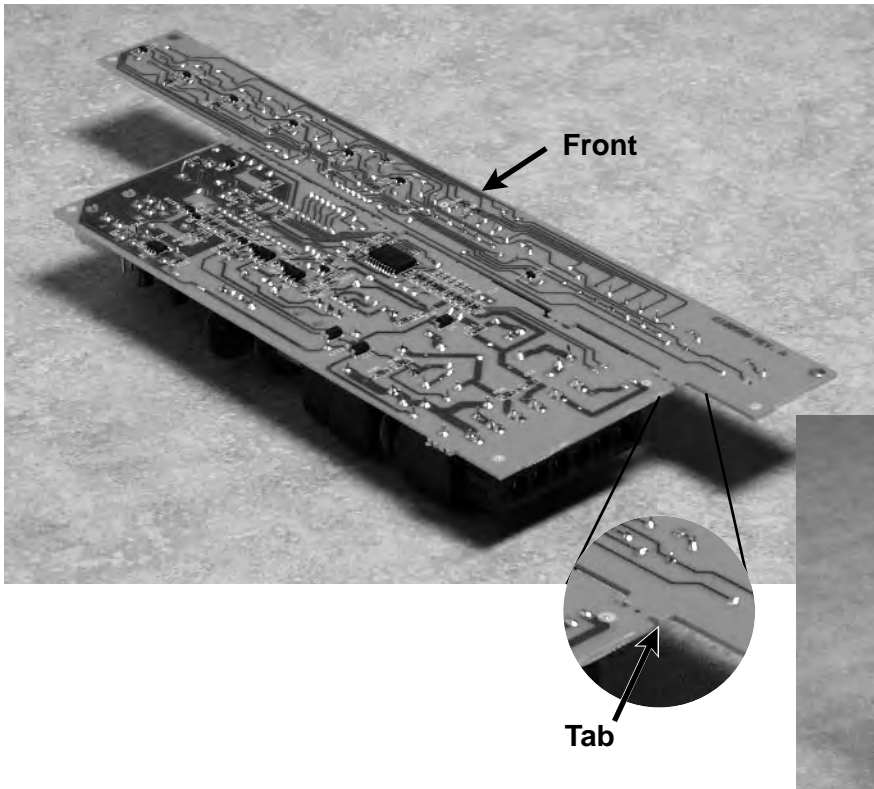
3. Press against the plastic retaining clips to release the main portion of the board from the control box. Then release the narrow portion of the board.



4. Disconnect the wire connectors and carefully remove the board from the control panel.



5. Remove the new control board from the electrostatic packaging. Carefully, bend the front of the board up until the tabs between the circuit boards separate. The boards will remain connected by trace wires. Be careful not to damage components on the topside of the board.
6. Position the tabs from the front of the board under the edge of the main board until it is bent to about a 40° angle.



7. Reconnect the wiring connectors to the new board.
8. Install the new board under plastic retaining clips on the control box.
9. Replace the control panel.
10. Plug in refrigerator or reconnect power.

## Replacing the Air Baffle

### **⚠ WARNING**



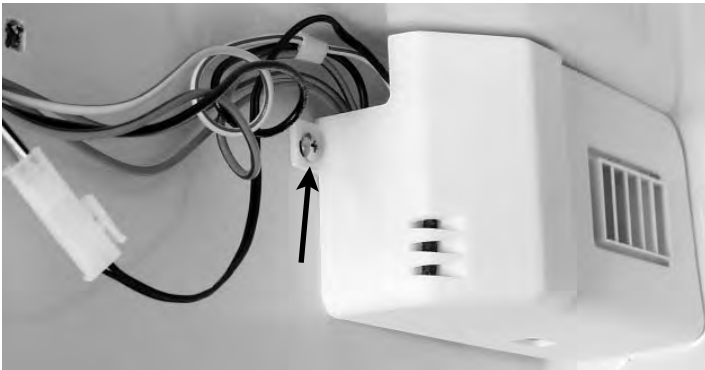
#### **Electrical Shock Hazard**

**Disconnect power before servicing.  
Replace all panels before operating.  
Failure to do so can result in death or  
electrical shock.**

1. Unplug refrigerator or disconnect power.
2. Remove the mounting screw and wire channel from the top of the refrigerator compartment.



3. Remove the mounting screw and air baffle cover.



4. Locate the air chute in the top of the freezer compartment.

**NOTE:** For models in which the ice maker is turned for ice in the door, pull the ice maker forward and remove it from the product.

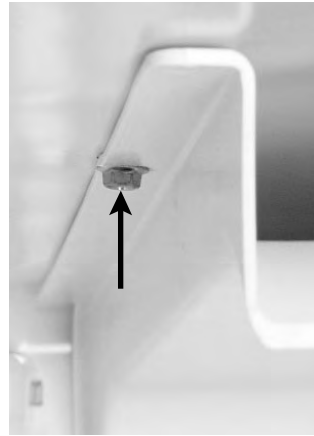
5. Remove the air chute mounting screw and cover.

**Style 1** - Remove the air chute. Then remove the air scoop from the baffle.

**Style 2** - Remove the air chute from the baffle.

## Style 1 Ice-in-the-door Ice Maker

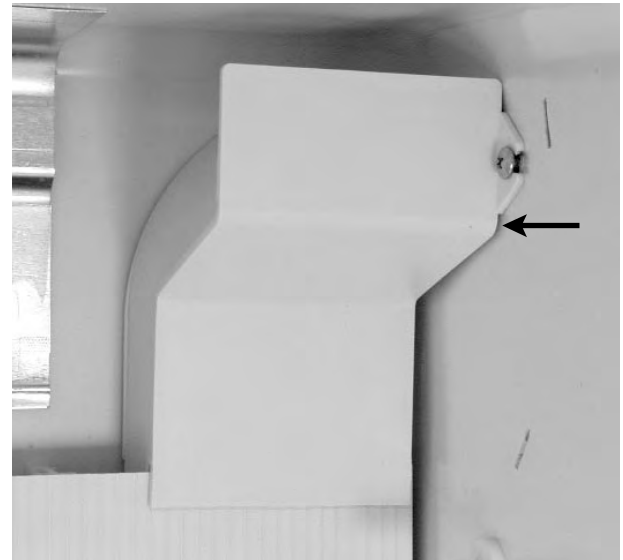
**Air Chute**



**Air Scoop**



## Style 2 Standard Ice Maker



6. Release the air baffle retaining clips from the freezer compartment and push the air baffle toward the refrigerator compartment.



7. Pull the air baffle assembly into the refrigerator compartment and disconnect the wiring connector from the baffle motor.



8. Reinstall the baffle assembly in the reverse order.
9. Plug in refrigerator or reconnect power.

### Replacing the Thermistors

## **⚠ WARNING**



**Electrical Shock Hazard**  
**Disconnect power before servicing.**  
**Replace all panels before operating.**  
**Failure to do so can result in death or electrical shock.**

### Refrigerator Compartment Thermistor:

1. Unplug refrigerator or disconnect power.

2. Remove the wiring channel from the top of the refrigerator compartment.



3. Remove the air baffle cover and disconnect the thermistor lead connector.



4. Remove the lead from the strain relief.



5. Attach the new lead connector and place the new lead in the strain relief.
6. Replace the baffle cover and wiring channel.
7. Plug in refrigerator or reconnect power.

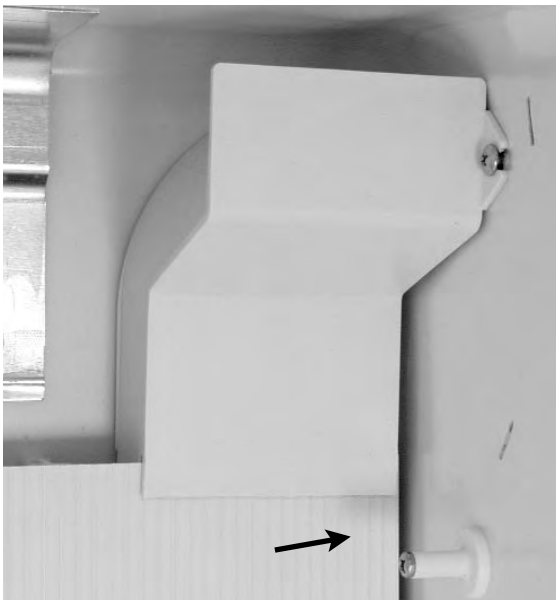
## Freezer Compartment Thermistor:

1. Unplug refrigerator or disconnect power.
2. Remove the air baffle assembly. See the "Removing the Air Baffle" section.
3. Remove the tape from the freezer thermistor lead.
4. Pull freezer thermistor through the refrigerator compartment wall and disconnect the lead connector.
5. Connect the new thermistor lead connector.
6. Route the thermistor and lead through the baffle opening into the freezer.

**Style 1** - For models with shelf ladders, the bottom of the thermistor should be placed in the ladder 7.8" (20 cm) from the freezer compartment ceiling. (*Helpful Hint:* Drop the lead until it is visible in the uppermost ladder opening. Then raise the lead until it is just out of view.) Tape the thermistor lead to the freezer liner.



**Style 2** - For models without ladders, the thermistor should be placed behind the air scoop assembly 7.8" (20 cm) down from the freezer compartment ceiling. Tape the thermistor lead to the freezer liner.



7. Replace the air chute, air baffle and wiring channel. See the "Removing the Air Baffle" section. Replace the baffle cover and wiring channel.
8. Plug in refrigerator or reconnect power.

## DIAGNOSIS

### Pre-Diagnostics Checks

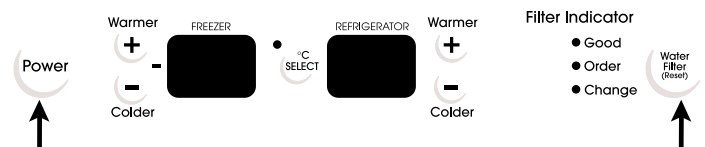
- Confirm the refrigerator and freezer temperatures before beginning other checks.
- See if the compressor, evaporator fan, or condenser fan is running.
- Check to see if the baffle is open or closed.

### Diagnostics Mode

The refrigerator must be plugged in for at least 13 seconds prior to entering the diagnostic mode. This mode tests the thermistor inputs and control board outputs. The refrigerator compartment display shows the diagnostic step number. The results of the checks are displayed on the water filter status indicator. After 20 minutes, the control will default from the diagnostic mode to the normal cooling mode.

#### To enter the diagnostics mode:









Press the control **POWER** button and the water filter **RESET** button ***simultaneously*** for 3 seconds.



#### To advance the diagnostics sequence:

To advance to the next step in the sequence, press and hold the water filter reset button for 2 seconds or until it beeps. The Diagnostics Chart shows the number of steps and the component tested at each step.

## Diagnostics Chart

Step	Component tested	Comment	Results
	Freezer Thermistor	The board will check the resistance of the thermistor and display the results on the water filter indicator.	Filter Indicator ● Good ● Order ● Change  ● Good (Pass/green) ● Change (Fail/red)
	Refrigerator Thermistor	The board will check the resistance of the thermistor and display the results on the water filter indicator.	
	Evaporator Fan Motor	The control switches neutral to the evaporator fan motor. Confirm evaporator fan motor is running and operating correctly.	
	Compressor and Condenser Fan Motor	Line voltage is switched to the components. Confirm components are running and operating correctly.	
	Air Baffle Motor	The control switches neutral to the baffle motor. The baffle motor continues to run until advanced to step 6. Confirm that the evaporator fan motor is running and the air baffle is opening and closing.	
	Defrost Heater and Bi-metal	Line voltage is switched to the heater circuit. Confirm that the heater is operating. <b>NOTE:</b> If the bi-metal is open, it will be necessary to by pass it with an insulated jumper.	
	Exit	Press and hold the Water Filter Indicator Reset button for 2 seconds until you hear a beep.	

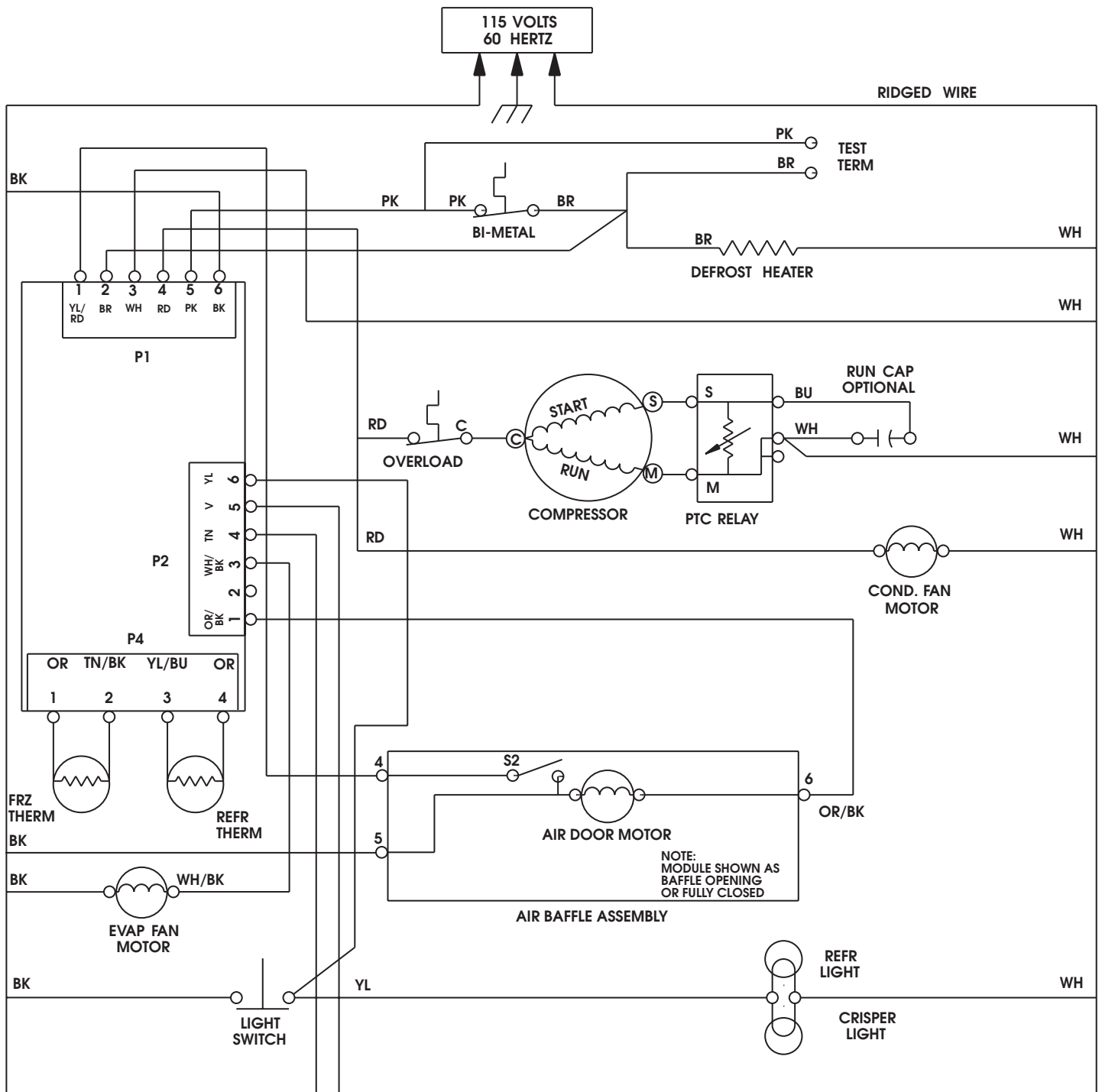
## Thermistor Resistance Chart

Temperature (Fahrenheit)	Resistance (Approximate Ohms)	Temperature (Fahrenheit)	Resistance (Approximate Ohms)
-5	26705	45	6115
0	22774	50	5348
5	19476	55	4688
10	16701	60	4118
15	14360	65	3625
20	12379	70	3197
25	10698	75	2826
30	9269	80	2503
35	8050	85	2221
40	7008	90	1975

## Troubleshooting Guide

Problem	Possible Cause
1. Freezer too warm.	<ul style="list-style-type: none"><li>• Freezer thermistor failed. Run diagnostic test Step 1.</li><li>• Excessive frost on evaporator. Check defrost system with diagnostic test, Step 6.</li><li>• Freezer light not shutting off.</li><li>• Condenser blocked or fan motor not running.</li><li>• Evaporator fan motor failed. Confirm at Step 3 in diagnostic test mode.</li></ul>
2. Freezer too cold.	<ul style="list-style-type: none"><li>• Failed freezer thermistor. Run diagnostic test.</li></ul>
3. Refrigerator too warm.	<ul style="list-style-type: none"><li>• Refrigerator thermistor failed. Run diagnostic test.</li><li>• Excessive frost on evaporator. Check defrost system in test mode with Step 6.</li><li>• Refrigerator light not shutting off.</li><li>• Baffle not opening or air returns blocked.</li><li>• Condenser blocked or fan motor not running.</li><li>• Evaporator fan motor failed. Confirm at Step 3 in diagnostic test mode.</li></ul>
4. Refrigerator too cold.	<ul style="list-style-type: none"><li>• Air baffle not closing.</li><li>• Refrigerator thermistor failed. Run diagnostic test.</li></ul>
5. Refrigerator won't run.	<ul style="list-style-type: none"><li>• Is control powered off? Press the "Power" button for 2 seconds. If there is no response, unplug refrigerator for 30 seconds. Plug in refrigerator and check for normal operation.</li><li>• Failed control board. Run diagnostic test.</li></ul>
6. Evaporator fan won't run.	<ul style="list-style-type: none"><li>• It is normal for the fan to delay for the first 4 minutes 15 seconds after defrost and 40 seconds after the compressor starts.</li><li>• Failed fan motor. Confirm at Step 3 in test mode.</li></ul>
7. Defrost system not operating.	<ul style="list-style-type: none"><li>• Enter the diagnostic mode and go to Step 6. Confirm the heater is operating. <b>NOTE:</b> If the bi-metal is open, it will be necessary to by pass it with an insulated jumper.</li></ul>
8. Defrost heater won't stay on.	<ul style="list-style-type: none"><li>• After the first 5 minutes of defrost, it is normal for the heater to cycle at the rate of off for 1 minute and on for 2 minutes.</li></ul>
9. Control does not respond.	<ul style="list-style-type: none"><li>• Disconnect the power for 30 seconds. Reconnect the power and run diagnostics. If the control still does not respond, replace the control board.</li></ul>

# TECH TIPS



## Model/Serial Number Plate

### SERIAL NUMBER DESIGNATOR

SERIAL NUMBER	<b>S</b>	<b>L</b>	<b>36</b>	<b>50001</b>
MANUFACTURING SITE S = Ft. Smith, AR				
YEAR OF MANUFACTURE L = 2001				
WEEK OF MANUFACTURE				
PRODUCT SEQUENCE NUMBER				

### MODEL NUMBER DESIGNATOR

MODEL NUMBER	<b>K</b>	<b>SR</b>	<b>A</b>	<b>22</b>	<b>F</b>	<b>K</b>	<b>WH</b>	<b>0</b>	<b>0</b>
INTERNATIONAL SALES OR MARKETING CHANNEL K = KITCHENAID BRAND									
PRODUCT IDENTIFIER SH = Side-By-Side High Efficiency SR = Side-By-Side Regular									
SERIES CONFIGURATION									
CAPACITY									
FEATURES									
YEAR OF INTRODUCTION K = 2001									
COLOR CODE WH = White BL = Black BT = Biscuit SS = Stainless									
ENERGY CHANGE 0 = Basic Release 1 = First Revision 2 = Second Revision									
EN CHANGE 0 = Basic Release 1 = First Revision 2 = Second Revision									



# NOTES