Service Bulletin

Trouble Shooting Procedures for Power Boards and Control Panels

Purpose

Use this bulletin to diagnose Norcold refrigerator control panels and power boards. Most problems can be linked to components controlled by the power board or voltage input to the power board. Sometimes the power board or control board will need to be replaced. Use this bulletin to determine the correct action.

Background

The electronic control system controls the refrigerator's power board and control panel. Use the electronic control system diagnostic mode to identify problems with the power board and control panel.

The electronic controls work on 10.5 to 15.4 volts DC. The AC power cord that is attached to the power board conducts 120 volts AC power from the RV receptacle to the power board. It does not provide power to the electronic controls.

Applicability

Before trying to fix or replace the control panel and power board, make sure these areas, which can be affected by the electronic controls, are working properly:

- Proper refrigerator installation
- Adequate ventilation
- Leveled operation
- AC heater(s)
- DC heater
- Burner and orifice assembly
- Fan(s)
- Heat deflector cap (flue cap)
- Flue baffle

IMPORTANT!

The power board and the control panel do not control the fans, ice maker, or the ice maker water valve.

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Procedure C: Checking Power Board 621267/621268 Diagnostics Inputs and Outputs on N41X/N41X.3/N51X/N51X.3/N62X/N82X Models.

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Procedure G: Checking DC Power Input at the Control Panel (applies to Power Board 628661).

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Publication No. 631361A (05-31-07)

Procedure A: Checking Power Board 628661 Diagnostics Inputs and Outputs – N41X / N41X.3 /N51X / N51X.3 /N62X / N82X Refrigerators

Turn ON Refrigerator and select the highest temperature setting.

Accessing Diagnostics

1. At the same time, press and hold the TEMP SET and MODE switch buttons.
2. Release both buttons when 1 shows on the screen.

Screen 1

Screen [1] Action

The 1 turns off. If no LEDs show on the screen after the [1] turns off, replace the control panel.

Navigating and Exiting Diagnostics

- To move to the next screen, press and release the MODE switch button.
- To return to a previous screen, press and hold the MODE switch button until you reach the desired screen.
- To exit Diagnostics, turn the refrigerator OFF and back ON.

Screen 2

Screen [2] Action

The 2 turns off. The On LED remains lit. If any LED segments show on this screen after the screen number turns off, replace the control panel.

Screen 3

Screen [3] Action

The 3 turns off. After a short pause the screen displays fin temperature.

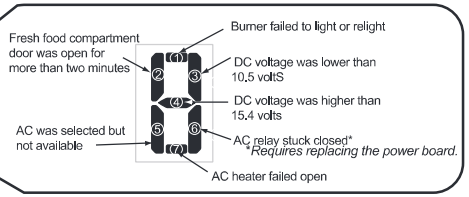
0 (Short pause) 0 *Indicates the thermistor circuit is open.*

8 (Short pause) 9 *Indicates the thermistor circuit is shorted.*

Screen 4

Screen [4] Action

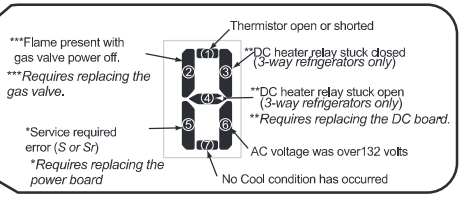
Screen 4 displays the fault history stored in non-volatile memory. After the screen number turns off, the fault history LEDs display. The position of the LEDs identify recent fault items.



Screen [5] Action

Screen 5

Screen 5 displays the fault history stored in non-volatile memory. After the screen number turns off, the fault history LEDs display. The position of the LEDs indentify recent fault items.



Screen 6

Screen [6] Action

Screen 6 is used to clear stored fault history. After the screen number turns off, the letters [E] and [r] show on the screen.

To erase fault history:

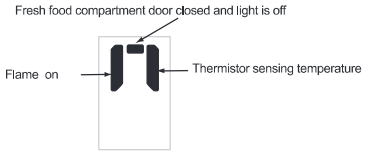
1. After the letters [E] and [r] display, press and hold the TEMP SET switch button until the letters [CL] show on the screen.

2. Allow the letters [C] and [L] to display for five seconds, then press and hold the TEMP SET switch button until the letters [E] and [r] show on the screen.

Screen 7

Screen [7] Action

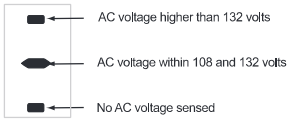
Screen 7 shows active inputs to the power board. After the screen number turns off, the power board input LEDs display. The position of the LEDs indicate active inputs to the power board.



Screen 0

Screen [0] Action

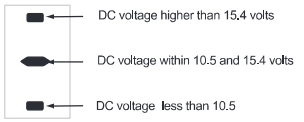
Screen 0 shows AC voltage input to the power board. After the screen number turns off, the LED segment that displays identifies the AC voltage input to the power board.



Screen 9

Screen [9] Action

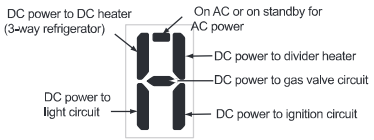
Screen 9 shows DC voltage input to the power board. After the screen number turns off, the LED segment that displays identifies the DC voltage input to the power board.



Screen 8

Screen [8] Action

Screen 8 shows active power board outputs. After the screen number turns off, the power board output LEDs display. The position of the LEDs indicate active outputs to the power board.



Procedure B: Checking Power Board 628661 Diagnostics Inputs and Outputs N64X /N64X.3 /N84X / N84X.3 /N109X / 12XX Refrigerators

Turn ON Refrigerator and select the highest temperature setting.

Accessing Diagnostics

1. At the same time, press and hold the TEMP SET and MODE switch buttons.
2. Release both buttons when 1 shows in the screen.

Screen 1

Screen [1] Action

The 1 turns off. If no LEDs show on the screen after the [1] turns off, replace the control panel.

Navigating and Exiting Diagnostics

- To move to the next screen, press and release the MODE switch button.
- To return to a previous screen, press and hold the MODE switch button until you reach the desired screen.
- To exit Diagnostics, turn the refrigerator OFF and back ON.

Screen 2

Screen [2] Action

The 2 turns off. The On LED remains lit. If any LED segments show on this screen after the screen number turns off, replace the control panel.

Screen 3

Screen [3] Action

The 3 turns off. After a short pause the screen displays fin temperature.

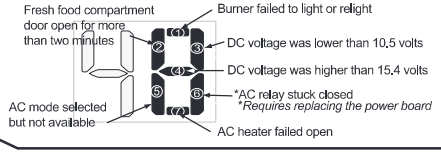
Indicates the thermistor circuit is open.

Indicates the thermistor circuit is shorted.

Screen 4

Screen [4] Action

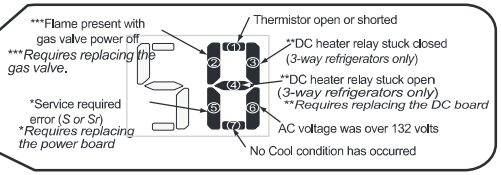
Screen 4 displays the fault history stored in non-volatile memory. After the screen number turns off, the fault history LEDs display. The position of the LEDs identify recent fault items.



Screen 5

Screen [5] Action

Screen 5 displays the fault history stored in non-volatile memory. After the screen number turns off, the fault history LEDs display. The position of the LEDs indentify recent fault items.



Screen 6

Screen [6] Action

Screen 6 is used to clear stored fault history. After the screen number turns off, the letters [Er] show on the screen.

To erase fault history:

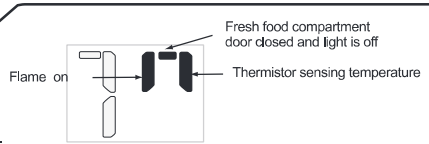
1. After the letters [Er] display, press and hold the TEMP SET switch button until the letters [CL] show on the screen.

2. Allow the letters [CL] to display for five seconds, then press and hold the TEMP SET switch button until the letters [Er] show in the screen.

Screen 7

Screen [7] Action

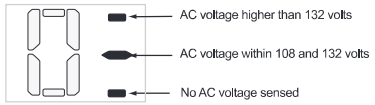
Screen 7 shows active inputs to the power board. After the screen number turns off, the power board input LEDs display. The position of the LEDs indicate active inputs to the power board.



Screen 0

Screen [0] Action

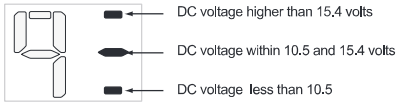
Screen 0 shows AC voltage input to the power board. After the screen number turns off, the LED segment that displays identifies the AC voltage input to the power board.



Screen 9

Screen [9] Action

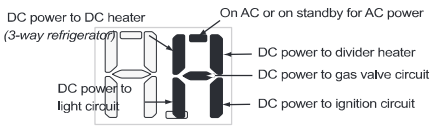
Screen 9 shows DC voltage input to the power board. After the screen number turns off, the LED segment that displays identifies the DC voltage input to the power board.



Screen 8

Screen [8] Action

Screen 8 shows active power board outputs. After the screen number turns off, the power board output LEDs display. The position of the LEDs indicate active outputs to the power board.



Procedure C: Checking Power Board 621267 / 621268 Diagnostics Inputs and Outputs – N41X / N41X.3 /N51X / N51X.3 /N62X / N82X Refrigerators

Turn ON Refrigerator and select the highest temperature setting.

Accessing Diagnostics

1. At the same time, press and hold the TEMP SET and MODE switch buttons.
2. Release both buttons when 1 shows on the screen.

Screen 1

Screen [1] Action

The 1 turns off. If no LEDs show on the screen after the [1] turns off, replace the control panel.

Navigating and Exiting Diagnostics

- To move to the next screen, press and release the MODE switch button.
- To return to a previous screen, press and hold the MODE switch button until you reach the desired screen.
- To exit Diagnostics, turn the refrigerator OFF and back ON.

Screen 2

Screen [2] Action

The 2 turns off. The On LED remains lit. If any LED segments show on this screen after the screen number turns off, replace the control panel.

Screen 3

Screen [3] Action

The 3 turns off. After a short pause the screen displays fin temperature.

0 Short pause 0 *Indicates the thermistor circuit is open.*

8 Short pause 9 *Indicates the thermistor circuit is shorted.*

Screen 4

Screen [4] Action

Screen 4 displays the fault history stored in non-volatile memory. After the screen number turns off, the fault history LEDs display. The position of the LEDs identify recent fault items.

- Fresh food compartment door open for more than two minutes
- Burner failed to light or relight
- DC voltage was lower than 10.5 volts
- DC voltage was higher han 15.4 volts
- AC mode selected but not available
- AC relay stuck closed* **Requires replacing the power board*
- AC heater failed open

Screen 5

Screen [5] Action

Screen 5 displays the fault history stored in non-volatile memory. After the screen number turns off, the fault history LEDs display. The position of the LEDs indentify recent fault items.

- **Flame sense failure ***Requires replacing the gas valve.*
- Thermistor open or shorted
- *DC heater relay stuck closed (*3-way refrigerators only*)
- *DC heater relay stuck open (*3-way refrigerators only*)
- AC voltage was less than 108 volts
- **Requires replacing the DC board*
- AC voltage was over 132 volts

Screen 6

Screen [6] Action

Screen 6 is used to clear stored fault history. After the screen number turns off, the letters [E] and [r] show on the screen.

To erase fault history:

1. After the letters [E] and [r] display, press and hold the TEMP SET switch button until the letters [CL] show on the screen.

2. Allow the letters [C] and [L] to display for five seconds, then press and hold the TEMP SET switch button until the letters [E] and [r] show on the screen.

Screen 7

Screen [7] Action

Screen 7 shows active inputs to the power board. After the screen number turns off, the power board input LEDs display. The position of the LEDs indicate active inputs to the power board.

- Fresh food compartment door is closed and light is off
- Flame on
- Thermistor sensing temperature

Screen 9

Screen [9] Action

Screen 9 shows DC voltage input to the power board. After the screen number turns off, the LED segment that displays identifies the DC voltage input to the power board.

- DC voltage higher than 15.4 volts
- DC voltage within 10.5 and 15.4 volts
- DC voltage less than 10.5

Screen 8

Screen [8] Action

Screen 8 shows active power board outputs. After the screen number turns off, the power board output LEDs display. The position of the LEDs indicate active outputs to the power board.

- DC power to DC heater (3-way refrigerator)
- On AC or standby for AC power
- DC power to divider heater
- DC power to gas valve circuit
- DC power to light circuit
- DC power to ignition circuit

Procedure D: Checking Power Board 621269 / 621270 / 621271 / 621272 Diagnostics Inputs and Outputs
N64X / N64X.3 / N84X / N84X.3 / N109X / 12XX Refrigerators

Turn ON Refrigerator and select the highest temperature setting.

Accessing Diagnostics
1. At the same time, press and hold the TEMP SET and MODE switch buttons.
2. Release both buttons when 1 shows on the screen.

Screen 1

Screen [1] Action
The 1 turns off. If no LEDs show on the screen after the [1] turns off, replace the control panel.

Navigating and Exiting Diagnostics
- To move to the next screen, press and release the MODE switch button.
- To return to a previous screen, press and hold the MODE switch button until you reach the desired screen.
- To exit Diagnostics, turn the refrigerator OFF and back ON.

Screen 2

Screen [2] Action
The 2 turns off. The On LED remains lit. If any LED segments show on this screen after the screen number turns off, replace the control panel.

Screen 3

Screen [3] Action
The 3 turns off. After a short pause the screen displays fin temperature.

00 *Indicates the thermistor circuit is open.*

89 *Indicates the thermistor circuit is shorted.*

Screen 4

Screen [4] Action
Screen 4 displays the fault history stored in non-volatile memory. After the screen number turns off, the fault history LEDs display. The position of the LEDs identify recent fault items.

- Fresh food compartment door open for more than two minutes
- Burner failed to light or relight
- DC voltage was lower than 10.5 volts
- DC voltage was higher than 15.4 volts
- AC relay stuck closed* **Requires replacing the power board*
- AC mode selected but not available
- AC heater failed open

Screen 5

Screen [5] Action
Screen 5 displays the fault history stored in non-volatile memory. After the screen number turns off, the fault history LEDs display. The position of the LEDs indentify recent fault items.

- *Flame sense failure **Requires replacing the power board*
- Thermistor open or shorted
- DC heater relay stuck closed** *(3-way refrigerators only)*
- DC heater relay stuck open** *(3-way refrigerators only)* ***Requires replacing the DC board*
- AC voltage was less than 108 volts
- AC voltage was over 132 volts

Screen 6

Screen [6] Action
Screen 6 is used to clear stored fault history. After the screen number turns off, the letters [Er] show on the screen.

To erase fault history:

1. After the letters [Er] display, press and hold the TEMP SET switch button until the letters [CL] show on the screen.

2. Allow the letters [CL] to display for five seconds, then press and hold the TEMP SET switch button until the letters [Er] show on the screen.

Screen 7

Screen [7] Action
Screen 7 shows active inputs to the power board. After the screen number turns off, the power board input LEDs display. The position of the LEDs indicate active inputs to the power board.

- Fresh food compartment door is closed and light is off
- Flame on
- Thermistor sensing temperature

Screen 0

Screen [0] Action
Screen 0 shows AC voltage input to the power board. After the screen number turns off, the LED segment that displays identifies the AC voltage input to the power board.

- AC voltage higher than 132 volts
- AC voltage within 108 and 132 volts
- No AC voltage sensed

Screen 9

Screen [9] Action
Screen 9 shows DC voltage input to the power board. After the screen number turns off, the LED segment that displays identifies the DC voltage input to the power board.

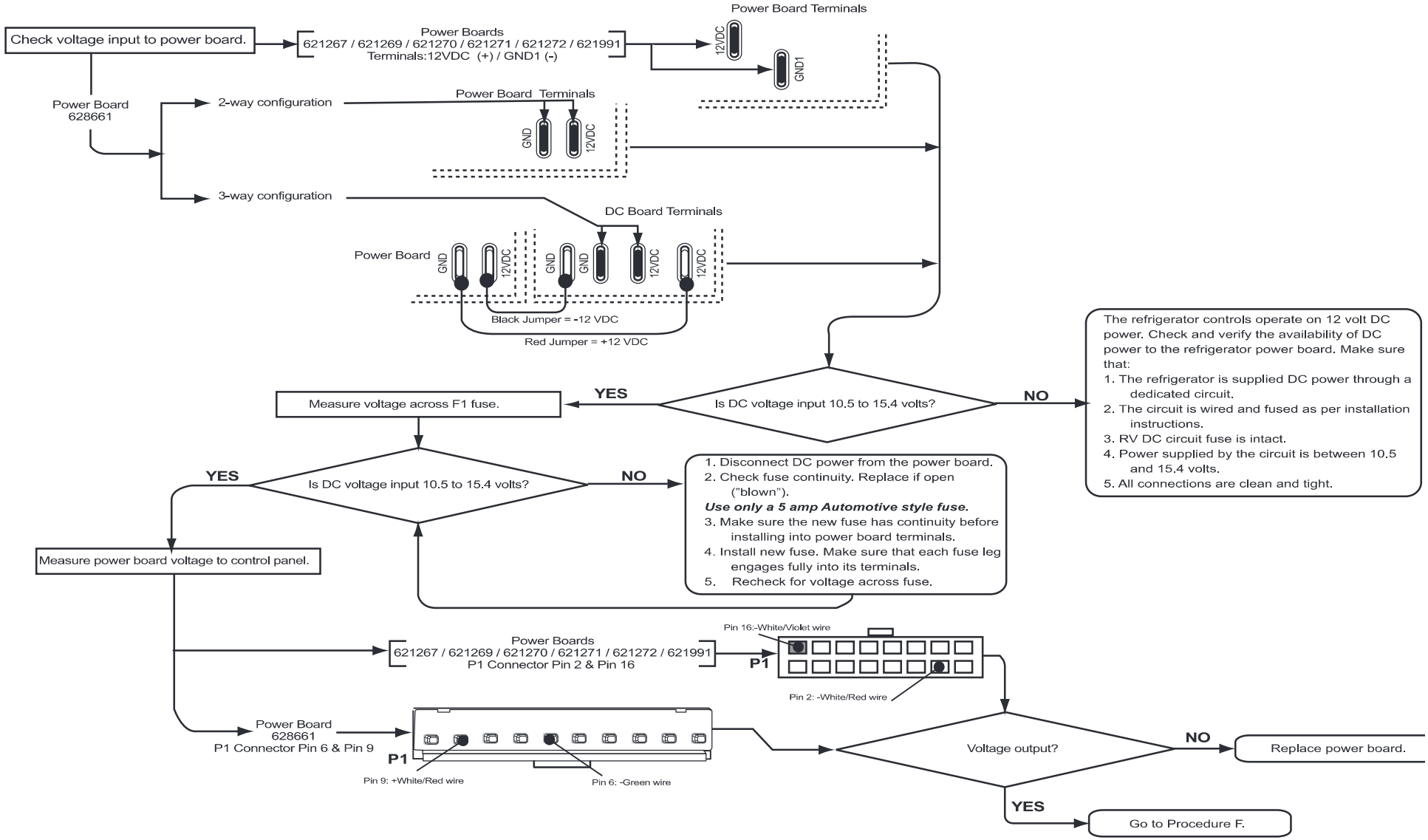
- DC voltage higher than 15.4 volts
- DC voltage within 10.5 and 15.4 volts
- DC voltage less than 10.5

Screen 8

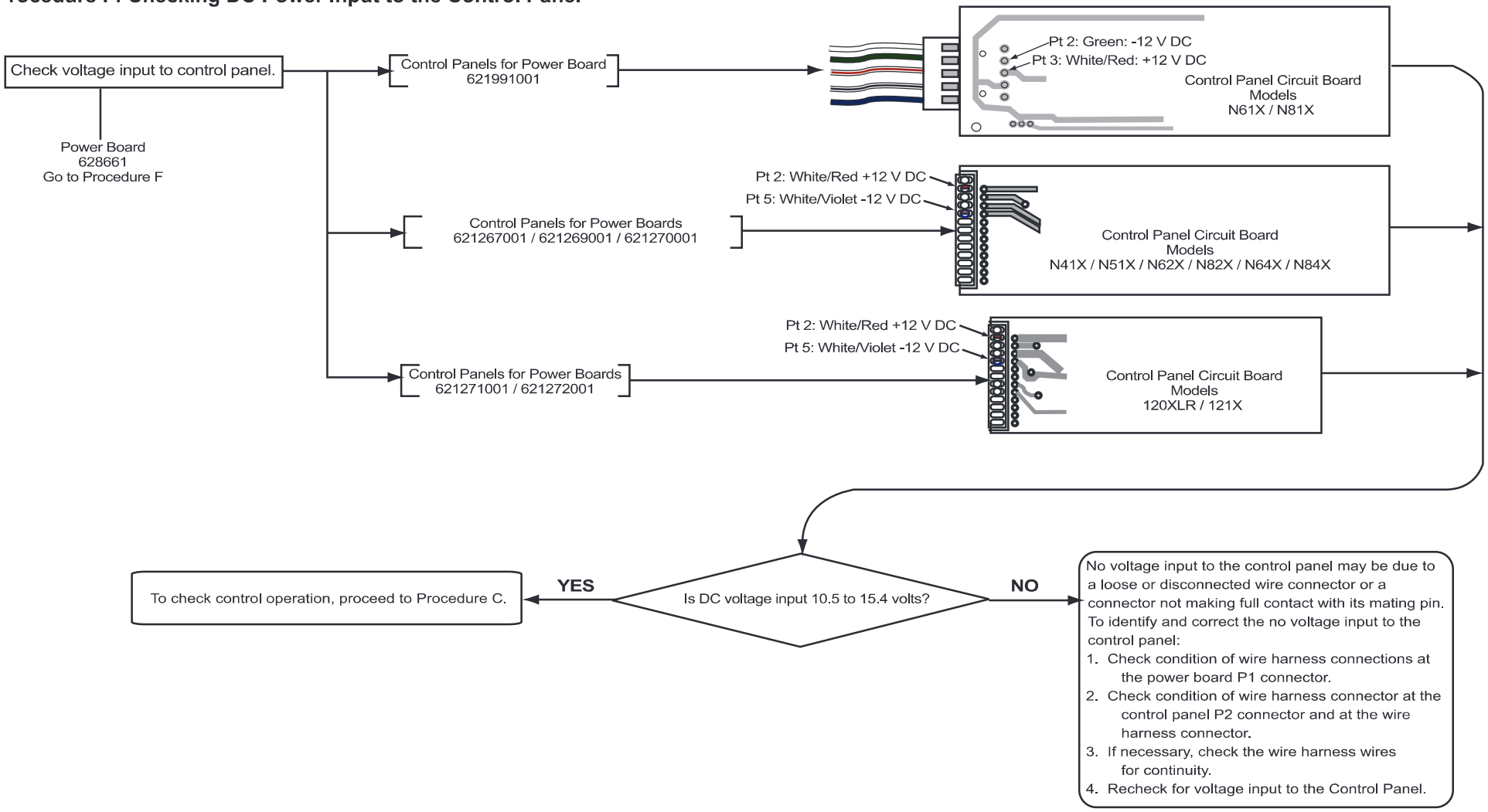
Screen [8] Action
Screen 8 shows active power board outputs. After the screen number turns off, the power board output LEDs display. The position of the LEDs indicate active outputs to the power board.

- DC power to DC heater (3-way refrigerator)
- On AC or standby for AC power
- DC power to divider heater
- DC power to gas valve circuit
- DC power to light circuit
- DC power to ignition circuit

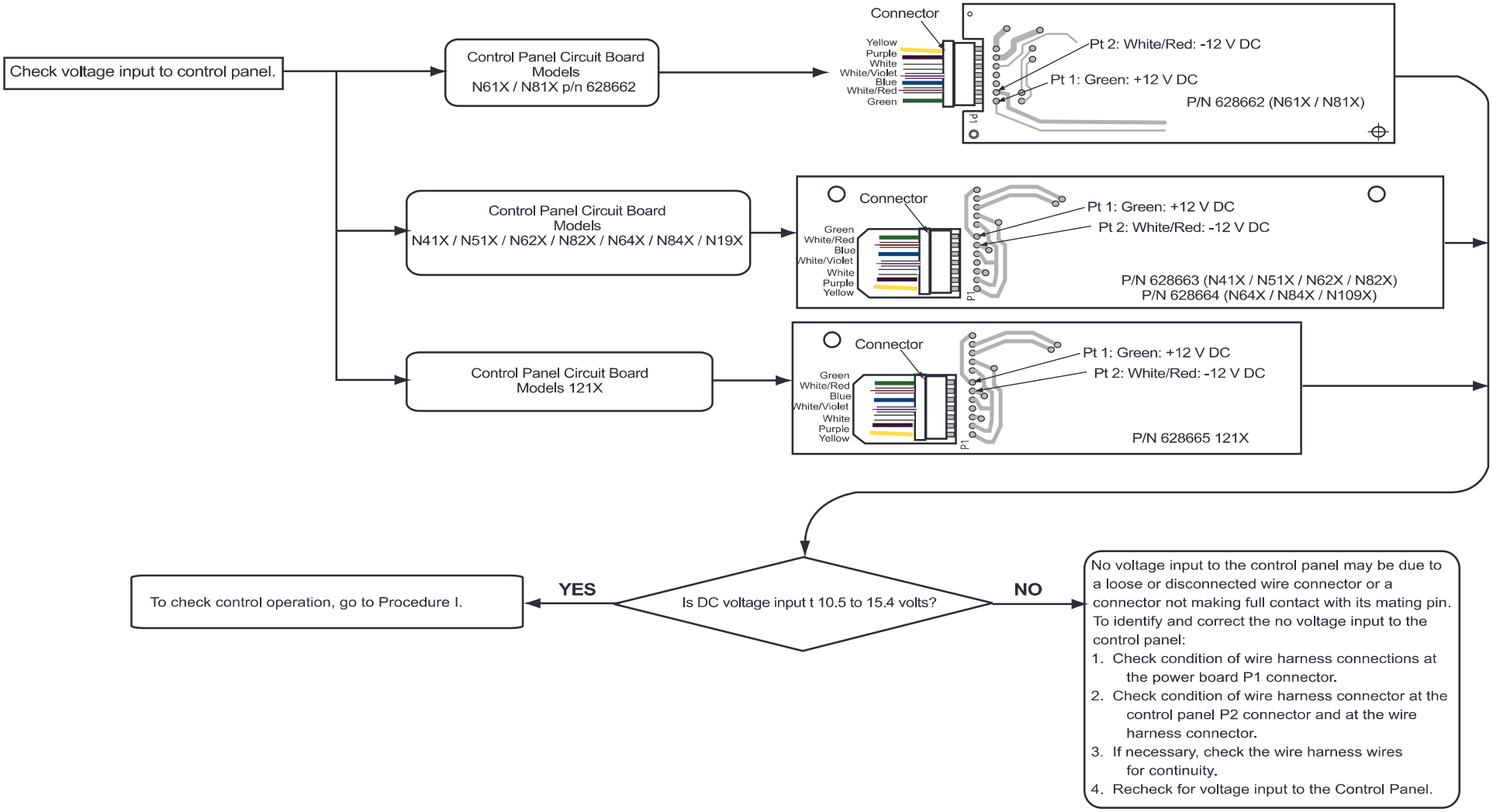
Procedure E: Checking DC Power Input to the Power Board and Power Board DC Power Output to the Control Panel



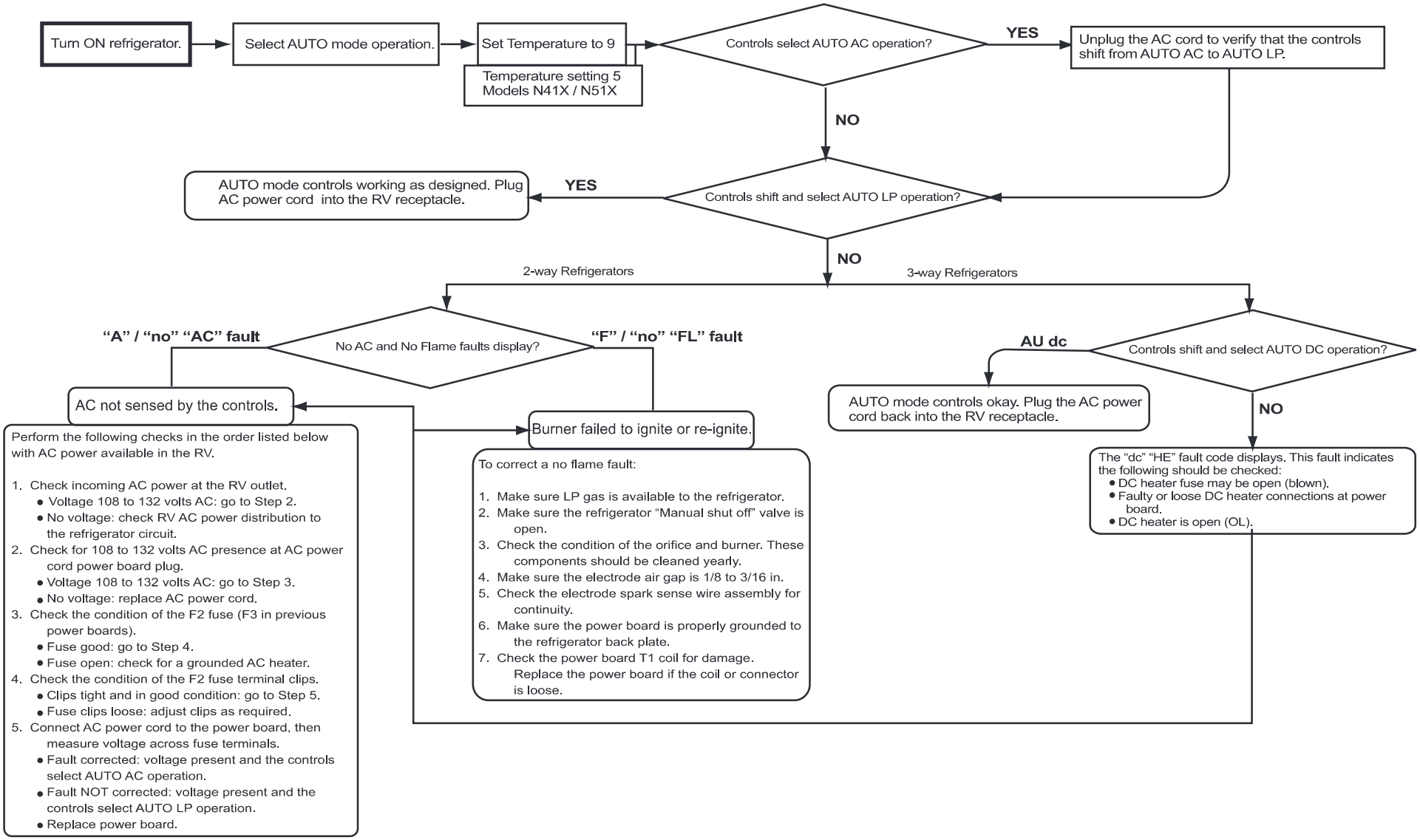
Procedure F: Checking DC Power Input to the Control Panel



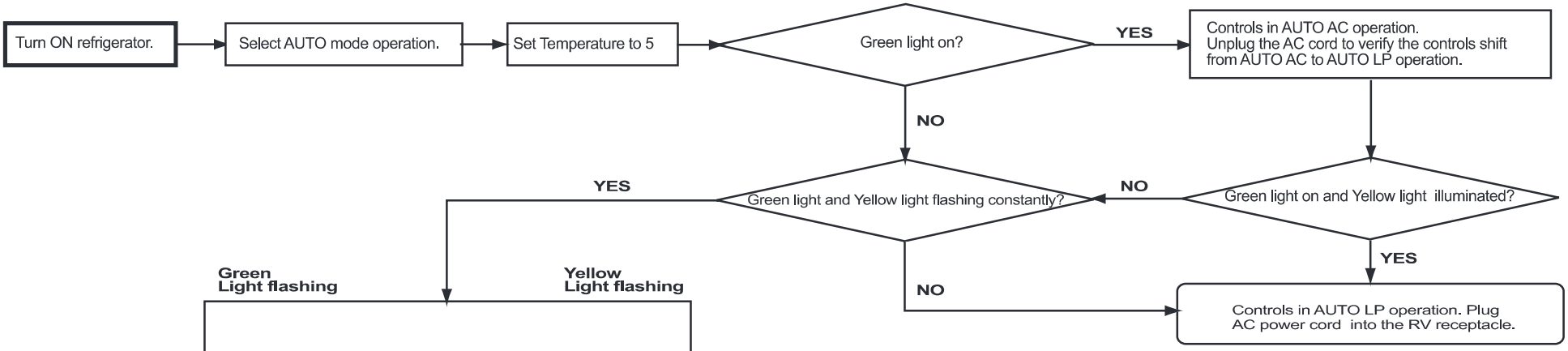
Procedure G: Power Board 628661 – Checking DC Power Input at the Control Panel



Procedure H: Checking Electronic Controls AUTO Operation (Except N61X and N81X Refrigerators)



Procedure I: Checking Electronic Controls AUTO Operation N61X and N81X Refrigerators



AC not sensed by the controls.

Perform the following checks in the order listed below with AC power available in the RV.

1. Check incoming AC power at the RV outlet.
   - Voltage 108 to 132 volts AC: go to Step 2.
   - No voltage: check RV AC power distribution to the refrigerator circuit.
2. Check for 108 to 132 volts AC presence at AC power cord power board plug.
   - Voltage 108 to 132 volts AC: go to Step 3.
   - No voltage: replace AC power cord.
3. Check the condition of the F2 fuse (F3 in previous power boards).
   - Fuse good: go to Step 4.
   - Fuse open: check for a grounded AC heater.
4. Check the condition of the F2 fuse terminal clips.
   - Clips tight and in good condition: go to Step 5.
   - Fuse clips loose: adjust clips as required.
5. Connect AC power cord to the power board, then measure voltage across fuse terminals.
   - Fault corrected: voltage present and the controls select AUTO AC operation.
   - Fault NOT corrected: voltage present and the controls select AUTO LP operation.
   - Replace power board.

Burner failed to ignite or re-ignite.

To correct a no flame fault:

1. Make sure LP gas is available to the refrigerator.
2. Make sure the refrigerator "Manual shut off" valve is open.
3. Check the condition of the orifice and burner. These components should be cleaned yearly.
4. Make sure the electrode air gap is 1/8 to 3/16 in.
5. Check the electrode spark sense wire assembly for continuity.
6. Make sure the power board is properly grounded to the refrigerator back plate.
7. Check the power board T1 coil for damage. A loose coil or connector will require power board replacement.

Fault Codes displayed by N61X and N81X Control Panel LEDs

Green "ON" lignt flashes 1 time every 3 seconds. Thermistor or its circuit is open or shorted. The controls are in Backup Operating Mode.
(1) Check thermistor connections.
(2) Measure thermistor resistance. Do not replace the power board or the control panel.

Green "ON" lignt flashes 2 times every 3 seconds. Mode switch in control panel faulty.
Replace the control panel.

Green "ON" lignt flashes 3 times every 3 seconds. AC heater or its circuit is open. Check AC heater connections and continuity.
Do not replace the power board or the control panel.

Green "ON" light flashes 4 times every 3 seconds. The Yellow light (LP operation) is off. Flame sensing circuit fault.
Replace the power board.

Green "ON" light flashes 5 times every 3 seconds. The Yellow light (LP operation) is off. The controls have detected a No cooling condition.
(1) First occurance - ***reset and then turn the refrigerator Off and back On.***
(2) Second occurance - ***the Power Board has to be hardwire reset. Do not replace the power board or the control panel.***

Green "ON" light flashes 6 times every 3 seconds. The Yellow light (LP operation) is off. Probable causes:
(1)The open limit switch in the cooling unit canister has tripped. It may be due to poor ventilation, exceeding off-level operation limits, or a dirty burner.
(2) The switch connections or jumper wire is disconnected (units without the high temperature limit switch) . ***Do not replace the power board or the control panel.***