



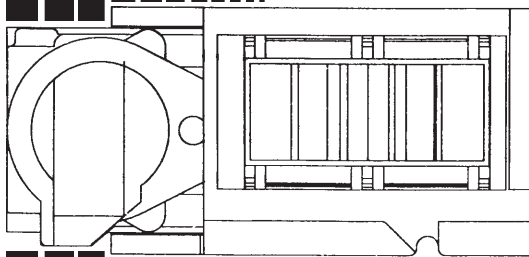
**CONSUMER SERVICES TECHNICAL  
EDUCATION GROUP PRESENTS**

**R-80**

**ENERGY EFFICIENT  
TEMPERATURE REGULATING  
and  
DEFROST CONTROL SYSTEMS**

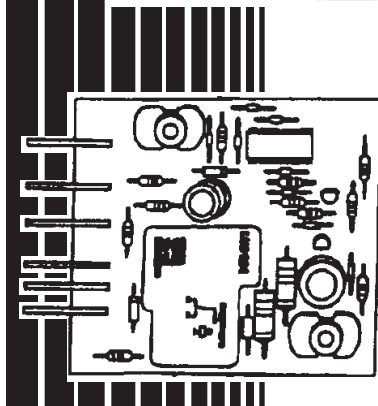
Appliance 911

**Independent Temperature Control  
for  
Side-by-Side  
Refrigerator/Freezers**



Repair Clinic

**Adaptive Defrost Control  
for  
Top-Mount and  
Side-by-Side  
Refrigerator/Freezers**



JOB AID  
Part No. 4321863



# INTRODUCTION

This Job Aid, *“Energy Efficient Temperature Regulating and Defrost Control Systems”*, L-80, Part No. 4321863, provides specific information on the operation and servicing of energy efficient features installed on Whirlpool-built refrigerator/freezers. These features are :

- The “Smart Fan” or Independent Temperature Control (ITC) system is installed in some freestanding SxS refrigerator/freezers beginning with the 1995 model year.
- The solid state electronic Adaptive Defrost Control (ADC) system is installed in top-mount and SxS refrigerator/freezers beginning with the 1992 model year.

*“Energy Efficient Temperature Regulating and Defrost Control Systems”* has been compiled to provide information on the most recent changes. Special attention has been given to:

- Operational Theory
- Testing Procedures
- Servicing Procedures

## GOALS AND OBJECTIVES


The goal of this Job Aid is to provide detailed information that will enable the service technician to trouble shoot and service ADC and ITC systems.

The objectives of this Job Aid are:

The Service Technician will -

- Have a working knowledge of the operational theory of ADC and ITC systems.
- Understand the proper safety precautions.
- Follow proper service procedures
- Successfully return the refrigerator/freezer to proper operational status.

## TO THE INSTRUCTOR/INDEPENDENT STUDENT

This Job Aid contains “Confirmation of Understanding Exercises” at the end of various sections. A symbol that looks like this: (  ) indicates that a pencil or pen will be necessary to complete the exercise.

This Job Aid is designed to be used with the video tape, *Energy Efficient Temperature Regulating and Defrost Control Systems*, Part No. 4321878. As you use this Job Aid you will see a symbol that looks like this:



It instructs you to view certain section of the video tape. the numbers of the sections you should view appear in the lower left corner of the television screen.

WHIRLPOOL CORPORATION ASSUMES NO RESPONSIBILITY  
FOR ANY REPAIRS MADE ON OUR PRODUCTS BY ANYONE  
OTHER THAN AUTHORIZED SERVICE TECHNICIANS.

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*View Section 1 of the video Tape*

## **Section 1**

# **SAFETY**

### **! WARNING**

#### **ELECTRIC SHOCK HAZARD**

A good electrical ground is required for this appliance.

Do not modify the three-prong plug on the power supply line cord. If it does not fit the outlet, have a qualified electrician install the proper outlet.

Do not use an extension cord with these units.

Disconnect power before servicing.

Failure to follow these instructions may result in serious injury or death.

### **! WARNING**

#### **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.

-OR-

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 its edges only.





View Section 2 of the video Tape

## Section 2 ADAPTIVE DEFROST CONTROL

### THEORY OF OPERATION

#### General Information

Beginning in 1992, energy efficient and other selected models of refrigerator/freezers were equipped with Adaptive Defrost Control (ADC). (Fig. 1)

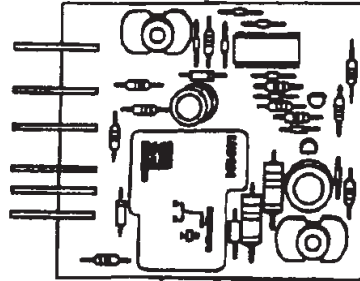


Figure 1

The Adaptive Defrost Control is mounted in the same place in the control box as the standard electro-mechanical defrost timer. (Fig. 2) The ADC printed circuit board uses the same mounting screws and holes. The 4 wire connector plug is also the same as that used with the standard timer. **NOTE:** Units using standard mechanical timers cannot be retrofitted with ADC.

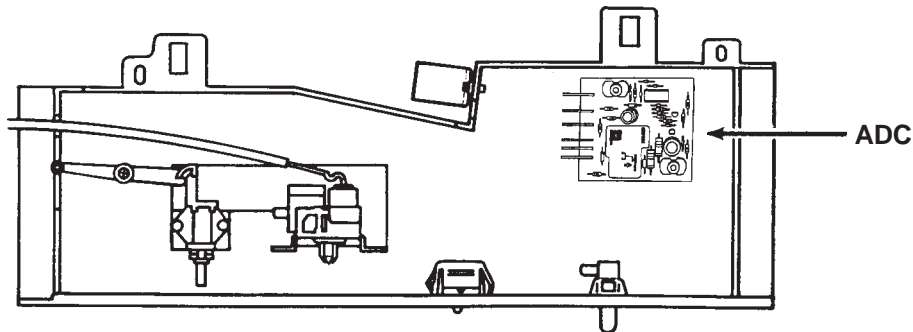


Figure 2

A brown and a white neutral wire are plugged into the other two terminals on the ADC.

The Adaptive Defrost Control has no serviceable components mounted on the microcomputer board. If an ADC fails, the entire board should be replaced.

#### Operation

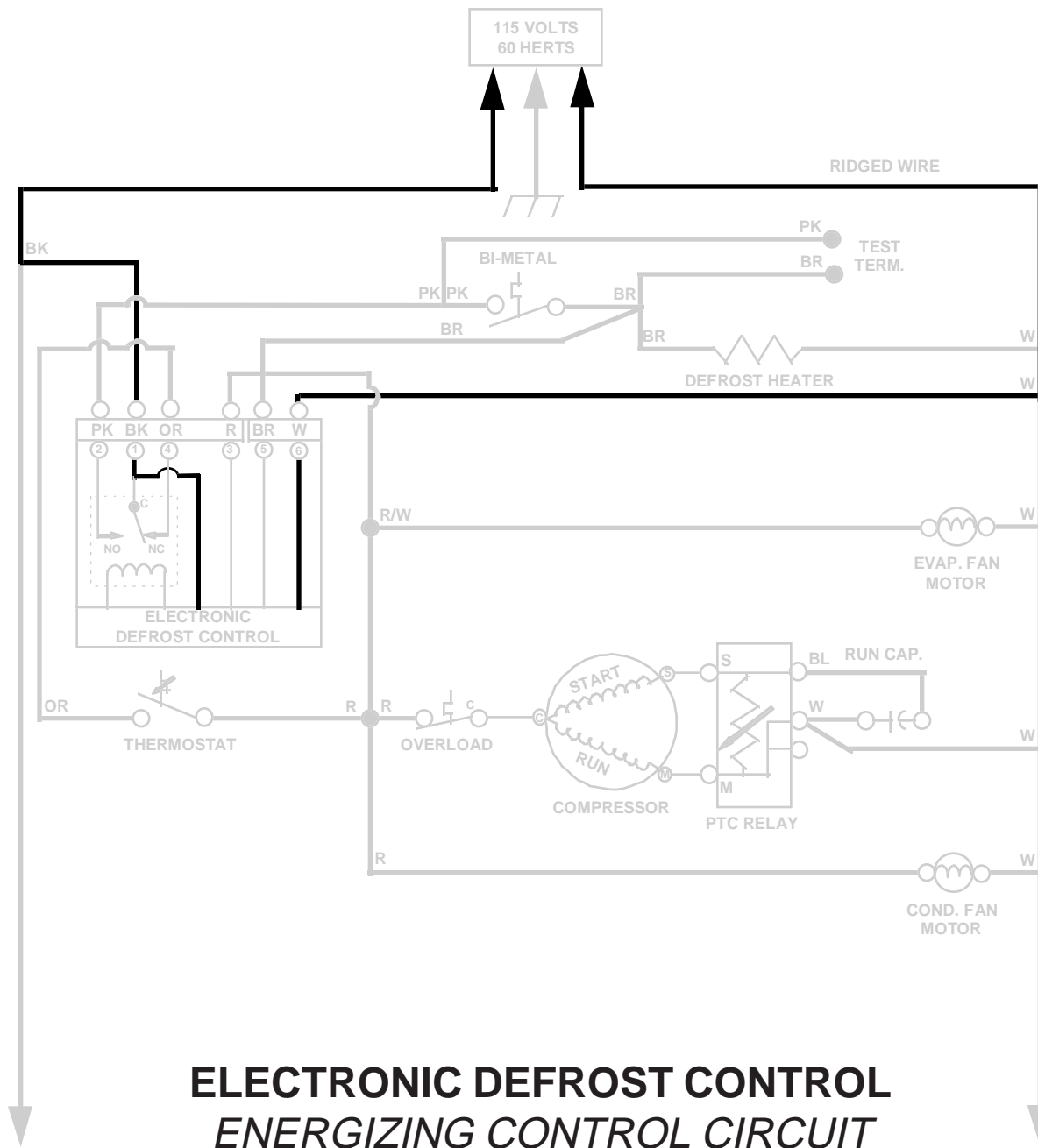
The general purpose of Adaptive Defrost Control is to limit the unit going into a defrost mode to only those times when it is needed. This saves on the energy cost of operating the refrigerator/freezer.

The first time the unit is turned on the ADC will initiate a defrost mode after 6 hours of compressor accumulated run-time. This defrost circuit will remain energized for a total of 21 or 25 minutes depending on model. The defrost heater will be energized until the bimetal opens.

After the initial defrost cycle is complete, the ADC will monitor Cumulative Compressor Run-Time and the Duration of Previous Defrost Heater Time and adapt to time periods between 8 and 100 hours between defrost modes.

If the defrost heater is energized for nearly all of the defrost cycle, the ADC will default to 8 hours between defrost modes.

The ADC module is energized with 120VAC applied to connector pin 1. The circuit is closed through connector pin 6 at all times. (Fig. 3) If this circuit should become de-energized for any reason the module will not function and all memory in the microcomputer will be lost. If this should occur the ADC will revert to 8 hours of cumulative run-time before initiating defrost.

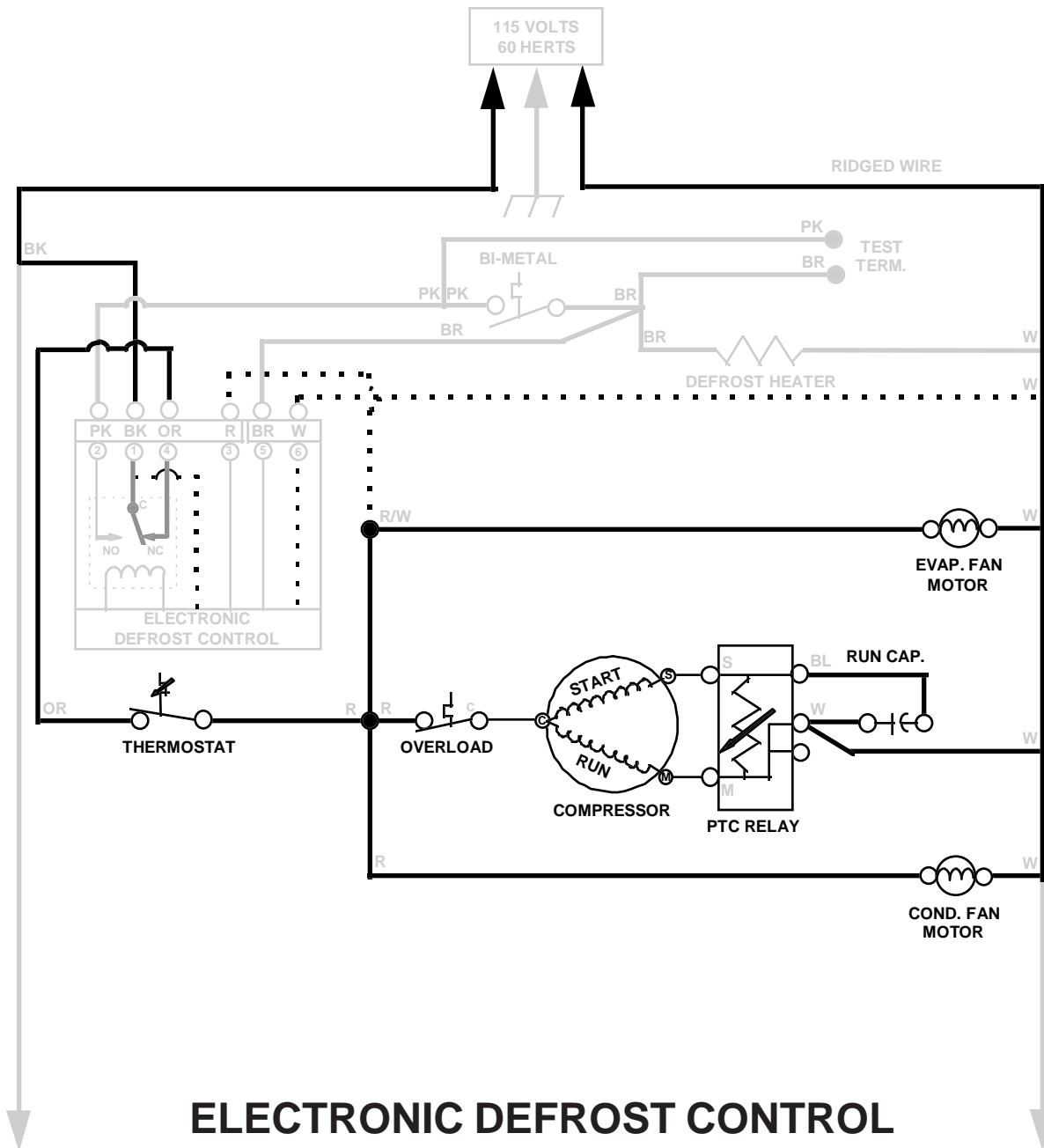


**ELECTRONIC DEFROST CONTROL  
ENERGIZING CONTROL CIRCUIT**

Figure 3



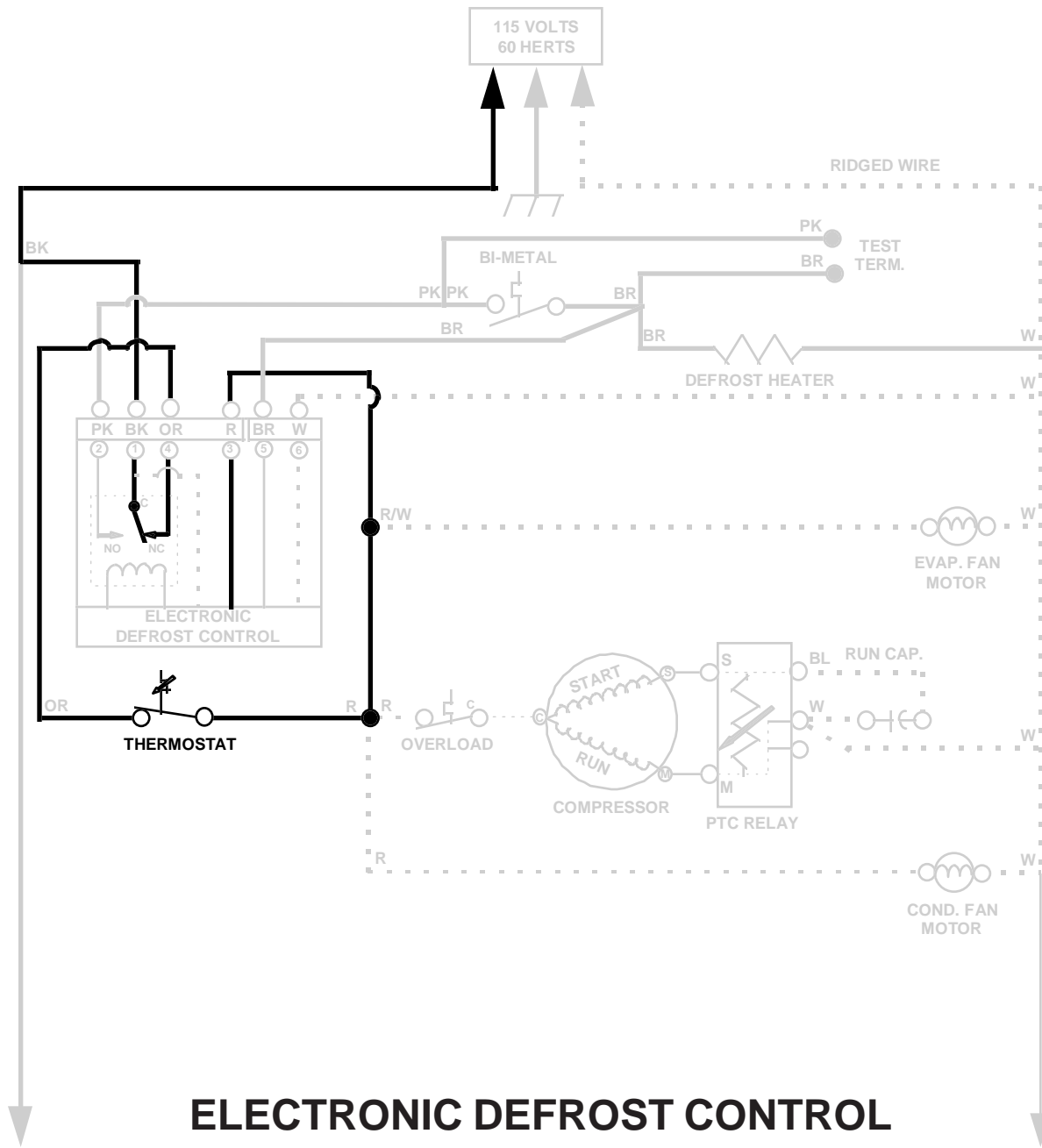
During normal cooling 120VAC is directed to the compressor, evaporator fan motor and condenser fan motor through the normally closed relay mounted on the ADC board. (Fig. 4)



**ELECTRONIC DEFROST CONTROL**  
*COOLING MODE*  
*(Compressor, Evaporator Fan and Condenser Fan Running)*

Figure 4

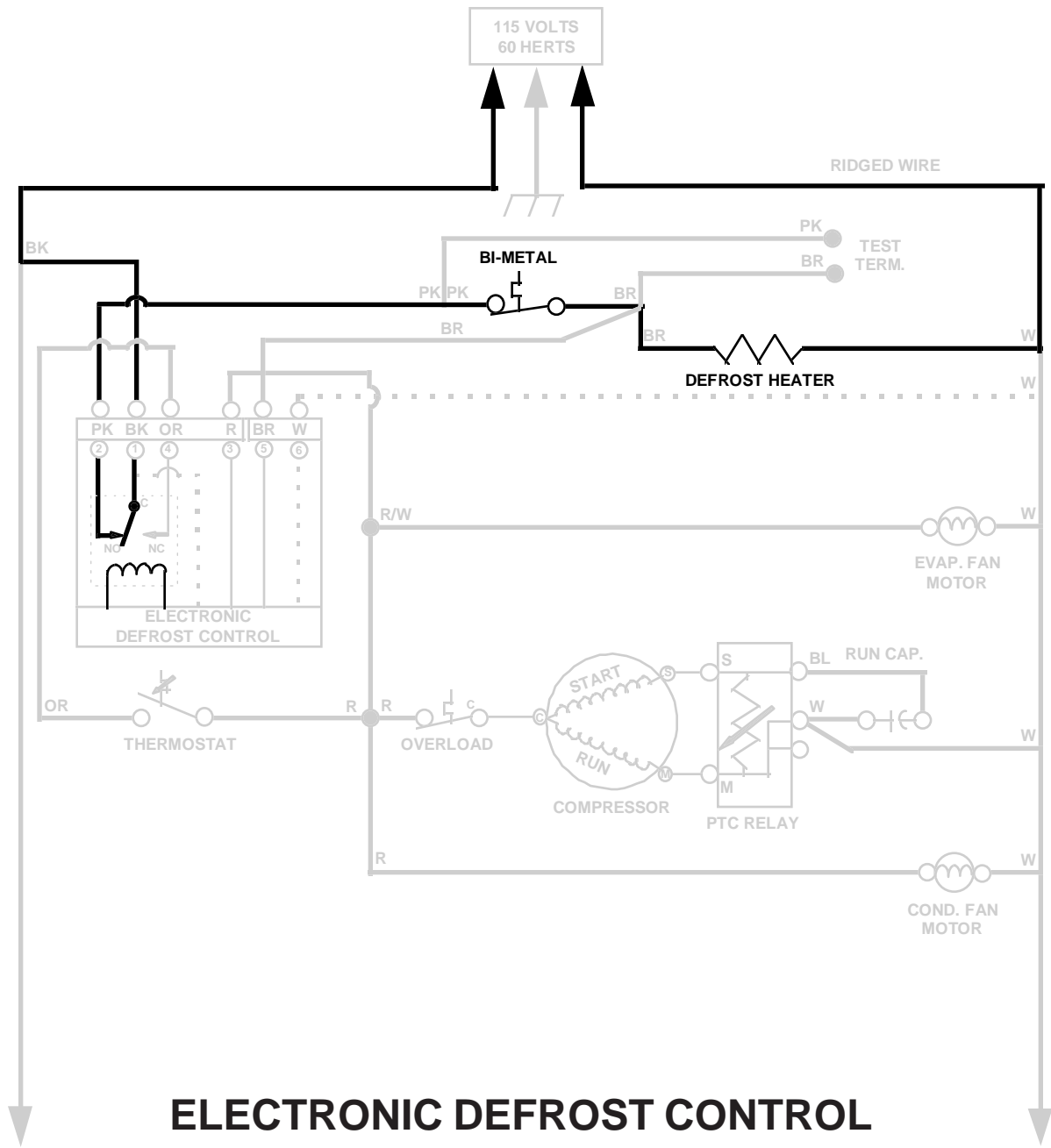
Defrost is initiated by an internal electronic clock in the ADC which will energize the relay directing 120VAC to the defrost heater. (Fig. 5)



**ELECTRONIC DEFROST CONTROL**  
**COOLING MODE**  
*(Monitoring Run-Time Circuit)*

Figure 5

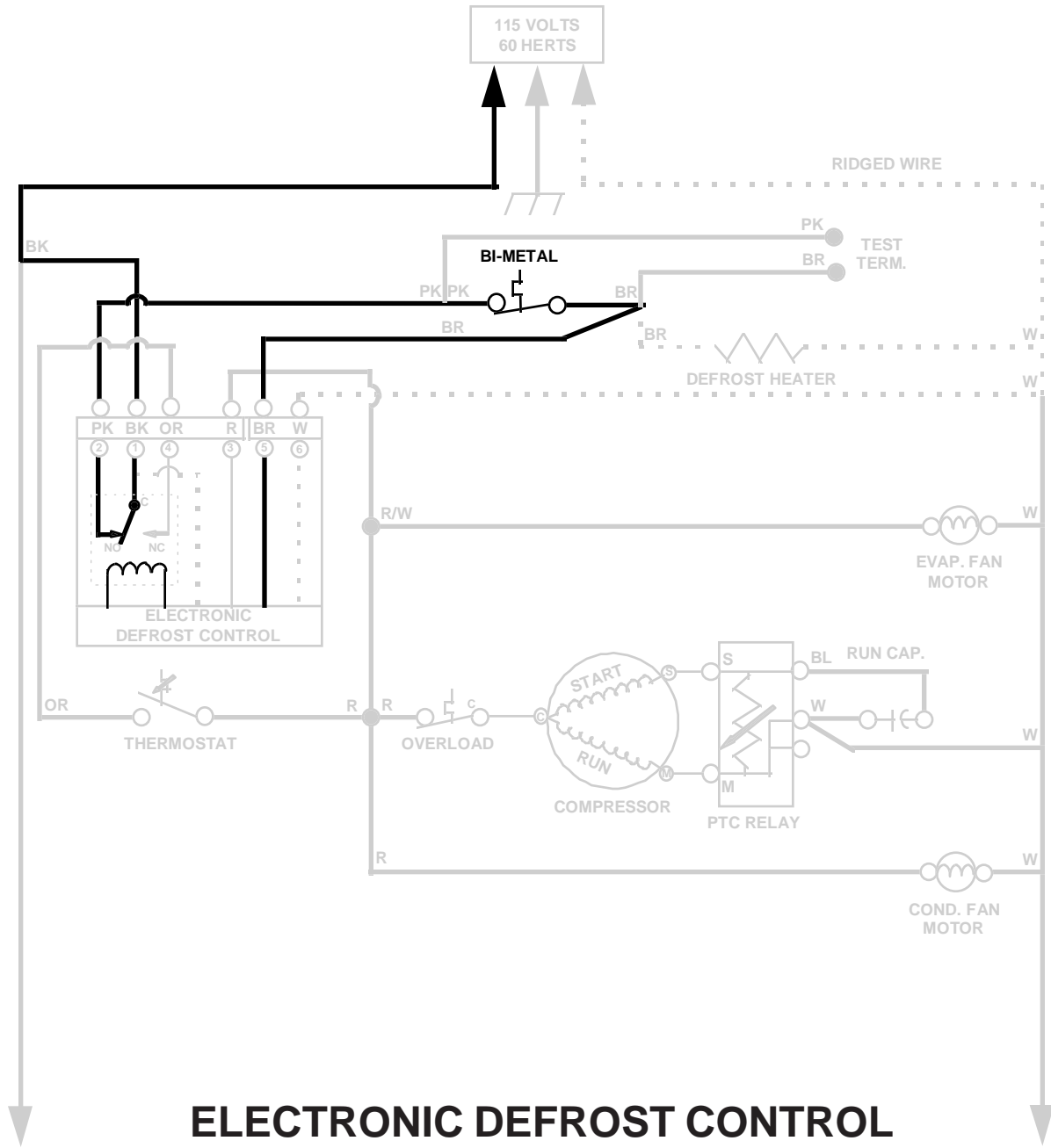
While the unit is in the cooling mode the ADC will monitor the cumulative compressor run-time through connector pin 3. (Fig. 6)



**ELECTRONIC DEFROST CONTROL**  
*DEFROST MODE*  
*(Defrost Heater Energized)*

Figure 6

While the unit is in the defrost mode the ADC will monitor the duration of the defrost heater run-time through connector pin 5. (Fig. 7)



**ELECTRONIC DEFROST CONTROL**  
*DEFROST MODE*  
*(Monitoring Defrost Cycle Duration)*

Figure 7

The microcomputer processes both the cumulative compressor run-time and the defrost heater run-time to determine when defrost mode is needed.

# TESTING AND DIAGNOSIS

## ADC Test Mode

The refrigerator/freezer defrost system can be checked by manually initiating a defrost cycle. There are two methods of initiating the ADC Test Mode.

### First Test Method:

1. Turn the thermostat off for 15 seconds.
2. Turn the thermostat on for 5 seconds.
3. Turn the thermostat off for 15 seconds.
4. Turn the thermostat on for 5 seconds.
5. Turn the thermostat off for 15 seconds.
6. Turn the thermostat on for 5 seconds.
7. Turn the thermostat off.

In 3 to 8 seconds the ADC should turn on the defrost heater (with the bimetal closed). **NOTE:** The test mode will terminate when the bimetal opens.

If the refrigerator/freezer is already in defrost, Test Mode can be terminated by unplugging the refrigerator/freezer from the wall outlet and waiting 30 seconds before plugging it back in. The refrigerator/freezer should immediately go into cooling mode if the thermostat is closed.

If this first test procedure fails to make the ADC initiate a defrost cycle, try the following procedure to make the ADC begin the Test Mode.

### Second Test Method:

1. Disconnect the refrigerator/freezer from the wall outlet for at least 30 seconds.
2. Turn the thermostat off.
3. Reconnect power to the refrigerator/freezer.

Within 3 to 8 seconds the ADC should turn on the defrost heater (with the bimetal close).

If the unit fails to go into the defrost mode during this test, the problem may not be with the ADC. A defective bimetal may be the cause of the failure. The ADC will only go into a test mode if the bimetal is closed. If the ADC senses an open bimetal it will return to the cooling mode within 3 to 8 seconds.

**HELPFUL HINT:** Upon entering the Test Mode, the relay mounted on the ADC board should turn off the compressor and turn on the defrost heater. Listen for the relay to click.

- If the relay clicks one time when entering the Test Mode, check for continuity in the defrost heater.
- If the relay clicks two times, check for an open bimetal.

## Defrost Circuit Tests

Inspect all connectors to verify that they are seated properly and are not corroded.

### Bimetal Test

1. Disconnect the unit from the wall outlet.
2. Locate the loose brown and pink test lead harness plug in the control box.

3. Use a VOM set to the Rx1 (resistance) scale and check for continuity between the brown and pink leads.
  - a. If the evaporator is cold, the bimetal should be closed and the meter will show 0 ohms or continuity.
  - b. If the evaporator is warm, the bimetal will be open and the meter will indicate infinite resistance or no continuity.
4. Visually inspect the bimetal to determine whether it is opening before frost or ice is cleared from the evaporator. The evaporator cover will have to be removed for this.

## Defrost Heater Test

1. Disconnect the unit from the wall outlet.
2. Locate the loose brown and pink test lead harness plug in the control box.
3. Check for proper heater resistance between the brown test lead and any white common lead in the control box. The resistance reading should be within normal tolerances of the range noted in the Tech Sheet supplied with the unit. If not, the heater should be replaced.
4. If the defrost heater tests good in the previous test, verify that the heater is not grounded by checking continuity between each of the wire leads to the heater itself.
  - a. Disconnect the heater wire connectors from the heater located behind the evaporator cover.
  - b. Place one test lead from the VOM on one wire connector of the heater. Place the other test lead on the external body of the heater element. Any continuity or resistance indicates the heater is grounded and should be replaced.

**NOTE:** Only after all other components in the defrost system have been tested or inspected should the ADC microcomputer board be replaced.

## REPLACING THE ADC BOARD

### NOTICE

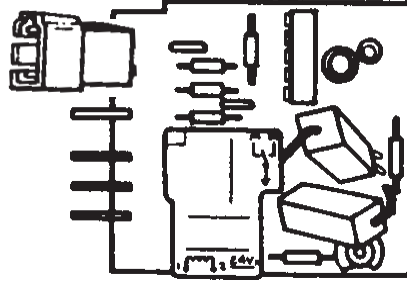
***DISCONNECT POWER BEFORE SERVICING  
FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH***

***HANDLE THE PRINTED CIRCUIT BOARD BY ITS EDGES  
AVOID TOUCHING ELECTRICAL CONNECTIONS OR TERMINAL CONTACTS***

## Replacement Parts Compatibility

The ADC Service Replacement Assembly, Part No. 4386981 is supplied with a plug adapter kit to replace the following ADC board installed in Whirlpool-built refrigerator/freezers (*Fig. 8*):

2154985



*Figure 8*

The ADC Universal Service Replacement Assembly, Part No. 483187 will directly replace the following ADC boards:

2162373

2169266

2162270

2169268

The ADC Universal Service Replacement Assembly, Part No. 483187 will require modification to replace the following ADC boards:

2169269

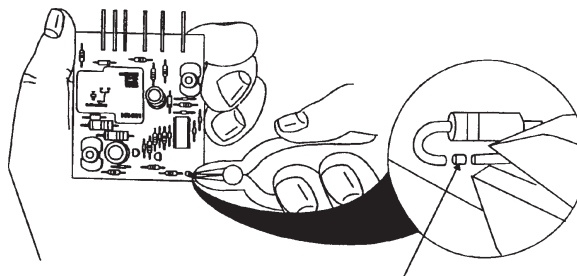
2154958

2169267

## Instructions

1. Remove the Control Box from the refrigerator section of the unit.
2. Remove the two connector plugs from the ADC board.
3. Remove the ADC board from the Control Box.
4. When replacing original part numbers 2154958, 2169267 or 2169269, remove the resistor marked **R17** from the circuit by cutting the wire leads to the resistor in two places with wire cutters. (*Fig. 9*)

*Figure 9*



5. Replace the new board in the Control Box.
6. Replace the Control Box in the refrigerator.

## Section 2

### **CONFIRMATION OF LEARNING EXERCISE**

1. The purpose of Adaptive Defrost Control is:
  - a) To extend the life of the defrost heater element.
  - b) To bypass the bimetal.
  - c) To limit a refrigerator/freezer going into defrost to only those times when it is needed.
  - d) None of the above.
  
2. The ADC module performs 2 basic functions:
  - a) Monitoring compressor run-time and defrost heater run-time.
  - b) Monitoring the temperature of the freezer and refrigerator sections.
  - c) Monitoring compressor run-time and refrigerator/freezer temperatures.
  - d) Monitoring defrost heater run-time and refrigerator section temperature.
  
3. If a refrigerator/freezer does not go into defrost:
  - a) Replace the ADC module immediately.
  - b) Check to be sure all connectors are seated properly and are not corroded.
  - c) Call Technical Assistance for instructions.
  - d) Change out the bimetal and defrost heater element.
  
4. The ADC Universal Service Replacement Assembly will replace:
  - a) All ADC modules currently installed in refrigerator/freezers.
  - b) Will need some modification to replace some ADC modules currently installed in refrigerator/freezers.
  - c) Should not be used without calling Technical Assistance.
  - d) a and b.
  
5. The ADC module is located:
  - a) In the unit compartment.
  - b) In the freezer section behind the evaporator cover.
  - c) In the control box.
  - d) None of the above.
  
6. If the unit does not go into a test mode (using either Test Method 1 or 2):
  - a) Check the defrost heater element for shorting.
  - b) Check for a closed bimetal.
  - c) Check thermostat resistance.
  - d) Check evaporator fan motor.
  
7. **(OPTIONAL)** If a refrigerator/freezer equipped with ADC is available:
  - a) Perform a resistance check on the bimetal and defrost heater element.
  - b) Replace the ADC module.





View Section 3 of the video Tape

## Section 3

# INDEPENDENT TEMPERATURE CONTROL

## THEORY OF OPERATION

### General Information

Beginning with the 1995 model year some free standing SxS refrigerator/freezers have been equipped with the “Smart Fan” or Independent Temperature Control (ITC) system which allows for separate temperature control in both the refrigerator and freezer compartments through the use of two thermostats and a motorized air baffle between the two sections of the appliance. (Fig. 10)

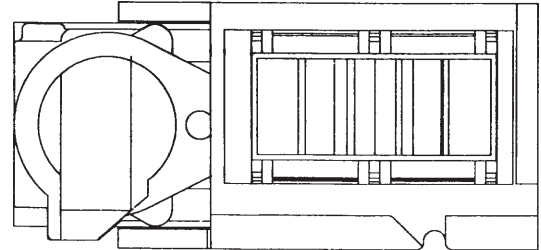


Figure 10

Both thermostats are located in the control box in the refrigerator section. (Fig. 11) The freezer temperature sensing tube is routed to and located inside the freezer section behind the air duct to sense freezer temperature. The refrigerator temperature sensing tube is located around the diffuser discharge to sense refrigerator temperature.

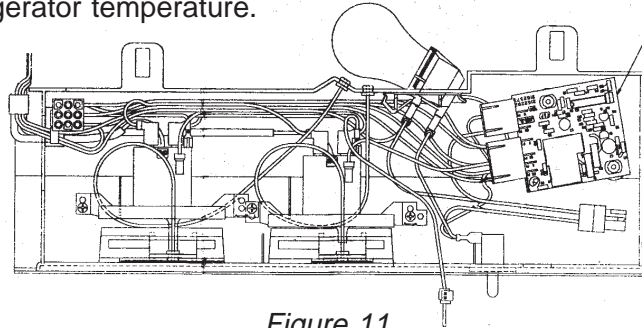


Figure 11

### Operation

**HELPFUL HINTS:** The auxillary switch directly controls the following functions.

- Freezer Thermostat
- Refrigerator Thermostat
- All Cooling Function Components

The freezer thermostat directly controls:

- Compressor
- Condenser Fan
- Evaporator Fan (Only when the air baffle is closed.)

The refrigerator thermostat directly controls:

- Motorized Air Baffle
- Evaporator Fan (Only when the air baffle is open.)

During the defrost cycle the compressor, condenser fan, evaporator fan and the motorized air baffle motor are de-energized. The air baffle remains in the position it was in (either open or closed) when the defrost cycle started.

## Freezer and Refrigerator Satisfied

If both the freezer and refrigerator are “satisfied” the freezer thermostat is open and the refrigerator thermostat is at the cold or “satisfied” position. No voltage is available to the compressor, condenser fan motor or evaporator fan motor. There is no voltage available to the air baffle motor and it remains closed. (Fig. 12)

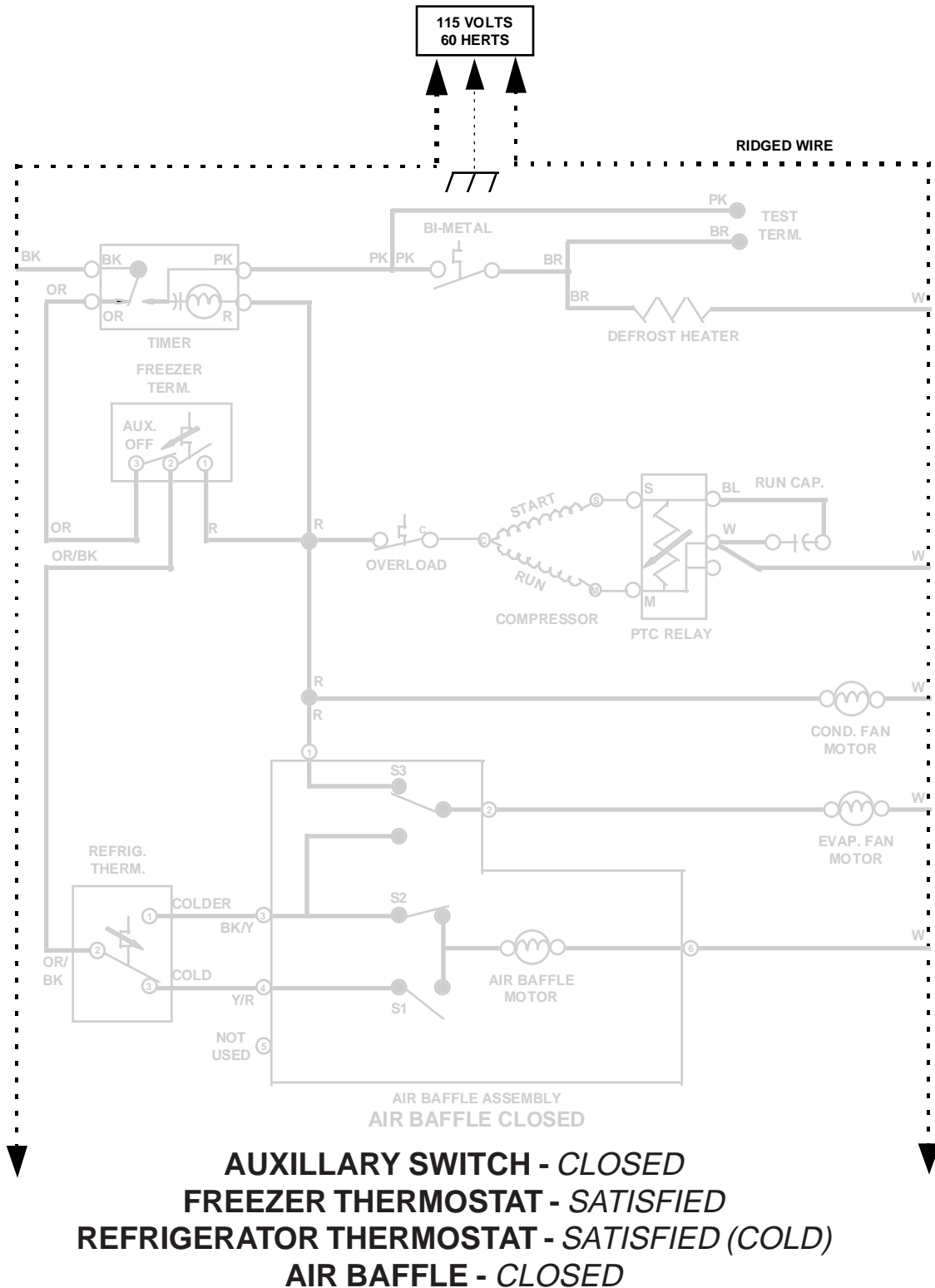


Figure 12

## Freezer Calling for Cooling - Refrigerator Satisfied

If the freezer thermostat closes, calling for cooling, 120VAC is directly applied to the compressor and condenser fan motor. Voltage is also applied to the evaporator fan motor through switch **S3 (1 - 2)** of the Air Baffle Assembly. Since the refrigerator is satisfied, its thermostat remains in the cold position and the air baffle remains closed. (Fig. 13) This configuration allows the freezer only to be cooled.

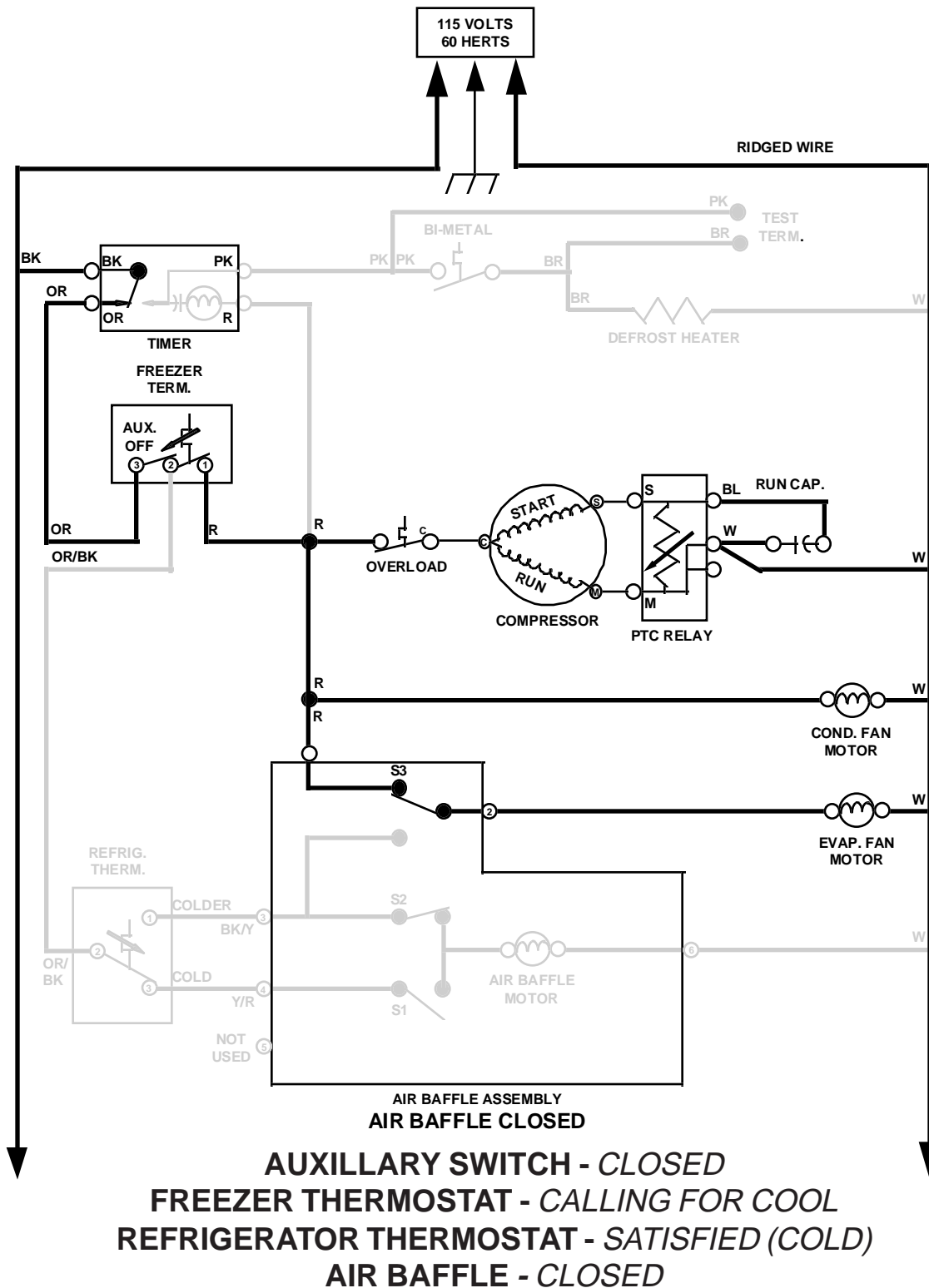
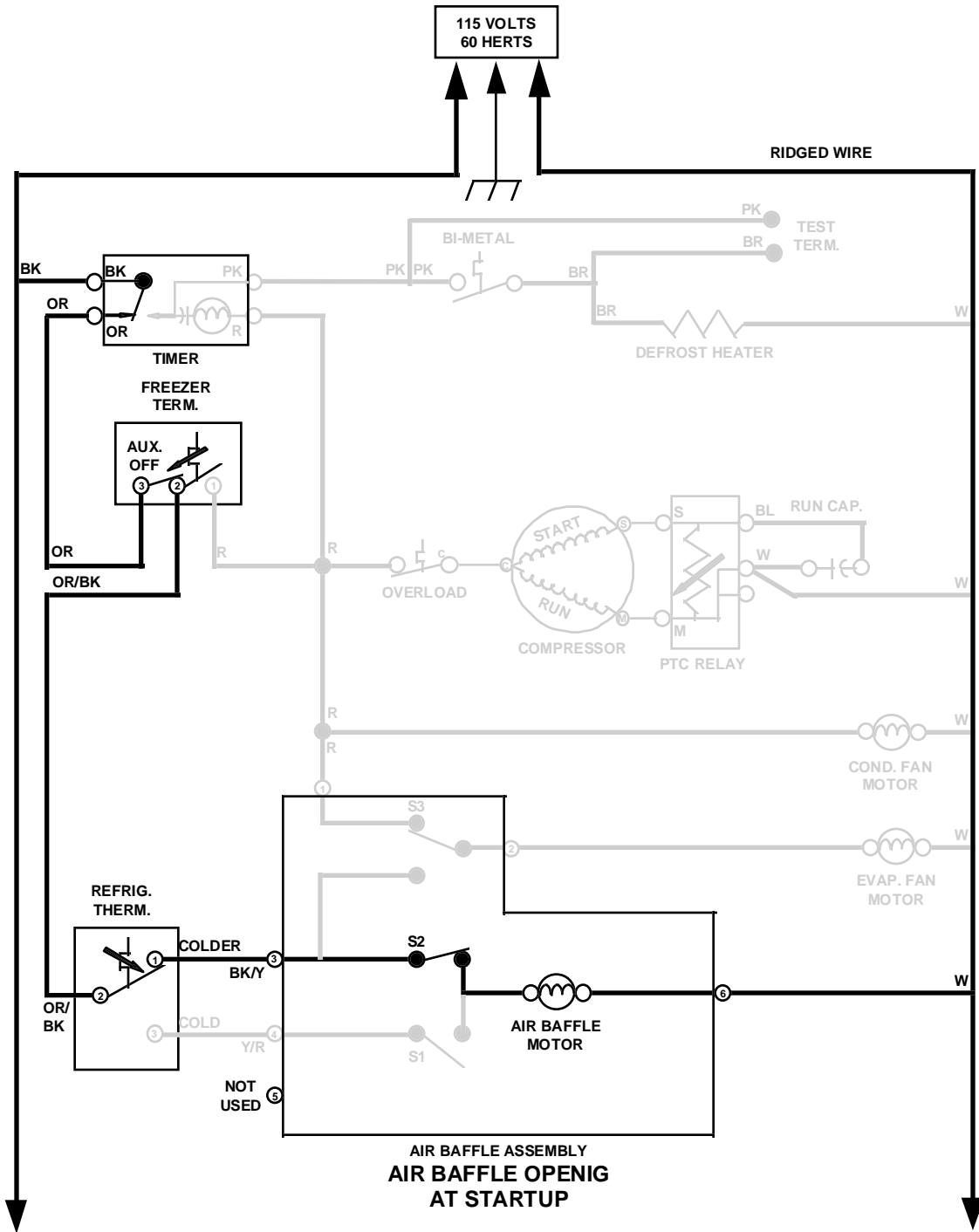


Figure 13

### Freezer Satisfied - Refrigerator Calling For Cooling

If the freezer is satisfied (freezer thermostat open) and the refrigerator thermostat calls for cooling, 120VAC will be applied through switch **S2 ( 3 - 6 )** energizing the air baffle motor to begin opening the baffle. (Fig. 14)

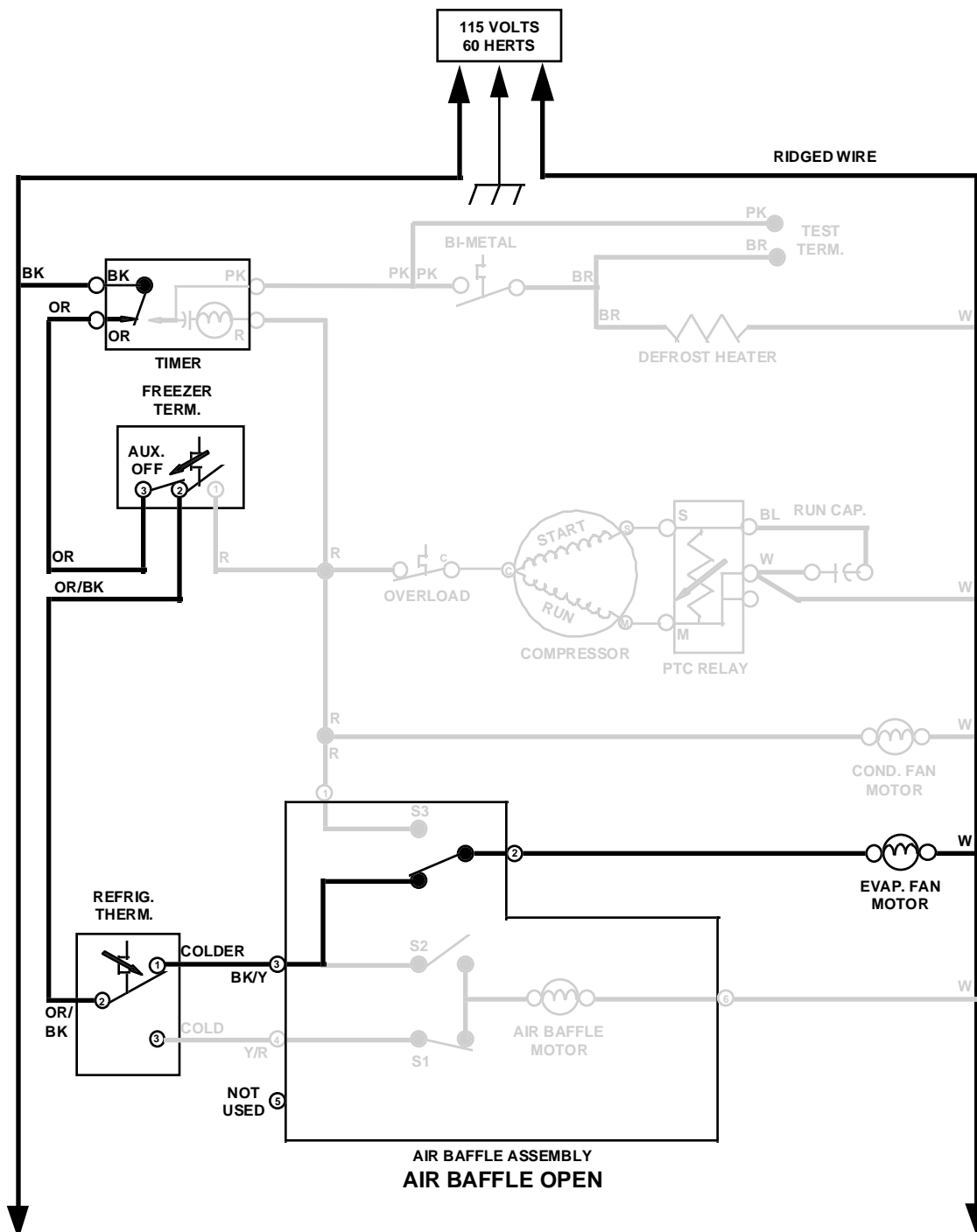


**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - SATISFIED**  
**REFRIGERATOR THERMOSTAT - JUST CALLING FOR COOL (COLDER)**  
**AIR BAFFLE - OPENING UP**

Figure 14

## Freezer Satisfied - Refrigerator Calling For Cooling (continued)

Once the air baffle has reached its full open position switch **S2** opens and switch **S1** closes de-energizing the air door motor, leaving the door in the open position. Voltage is now applied to the evaporator fan motor through switch **S3 (3 - 2)** of the air baffle assembly. (Fig. 15)

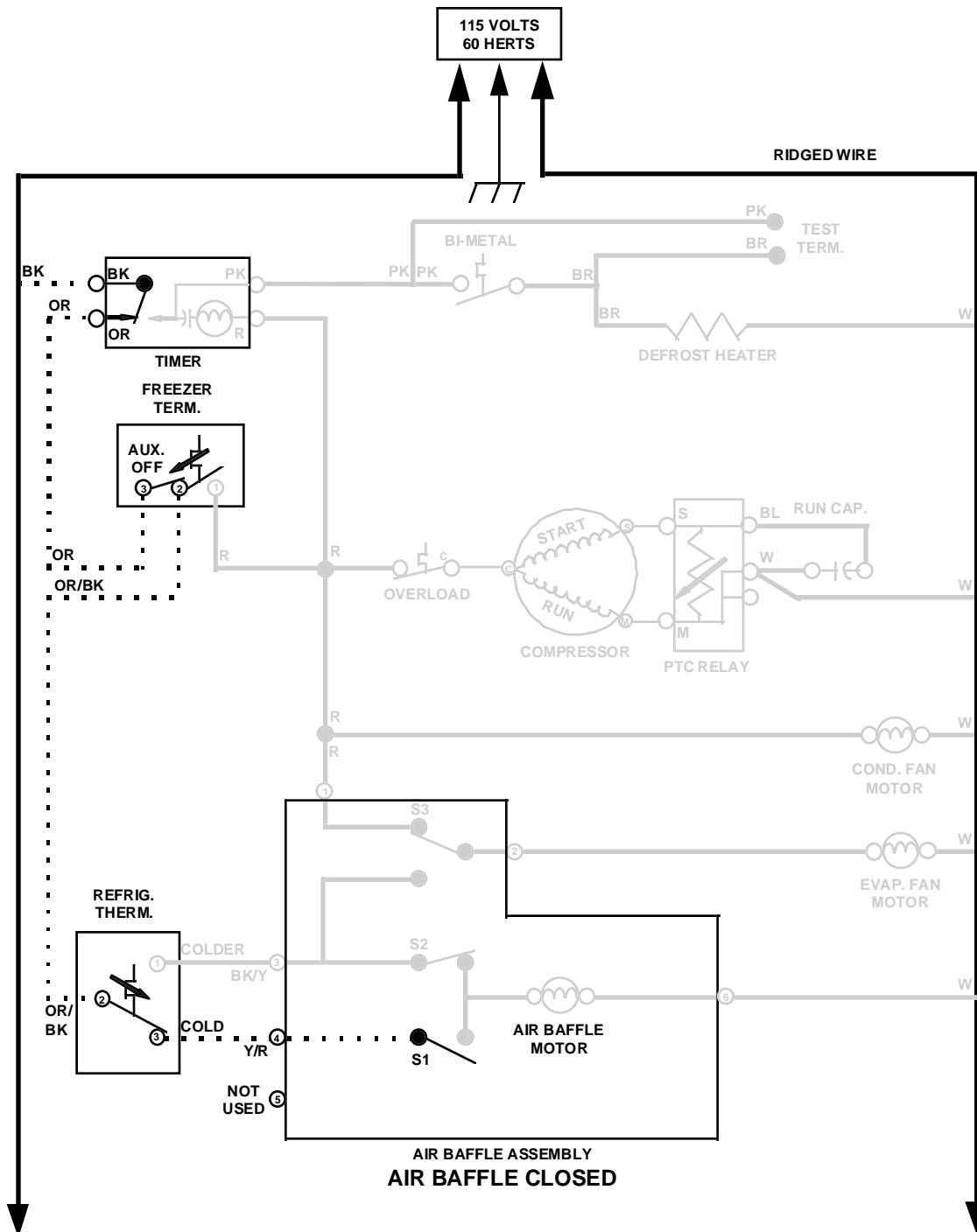


**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - SATISFIED**  
**REFRIGERATOR THERMOSTAT - CALLING FOR COOL (COLDER)**  
**AIR BAFFLE - OPEN**

Figure 15

## Freezer Satisfied - Refrigerator Just Satisfied

The evaporator fan motor will continue to run until the refrigerator thermostat is satisfied (moves to the "COLD" position). This turns the evaporator fan motor off and applies voltage to the air baffle door motor through switch **S1**. The baffle will then close. (Fig. 16)

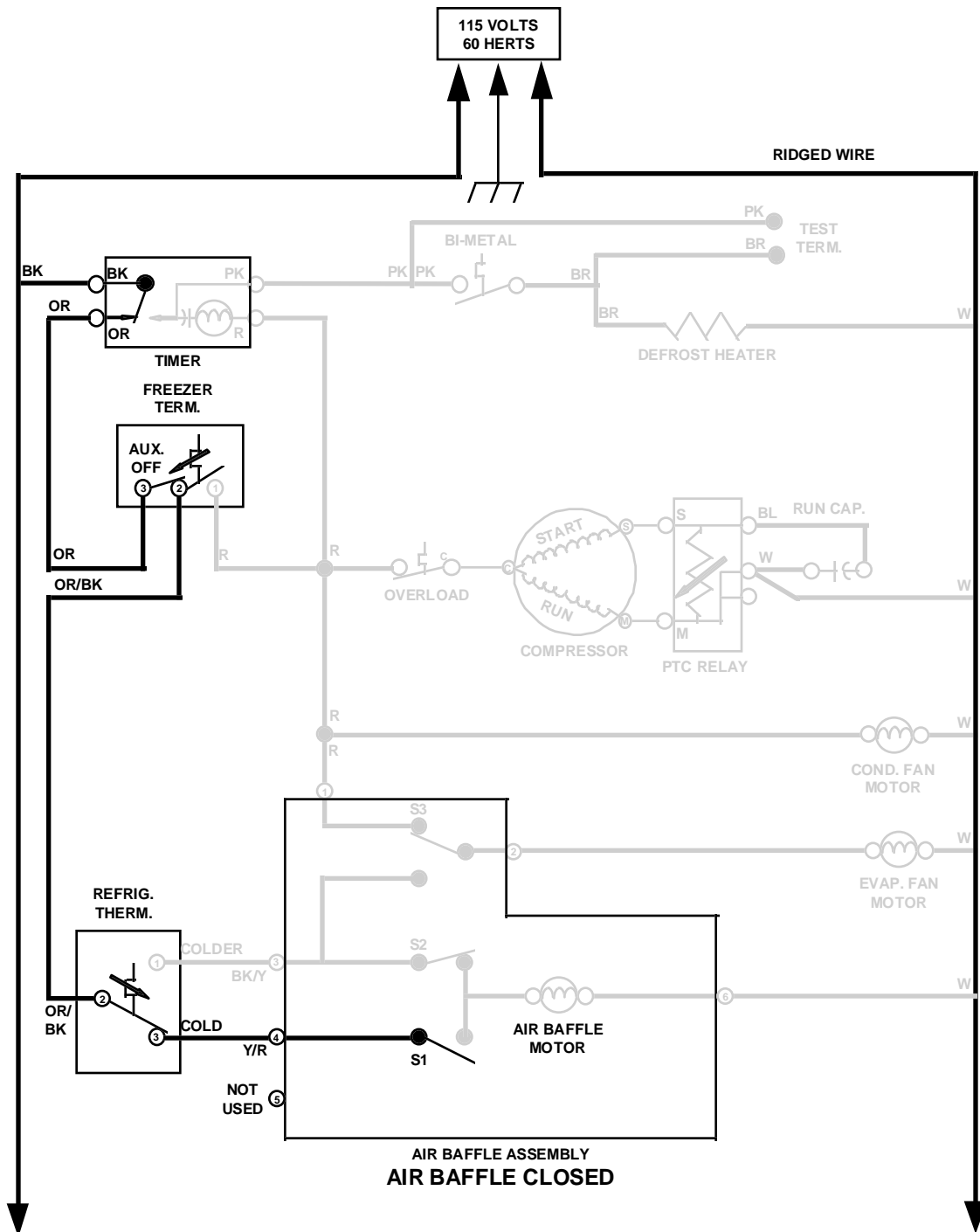


**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - SATISFIED**  
**REFRIGERATOR THERMOSTAT - JUST SATISFIED (COLD)**  
**AIR BAFFLE - STARTING TO CLOSE**

Figure 16

## Freezer Satisfied - Refrigerator Satisfied

Once the air baffle has reached its full closed position, switch **S1** opens, switch **S2** closes and switch **S3** changes position (1 - 2). (Fig. 17) This configuration allows the refrigerator section only to be cooled.



**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - SATISFIED**  
**REFRIGERATOR THERMOSTAT - SATISFIED (COLD)**  
**AIR BAFFLE - CLOSED**

Figure 17

## Freezer Calling for Cooling - Refrigerator Calling for Cooling

If both the freezer thermostat closes (calling for cooling) and the refrigerator thermostat moves to the colder position (calling for cooling), 120VAC is directly applied to the compressor and condenser fan motor. Voltage is also applied to switch **S3 (1 to 2)** to energize the evaporator fan motor while the air baffle door is opening. This begins the cooling process for the freezer. Voltage is applied through switch **S2 (4 to 6)** to energize the air baffle motor and open the air baffle. (Fig. 18)

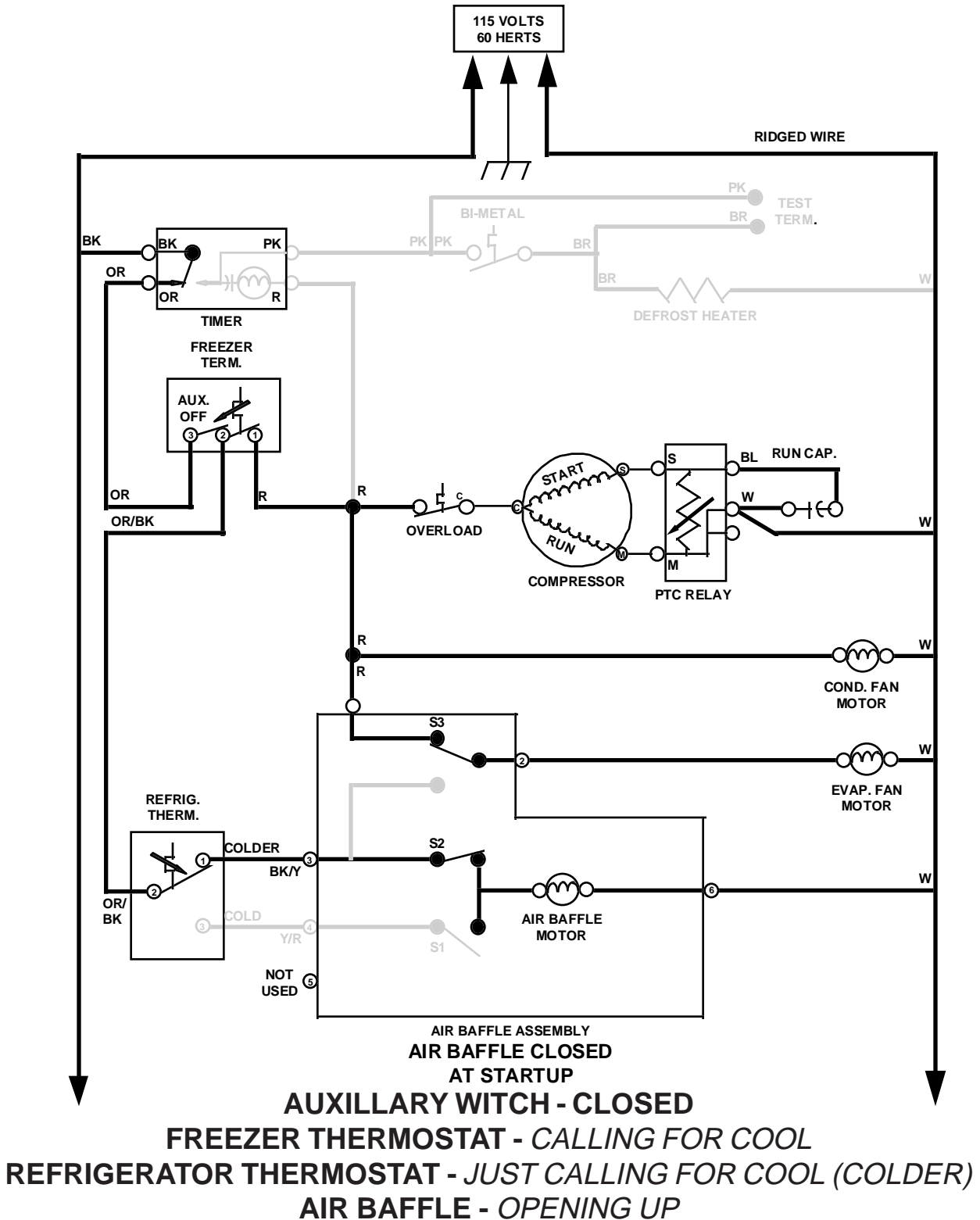


Figure 18



## Freezer Calling for Cooling - Refrigerator Calling for Cooling (continued)

Once the baffle has reached its full open position switch **S2** opens and switch **S1** closes de-energizing the air door motor, leaving the baffle in the open position. Voltage is now applied to the evaporator fan motor through switch **S3 (3 to 2)** of the air baffle assembly. (Fig. 19)

This configuration allows both the freezer and refrigerator to be cooled at the same time.

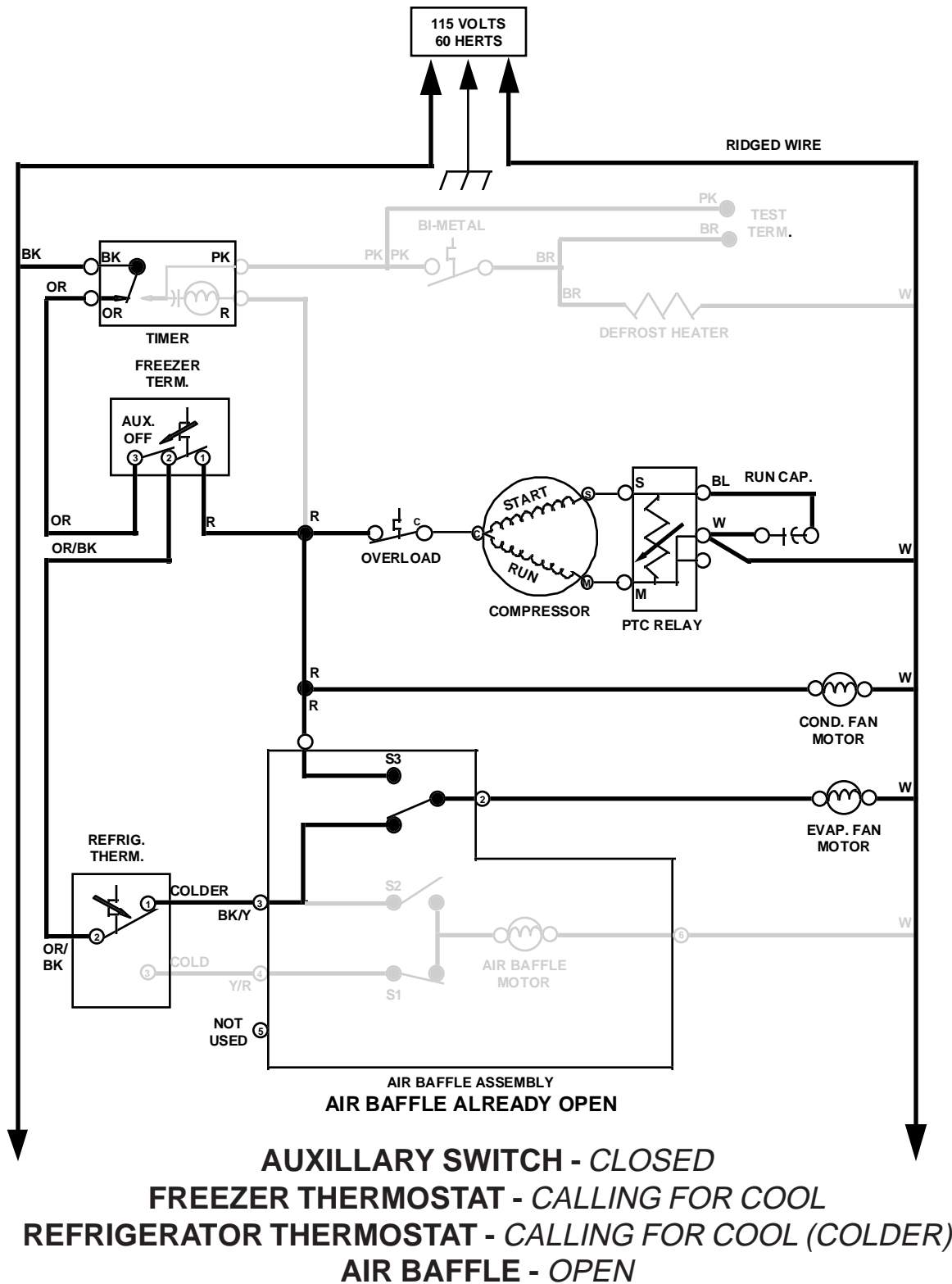
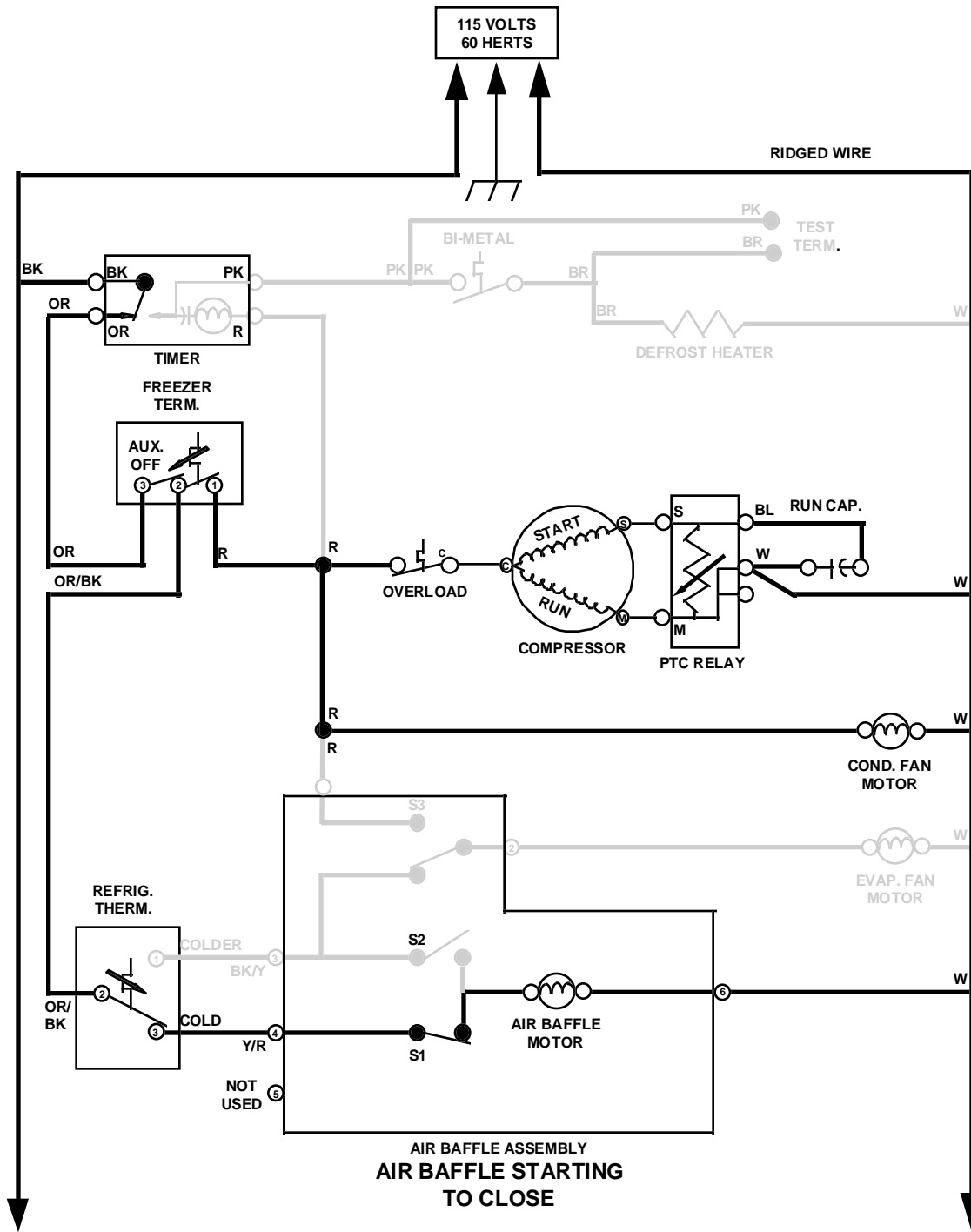


Figure 19

## Freezer Calling for Cooling - Refrigerator Satisfied

When the refrigerator section thermostat moves to the cold position (satisfied), 120VAC is applied through switch **S1 (4 to 6)** which closes the air baffle. (Fig. 20)

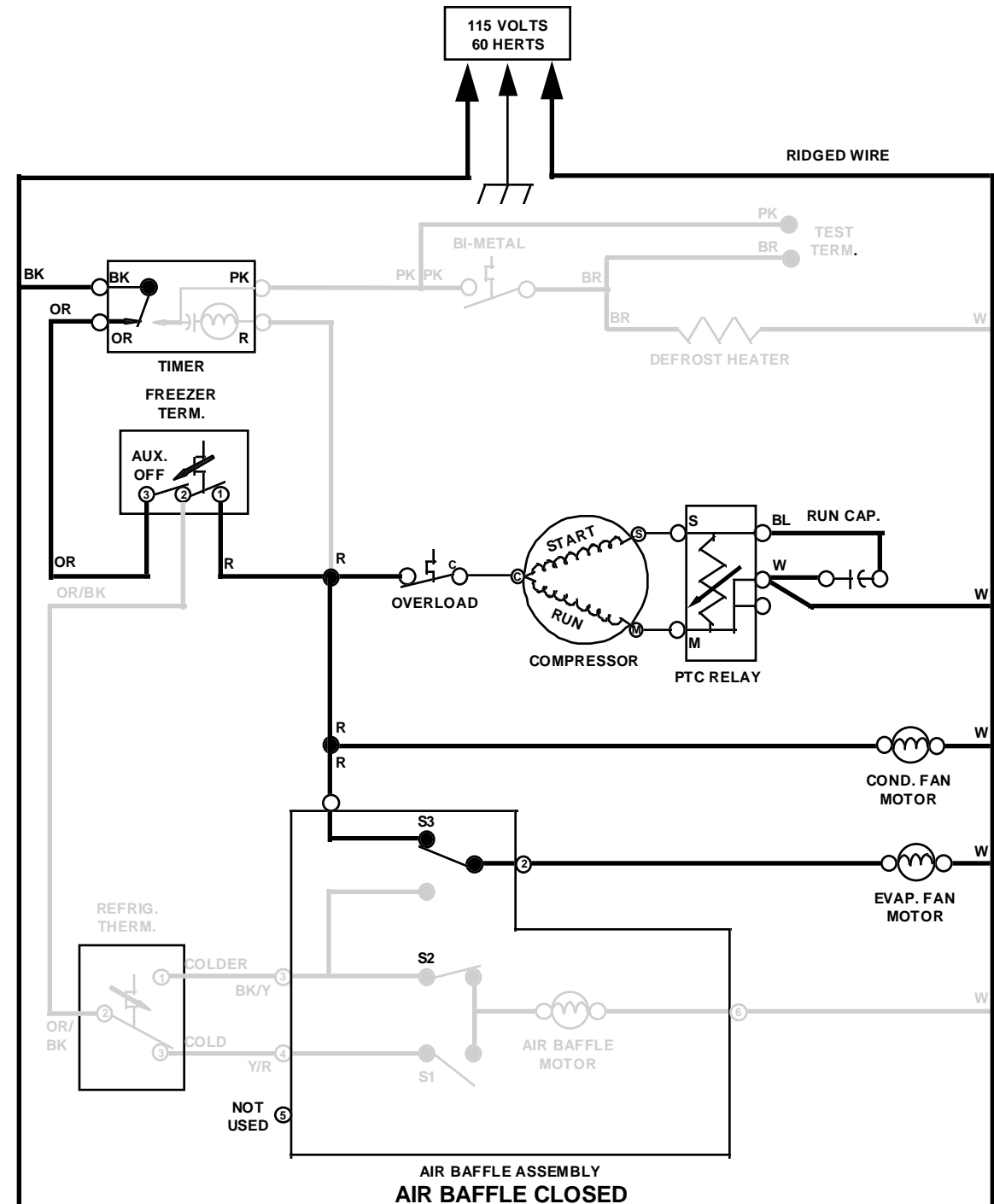


**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - CALLING FOR COOL**  
**REFRIGERATOR THERMOSTAT - JUST SATISFIED (COLD)**  
**AIR BAFFLE - STARTING TO CLOSE**

Figure 20

## Freezer Calling for Cooling - Refrigerator Satisfied (continued)

Once the baffle has reached its full closed position, switch **S1** opens, **S2** closes and **S3** changes position. The evaporator fan motor is now energized through switch **S3** (1 to 2). (Fig. 21)



**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - ON AND CALLING FOR COOL**  
**REFRIGERATOR THERMOSTAT - ON AND SATISFIED (COLD)**  
**AIR BAFFLE - CLOSED**

Figure 21

# TESTING AND DIAGNOSIS

## ITC TEST MODE

The Air Baffle Module functions can be checked in the following manner:

1. Verify that the product is not in defrost.
2. Open the refrigerator and freezer doors and allow the unit to warm up enough to trip the refrigerator and freezer thermostats. When both the freezer and refrigerator thermostats call for cooling, the baffle door should open.
3. Note the thermostat settings and remove the control box front cover.
4. Set the controls in the following manner. Check for the given results:

### Settings:

- a. Move the freezer thermostat control to the far right
- b. Move the refrigerator thermostat control to the far left.

### Results:

Air Baffle - In 15 seconds the baffle should be fully closed.  
Compressor - ON  
Condenser Fan - ON  
Evaporator Fan - ON

### Settings:

- a. Freezer Thermostat Control to the far right
- b. Refrigerator Thermostat Control to the far right

### Results:

Air Baffle - In 15 seconds the baffle should be fully open.  
Evaporator Fan - ON  
Compressor - ON  
Condenser Fan - ON

If the given results do not occur, check all electrical components. Evaluate all wiring connections, the freezer thermostat, the refrigerator thermostat, the defrost timer, the evaporator fan, the condenser fan and the compressor. If these components all check out good, the following procedure will allow a complete evaluation of the component inside the Air Baffle Module.

**Motorized Air Baffle Assembly Test:** (Make sure to notice the position of the air baffle door - OPEN or CLOSED)

**Air Baffle OPEN:**

Continuity between terminals 3 & 2 (checks S3)

No continuity between terminals 1 & 2 (checks S3)

Approximately 8,200 ohms resistance between terminals 4 & 6.  
(This verifies continuity through S1 and resistance through the Air Door Motor)

No continuity between terminals 3 & 6 (checks S2)

**Air Baffle CLOSED:**

Continuity between terminals 1 & 2 (checks S3)

No continuity between terminals 3 & 2 (checks S3)

Approximately 8,200 ohms resistance between terminals 3 & 6.  
(This verifies continuity through S2 and resistance through the Air Door Motor)

No continuity between terminals 4 & 6 (checks S2)

**NOTE:** Do not attempt to repair the Module. Replace the entire baffle assembly.

**Thermostat Test**

**Auxillary Switch:**

**NOTE:** The auxillary switch is found inside the freezer thermostat housing. It operates independently of the freezer thermostat.

In ON position: Continuity between terminals 3 & 2

In Off position: No continuity between terminals 3 & 2.

**Freezer Thermostat:**

In CLOSED position (Calling for Cooling): Continuity between terminals 2 & 1

In OPEN position (Satisfied): No continuity between terminals 2 & 1.

**Refrigerator Thermostat:**

In COLDER position (Calling for Cooling): Continuity between terminals 2 & 1  
No continuity between terminals 2 & 3

In COLD position (Satisfied): Continuity between terminals 2 & 3  
No continuity between terminals 2 & 1

# REPLACING THE BAFFLE MODULE

**NOTE:** When replacing the Air Baffle Assembly, note the routing and location of the freezer and refrigerator temperature sensing tubes. Be sure to replace the tubes in their same locations or the refrigerator/freezer will not operate properly.

## **WARNING**

**DISCONNECT POWER BEFORE SERVICING**

**FAILURE TO DO SO MAY RESULT IN SRIIOUS INJURY OR DEATH**

### Instructions:

1. Remove the screw securing the conduit cover over the wiring harness from the top left edge of the refrigerator section. (Fig. 22)

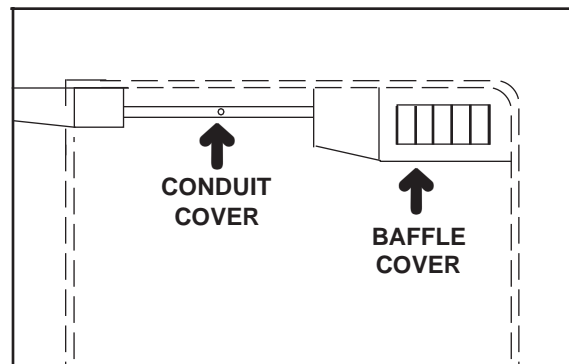


Figure 22  
(Refrigerator Compartment)

2. Remove the screw securing the plastic covering over the Baffle Module. (Fig. 23)
3. Disconnect the two harness plugs from the Baffle Module.
4. Remove the light lens and air scoop assembly from the back of the freezer section. (Fig. 23)

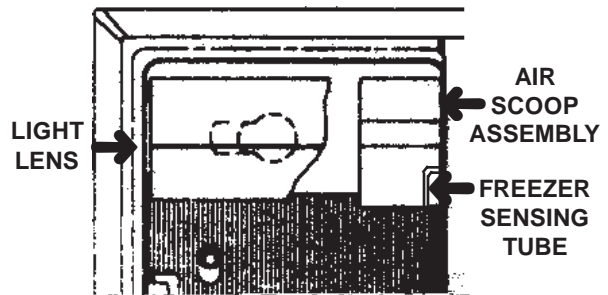


Figure 23  
(Freezer Compartment)

5. Carefully guide the freezer compartment temperature sensing tube from its position as the Baffle Assembly is pulled from the compartment wall in the refrigerator section.
6. Carefully unwrap the refrigerator compartment temperature sensing tube from air defuser.
7. Unsnap the baffle assembly from the air duct.
8. the Baffle Assembly is not serviceable and must be replaced as a unit. To reinstall, reverse the instructions above.

# REPLACING THE THERMOSTATS AND TEMPERATURE SENSING TUBES

The temperature sensing tubes are an integral part of the freezer and refrigerator thermostat controls located in the control box in the refrigerator compartment. (Fig. 24)

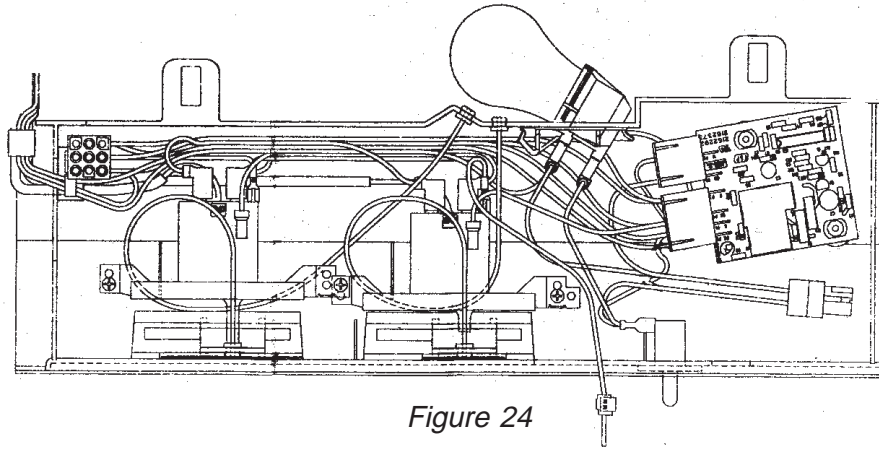


Figure 24

## Instructions

1. The Air Baffle Assembly must be removed from its position in the compartment wall as described above.
2. Remove the control box eschtcheon.
3. Remove the two to four screws securing the control box to the top of the refrigerator compartment.
4. Disconnect the two wiring harness plugs from their connector blocks and remove the ground wire clip.
5. The control box and air baffle assembly can now be removed from the refrigerator for service.
  - a. The freezer thermostat contains the auxillary switch, the thermostat control and the freezer temperature sensing tube and is replaced as one unit.
  - b. The refrigerator thermostat contains the thermostat control and refrigerator temperature sensing tube and is replaced as one unit.

**NOTE:** When replacing the the control box and air baffle assembly, note the routing and location of the freezer and refrigerator temperature sensing tubes. Be sure to replace the tubes in their proper locations or the refrigerator/freezer will not operate properly.

## Section 3

### **CONFIRMATION OF LEARNING EXERCISE**

1. The purpose of Independent Temperature Control is to:
  - a) Keep the freezer compartment colder than the refrigerator compartment.
  - b) Allow for separate temperature control in the freezer and refrigerator compartments.
  - c) Reduce compressor run-time.
  - d) Reduce the amount of refrigerant required in the sealed system.
2. The refrigerator thermostat controls:
  - a) The evaporator fan motor and the air baffle motor.
  - b) The evaporator fan motor and the condenser fan motor.
  - c) The compressor and the air baffle motor.
  - d) The compressor and the evaporator fan motor.
3. If the air baffle assembly does not function properly:
  - a) Replace the air baffle assembly immediately.
  - b) Check the defrost heater element.
  - c) Check all electrical connections and components before replacing the air baffle assembly.
  - d) Call Technical Assistance for instructions.
4. Replacing the air baffle assembly requires:
  - a) Disassembly in both the freezer and refrigerator compartments.
  - b) Special tools
  - c) Removal of the evaporator cover.
  - d) None of the above.
5. Replacing the thermostats and sensing tubes requires:
  - a) Disassembly in both the freezer and compartments.
  - b) Removing the evaporator cover.
  - c) Replacing the air baffle assembly.
  - d) None of the above.
6. The freezer thermostat controls:
  - a) Compressor and condenser fan motor only.
  - b) Compressor, condenser fan motor and evaporator fan motor (when baffle is open.)
  - c) Compressor, condenser fan motor and evaporator fan motor (when baffle is closed.)
  - d) Air baffle motor and condenser fan motor.
7. The evaporator fan motor:
  - a) Is controlled by the freezer thermostat only.
  - b) Is controlled by the refrigerator thermostat only.
  - c) Is controlled by a switch in the air baffle assembly.
  - d) Is controlled by both the refrigerator and freezer thermostats.
  - e) c and d
6. **(OPTIONAL)** If a unit with ITC is available:
  - a) Replace the Air Baffle Assembly.
  - b) Replace the freezer and refrigerator thermostats and sensing tubes.





View Section 4 of the video Tape

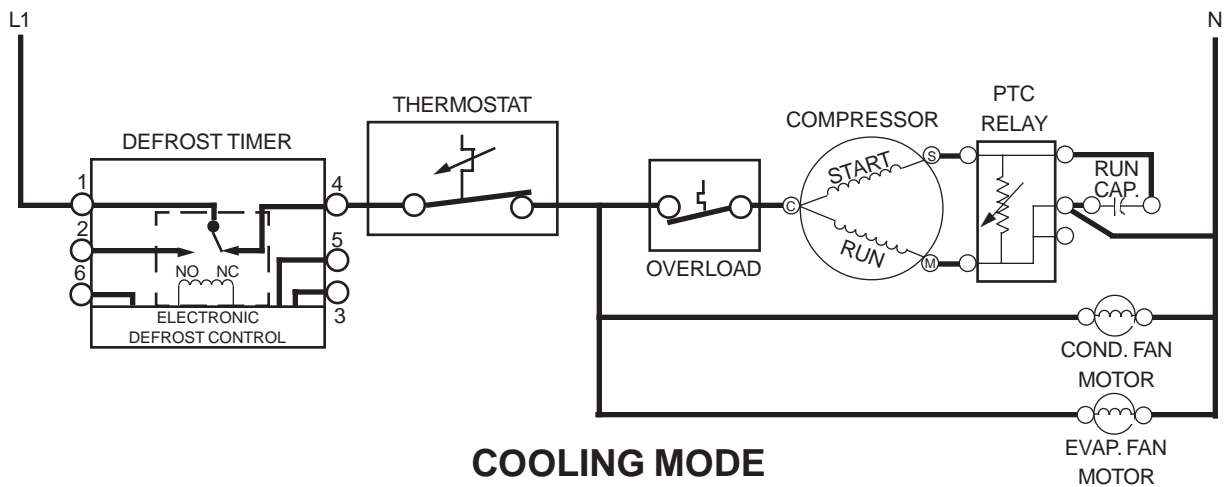
## Section 4

# TECH TIPS

## ADC STRIP CIRCUITS

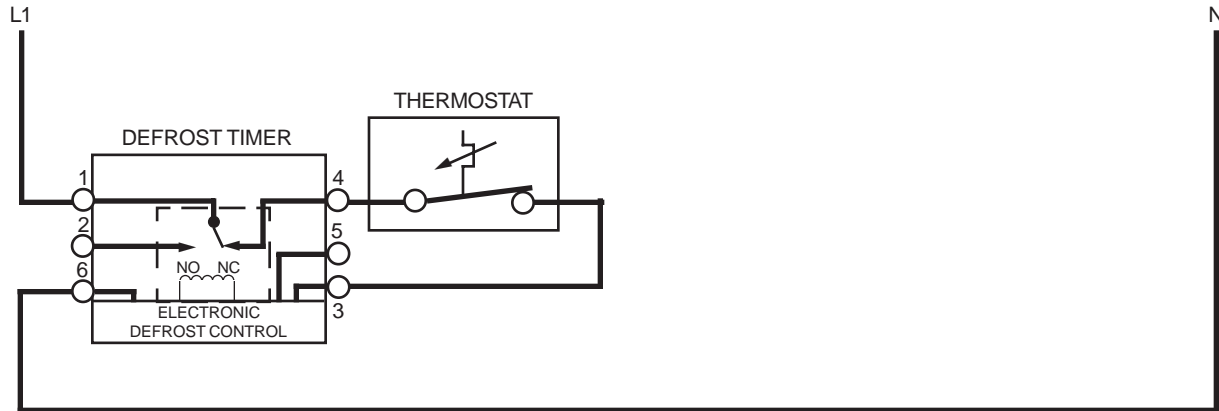


**ENERGIZING ELECTRONIC DEFROST CONTROL**

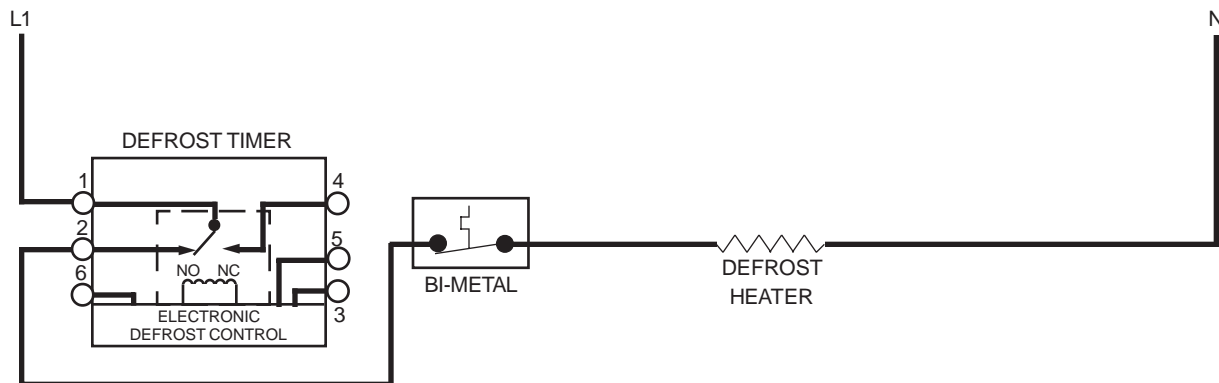


**COOLING MODE**

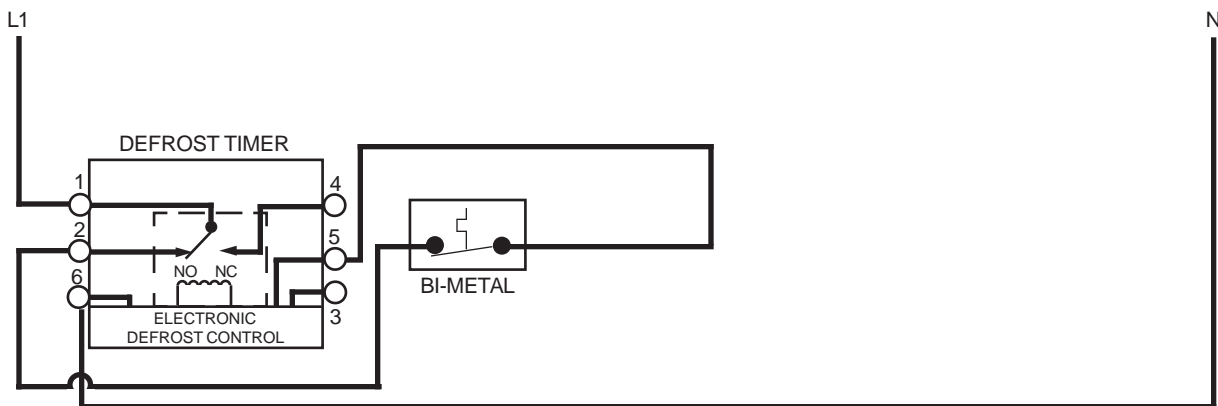
## ADC STRIP CIRCUITS (con't.)



**MONITORING COMPRESSOR RUN-TIME**

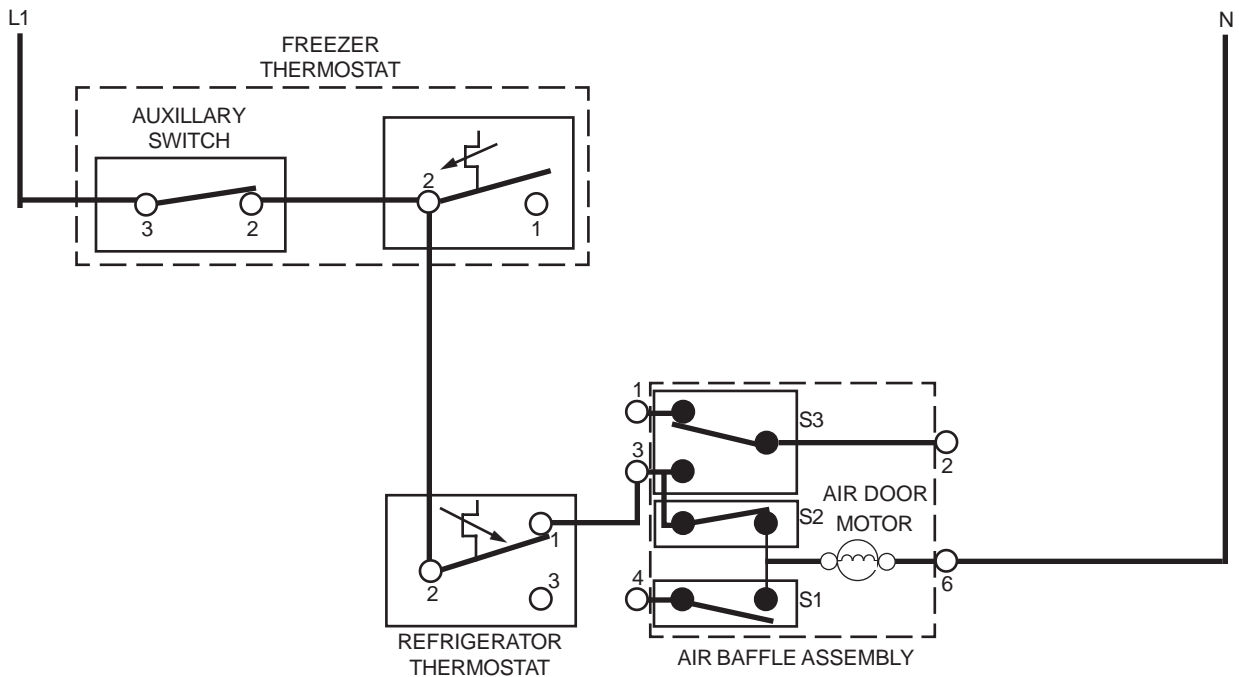


**DEFROST MODE**

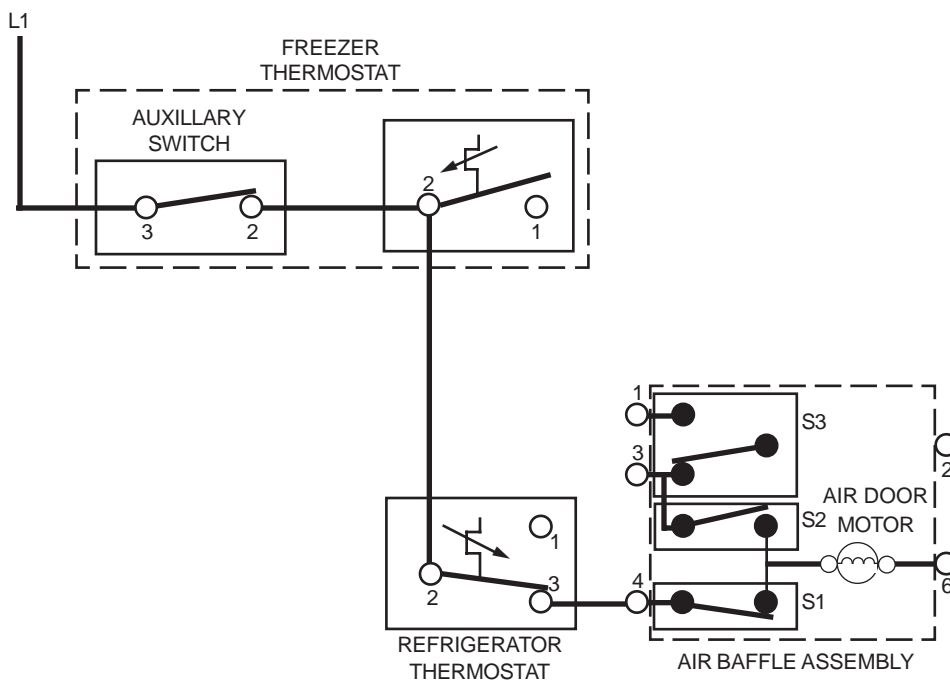


**MONITORING DEFROST HEATER RUN-TIME**

# ITC STRIP CIRCUITS

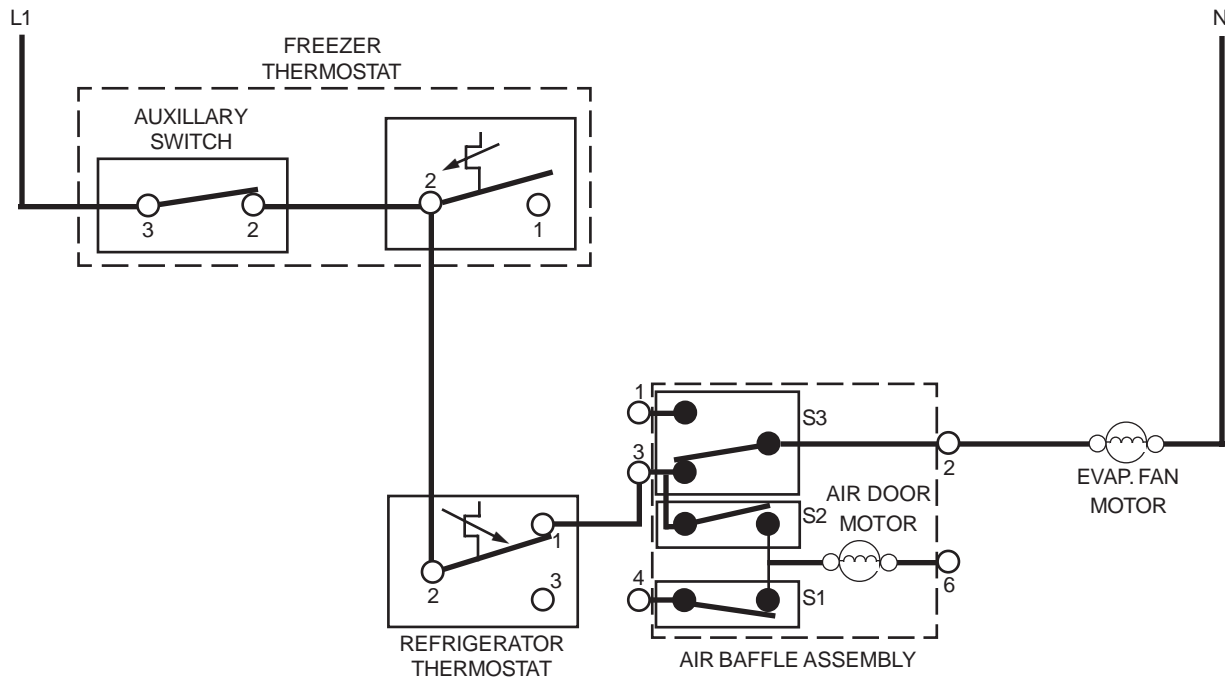


**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - SATISFIED**  
**REFRIGERATOR THERMOSTAT - JUST CALLING FOR COOLING**  
**AIR BAFFLE - OPENING**

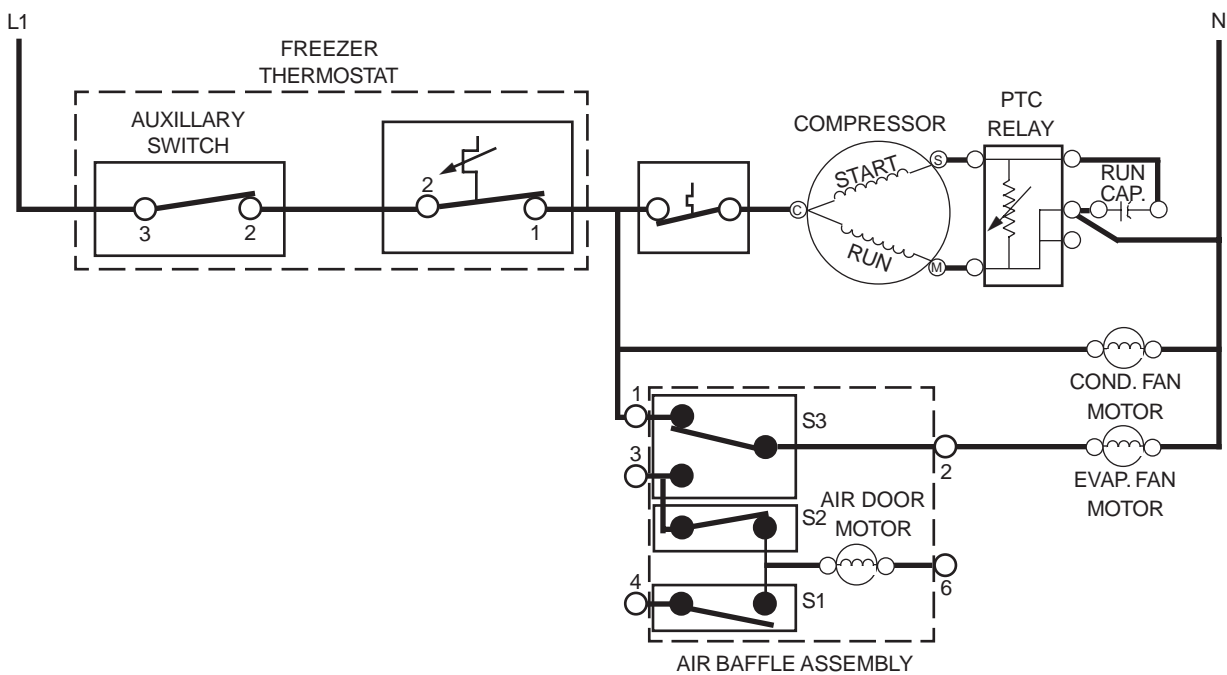


**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - SATISFIED**  
**REFRIGERATOR THERMOSTAT - JUST SATISFIED (COLD)**  
**AIR BAFFLE - CLOSING**

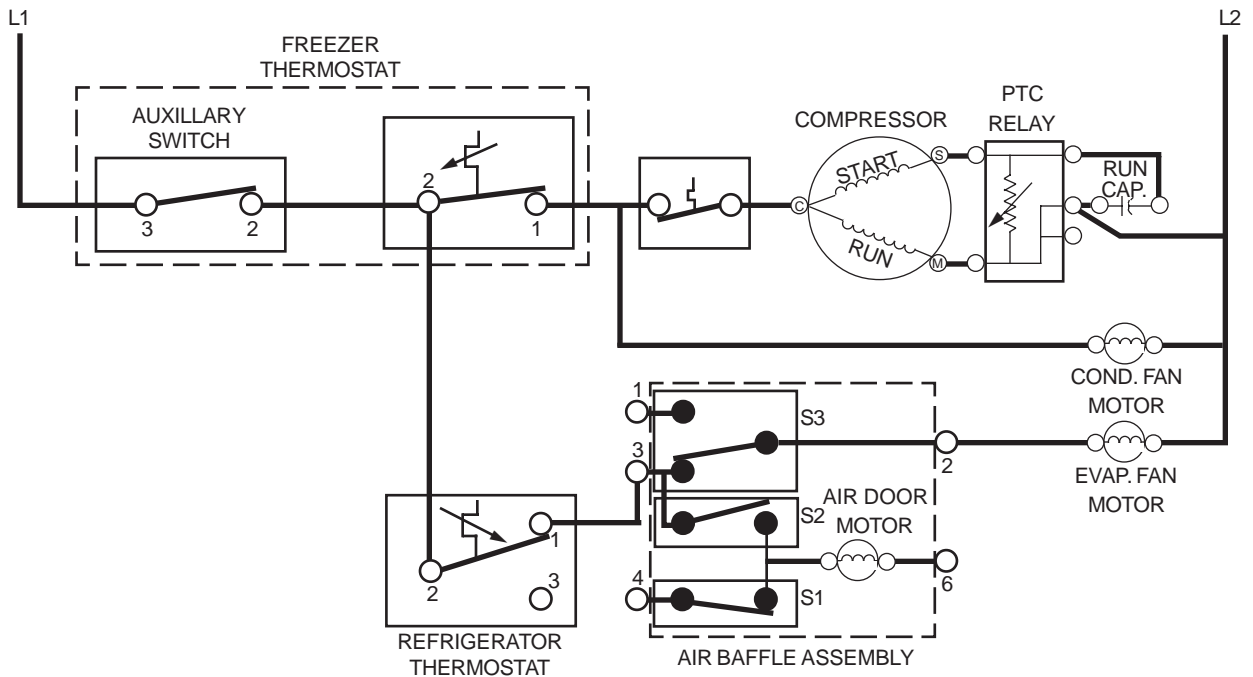
## ITC STRIP CIRCUITS (con't.)



**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - SATISFIED**  
**REFRIGERATOR THERMOSTAT - CALLING FOR COOL (COLDER)**  
**AIR BAFFLE - OPEN**



**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - CALLING FOR COOL**  
**REFRIGERATOR THERMOSTAT - SATISFIED (COLD)**  
**AIR BAFFLE - CLOSED**



**AUXILLARY SWITCH - CLOSED**  
**FREEZER THERMOSTAT - CALLING FOR COOL**  
**REFRIGERATOR THERMOSTAT - CALLING FOR COOL (COLDER)**  
**AIR BAFFLE - OPEN**

## PRODUCT SPECIFICATIONS AND WARRANTY INFORMATION SOURCES

FOR PRODUCT SPECIFICATIONS AND WARRANTY INFORMATION CALL:

**FOR KITCHENAID PRODUCTS: 1-800-422-1230**

**FOR WHIRLPOOL PRODUCTS: 1-800-253-1301**

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

**ANSWER SHEET**  
**CONFIRMATION OF LEARNING EXERCISES**



