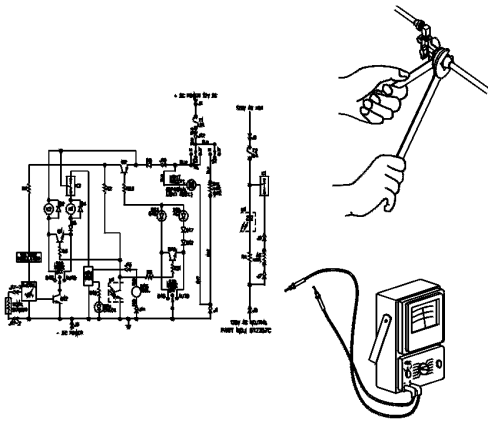




REPAIR GUIDE



MODELS

600

6000

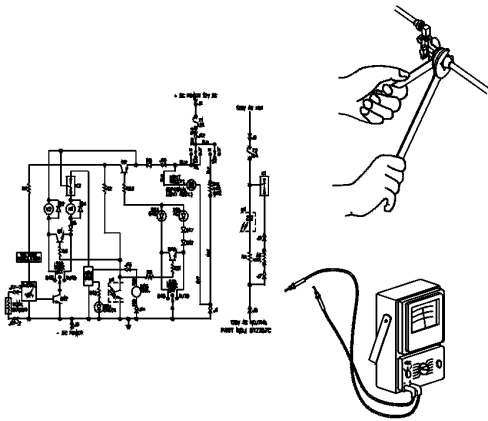
6100

Part No. 618615

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REPAIR GUIDE



MODELS

600

6000

6100

Part No. 618615

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Norcold Repair Guide

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General Information and Specification

OPERATING LIMITS - ALL MODELS

AC Mode: 132 VAC Max., 108 VAC Min.
15.4 VDC Max., 10.5 VDC Min.
DC Mode: 15.4 VDC Max., 11.5 VDC Min.
Gas Mode: 11" W.C.
15.4 VDC Max., 10.5 VDC Min.

MODELS 652, 653, 6052, 6053 RATINGS

1200 Btu/Hr Input
LP Gas Mode:
11" W.C.
LP14 Orifice
12 Volts DC control voltage
AC Mode:
110 Volts AC, 200 Watts
12 Volts DC control voltage
DC Mode (3-Way only):
12 Volts DC

MODELS 662, 663, 6062, 6063, 6162, 6163 RATINGS

1450 Btu/Hr Input
LP Gas Mode:
11" W.C.
LP16 Orifice
12 Volts DC control voltage
AC Mode:
110 Volts AC, 300 Watts
12 Volts DC control voltage
DC Mode (3-Way only):
12 Volts DC

MODELS 682, 683, 6082, 6083, 6182, 6183 RATINGS

1500 Btu/Hr Input
LP Gas Mode:
11" W.C.
LP16 Orifice
12 Volts DC control voltage
AC Mode:
110 Volts AC, 300 Watts
12 Volts DC control voltage
DC Mode (3-Way only):
12 Volts DC

CURRENT DRAWS - 652, 653, 6052, 6053

Automatic Ignition - Less than 500 milliamps or .50 amps
AC Heating Element - 1.5 amps at 110 Volts AC
1.7 amps at 120 Volts AC
DC Heating Element - 9.2 amps at 12 Volts DC
10.7 amps at 14 Volts DC

CURRENT DRAWS - 662, 663, 682, 683, 6062, 6063, 6082, 6083, 6162, 6163, 6182, 6183

Automatic Ignition - Less than 500 milliamps or .50 amps
Interior Light (when equipped) - 300 milliamps (.3 amps)
Humidity Heater - 240 milliamps (.24 amps)
AC Heating Element - 2.7 amps at 110 Volts AC
2.9 amps at 120 Volts AC
DC Heating Element - 13.8 amps at 12 Volts DC
16.1 amps at 14 Volts DC

12 Volts DC Connection

All refrigerator models require a 12 volt DC supply (even though 2-Way models are designed to operate on 120 volts AC and gas, a 12 volt DC control is required to perform control functions in Gas and AC Modes. The DC lead connections (1/4" male quick connects) are at terminals located on the Power Supply at the rear of the refrigerator. One connection is marked positive (+) and the other negative (-). Correct polarity must be observed when connecting to the DC supply. Connect two wires at the refrigerator and route to the DC supply.

The distance the current must travel from the battery to the refrigerator dictates the AWG wire size to be used. Should the wire be too small for the distance, a voltage drop will result. In the case of 3-Way models, the voltage drop affects the wattage output of the system heater and resultant refrigerator performance.

See the wire and fuse chart (Table 1) for the correct wire and fuse size.

Electrical Connection 120 Volts AC

The refrigerator is equipped with a three-prong plug for protection against shock hazard and must be connected into a recognized three-prong attachment receptacle. The free length of cord is 24" and therefore is recommended that the receptacle be located to the left side of the refrigerator (viewed from rear) and approximately 12" from the floor. This allows easy accessibility through the vent door. The cord must be routed so as not to come in contact with the Burner cover, flue pipe, or any other component that could damage the cord insulation.



DO NOT REMOVE (CUT) GROUNDING PRONG FROM THE REFRIGERATOR AC POWER CORD. REMOVAL OF THIS

PRONG CAN RESULT IN A SEVERE ELECTRICAL SHOCK, AS WELL AS, VOIDING THE REFRIGERATOR ELECTRICAL CERTIFICATION AND WARRANTY. EXTENSION CORDS ARE NOT RECOMMENDED.

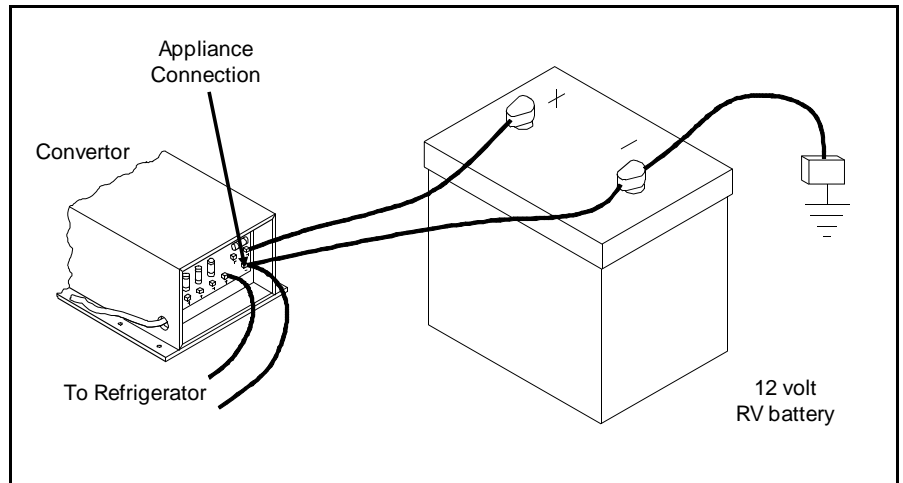


Figure 11.1 Recommended 12 Volt Supply Connection

	652, 6052		653, 6053	
	min. wire size	max. fuse size	min. wire size	max. fuse size
0-20'	18 AWG	5 Amp	12 AWG	20 Amp
over 20'	18 AWG	5 Amp	10 AWG	30 Amp

	662, 682, 6062, 6082, 6162, 6182		663, 683, 6063, 6083, 6163, 6183	
	min. wire size	max. fuse size	min. wire size	max. fuse size
0-20'	18 AWG	5 Amp	10 AWG	30 Amp
over 20'	18 AWG	5 Amp	8 AWG	40 Amp

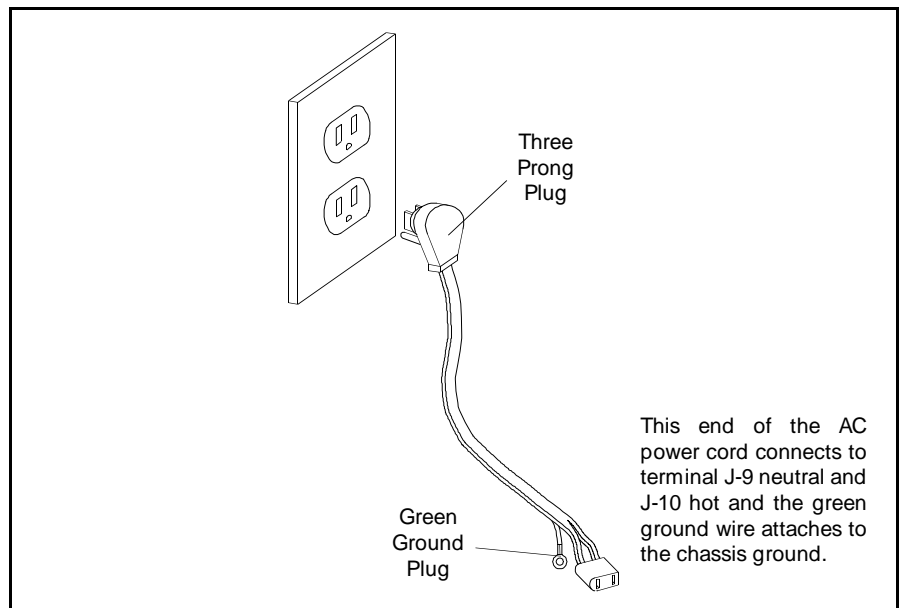


Figure 11.2

Operation

Control Description

These refrigerator models require 12 volts DC be applied at all times in order for the refrigerator to operate in any mode. The 12 volts must be supplied to the Power Supply terminal J3 ground and J4 + 12 volts. From terminal J4 the 12 volts is routed through a 3 AMP fuse to a wire harness (on 3 way models the 12 volts from J4 is also routed thru a 20 fuse to the normally open contact of relay K3).

On the single door refrigerator, when the Mode Selector switch(s) is in the OFF position all current draw is eliminated.

On double door models, the 12 volts is controlled by the User at the Humidity/Storage switch which is located on the Mode Selector (Eyebrow). When the switch is in STORAGE position, all DC current draw is eliminated. In the NORMAL position, the switch allows normal operation but restrains operation of the Humidity heater. The HIGH HUMIDITY position allows both normal operation and the Humidity heater function.

By setting the HUMIDITY/STORAGE switch to the NORMAL operation or HIGH HUMIDITY position, the 12 volts is then applied thru the switch back to the Power Supply where it is applied to the emitter of transistor Q2, the coil of relay K1, then thru the cable to the Mode Selector switch on the Eyebrow board. When the Mode Selector is set to any mode current will flow thru transistor Q2, thru the cable, to the indicator lights on the Eyebrow board.

Auto Mode

When AUTO is selected, and 120 volts AC is supplied to terminals J9 hot, and J8 neutral the AC light on the Eyebrow will be illuminated. The 12 volts DC will now be pulled to ground thru a transistor on the Eyebrow board, relay K1's contact will close and 120 volts AC will be applied to the AC heater terminals, J6 and J7 on the Power Supply.

If the 120 volts AC input is disconnected from the Power Supply input terminals J8 and J9, the opto coupler on the Power Supply will sense the loss of 120 volts. Q1 transistor will now ground the coil on relay K2, K2 contact will close, which breaks the 12 volt circuit to relay K1, and 12 volts will be applied to the Ignition Module to start the ignition sequence, and the L.P. light on the Eyebrow will illuminate.

When the 120 volt AC is reapplied to the Power Supply terminals J8 and J9 the refrigerator will automatically switch back to AC operation by the reverse of the previous paragraph.

Gas Mode

When the Mode Selector switch is set to GAS, the L.P. light on the Eyebrow will illuminate, the coil of relay K2 will be grounded by a transistor on the Eyebrow board, K2 contact will close, and 12 volts will be applied to the Ignition Module to start the ignition sequence, the Gas Solenoid valve will open. The ignition electrode will spark the Burner. When a flame is sensed the spark will cease. If the Burner does not light, the electrode will not sense the flame, the spark will cease. In this case, the Gas Solenoid valve will close, and the Ignition Module will illuminate the check light on the Eyebrow.

DC Mode

When the Mode Selector is set to DC ON (3 way models only), the coil of relay K3 is grounded by a transistor on the Eyebrow board, relay K3 contact closes and 12 volts DC is applied to the DC heater terminal J5 on the Power Supply.

Location of Controls

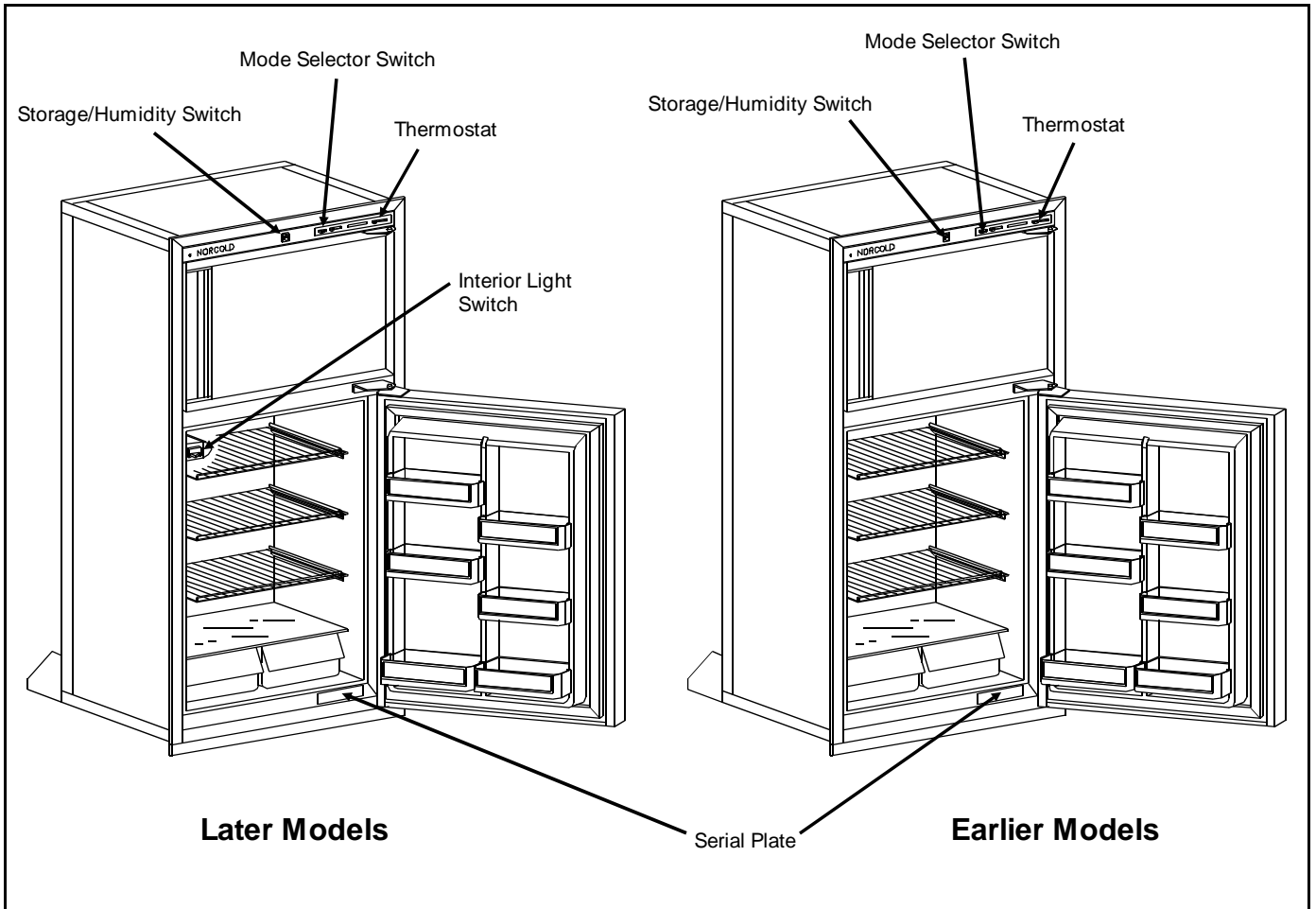


Figure 11.3 Front View

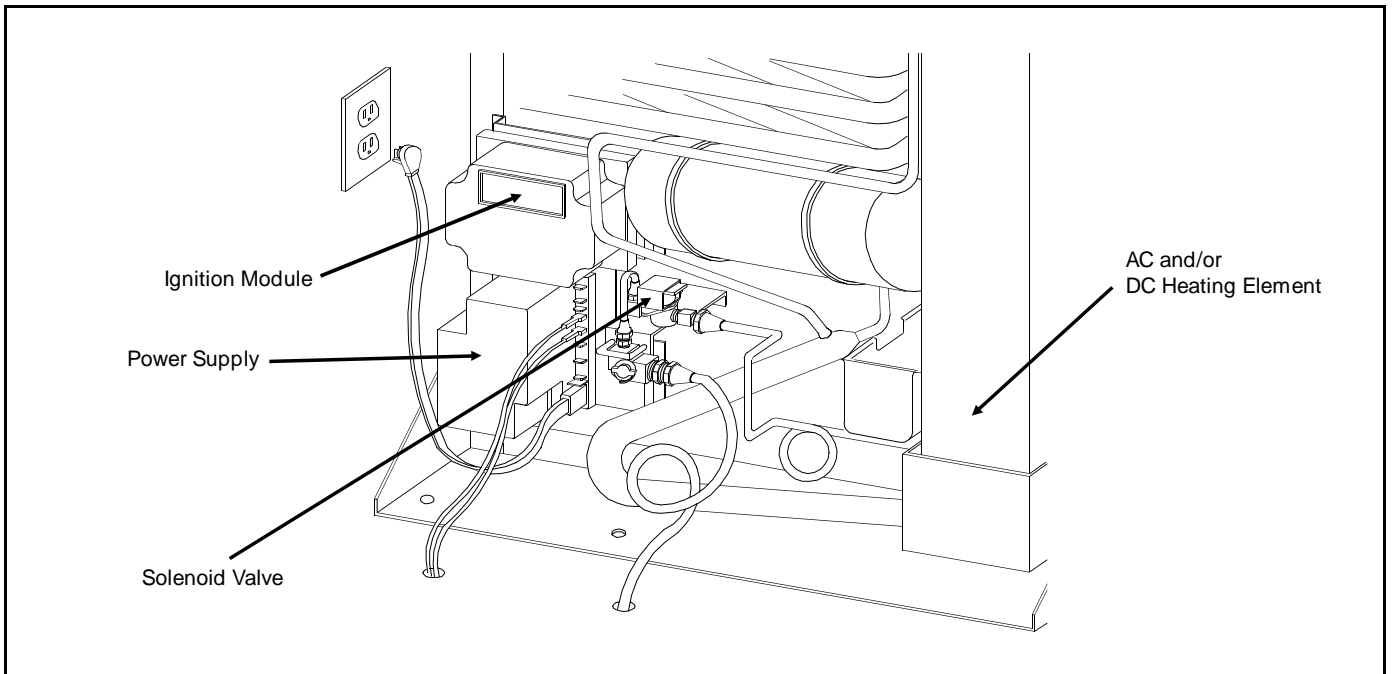


Figure 11.4 Rear View

Operation and Lighting Instructions

Start Up Instructions - Auto Mode

Note:

Double door models only - switch Humidity/Storage switch (on Eyebrow panel) must be in NORMAL operation or HIGH HUMIDITY position for refrigerator to operate.

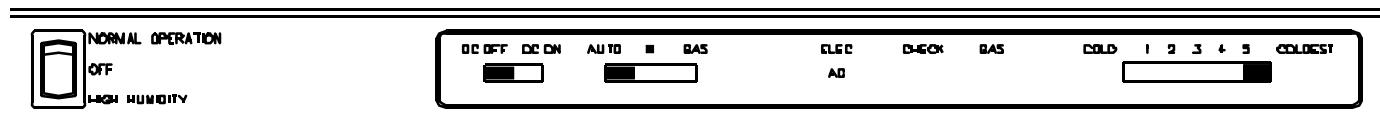


Figure 11.5 Electric Operation

1. Move Thermostat to COLDEST position. Set AUTO - OFF - GAS switch to AUTO. Set DC OFF/DC ON to DC OFF.
2. If 120 volts is active, Eyebrow panel will display AC, indicating refrigerator is operating in 120 volt AC Mode
3. If 120 volts AC is inactive (power failure, disconnected, etc.), Eyebrow panel will display LP, indicating refrigerator has automatically switched to LP gas mode.
4. If Eyebrow panel displays LP and a red X continuously, the refrigerator has failed to ignite Burner on gas mode. Restart gas operation by moving AUTO - OFF - GAS switch to OFF and back to AUTO (See steps 3, 4 and 5 under Gas Mode.). Note: Unit will automatically return to AC when 120 volts AC is restored, even if the unit is locked out on GAS operation.
5. Move Thermostat to desired setting, usually a mid-setting.

Start Up Instructions - Gas Mode

Note:

Double door models only - Humidity/Storage switch (on Eyebrow panel) must be in NORMAL operation or HIGH HUMIDITY position for refrigerator to operate.

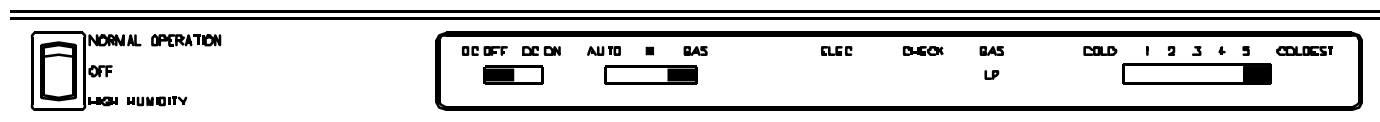


Figure 11.6 Gas Operation

1. Move Thermostat to COLDEST. Set AUTO - OFF - GAS switch to GAS. Set DC OFF/DC ON to DC OFF.
2. Eyebrow panel will display LP, indicating LP gas mode. (If LP is not displayed, check for loss of DC supply voltage.) Initially, the red X will be displayed for about 5 seconds; after which, sparking will start at the burner and the red X will shut off.
3. After 10 seconds, the burner should be ignited and operating normally.
4. On the initial refrigerator start-up, it may take longer than 10 seconds to allow air to be purged from the gas line. If gas does not ignite within 10 seconds, valve will automatically shut off and the red X will be displayed at the CHECK position.
5. To restart when the X is displayed, move AUTO-OFF-GAS switch to OFF position, then return switch to the GAS position.



DO NOT CONTINUE TO RESET GAS SWITCH IF THE CHECK INDICATION CONTINUES TO DISPLAY AFTER SEVERAL TRIES. A GAS BUILD-UP MAY OCCUR IN THE BURNER AREA AND RESULT IN A FLASH BACK WHICH MAY CAUSE PERSONAL INJURY.

DC Mode

Note:

Double door models only - Humidity/Storage switch (on Eyebrow panel) must be in Normal operation or High Humidity position for refrigerator to operate.

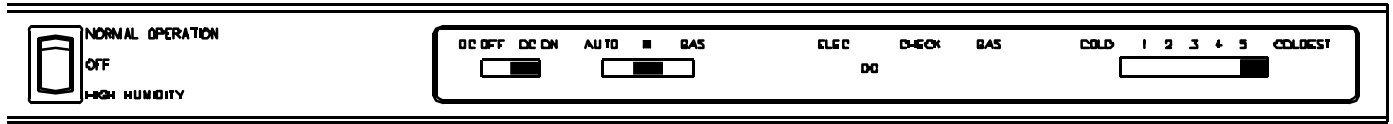


Figure 11.7 DC Operation

1. Move thermostat to COLDEST position.
2. Set DC OFF-DC \ ON switch to DC ON. (DC ON will override the AUTO-OFF-GAS switch.)
3. Eyebrow panel will display DC, indicating operation in DC mode.

Shut Down Instructions

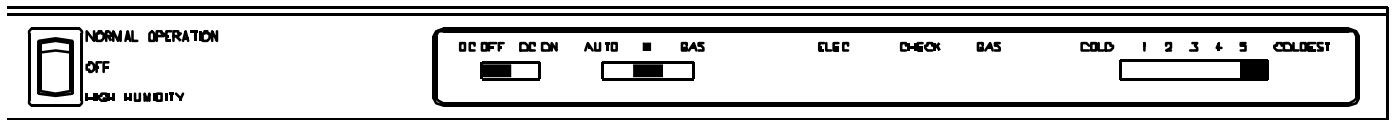


Figure 11.8 No Operation

Short Duration:

Set AUTO-OFF-GAS switch to OFF. Set DC OFF-DC ON switch to DC OFF.

Long Duration:

Set NORMAL-STORAGE-HIGH HUMIDITY switch (located on Eyebrow panel) to STORAGE.

Information Regarding Battery Drain

As indicated in the specifications, a 12 volt DC source is required for operation on gas to provide features of automatic ignition. The current draw is less than 500 milliamps. If the Humidity Heater is also energized, this adds 240 milliamps for a total of 740 milliamps (.74 amps). This indicates that the drain on the battery is very low and has little effect on "battery run down" unless these switches are left on for long periods of time on a battery with no means of recharging.

During AC operation, 12 volt DC is required to operate the Humidity Heater, temperature sensing circuit, and the light display.

On 3-Way models, the DC operation draws approximately 14 amps at 12 volts or 16 amps at 14 volts.

Battery drain should also be considered during times when the refrigerator is stored or defrosted. In this case, the NORMAL-STORAGE-HIGH HUMIDITY switch should be set to the STORAGE position.

Except for DC operation (3-Way models) it is evident that the 12 volt demand is quite low; nevertheless, the refrigerator should not be operated for long periods of time from a battery only, without a means of recharge (through alternator or convertor).

Parts Function

Power Supply

Furnishes the selected heat source with the selected voltage to operate the refrigerator, provided the voltage inputs are correct (See Figure 11.9). It supplies:

1. 12 volts DC to the HIGH HUMIDITY circuit (2-door models only)
2. 12 volts DC to the Eyebrow board
3. 12 volts DC to the Ignition Module when GAS is selected or when AUTO is selected and 120 volts AC is not present.
4. 12 volts DC to the DC heater when DC is selected (3-Way models only).
5. 120 volts AC to the AC heater when AUTO is selected and 120 volts AC is present.

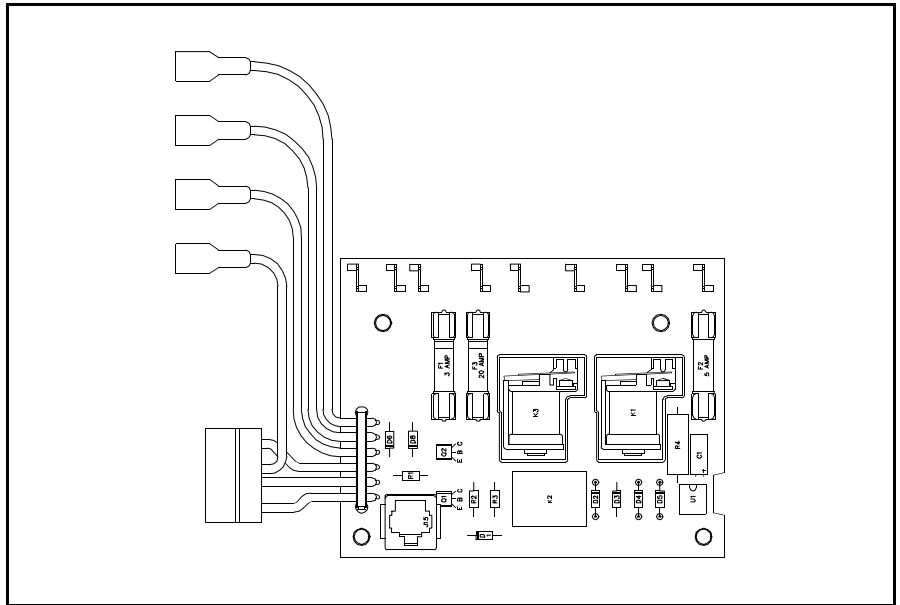


Figure 11.9 Power Supply

Cable

Connects the Power Supply and Eyebrow board together. See Figure 11.10

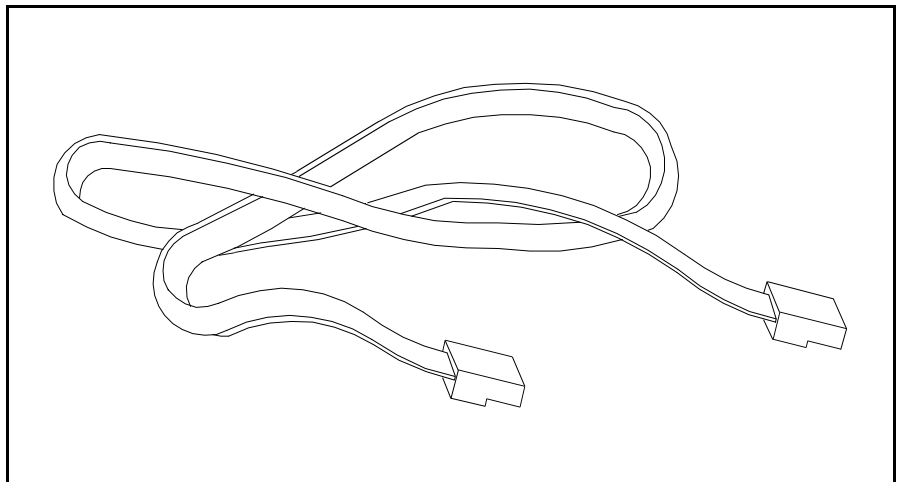


Figure 11.10 Cable

Eyebrow Board

Selects the modes of operation. When set to AUTO it will select AC as long as AC is supplied. If AC is lost for some reason it will automatically select GAS. It also displays the mode of operation, determines the operating temperature and indicates when a trial for ignition has failed. On 3-Way models when DC is selected it will override the automatic mode.

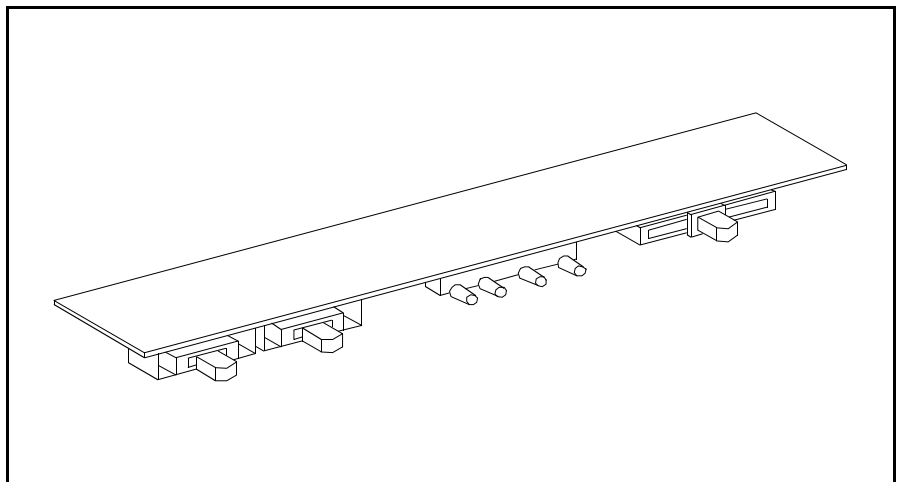


Figure 11.11 Eyebrow Board

Thermistor

Senses the temperature of the refrigerator and tells the Thermostat when to turn on and off.

Ignition Module

Ignition Module is used only during GAS operation, and does the following:

1. Supplies 12 volt DC to operate the Gas Valve.
2. Supplies power to ignition electrode to ignite the Burner.
3. Senses the flame through the electrode.
4. When the Burner ignites and remains lit, the Ignition Module turns off the spark.
5. If the Burner does not ignite, or ignites and goes out when the sparking stops, the Ignition Module will (a) close the Gas Valve thereby turning off the gas supply to the Burner and (b) illuminate the red check lamp.

Gas Valve Assembly

The Gas Solenoid valve opens when 12 volts DC is supplied and closes when the 12 volts is removed, allowing LP gas to flow to the Burner when it is open. Whether or not this 12 volts is supplied is determined by the flame sensing circuit in the Ignition Module.

The manual shut-off valve allows the gas supply to be turned off to the refrigerator.

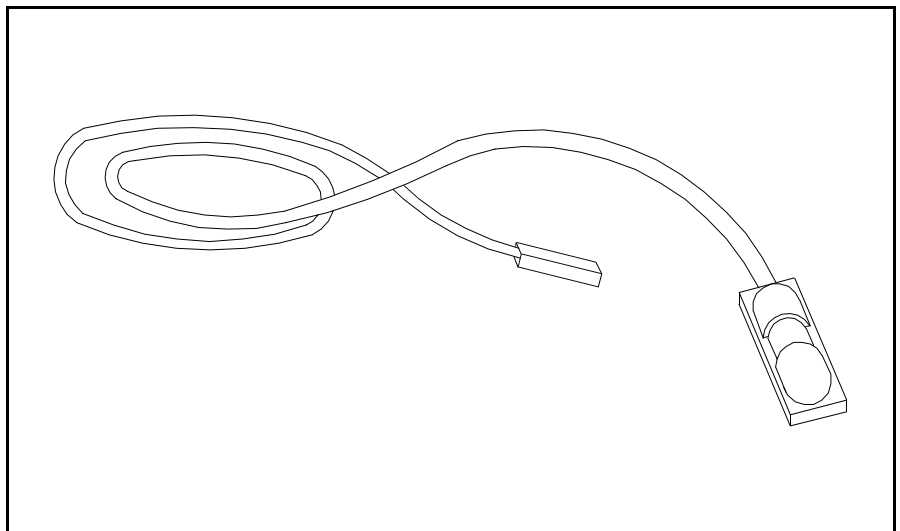


Figure 11.12 Thermistor

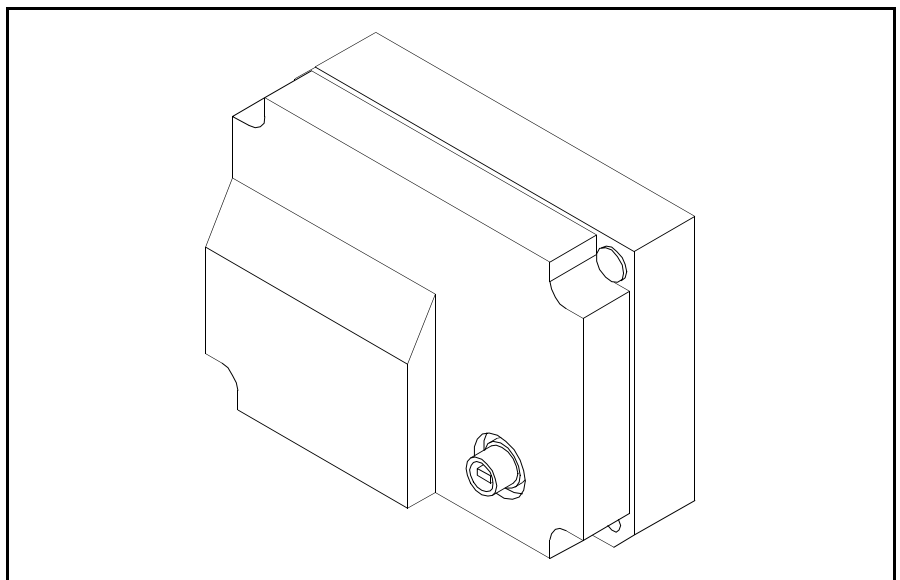


Figure 11.13 Ignition Module

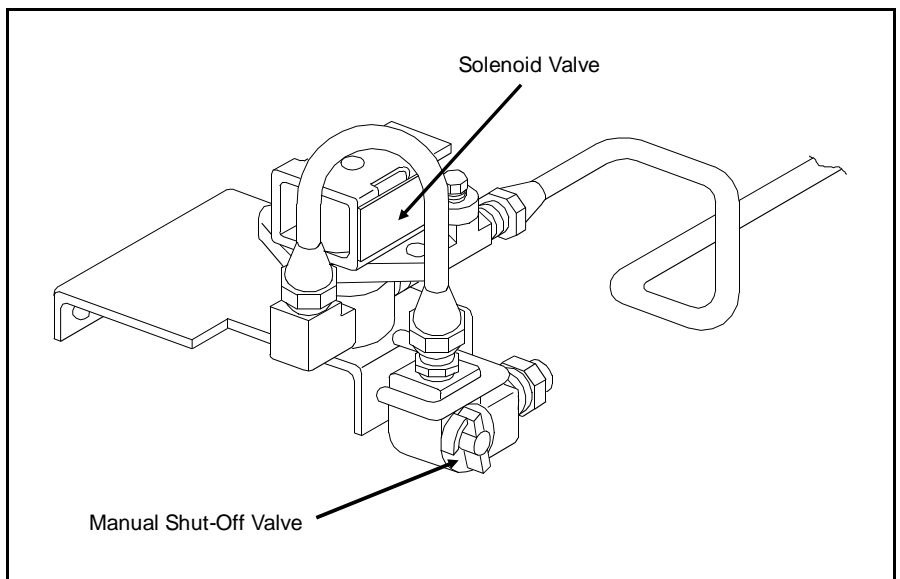


Figure 11.14 Gas Valve Assembly

Orifice

Applies the correct amount of LP gas to the Burner provided the main line gas pressure is correct.

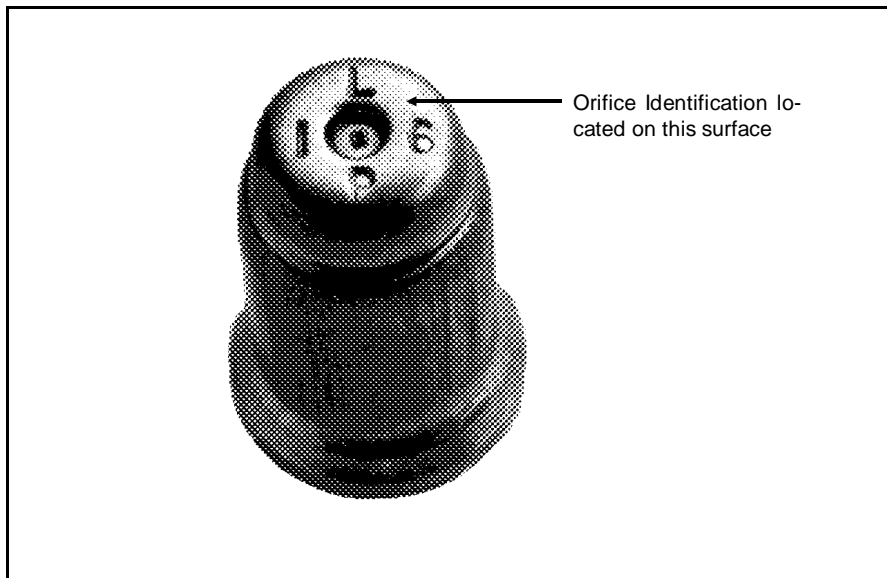


Figure 11.15 Burner Orifice

Burner

Applies the correct amount of heat to the cooling unit when supplied the correct amount of LP gas and air.

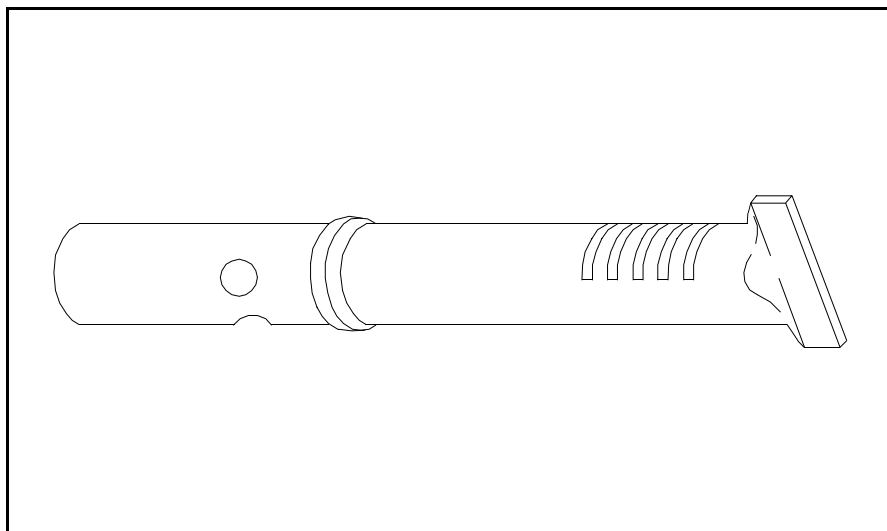


Figure 11.16 Burner

Ignition Electrode

Sparks to the Burner to ignite the flame and sense the presence of a proper flame.

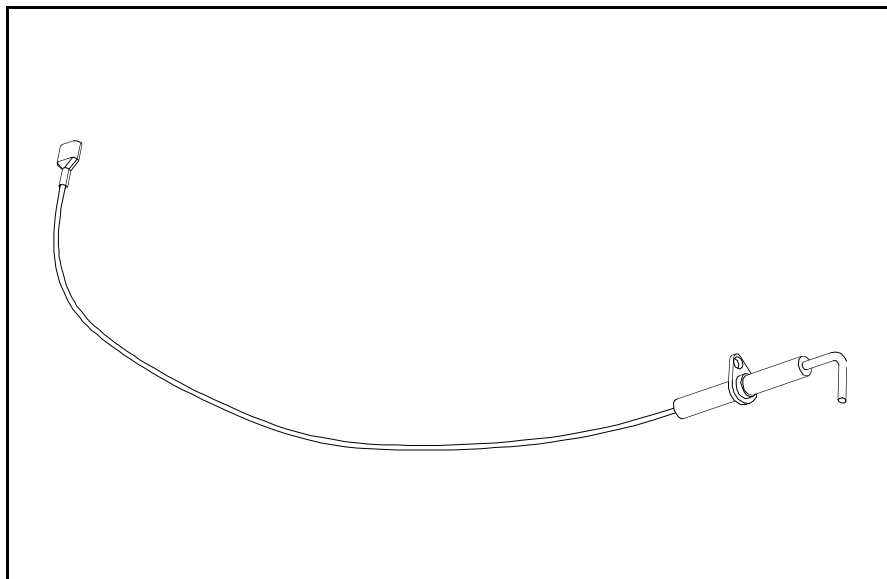


Figure 11.17 Ignition Electrode

AC Heating Element

Applies specific amount of heat to the cooling unit, providing 120 volts AC is present to the refrigerator.

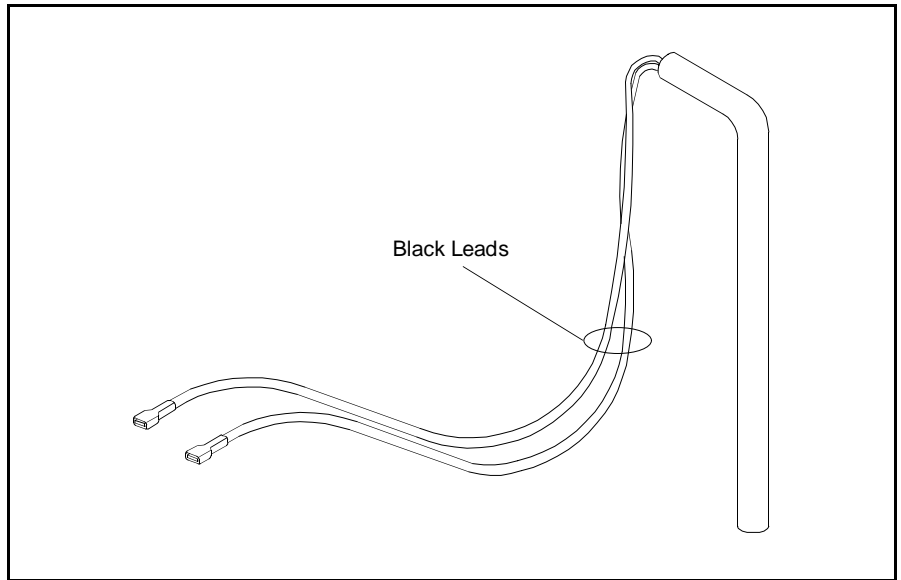


Figure 11.18 AC Heater

DC Heating Element

Applies specific amount of heat to the cooling unit, providing the DC input voltage is correct.

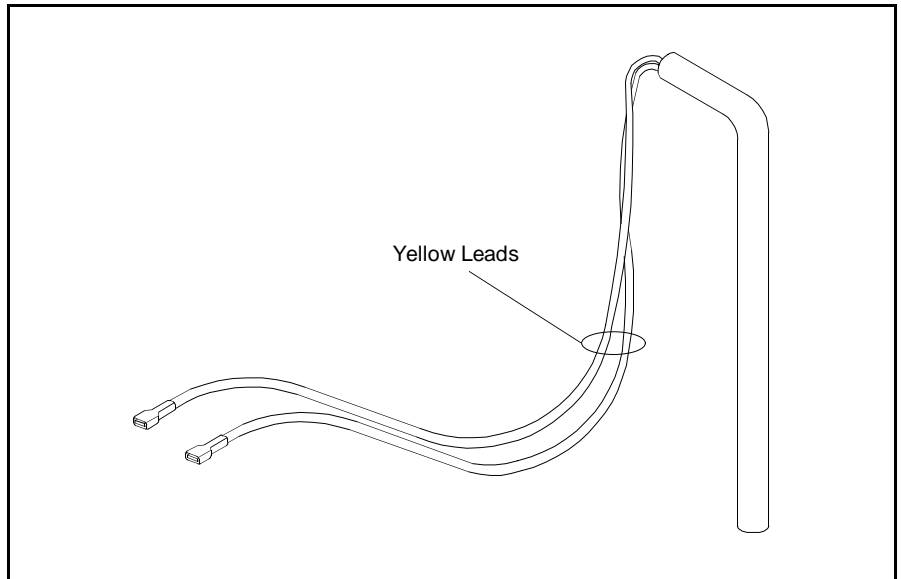


Figure 11.19 DC Heater

Humidity/Storage Switch (2 - Door Models Only)

The HIGH HUMIDITY position keeps the surface between the door openings dry during high humidity conditions. The switch should be left in the NORMAL OPERATION position unless condensation is observed in this area. When the RV is being stored for the winter this switch should be in the OFF position.

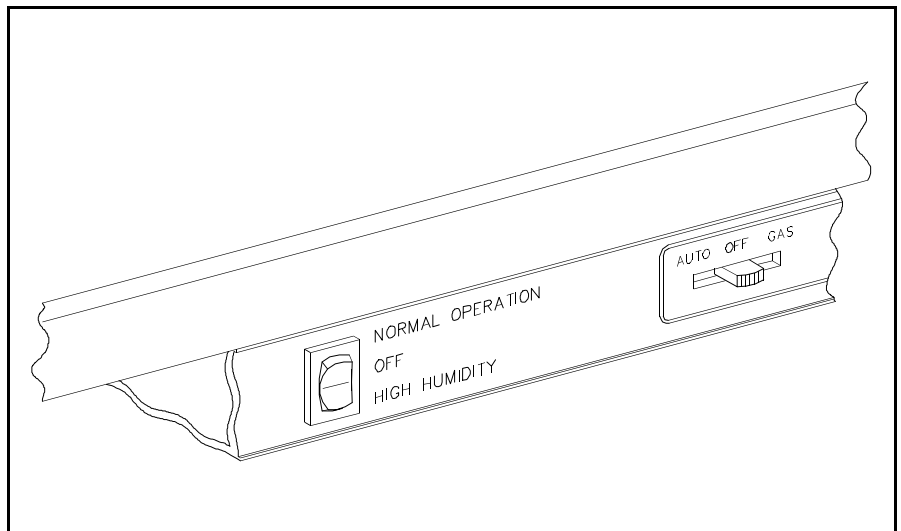


Figure 11.20 Humidity/Storage Switch

Troubleshooting

IMPORTANT:

The troubleshooting procedures which follow require that each check be performed in sequence. Conclusions made at any point in the procedure presumes that all preceding steps have been followed.

Auto Mode of Operation

Answer these questions before calling Norcold's technical Service Number.

1. Is the refrigerator installed and vented in accordance with the Ventilation instructions specified in Section 2?
2. Is the refrigerator being operated in a comfortably level position?
3. Is the refrigerator plugged into AC power?
4. Do you have 12VDC power to terminals (-J3) and (+ J4)?
5. Do you have 12 Volts DC through the 3 amp fuse?
6. Do you have 120 Volts AC through the 5 amp fuse?
7. Did you check for loose wire connections or pinched wires?
8. Is the modular connector on the cable plugged into the Power Supply board and the Eyebrow board?
9. Is the Mode Selector set to AUTO?
10. Is the AC heater element the proper voltage and wattage? See Technical Data section.
11. Is Humidity/Storage switch, located on the Eyebrow panel, in the NORMAL (ON) position or HIGH HUMIDITY (ON) position?

The following is a systematic approach for tracing faults in the AC mode:

1. Using a volt-ohm-meter, check for + 12 volts DC at terminals J3 and J4 and as shown by Figure 11.21. If you do not have 12 volts as shown, repair the 12 volt source.
2. With the volt-ohm-meter set to

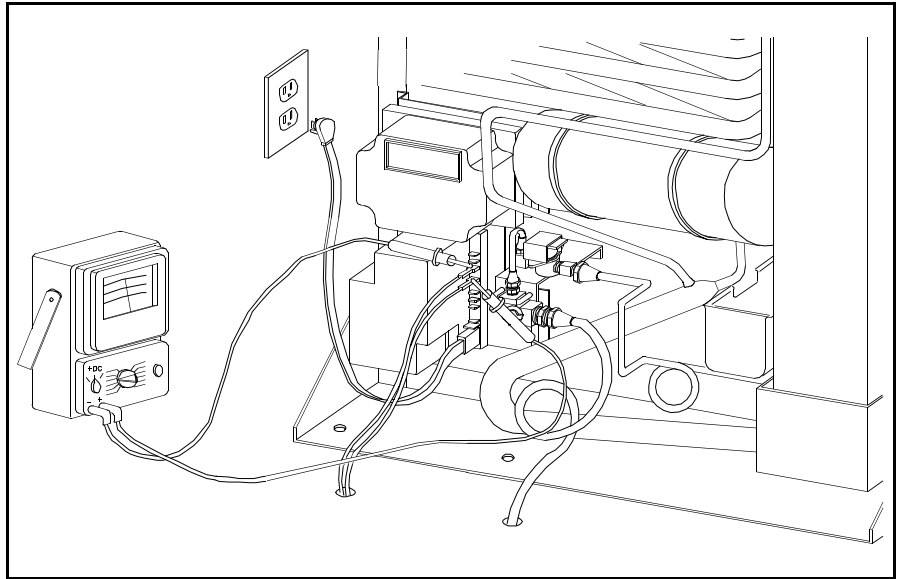


Figure 11.21 12 Volt DC Supply Check

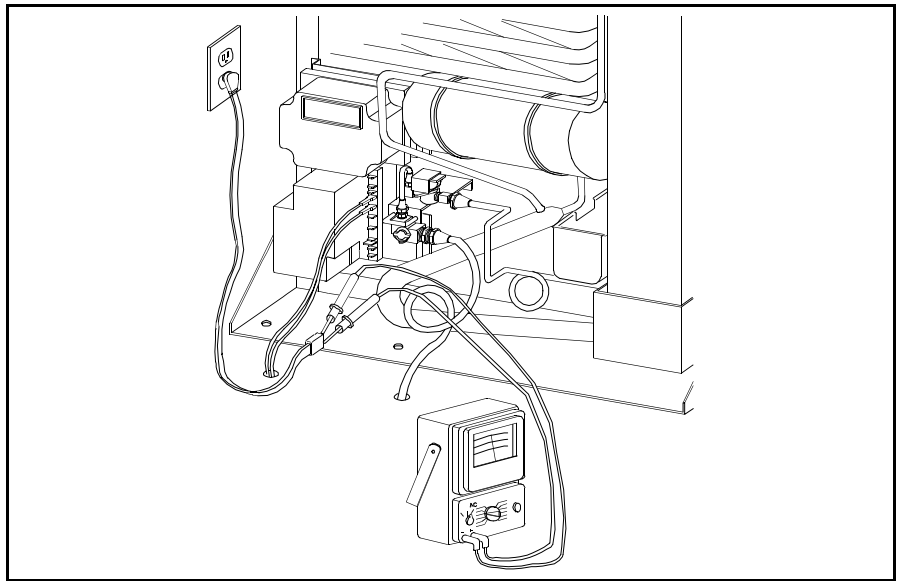


Figure 11.22 120 Volt AC Check at Power Cord

measure AC volts, check for 120 volts AC at the terminal ends of the power cord as shown in Figure 11.22. If 120 volts is not read, either the power cord is defective (open) or 120 volts AC is not being supplied at the receptacle.

WARNING

USE EXTREME CAUTION WHEN WORKING ON THE AC ELECTRICAL COMPONENTS OF THE REFRIGERATOR. BEFORE REPLACING ANY ELECTRICAL COMPONENT, DISCONNECT THE AC POWER SOURCE TO THE REFRIGERATOR. ELECTRICAL VOLTAGE CAN CAUSE SEVERE INJURY AND DEATH.

- Remove all the wires that are connected to the terminals on the right side of the Power Supply.

⚠ WARNING

USE EXTREME CAUTION WHEN REPLACING ANY DC ELECTRICAL COMPONENTS. CAUTION MUST BE TAKEN DISCONNECTING THE DC SUPPLY. THE DC SUPPLY IS CLOSE TO THE PROPANE GAS SUPPLY TO THE REFRIGERATOR. ARCING CAN EXIST WHEN DISCONNECTING THE DC SUPPLY WHICH CAN IGNITE A LEAK IN THE PROPANE SUPPLY LINE. RESULTS CAN BE SEVERE PERSONAL INJURY OR DEATH.

- Remove the Power Supply cover to gain access to the Power Supply.
- Reconnect the DC supply to terminals J3(-) and J4(+) on the Power Supply.
- Reconnect the AC power cord to terminals J8 and J9.
- With the volt-ohm-meter set to measure + 12 volts DC, check for 12 volts through the fuse as shown by Figure 11.23. If you do not have 12 volts, replace the 3 amp fuse.

⚠ WARNING

NEVER OVERFUSE A CIRCUIT. REPLACE BLOWN FUSE WITH EXACT REPLACEMENT INDICATED BY NORCOLD. OVERFUSING OF A CIRCUIT CAN RESULT IN A FIRE.

- With the volt-ohm-meter set to measure 120 volts AC, check for 120 volts through the 5 amp fuse as shown by Figure 11.24. If you do not have 120 volts as shown, replace the 5 amp fuse.

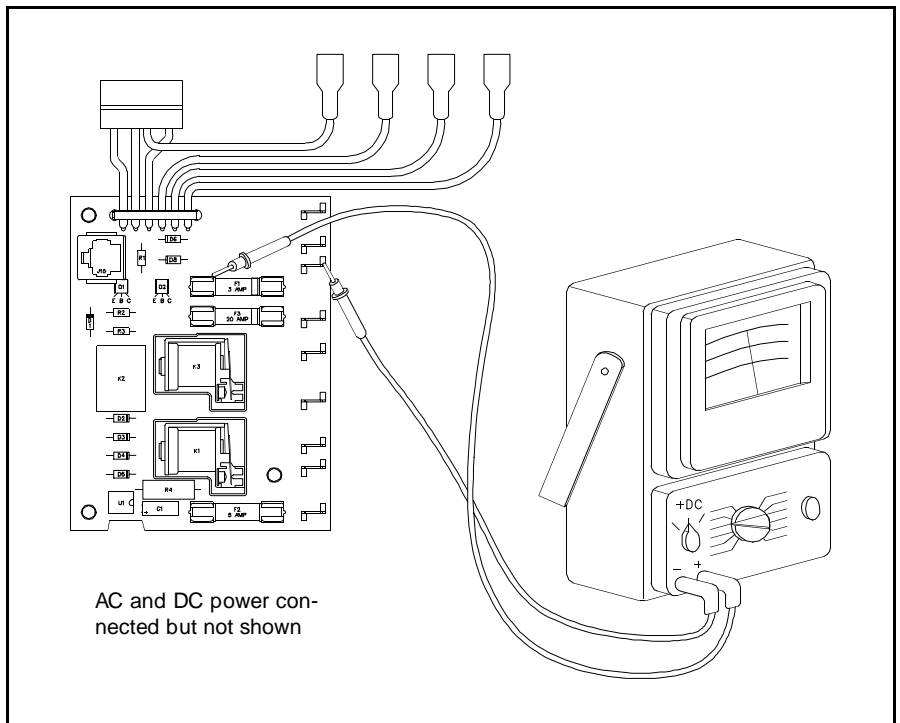


Figure 11.23 3 Amp Fuse Check

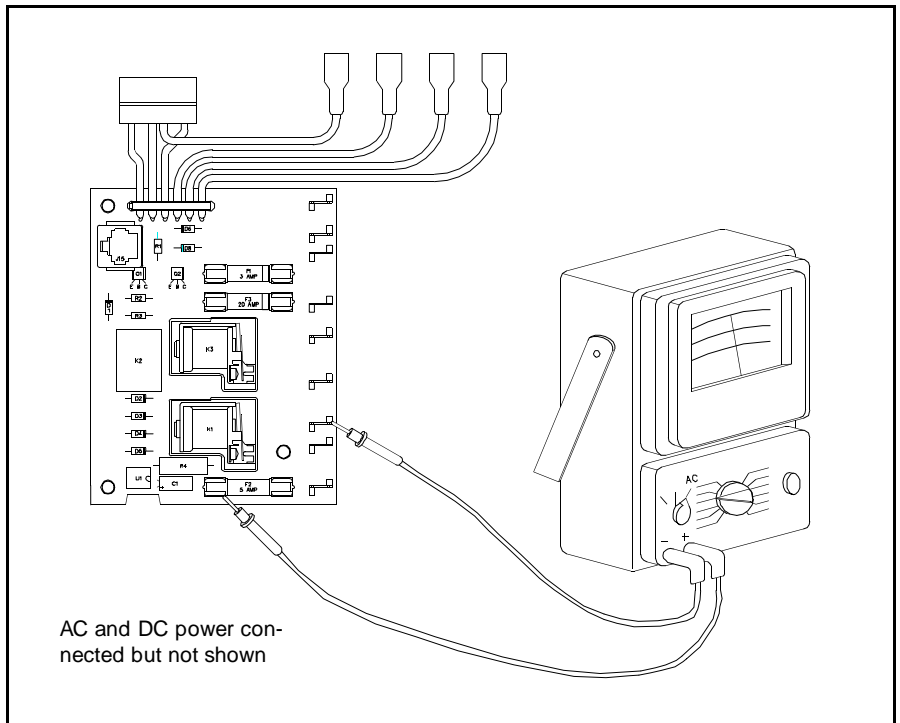


Figure 11.24 5 Amp Fuse Check

⚠ WARNING

NEVER OVERFUSE A CIRCUIT. REPLACE BLOWN FUSE WITH EXACT REPLACEMENT INDICATED BY NORCOLD. OVERFUSING OF A CIRCUIT CAN RESULT IN A FIRE.

9. Check that the Humidity/Storage switch (Figure 11.20) (2 door models only) is set to NORMAL or HIGH HUMIDITY.
10. For the single door models, check that the two blue wires, terminals J10 & J12, are connected together as shown by Figure 11.25.
11. With the volt-ohm-meter set to measure 12 volts DC, check for 12 volts at the emitter of transistor Q2 as shown in Figure 11.26.
 - A. If you do not have 11-12 volts as shown, connect J10 and J12 together as shown in Figure 11.25 (two-door models only).
 - B. If you now have 11-12 volts at the emitter of Q2 there is an open circuit in the harness to the NORMAL STORAGE HIGH HUMIDITY switch and it must be repaired. (See wiring pictorial at the back of this section.)
12. Set the Mode Selector switch to AUTO (on 3-Way models set to DC OFF). The AC light on the Eyebrow should be illuminated.
13. If the AC light is not illuminated, you must do some more testing to find the problem.

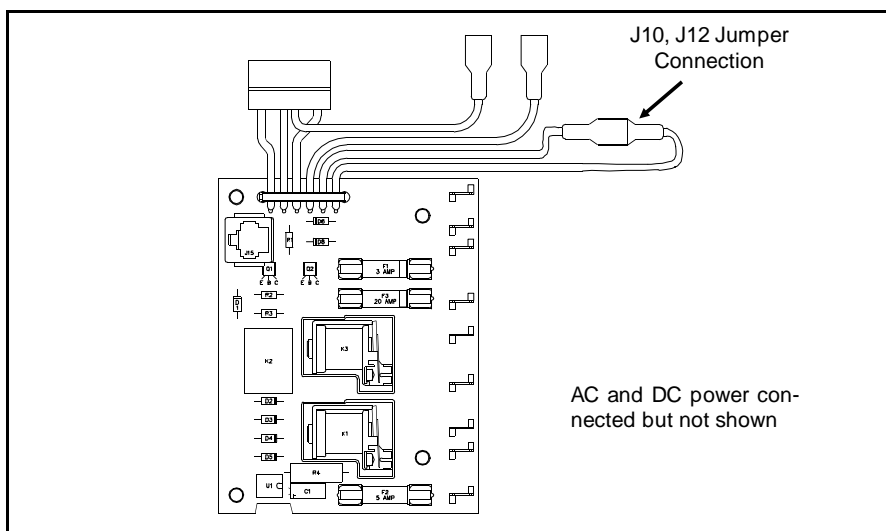


Figure 11.25 Single Door Power Supply

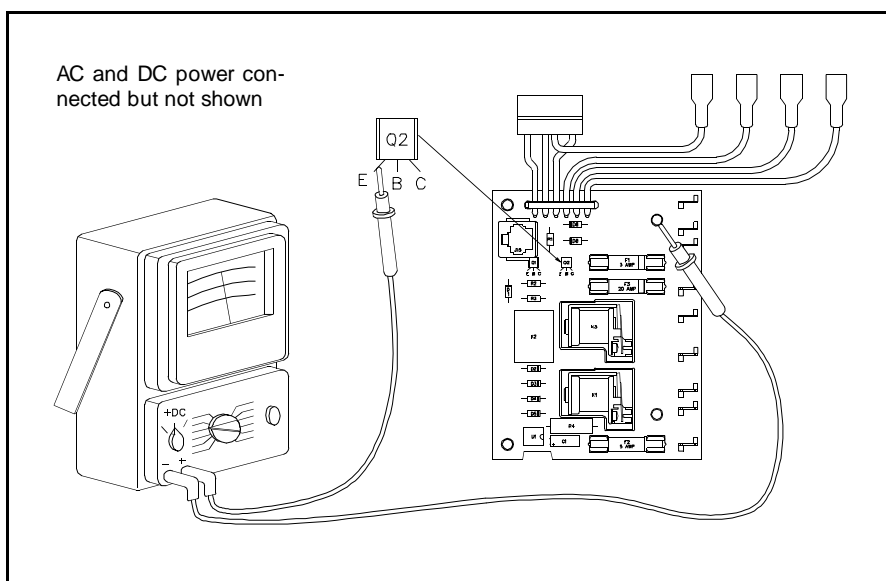


Figure 11.26 12 Volt Check at Q2 Emitter

14. With Mode Selector at AUTO and 12 Volt present at the emitter of Q2, check for 10 volts DC at the base of transistor Q2 on the Power Supply as shown by Figure 11.27. If you do not have 10 volts the Power Supply is defective and must be replaced.

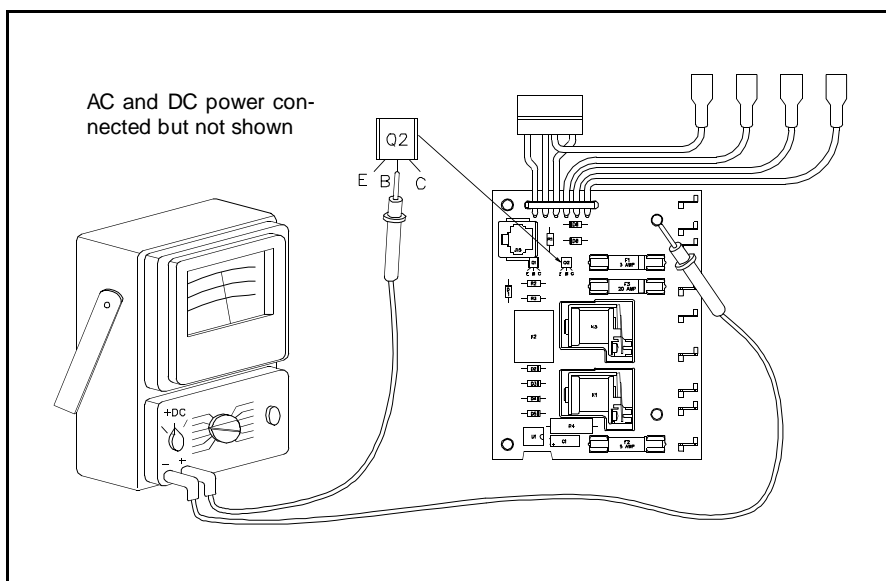


Figure 11.27 12 Volt Check at Q2 Base

15. If 10 Volts DC is present in the preceding step, continue by removing the Eyebrow assembly from the refrigerator by removing the 3 screws as shown in Figure 11.28.

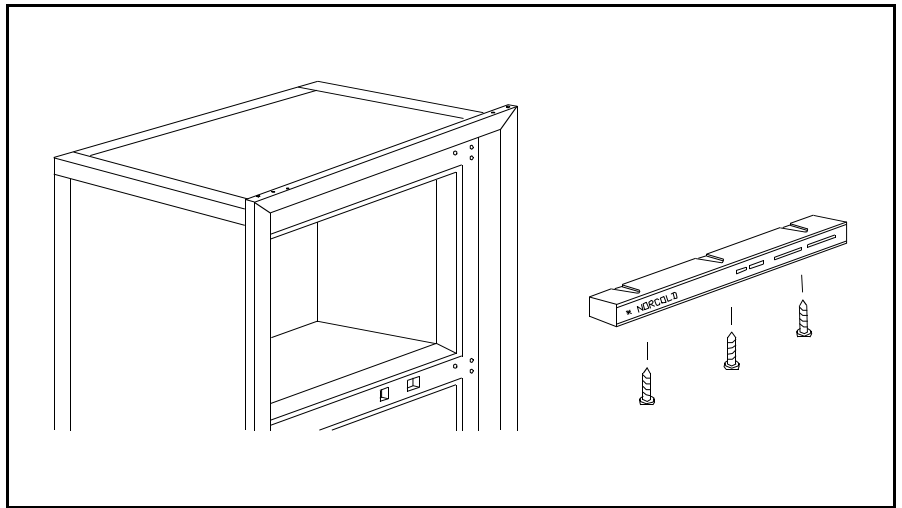


Figure 11.28 Eyebrow Removal

16. Remove the Eyebrow board from the Eyebrow assembly as shown in Figure 11.29. Do not disconnect the cable or thermistor from the Eyebrow board.

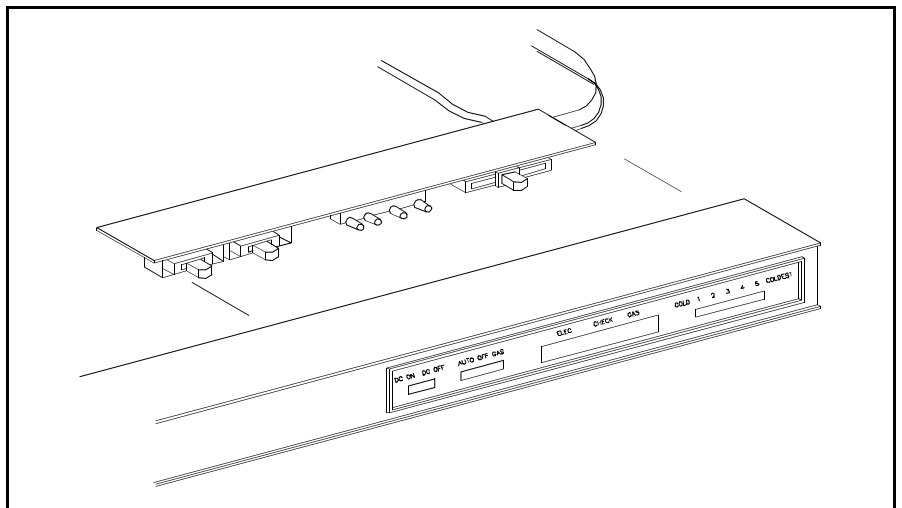


Figure 11.29 Eyebrow Board Removal

17. Set the volt-ohm-meter to measure + 12 volts DC and check for 10 volts at R22 and D11 (R23 and D11 for 2-Way models) as shown in Figure 11.30.
- A. If you do not have 10 volts the cable is defective.
 - B. If you have 10 volts and the AC light is not illuminated the Eyebrow board is defective.
18. Set the Mode Selector switches to OFF.

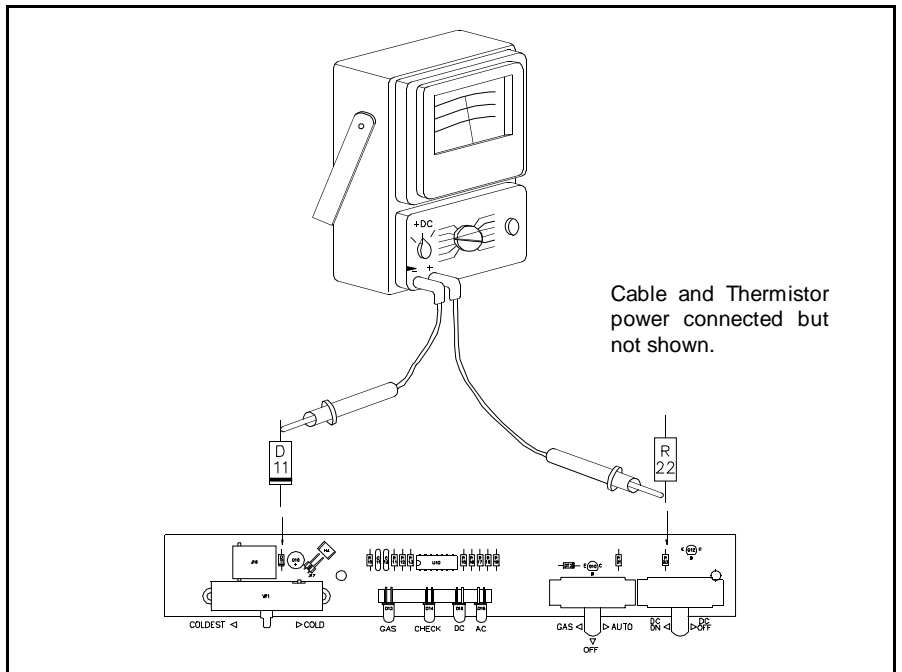


Figure 11.30 Control Voltage Check

19. With the volt-ohm-meter check the three points (A, B and C) indicated in Figure 11.31 for 12 volts DC. If you do not have 12 volts the cable is defective.
20. Set the Mode Selector to all modes of operation. The 12 volts as indicated in Figure 11.31 should go to zero. If they do not the Eyebrow board is defective.

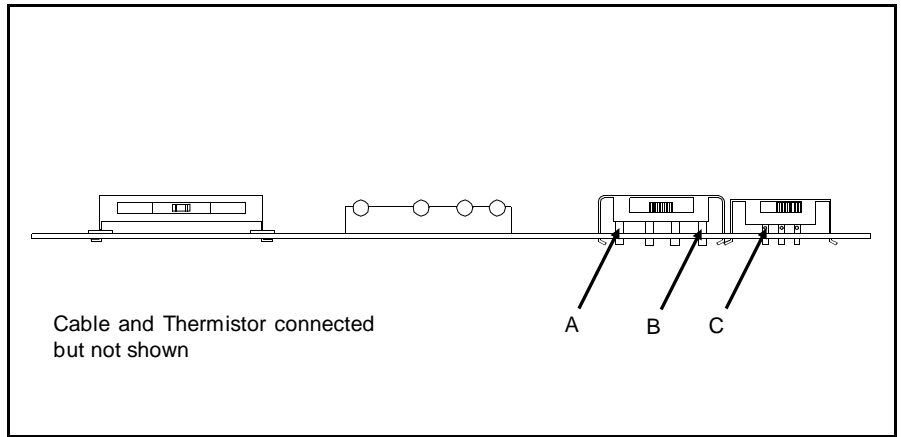


Figure 11.31 Control Voltage Check

21. Set the Mode Selector to AUTO.
22. Set the volt-ohm-meter to measure 120 volts AC and check the AC heater terminals J6 and J7 as shown in Figure 11.32. If you do not have 120 volts, replace the Power Supply.

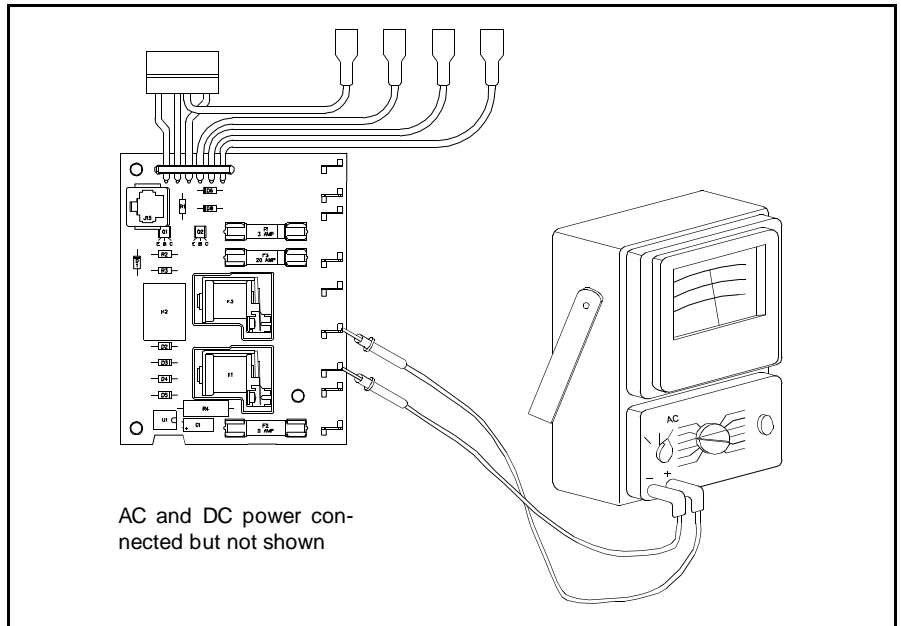


Figure 11.32 120 Volt AC Heater Output Check

23. Set the volt-ohm-meter to the Rx1 scale and check the resistance of the AC heater as shown in Figure 11.33A. If the measurement is not within allowable specifications (see Technical Data Section), replace heater. Next, check the resistance between each Terminal and the metal heater sheath as shown in Figure 11.33B. The needle of the meter should not move (high resistance). Replace heater if movement is observed.
 - A. Set volt-ohm meter to the Rx10 scale or higher and check the heater element for a short to ground. The meter should show no movement.

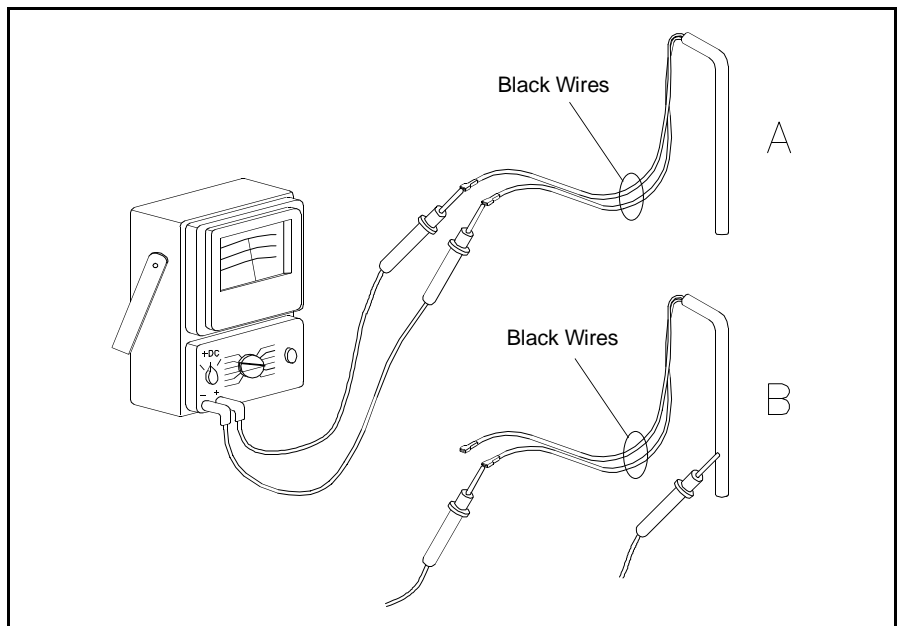


Figure 11.33 AC Heater Resistance Check

LP Gas Mode of Operation

Answer the questions before calling Norcold's Technical Service Number.

1. Is the refrigerator installed and vented in accordance with the Ventilation instructions specified in Section 2?
2. Is the refrigerator being operated in a comfortably level position?
3. Do you have 11 inches water column pressure (LP pressure) to the LP Pressure tap point, located at the rear of the refrigerator, at the 12V solenoid valve?
4. Is the combustion chamber which houses the spiral baffle clean and free from obstruction?
5. Is the spiral baffle in place?
6. Is the Burner Orifice clean and the correct size?
7. Have you checked all electrical connections?
8. Is 12 Volts DC power being supplied to terminal (-J3) (+ J4)?
9. Is 3 amp fuse good? (Located under Power Supply board cover)
10. Is STORAGE switch, located on the Eyebrow panel, in the NORMAL (ON) position or HIGH HUMIDITY (ON) position?
11. Is the modular connector on the wire harness connected at the Power Supply board and the Eyebrow board?
12. Is Mode Selector set to GAS mode?

Step By Step Trouble Shooting Guide Gas Mode

Note that gas operation can be obtained by a) setting the Mode Selector to GAS, or b) setting the Mode Selector to AUTO with 120 volts AC disabled (See discussion on gas operation on page 11-4). The following trouble shooting steps specify setting the Mode Selector to GAS. Once the gas operation is established in this mode, the Mode Selector should be switched to AUTO and 120 volts AC disconnected to ensure proper gas operation in the AUTO mode.

1. With a volt-ohm-meter set to measure 12 volts DC check the input supply to the Power Supply terminals J3 and J4 as shown in Figure 11.34. If you do not have 12 volts DC repair the source.

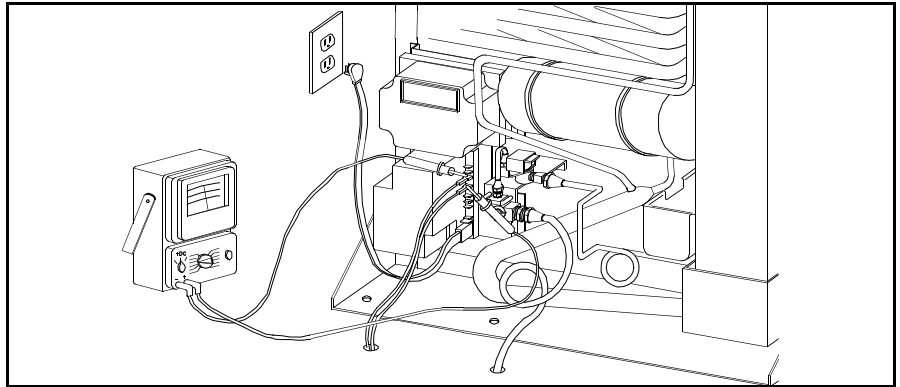


Figure 11.34 12 Volt DC Supply Check

2. Remove all the wires that are connected to the terminals on the right side of the Power Supply.



USE EXTREME CAUTION WHEN REPLACING ANY DC ELECTRICAL COMPONENTS. CAUTION MUST BE TAKEN WHEN DISCONNECTING THE DC SUPPLY. THE DC SUPPLY IS CLOSE TO THE PROPANE GAS WHICH SUPPLIES THE REFRIGERATOR. ARCING CAN EXIST WHEN DISCONNECTING THE DC SUPPLY WHICH CAN IGNITE A LEAK IN THE PROPANE SUPPLY LINE. RESULTS CAN BE SEVERE PERSONAL INJURY OR DEATH.

3. Remove the Power Supply cover to gain access to the power supply.
4. Reconnect the DC supply to terminals J3 and J4+ on the power supply.
5. With the volt-ohm-meter set to measure + 12 volts DC, check for 12 volts across the fuse as shown by Figure 11.35. If you do not have 12 volts, replace the 3 amp fuse.

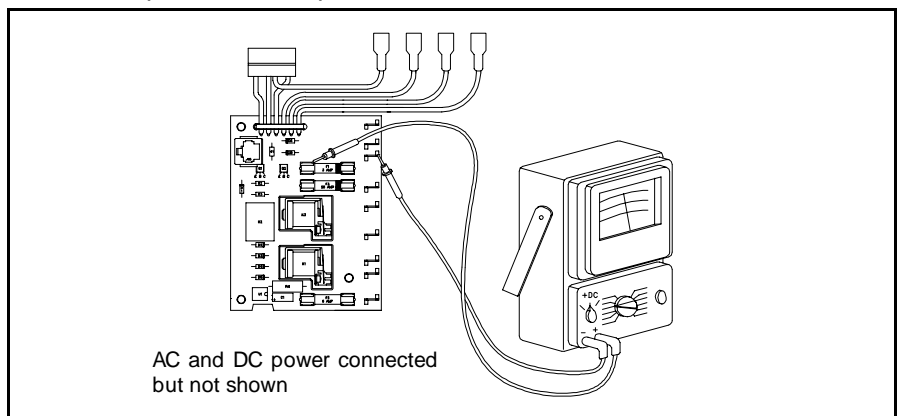


Figure 11.35 3 Amp Fuse Check



NEVER OVERFUSE A CIRCUIT. REPLACE BLOWN FUSE WITH EXACT REPLACEMENT INDICATED BY NORCOLD. OVERFUSING OF A CIRCUIT CAN RESULT IN A FIRE.

6. Check that the Humidity/Storage switch (Figure 11.20) (2 door models only) is set to NORMAL or HIGH HUMIDITY.

- For the single door models, check that the two blue wires terminals J10 and J12 are connected together as shown by Figure 11.36.

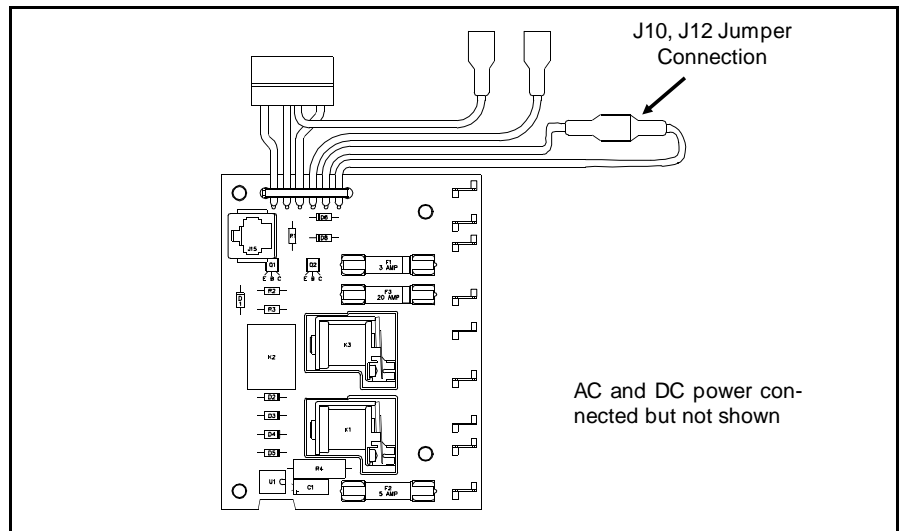


Figure 11.36 Single Door Power Supply

- With the volt-ohm-meter set to measure 11-12 volts DC check for 12 volts at the emitter of transistor Q2 as shown in Figure 11.37. If you do not have 11-12 volts as shown, connect J10 and J12 together as shown in Figure 11.36 (2 door models only).
- Set the Mode Selector switch to GAS, the LP light on the Eyebrow should be illuminated.
- If the LP light is not illuminated you must perform more tests to find the problem.

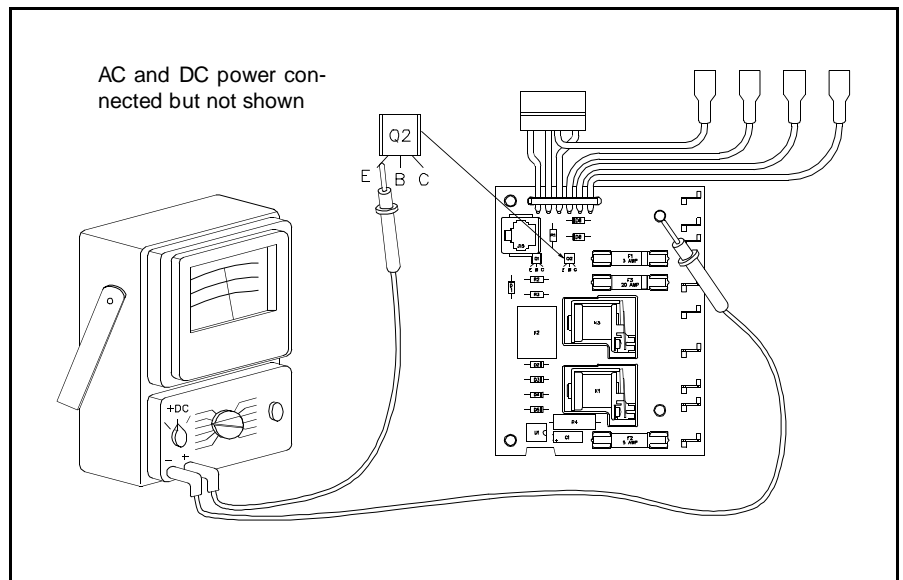


Figure 11.37 12 Volt Check at Q2 Emitter

- With Mode Selector at GAS and 12 Volts present at the emitter of Q2, check for 10 volts DC at the base of transistor Q2 on the Power Supply as shown by Figure 11.38. If you do not have 10 volts the Power Supply is defective and must be replaced.

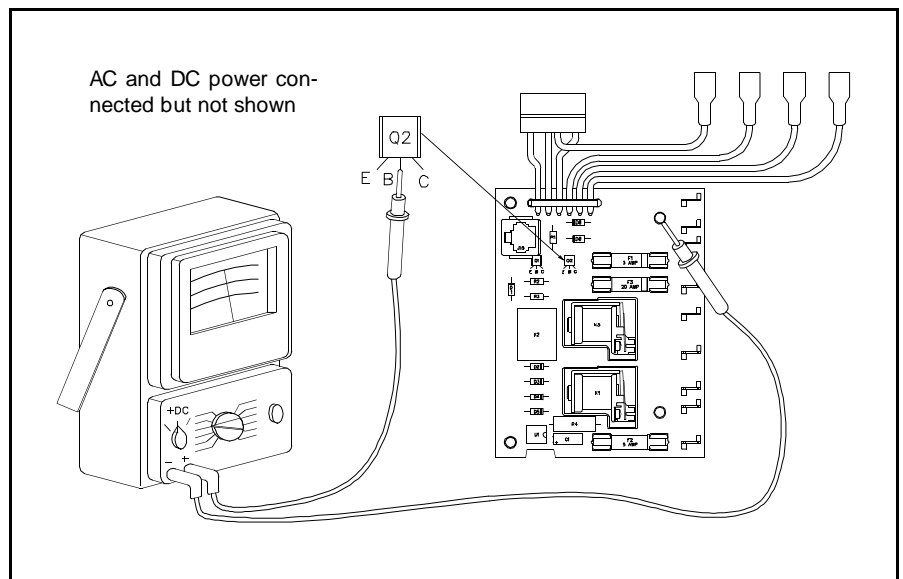


Figure 11.38 12 Volt Check at Q2 Base

12. If 10 Volts is present in the preceding step, continue by removing the Eyebrow assembly from the refrigerator by removing the 3 screws as shown in Figure 11.39.

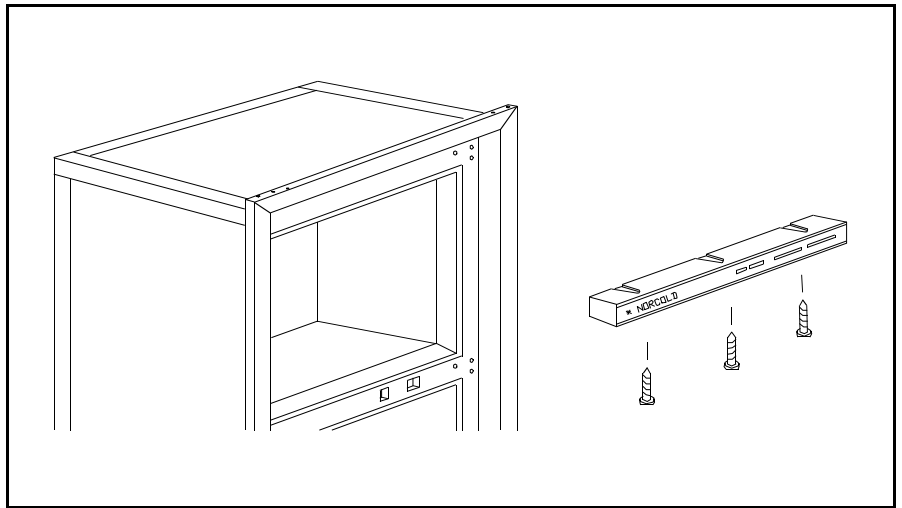


Figure 11.39 Eyebrow Removal

13. Remove the Eyebrow board from the Eyebrow assembly as shown in Figure 11.40. Do not disconnect the cable or thermistor from the Eyebrow board.

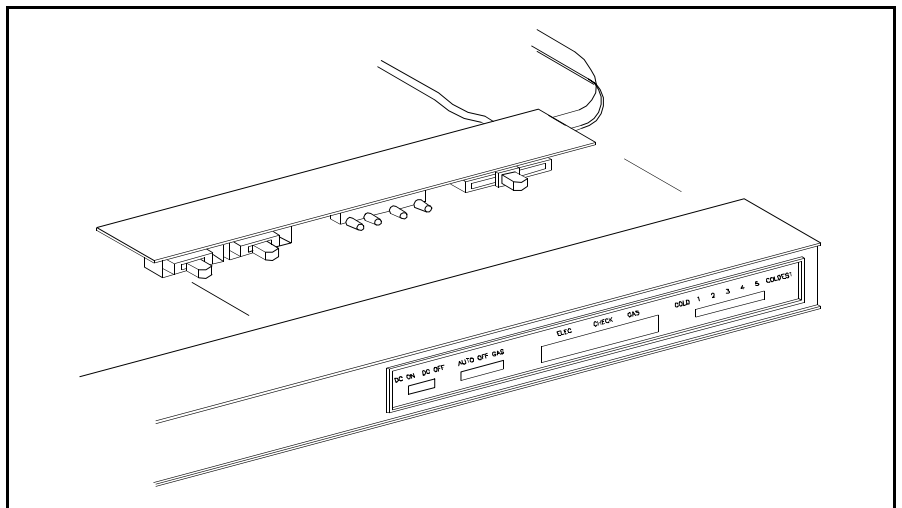


Figure 11.40 Eyebrow Board Removal

14. Set the volt-ohm-meter to measure + 12 volts DC and check for 10 volts at R22 and D11 (R23 and D11 for 2-Way models) as shown in Figure 11.41.
- A. If you do not have 10 volts the cable is defective.
 - B. If you have 10 volts and the LP light is not illuminated the Eyebrow board is defective.
15. Set the Mode Selector switch (es) to OFF.

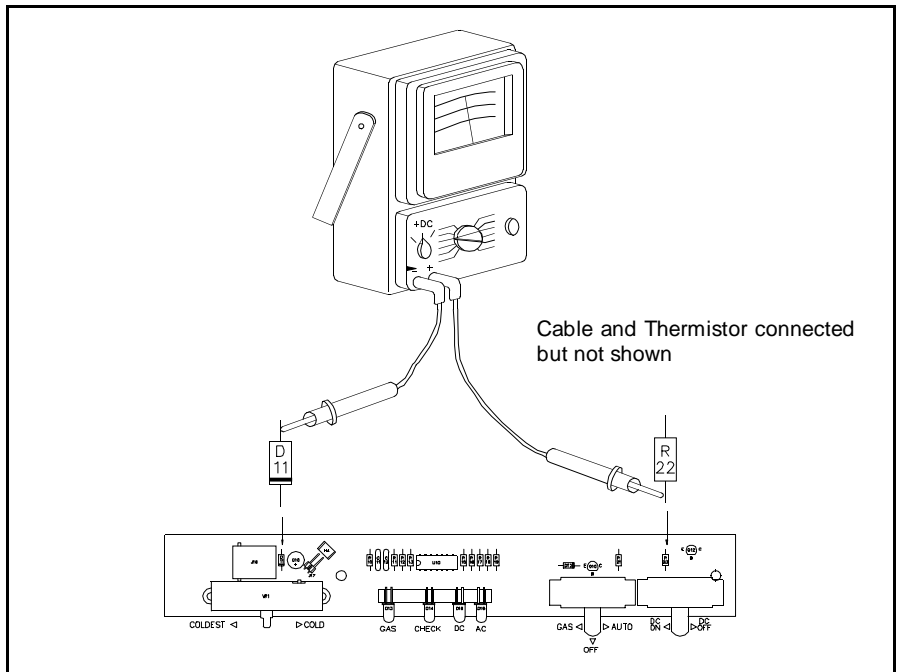


Figure 11.41 Control Voltage Check

16. With the volt-ohm-meter check the three points (A, B and C) indicated in Figure 11.42 for 12 volts DC. If you do not have 12 volts the cable is defective.
 - A. Set the Mode Selector to all modes of operation. The 12 volts as indicated in Figure 11.42 should go to zero.
 - B. If they do not the Eyebrow board is defective.
17. Set the Mode Selector to GAS.

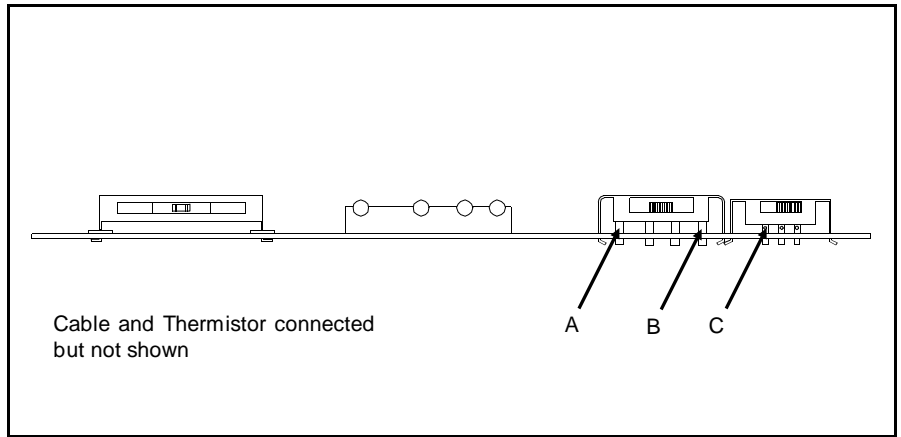


Figure 11.42 Control Voltage Check

18. Check for 12 volts DC between the negative power supply terminal (J3) and the left most connection to the Ignition Module as shown in Figure 11.43. If you do not have 12 volts (9.5-15 volts), replace the Power Supply.

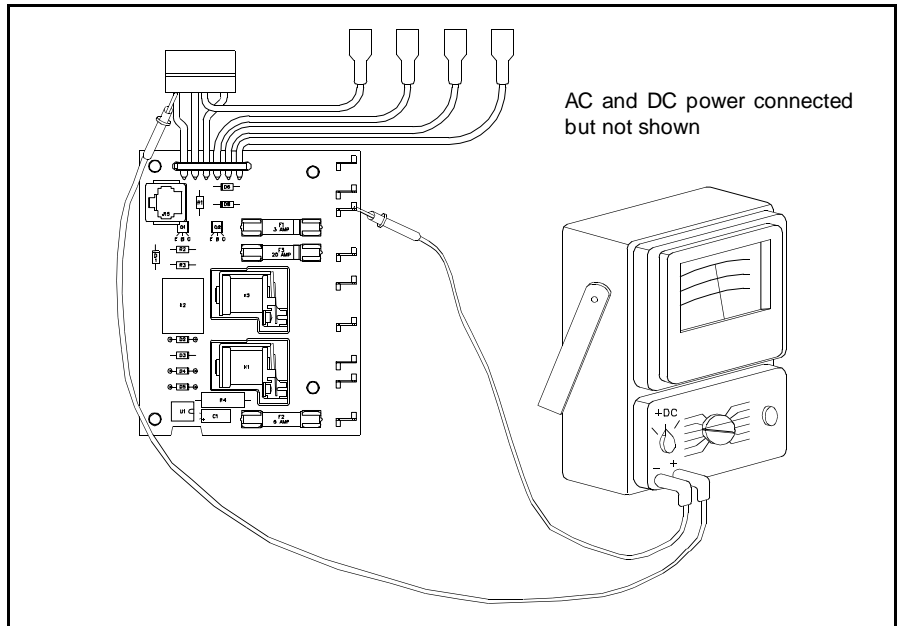


Figure 11.43 12 Volt Input Check to Ignition Module

19. Check that the main LP gas is turned on at the tank as shown in Figure 11.44
20. Check that the gas pressure is at 11". See gas pressure information in Section 7.

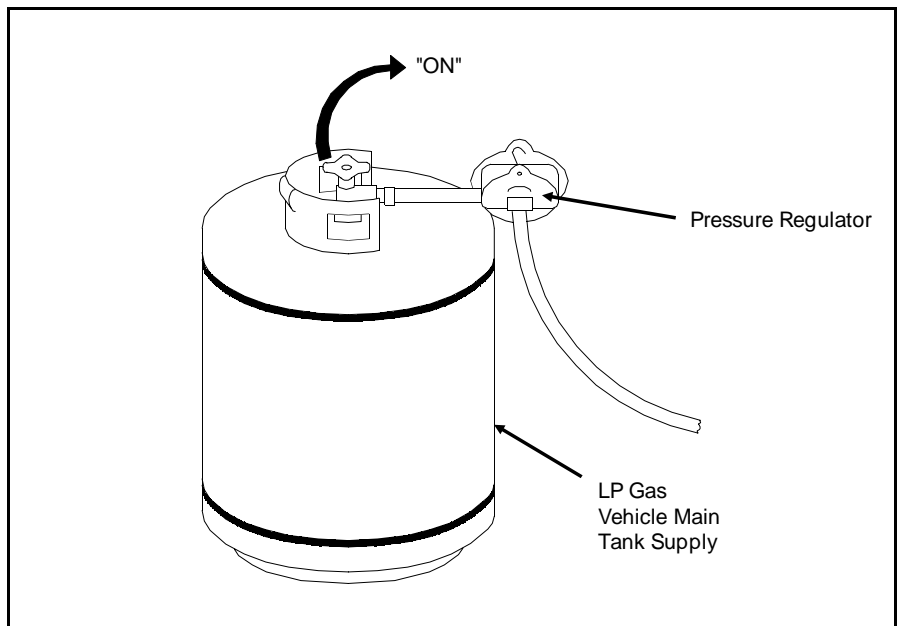


Figure 11.44 Main Gas Valve Check

21. Check the manual shut-off valve shown in Figure 11.45 to be sure it is in the on position.
22. If 12 volts was not measured in Step 18 and the Gas Valve did not open or there were no sparks to the Burner, and the check lamp did not go out, replace the Ignition Module.

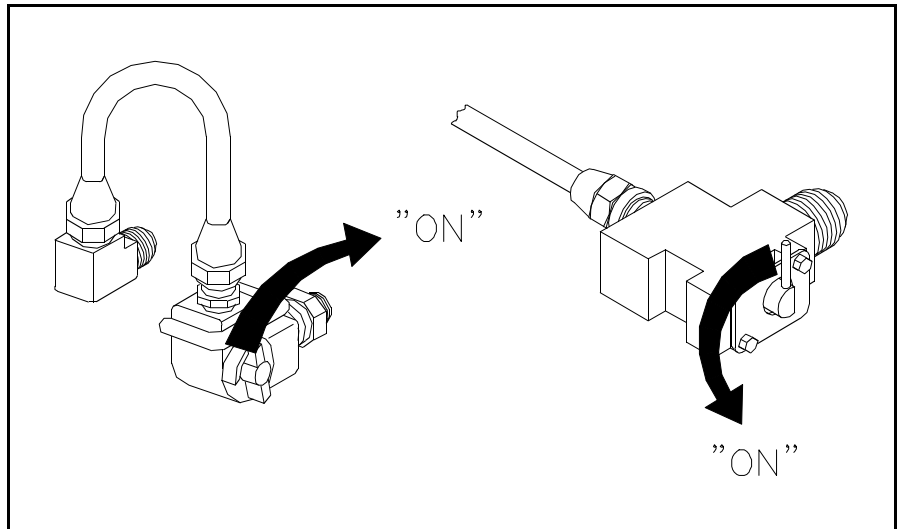


Figure 11.45 Manual Valve (Alternate Versions)

23. Check for 12 volts DC at the gas valve terminals as shown by Figure 11.46.
 - A. The valve will show 12 volts at the valve only during a trial for ignition or when the flame is burning.
 - B. If 12 volts is not measured, replace the Ignition Module.

Note: Be sure that the module is not in lockout, since 12 volts is de-energized during lockout and the module would be replaced unnecessarily.
 - C. If you have 12 volts and the valve did not open, replace the valve.

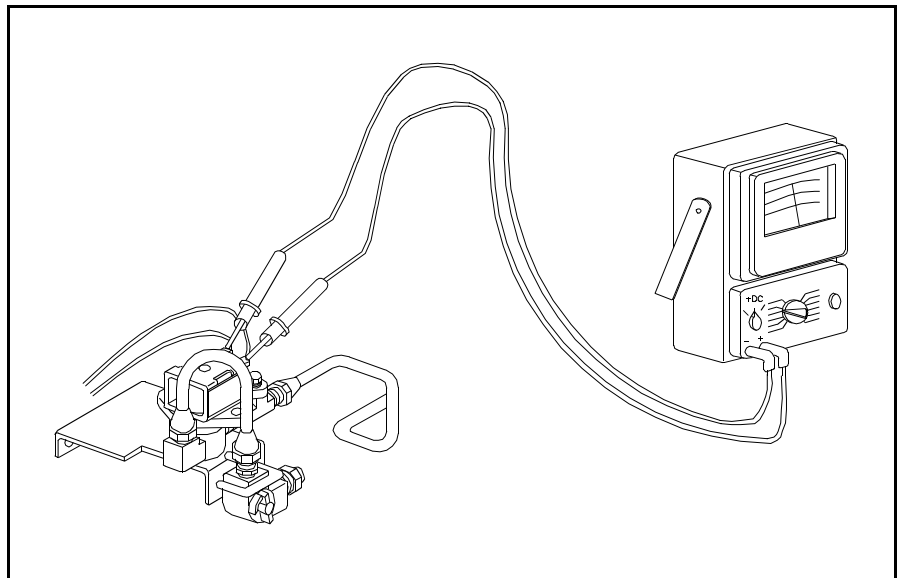


Figure 11.46 12 Volt Check at Gas Solenoid

24. If the Ignition electrode does not send sparks to the Burner, check the electrode wire for continuity as shown in Figure 11.47.

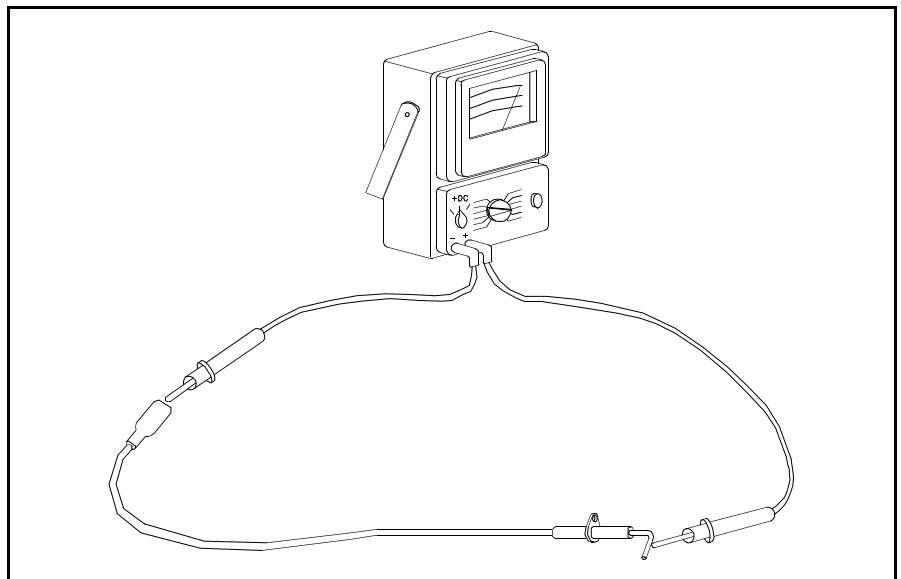


Figure 11.47 Continuity Check of Electrode Wire

25. Check that the alignment of the electrodes is correct as shown in Figure 11.48

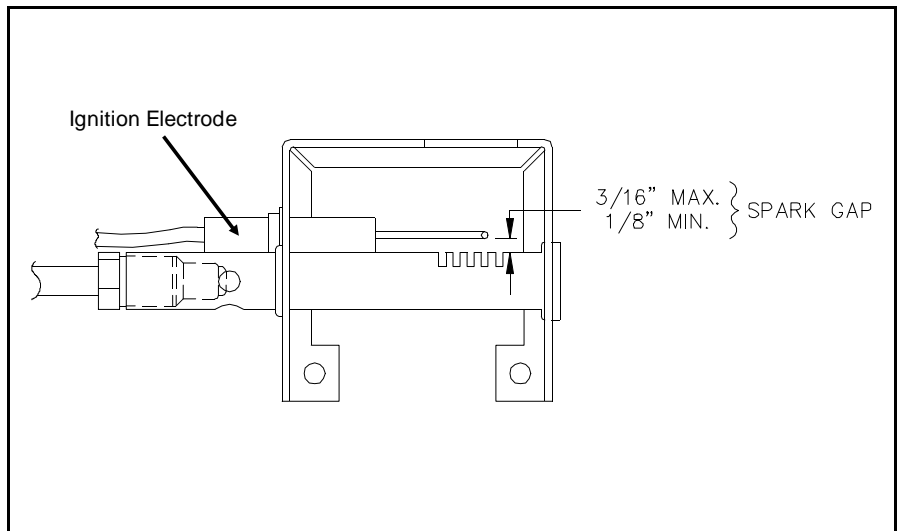


Figure 11.48 Proper Electrode Gap

26. Check the Ignition electrode shown in Figure 11.49 for a short to ground.

- A. Turn the Mode Selector to OFF.
- B. Set the volt-ohm-meter to the Rx 10K scale.
- C. Disconnect the wire to the electrode.
- D. Check the continuity to ground as shown in Figure 11.49.
- E. Any reading indicates a defective electrode and it must be replaced.

27. Reconnect the electrode and set the Mode Selector back to GAS.

28. Check that the Burner and Orifice shown in Figure 11.49 are not obstructed.

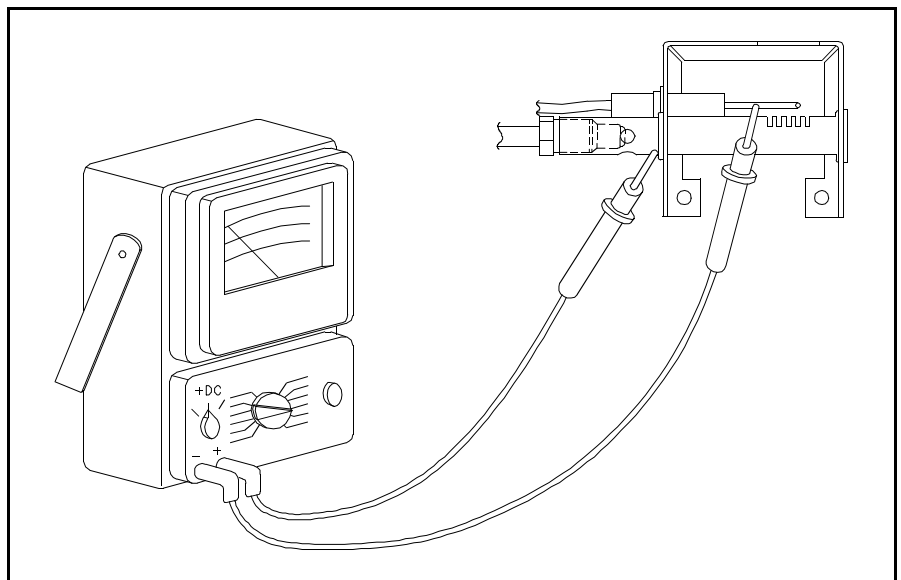


Figure 11.49 Electrode Grounding Check

29. Check for corrosion on the pins of the Ignition Module as shown in Figure 11.50. If corrosion exists clean with an eraser.

30. If the flame will not ignite and remain lit, replace the Ignition Module.

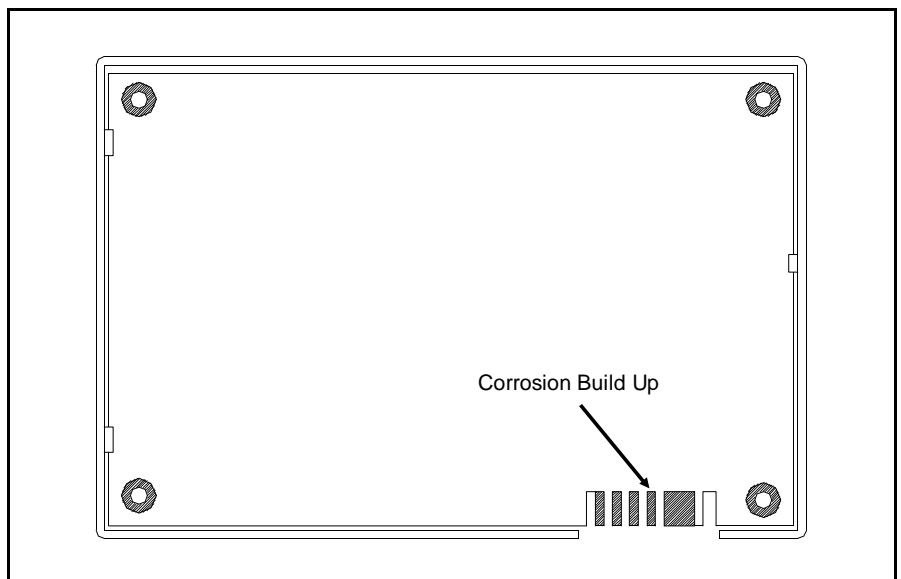


Figure 11.50 Edge Connector Visual Inspection

DC Mode of Operation

Answer these questions before calling Norcold's Technical Service Number.

1. Remember: this mode of operation is not designed to cool the refrigerator.
2. Do you have 12 Volts DC power to terminals J3(-) and J4(+)?
3. Is the 3 amp fuse (located under the Power Supply board cover) good?
4. Do you have 12 Volts DC to the 20 amp fuse?
5. Did you check for loose wire connections?
6. Are the modular connectors on the wire harness (cable) plugged into the Power Supply board and the Eyebrow board?
7. Is the Mode Selector set to the DC mode of operation?
8. Is Humidity/Storage switch, located on the Eyebrow panel, in the NORMAL (ON) position or HIGH HUMIDITY (ON) position?

Step By Step Trouble-Shooting Guide DC Mode

1. With a volt-ohm-meter set to measure 12 volts DC check the input supply to the Power Supply terminals J3(-) and J4(+) as shown in Figure 11.51. If you do not have 12 volts DC repair the source.
2. Remove all the wires that are connected to the terminals on the right side of the Power Supply.

WARNING

USE EXTREME CAUTION WHEN REPLACING ANY DC ELECTRICAL COMPONENTS. CAUTION MUST BE TAKEN WHEN DISCONNECTING THE DC SUPPLY. THE DC SUPPLY IS CLOSE TO THE PROPANE GAS WHICH SUPPLIES

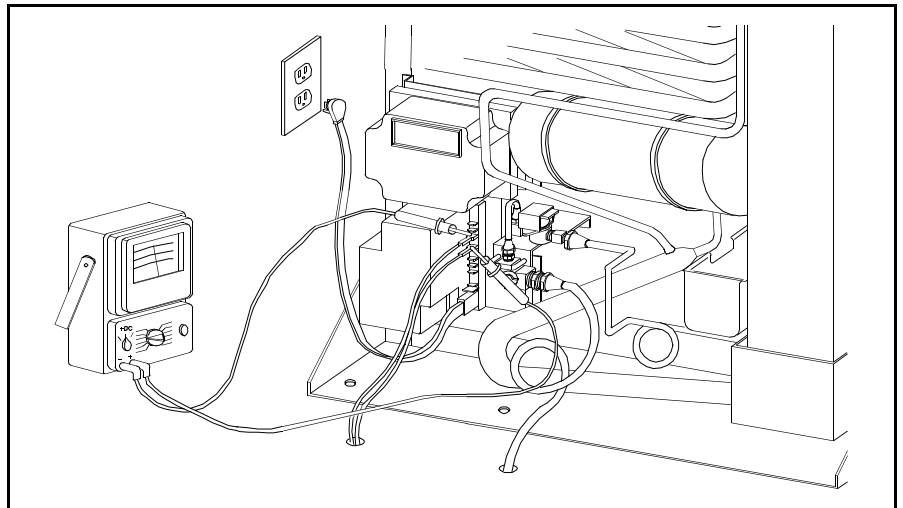


Figure 11.51 12 Volt DC Supply Check

THE REFRIGERATOR. ARCING CAN EXIST WHEN DISCONNECTING THE DC SUPPLY WHICH CAN IGNITE A LEAK IN THE PROPANE SUPPLY LINE. RESULTS CAN BE SEVERE PERSONAL INJURY OR DEATH.

3. Remove the Power Supply cover to gain access to the Power Supply.
4. Reconnect the DC supply to terminals J3(-) and J4(+) on the Power Supply.

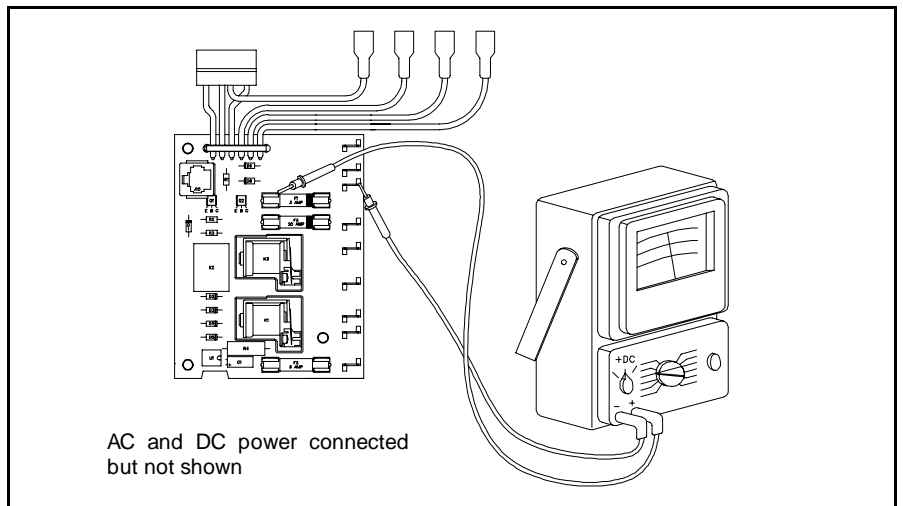


Figure 11.52 3 Amp Fuse Check

5. With the volt-ohm-meter set to measure + 12 volts DC, check for 12 volts through the fuse as shown by Figure 11.52. If you do not have 12 volts, replace the 3 amp fuse.

WARNING

NEVER OVERFUSE A CIRCUIT. REPLACE BLOWN FUSE WITH EXACT REPLACEMENT INDICATED BY NORCOLD. OVERFUSING OF A CIRCUIT CAN RESULT IN A FIRE.

6. Check that the Humidity/Storage switch located on the Eyebrow (2 door models only) is set to NORMAL or HIGH HUMIDITY.

7. For the single door models, check that the two blue wires terminals J10 and J12 are connected together as shown by Figure 11.53.

8. With the volt-ohm-meter set to measure 12 volts DC, check for 12 volts at the emitter of transistor Q2 as shown in Figure 11.54.

A. If you do not have 11-12 volts as shown, connect J10 and J12 together as shown in Figure 11.53. (2 door models only)

B. If you now have 11-12 volts at the emitter of Q2 there is an open circuit in the harness to the Humidity/Storage switch and it must be repaired (See wiring pictorial at the back of this section.).

9. Set the Mode Selector switch to DC-ON. The DC light on the Eyebrow should be illuminated.

10. If the DC light is not illuminated you must do some more tests to find the problem.

11. With the Mode Selector at DC-ON and 12 Volts present at the emitter of Q2, check for 10 volts DC at the base of transistor Q2 on the Power Supply as shown by Figure 11.55. If you do not have 10 volts, the Power Supply is defective and must be replaced.

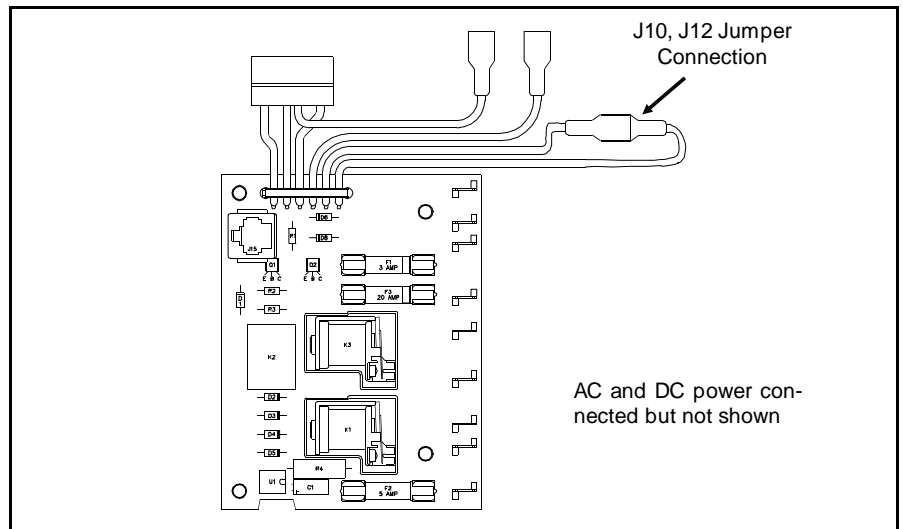


Figure 11.53 Single Door Power Supply

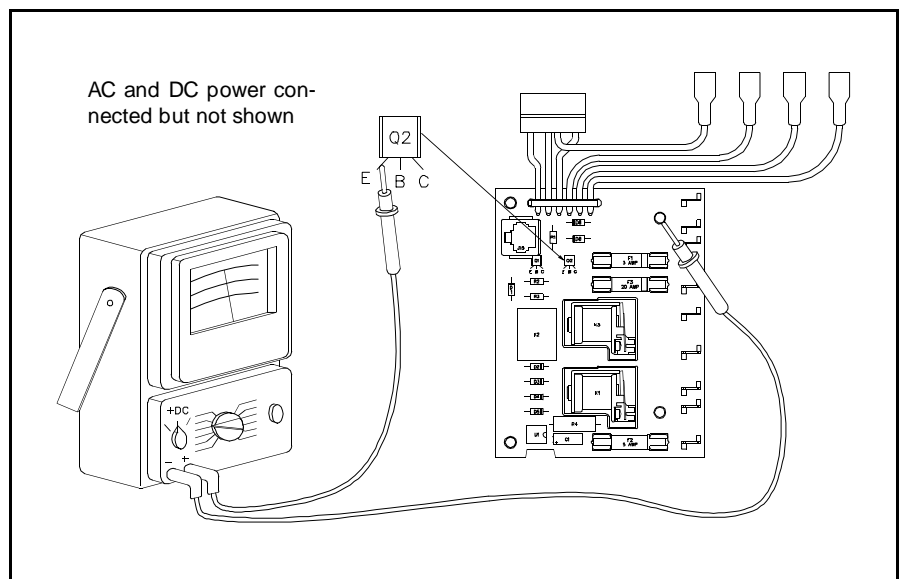


Figure 11.54 12 Volt Check at Q2 Emitter

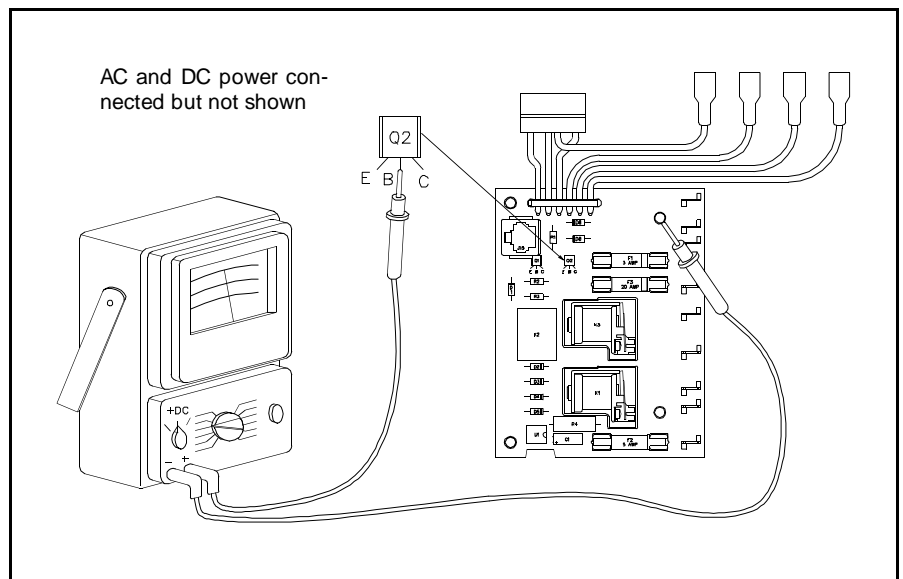


Figure 11.55 12 Volt Check at Q2 Base

12. If 10 Volts DC is present in the preceding step, continue by removing the Eyebrow assembly from the refrigerator by removing the 3 screws as shown in Figure 11.56.

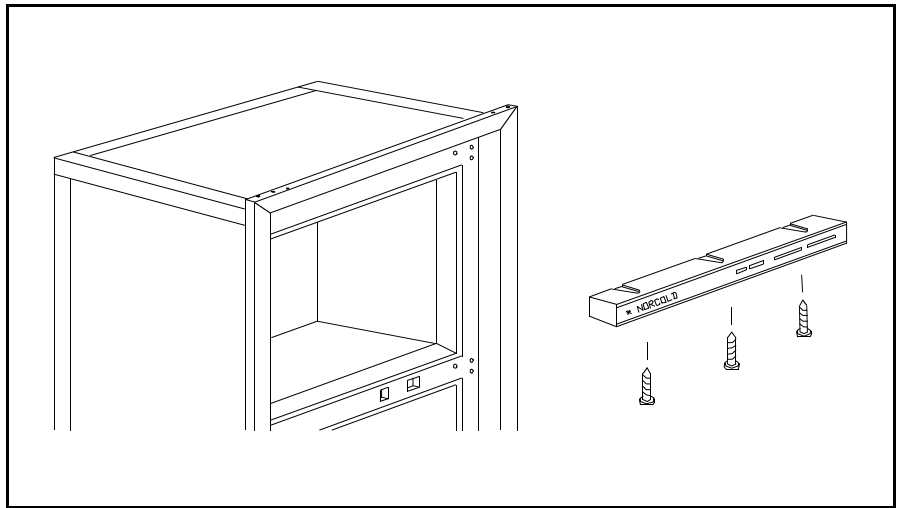


Figure 11.56 Eyebrow Removal

13. Remove the Eyebrow board from the Eyebrow assembly as shown in Figure 11.57. Do not disconnect the cable or thermistor from the Eyebrow board.

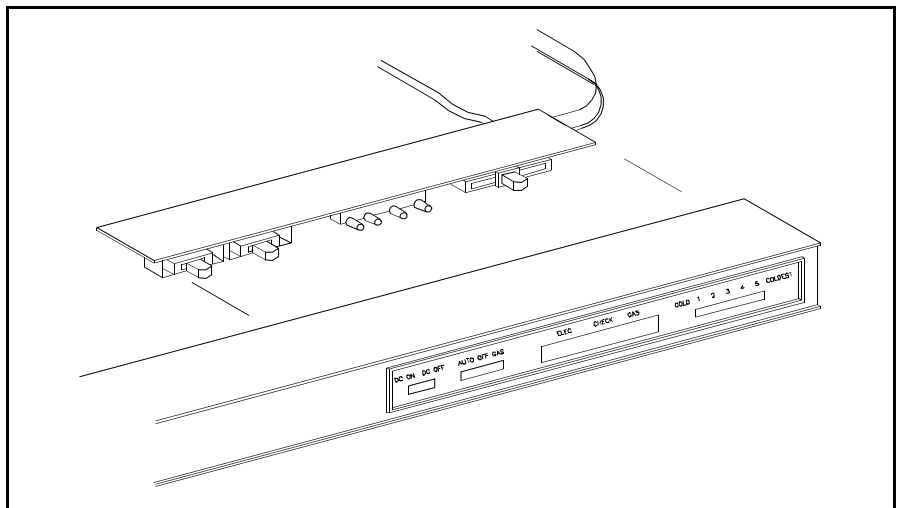


Figure 11.57 Eyebrow Board Removal

14. Set the volt-ohm-meter to measure + 12 volts DC, and check for 10 volts at R22 and D11 as shown in Figure 11.58.
- A. If you do not have 10 volts the cable is defective.
 - B. If you have 10 volts and the DC light is not illuminated the Eyebrow board is defective.
15. Set the Mode Selector switch(s) to OFF.

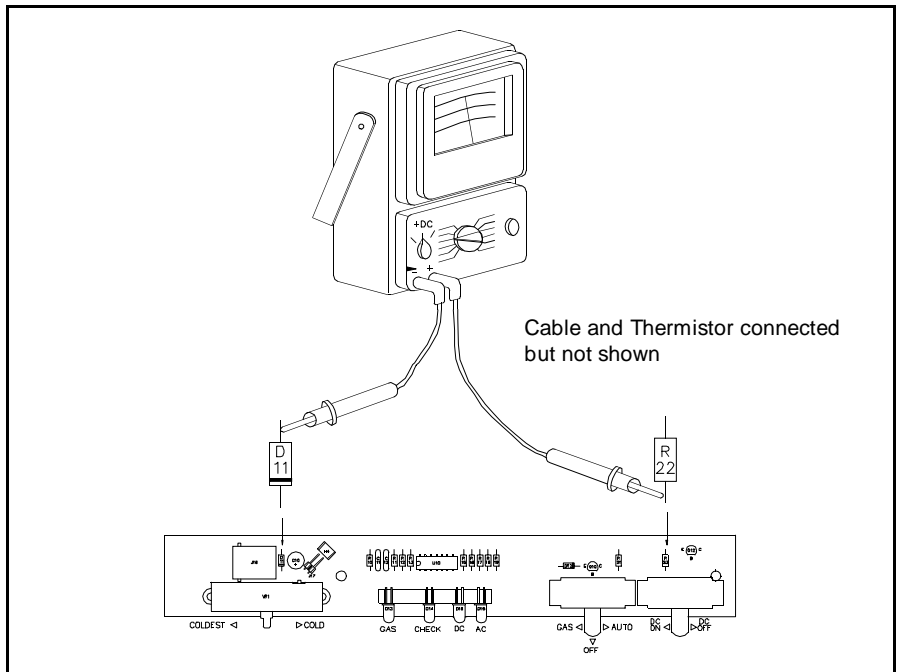


Figure 11.58 Control Voltage Check

16. With the volt-ohm-meter, check the points A, B and C indicated in Figure 11.59 for 12 volts DC. If you do not have 12 volts the cable is defective.
17. Set the Mode Selector to all modes of operation. The 12 volts shown in Figure 11.59 should go to zero volts. If not, the Eyebrow board is defective.
18. Set the Mode Selector to DC.

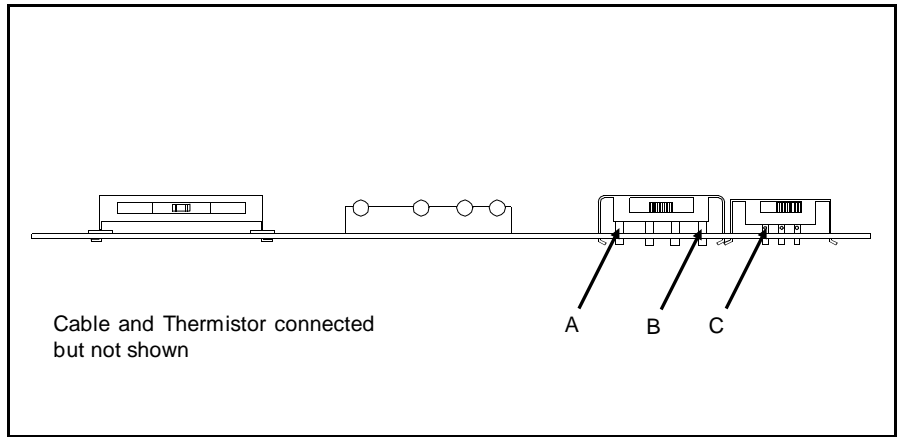


Figure 11.59 Control Voltage Check

19. Check the DC heater terminals J3, J5 on the Power Supply for 12 volts DC per Figure 11.60.
 - A. If you do not have 12 volts DC, check the 20 amp fuse. Replace if blown.

⚠ WARNING

NEVER OVERFUSE A CIRCUIT. REPLACE BLOWN FUSE WITH EXACT REPLACEMENT INDICATED BY NORCOLD. OVERFUSING OF A CIRCUIT CAN RESULT IN A FIRE.

- B. If the fuse is good, replace the Power Supply.

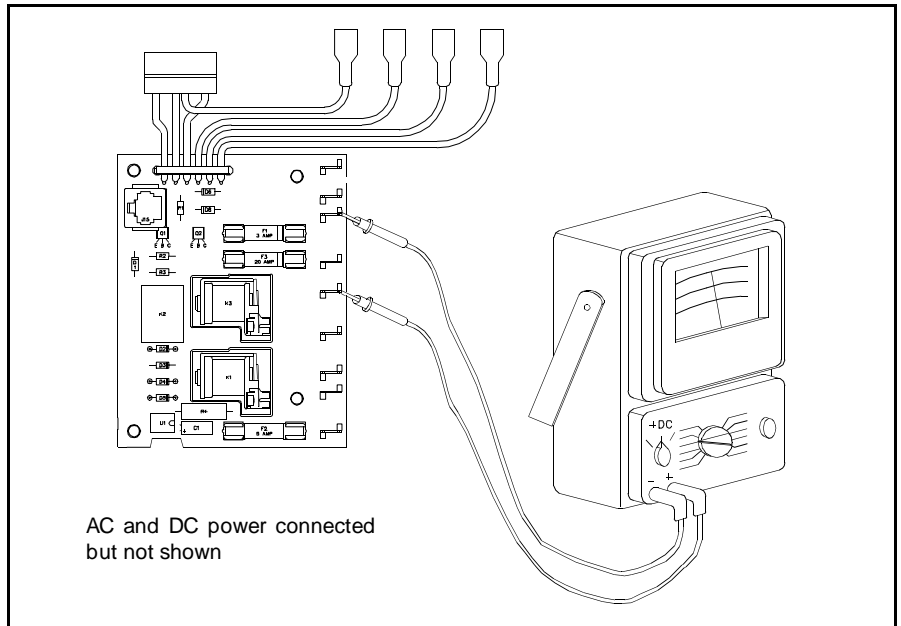


Figure 11.60 12 Volt DC Heater Output Check

20. With the volt-ohm-meter set to the Rx1 scale, check the resistance of the DC heater as shown in 11.61A. If the resistance is not within allowable specification (See Technical Data Section), replace heater. Next, check the resistance between each terminal and the metal heater sheath as shown in Figure 11.61B. The needle of the meter should not move (high resistance). Replace heater if movement is observed.

- A. Set volt-ohm meter to the Rx10 scale or higher and check the heater element for a short to ground. The meter should show no movement.

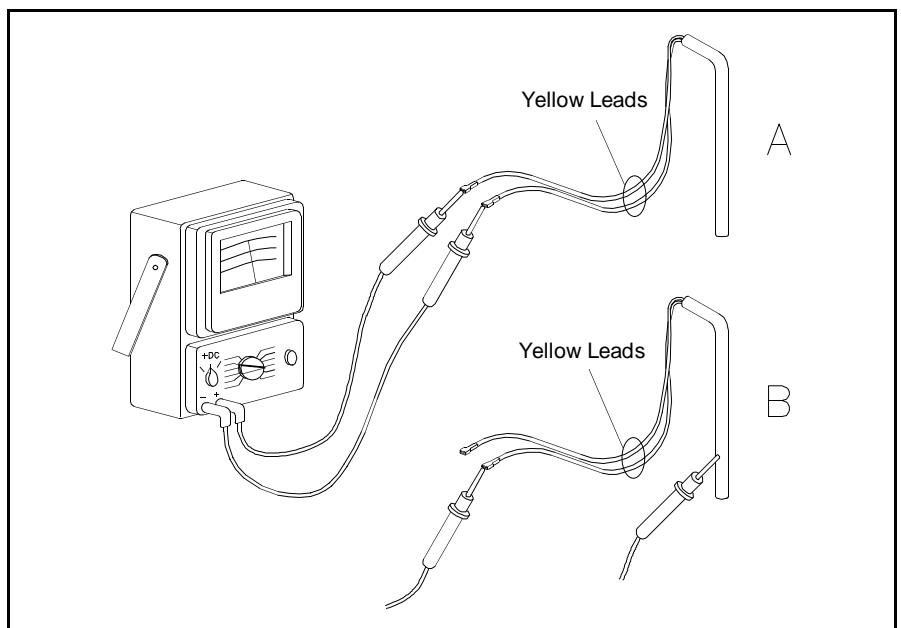


Figure 11.61 DC Heater Resistance Check

Illustrations Showing Normal and Abnormal Conditions of the Mode Selector

Normal Condition

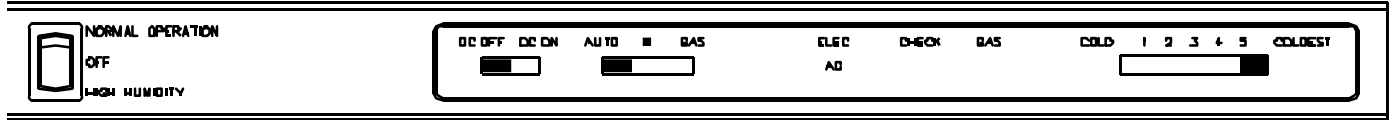


Figure 11.62 Electric Operation

Mode Selector set to AUTO; AC indicated. Refrigerator operating on AC.

Normal Condition

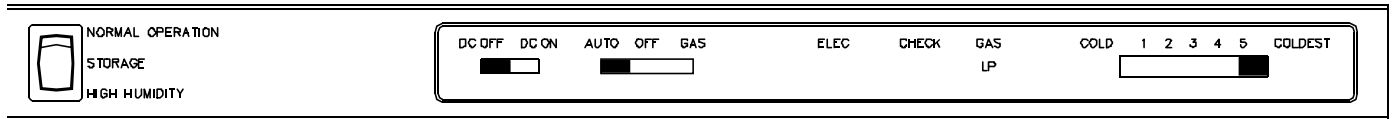


Figure 11.63 Gas Operation

Mode Selector set to AUTO; LP indicated. Refrigerator operating on GAS. 120 volts AC is not supplied to the refrigerator.

Normal Condition - Refrigerator off

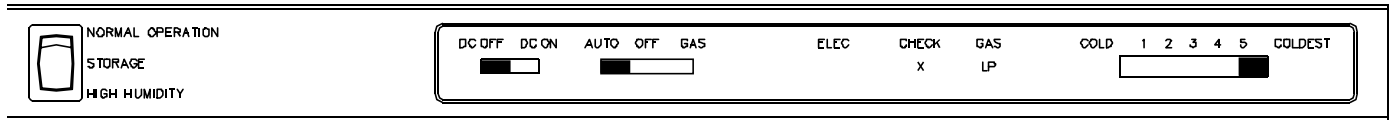


Figure 11.64 Gas Operation

Mode Selector set to AUTO; CHECK and LP indicated. 120 volts AC is not supplied to the refrigerator and a trial for ignition failed. The check light will turn on then off and on again during the process.

Normal Condition

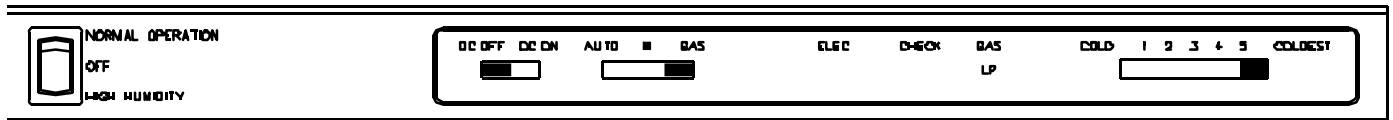


Figure 11.65 Gas Operation

Mode Selector set to GAS; LP indicated. Refrigerator operating on GAS.

Normal Condition - Refrigerator off

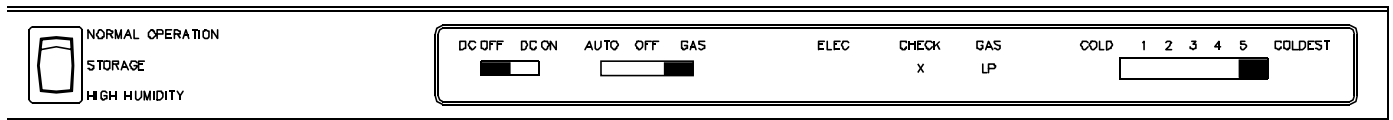


Figure 11.66 Gas Operation

Mode Selector set to GAS. CHECK and LP indicated a trial for ignition failed. The check light will turn on, then off, and on again during the process.

Normal Condition

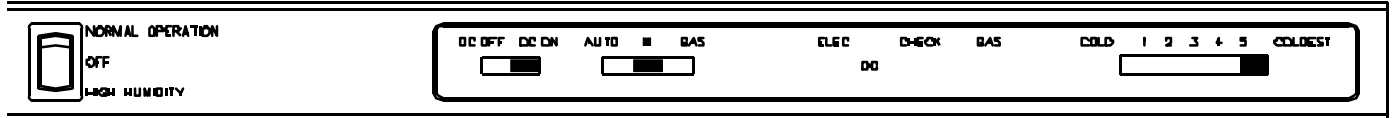


Figure 11.67 DC Operation

Mode Selector set to OFF; DC switch set to DC ON; DC indicated. Refrigerator operating on DC.

Normal Condition*

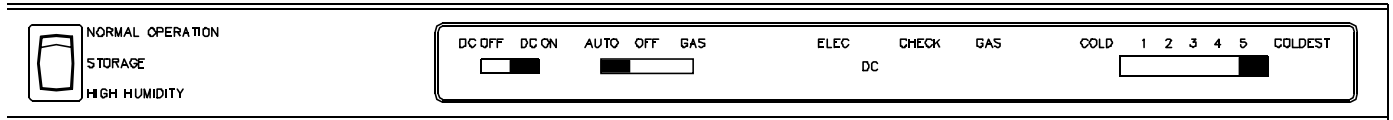


Figure 11.68 DC Operation

Mode Selector set to AUTO; DC switch set to DC ON; DC indicated. Refrigerator operating on DC.

Normal Condition*

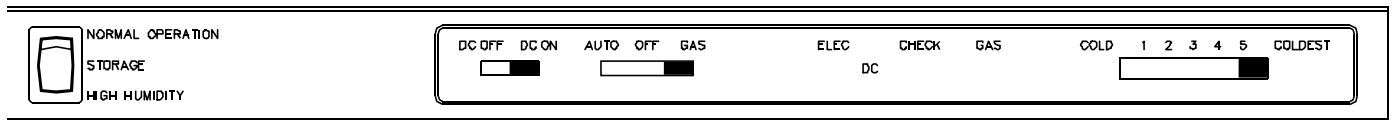


Figure 11.69 DC Operation

Mode Selector set to GAS; DC switch set to DC ON; DC indicated. Refrigerator operating on DC.

* Note:

The DC switch when set to DC ON will override both AUTO and GAS operation.

Abnormal Condition

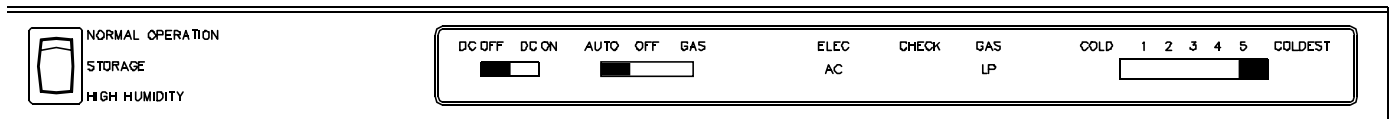


Figure 11.70 Auto Operation

Mode Selector set to AUTO; AC and LP indicated. Refrigerator operating on AC.

Remedy: Turn off the fluorescent lights (located in the coach) one at a time until the LP light goes off. Replace the fluorescent light, or run the 12 volt DC input wire directly from the battery to the refrigerator.

Abnormal Condition

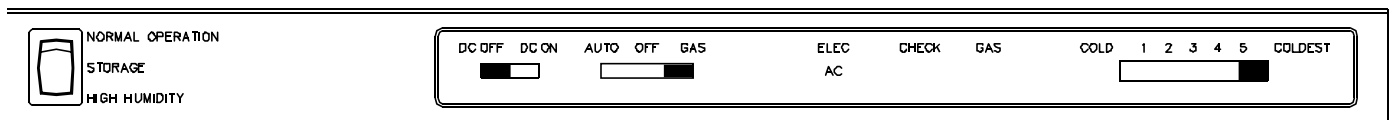


Figure 11.71 Gas Operation

Mode Selector set to GAS; AC indicated. Refrigerator operating on GAS.

Remedy: Replace Eyebrow board.

Abnormal Condition

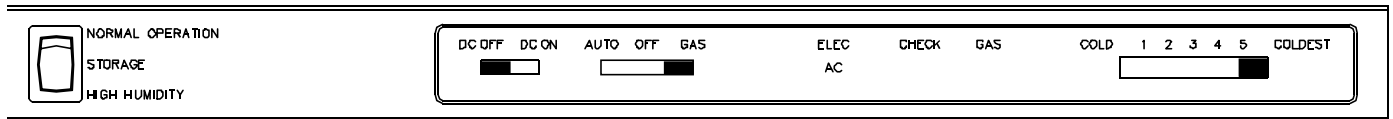


Figure 11.72 Auto Operation

Mode Selector set to GAS; AC indicated. Refrigerator operating on GAS.
Remedy: Replace Eyebrow board.

Abnormal Condition

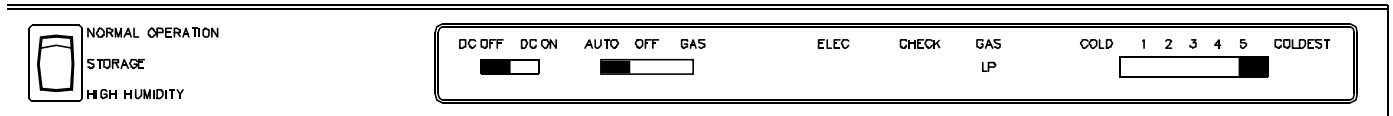


Figure 11.73 Auto Operation

Mode Selector set to AUTO; LP indicated. Refrigerator operating on AC
Remedy: Replace Eyebrow board

Abnormal Condition

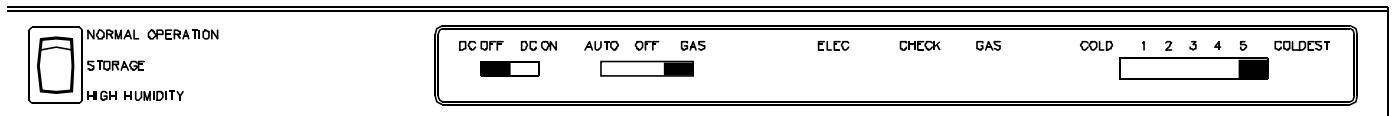


Figure 11.74 Gas Operation

Mode Selector set to GAS; No operation indicated. Refrigerator operating on GAS.
Remedy: Replace Eyebrow board.

Abnormal Condition

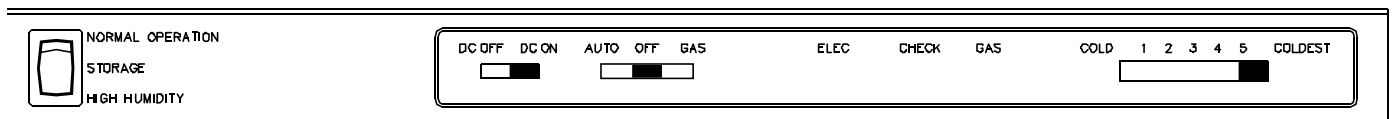


Figure 11.75 DC Operation

Mode Selector set to DC ON; No operation indicated. Refrigerator operating on DC.
Remedy: Replace Eyebrow board.

Abnormal Condition

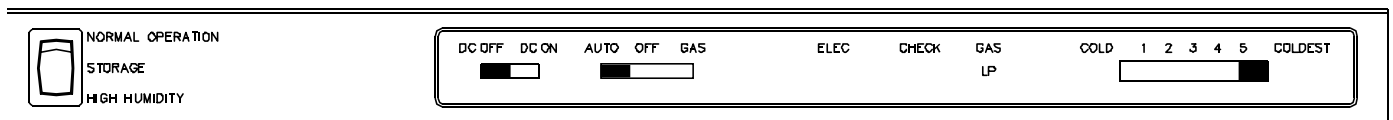
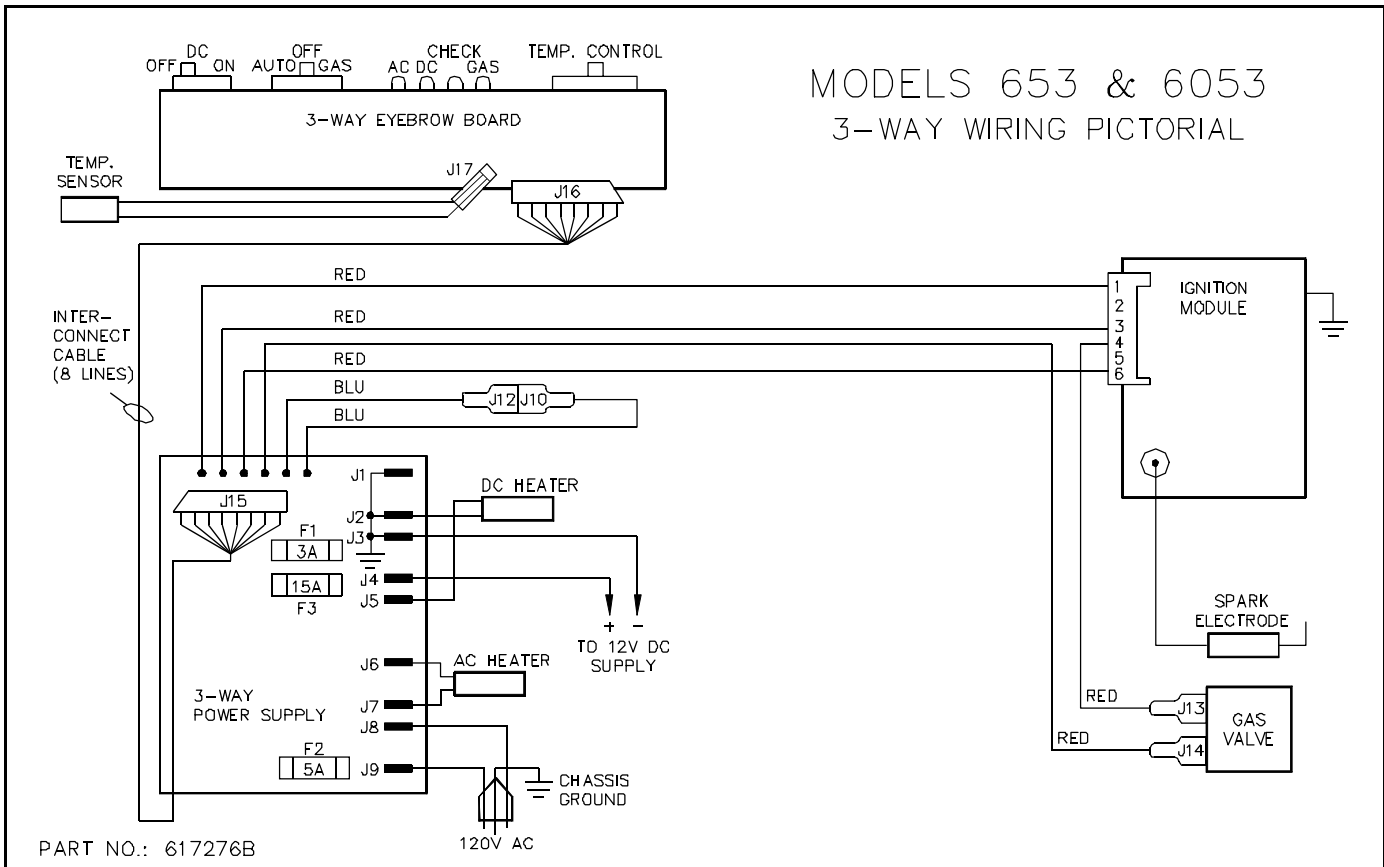
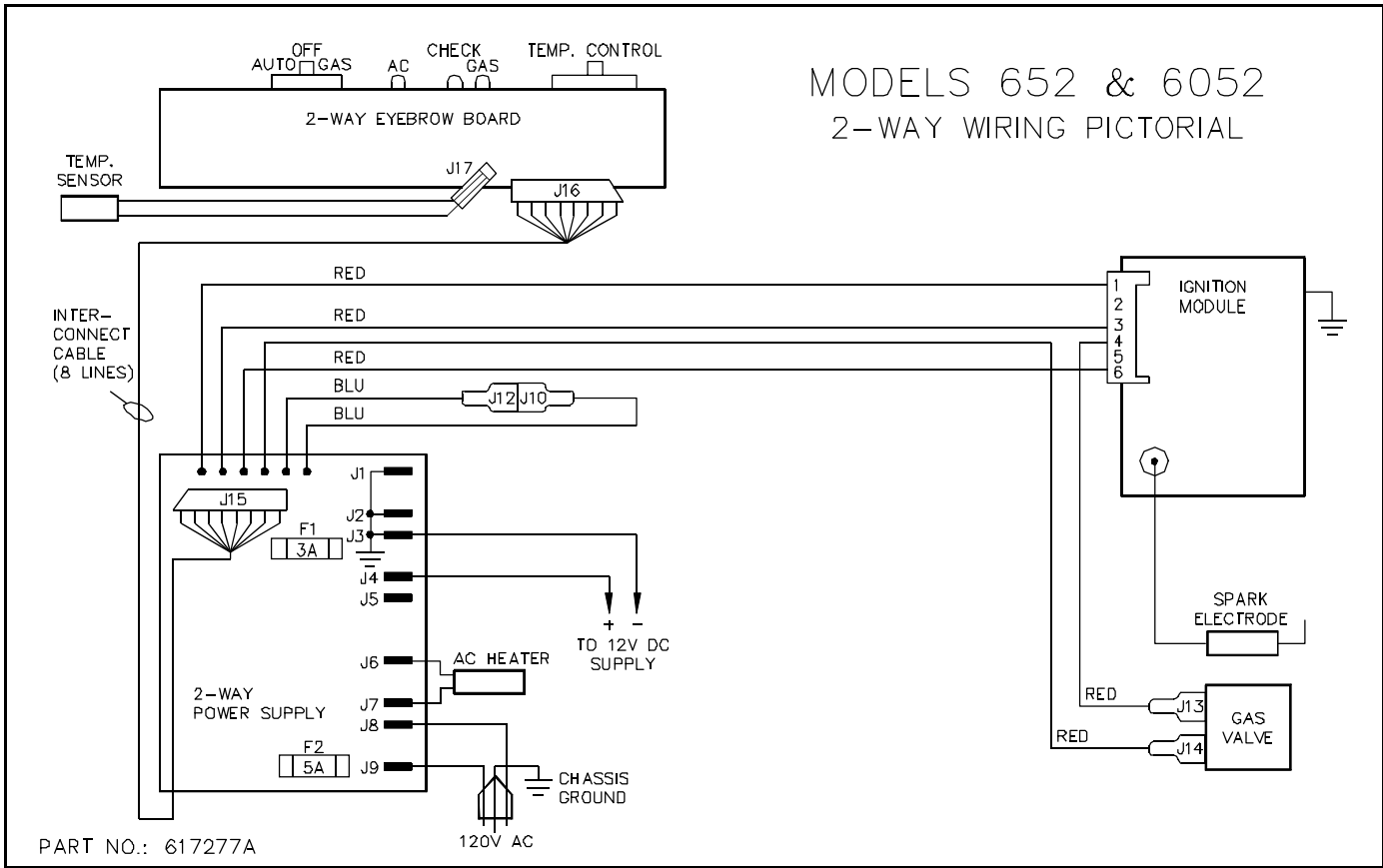
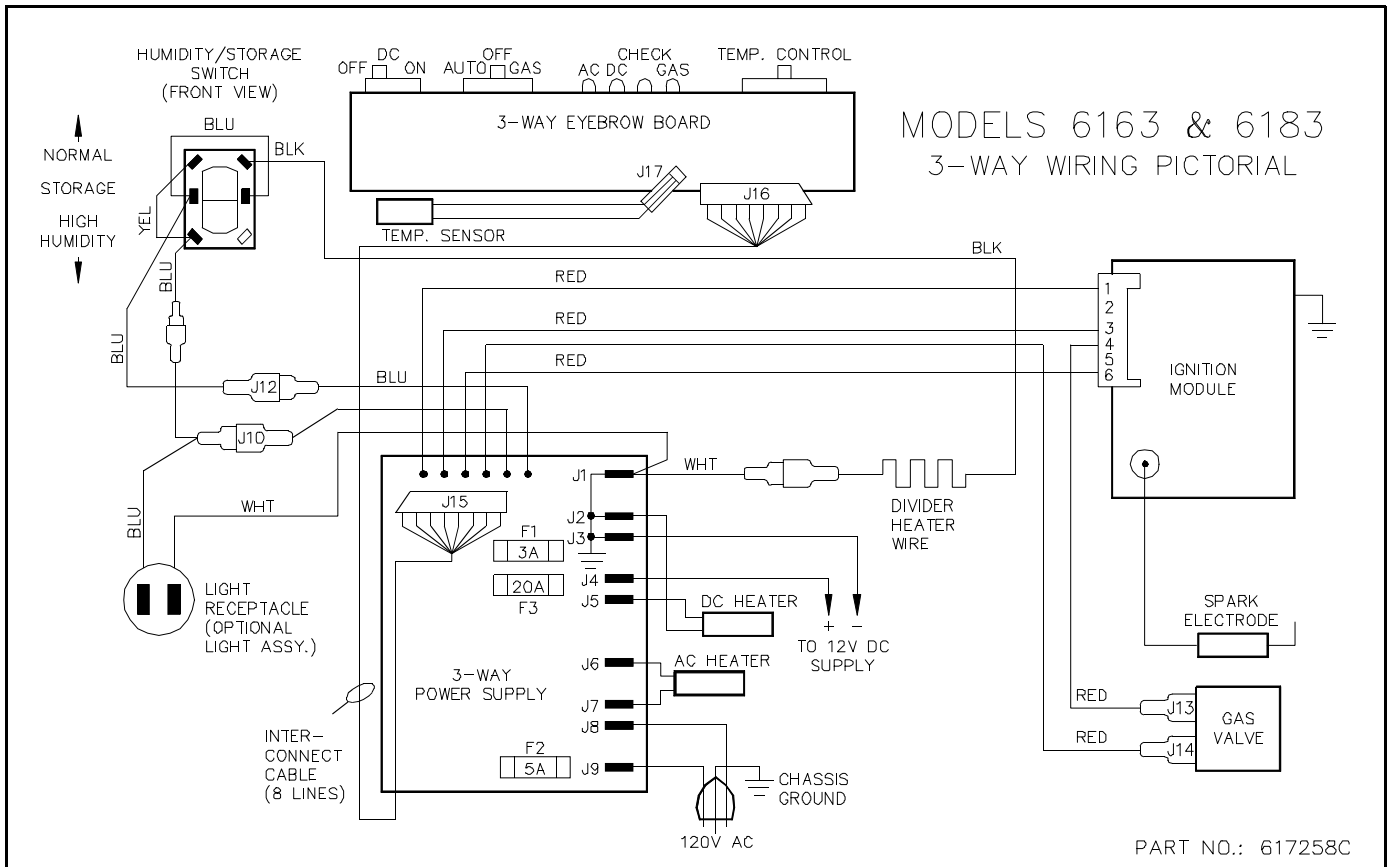
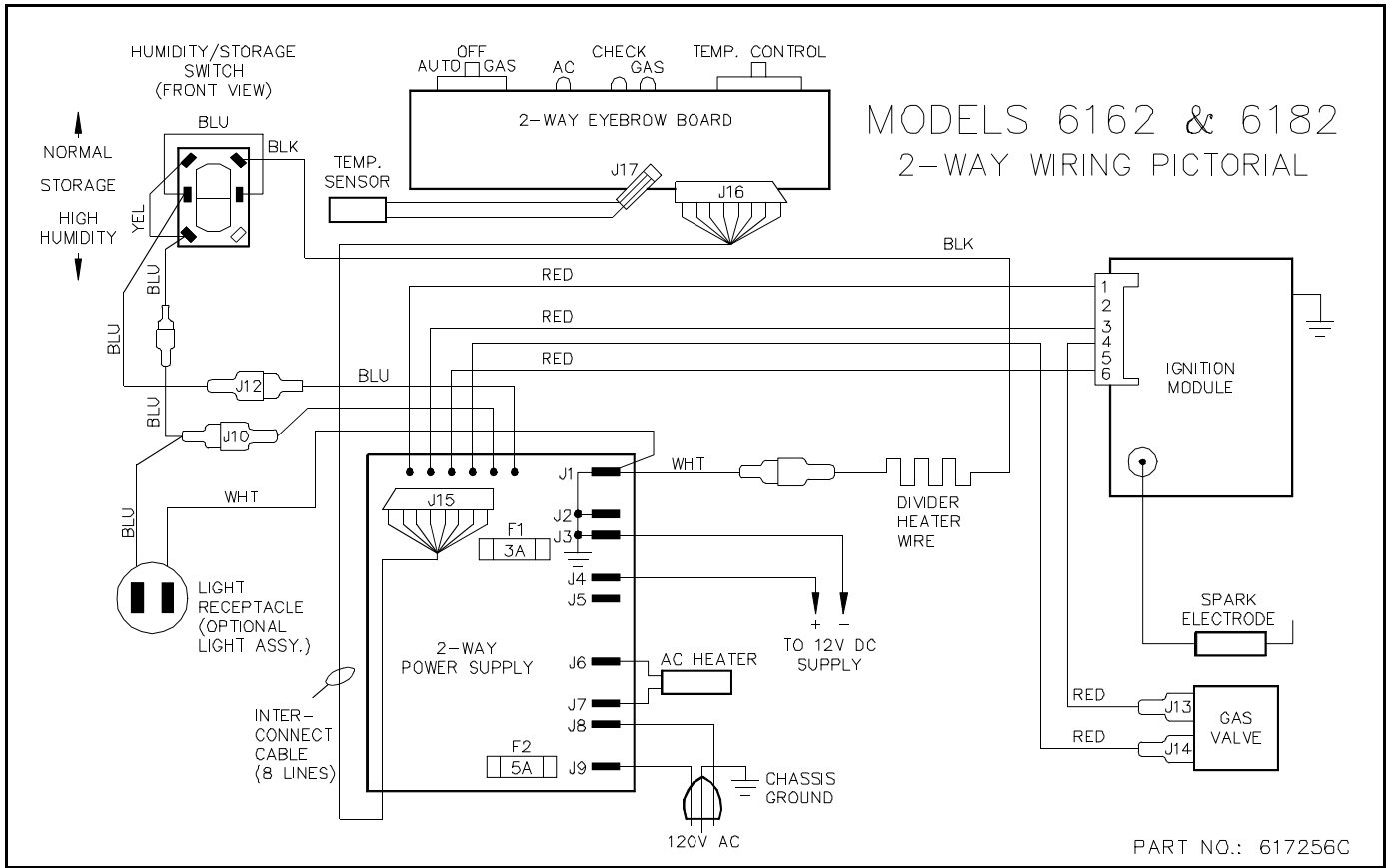


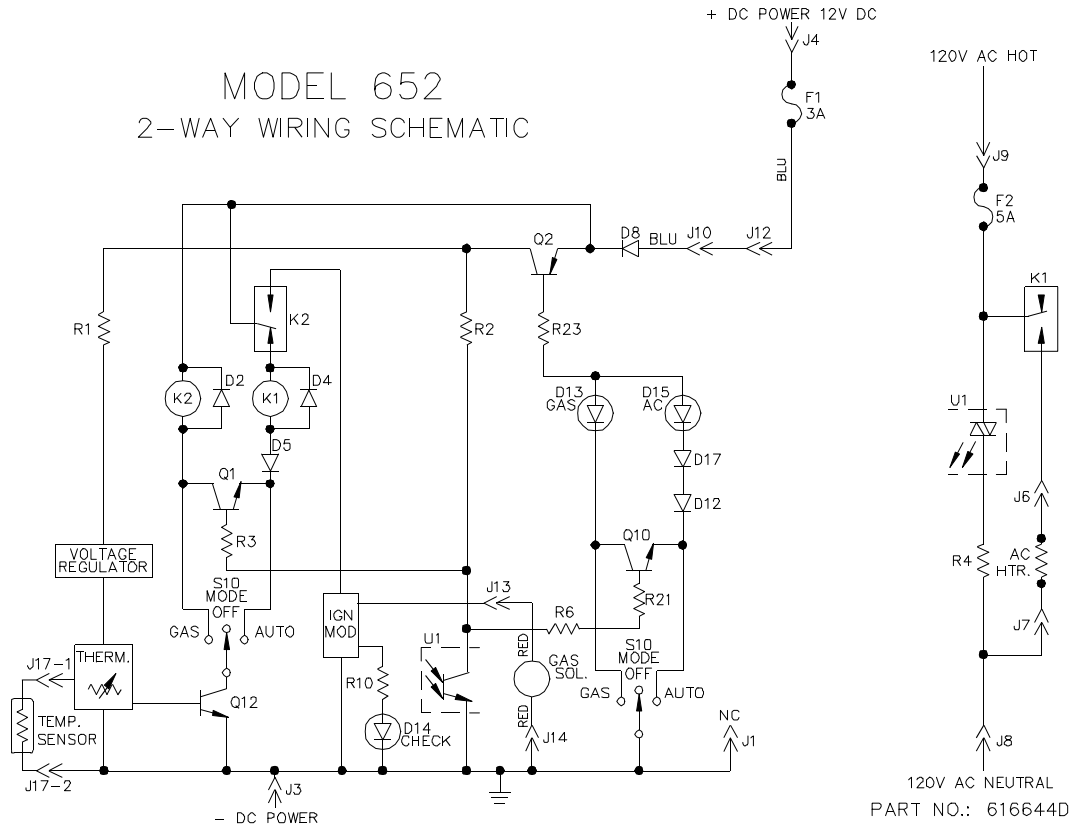
Figure 11.76 Auto Operation

Mode Selector set to AUTO; LP indicated. 120 volts AC supplied to refrigerator.
Remedy: Check the 5 amp fuse. If OK, replace Power Supply.

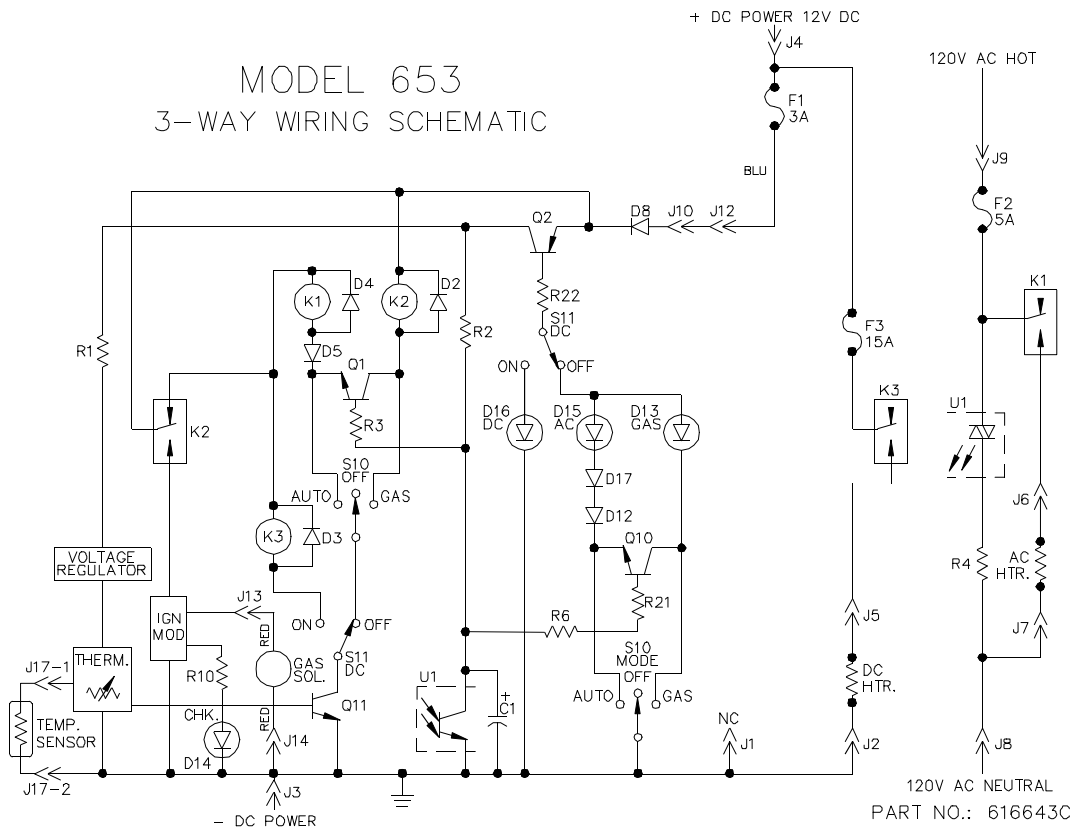




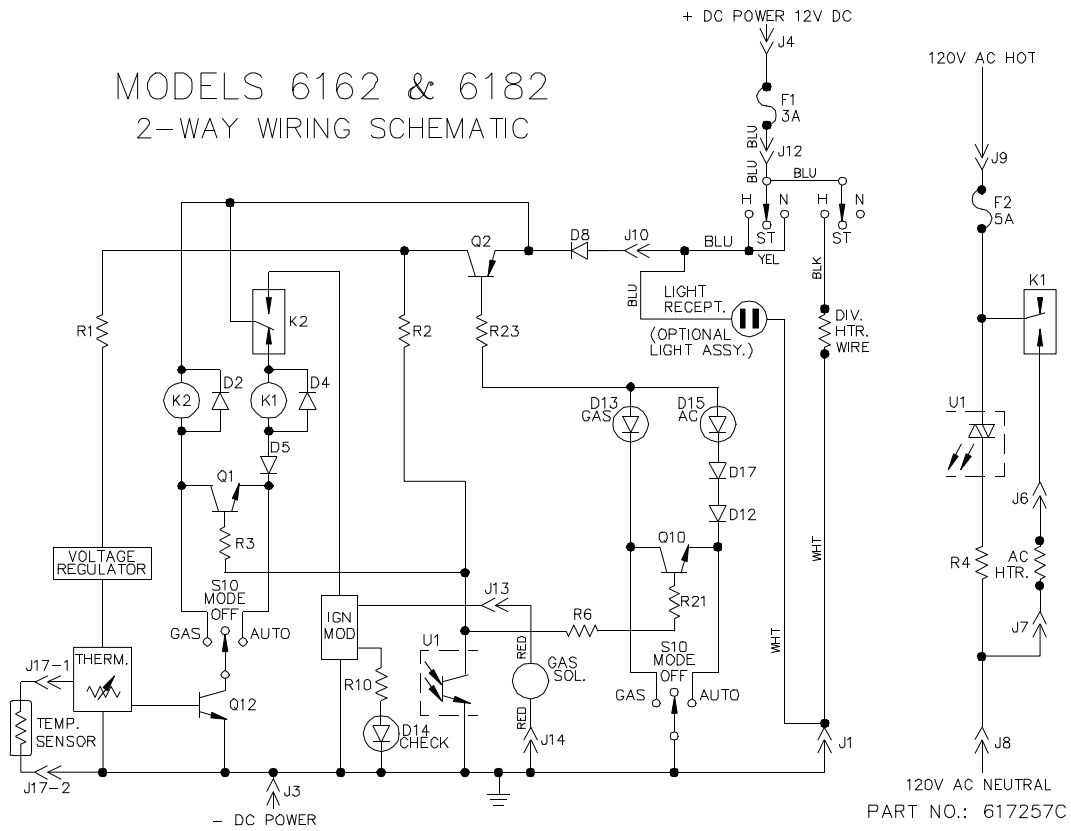
MODEL 652 2-WAY WIRING SCHEMATIC



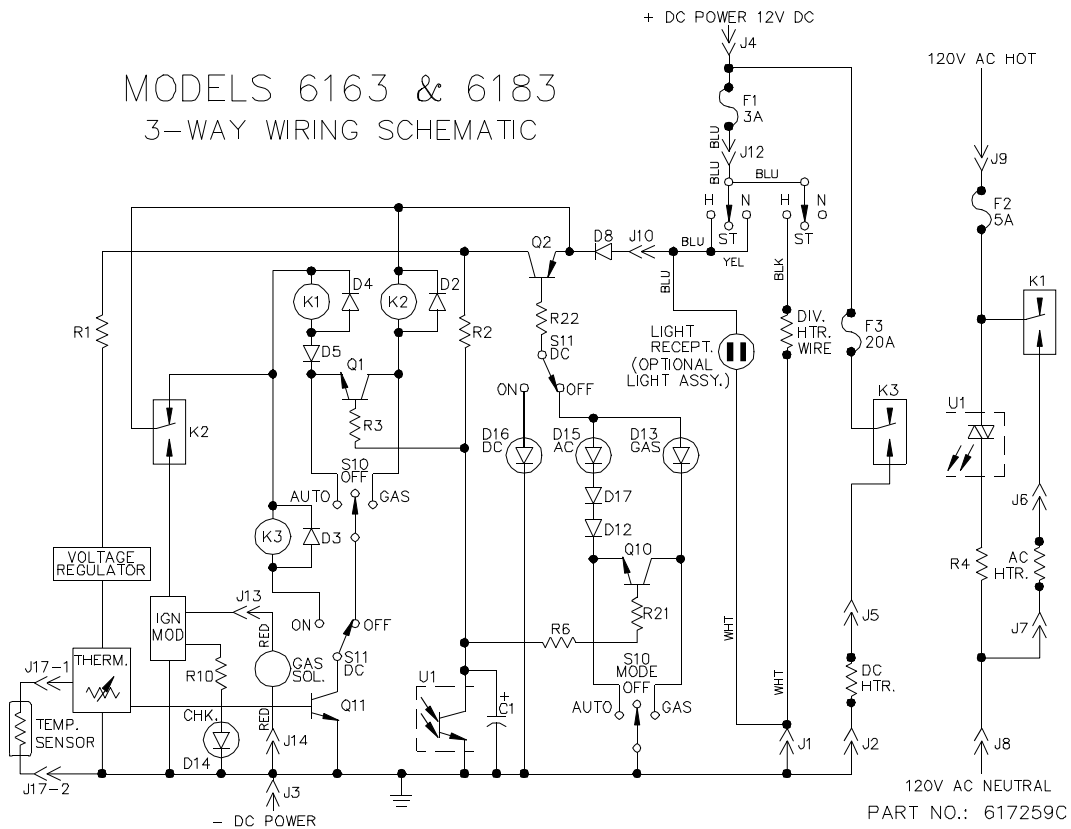
MODEL 653 3-WAY WIRING SCHEMATIC

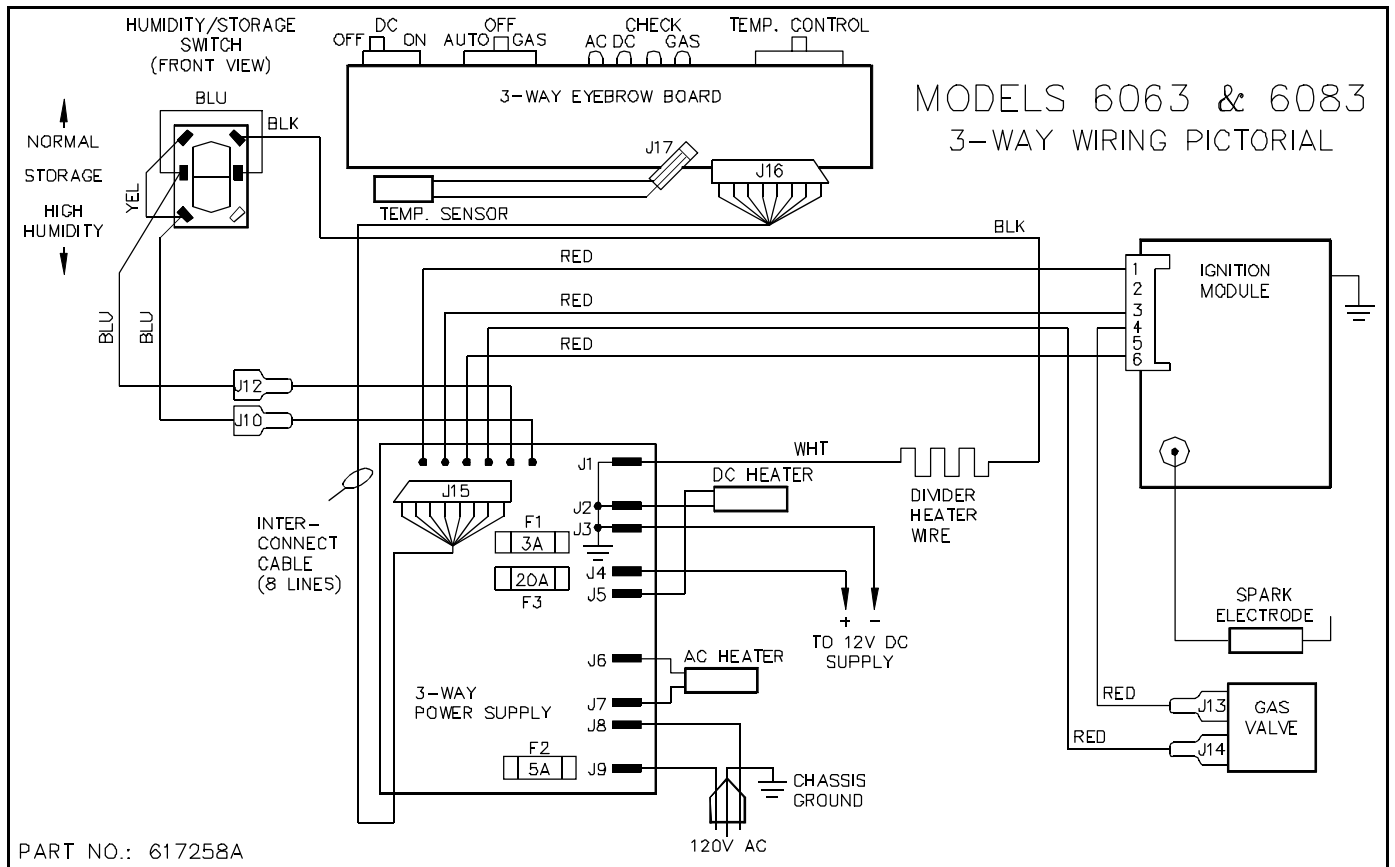
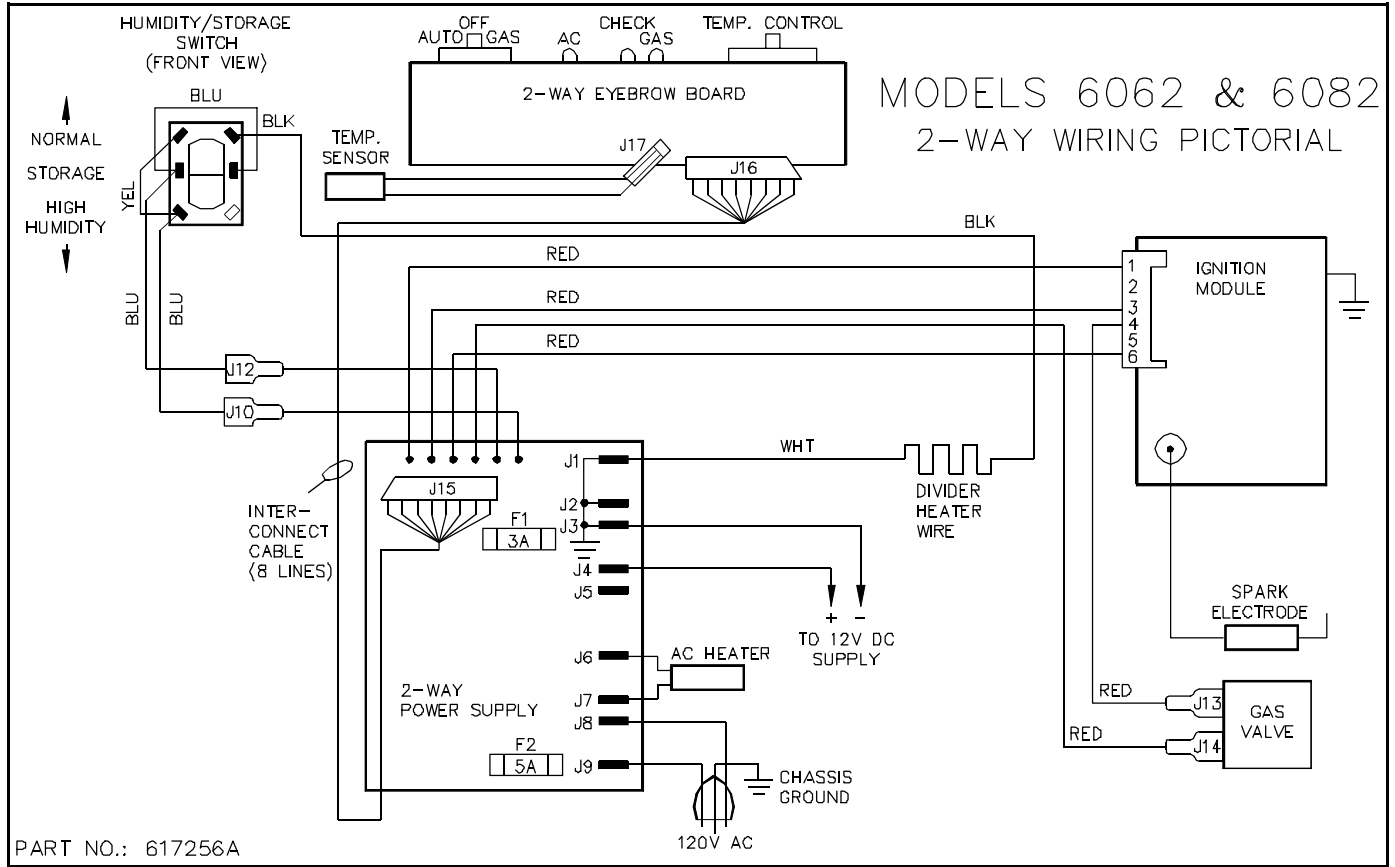


MODELS 6162 & 6182 2-WAY WIRING SCHEMATIC

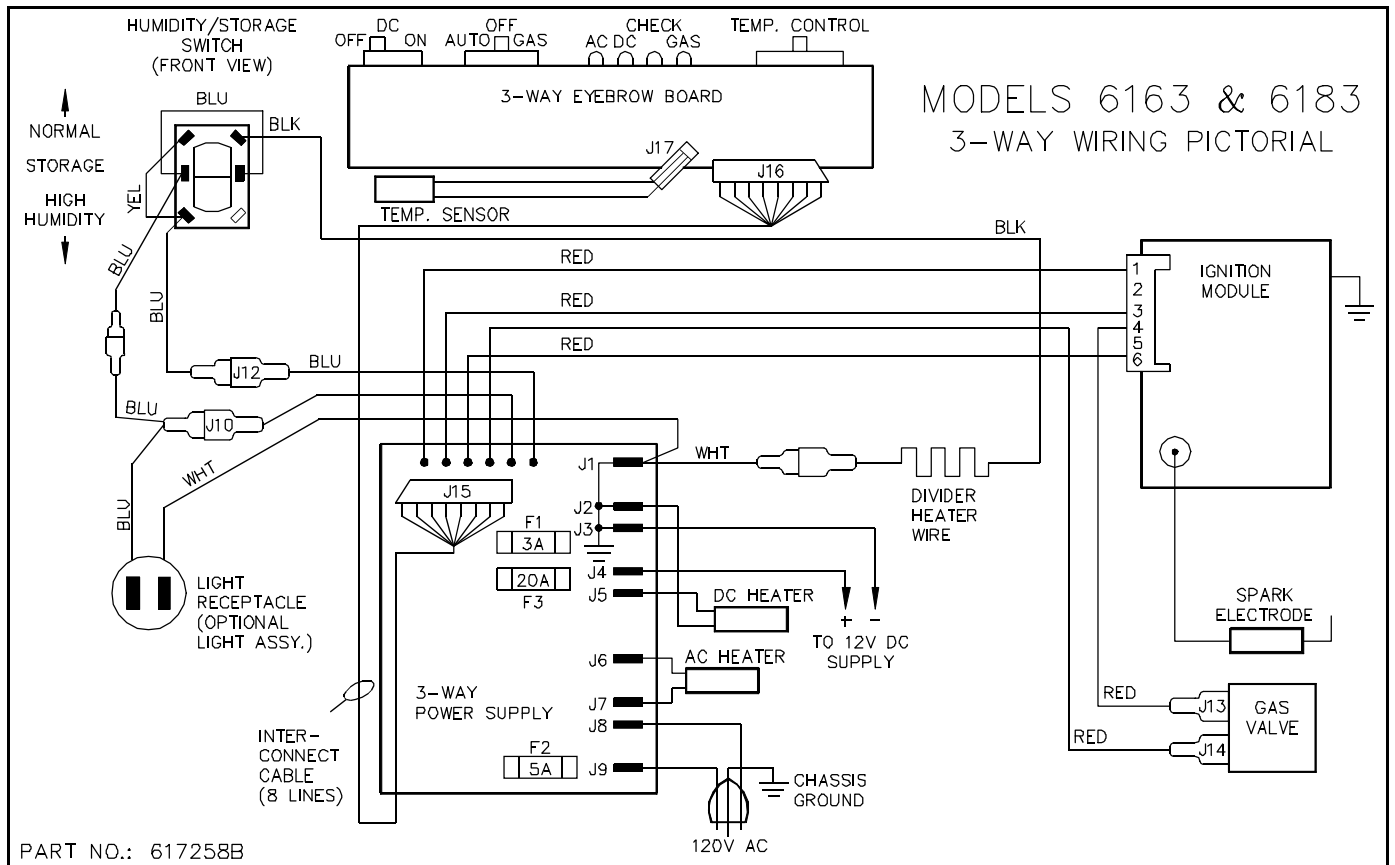
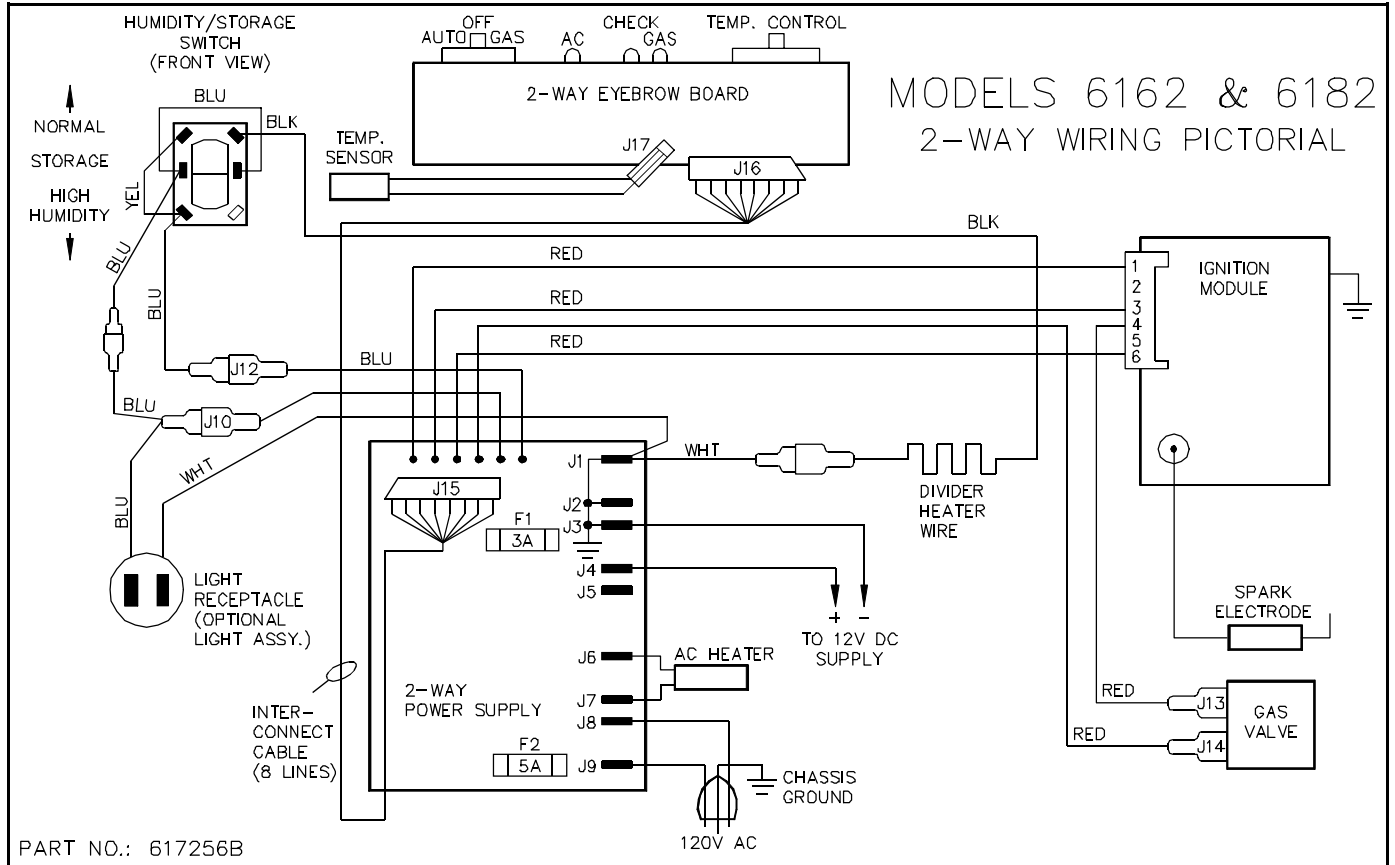


MODELS 6163 & 6183 3-WAY WIRING SCHEMATIC

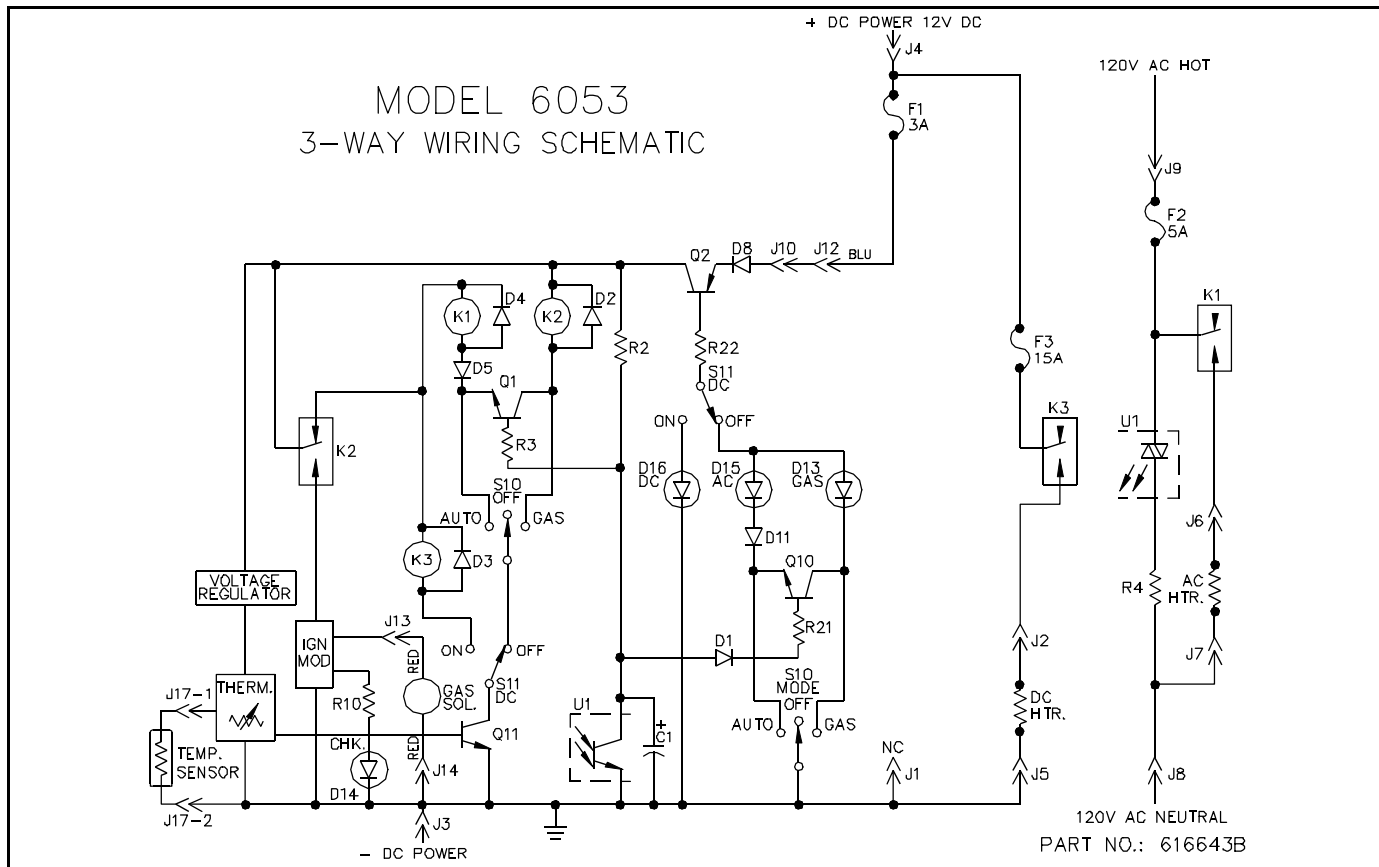
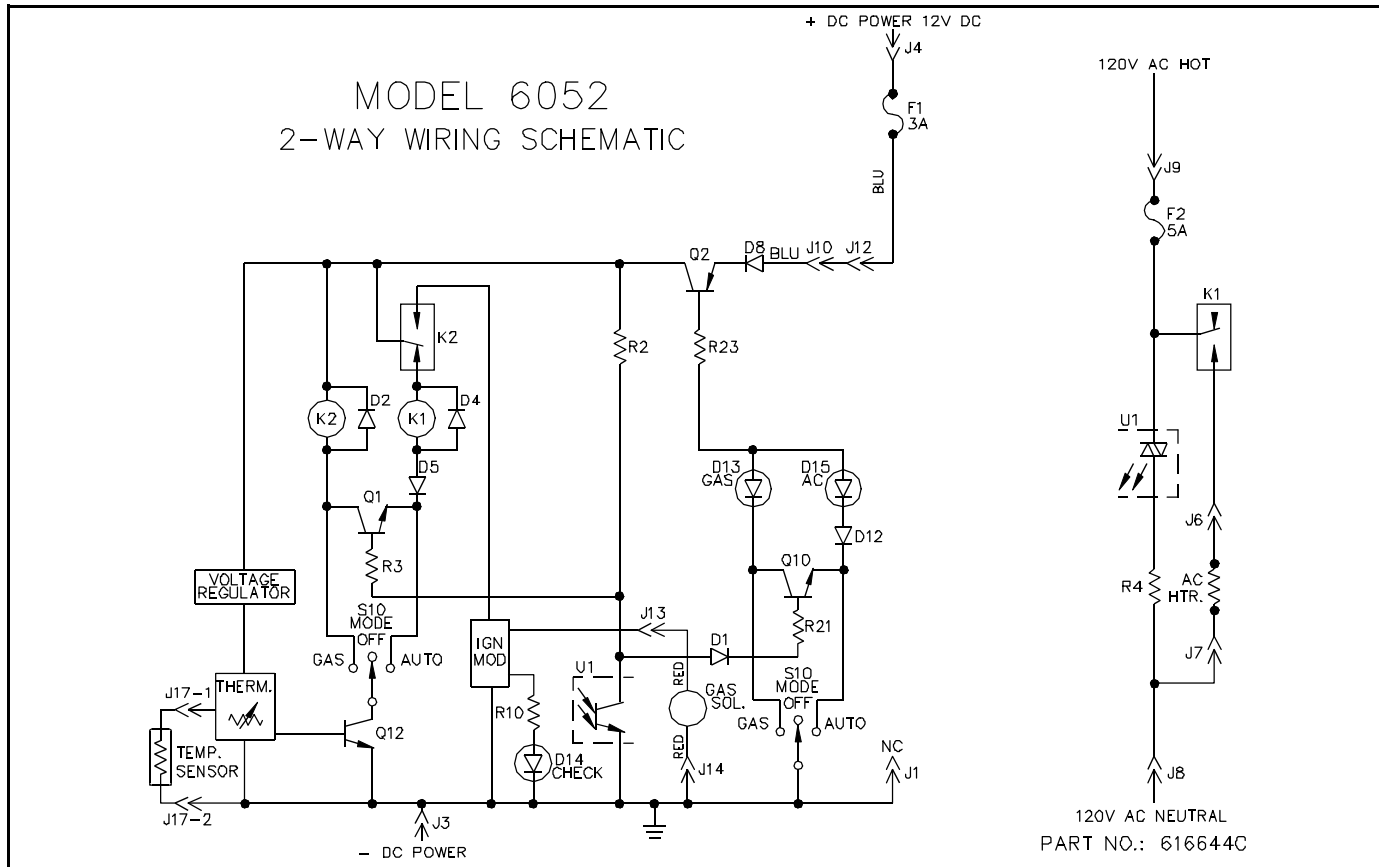




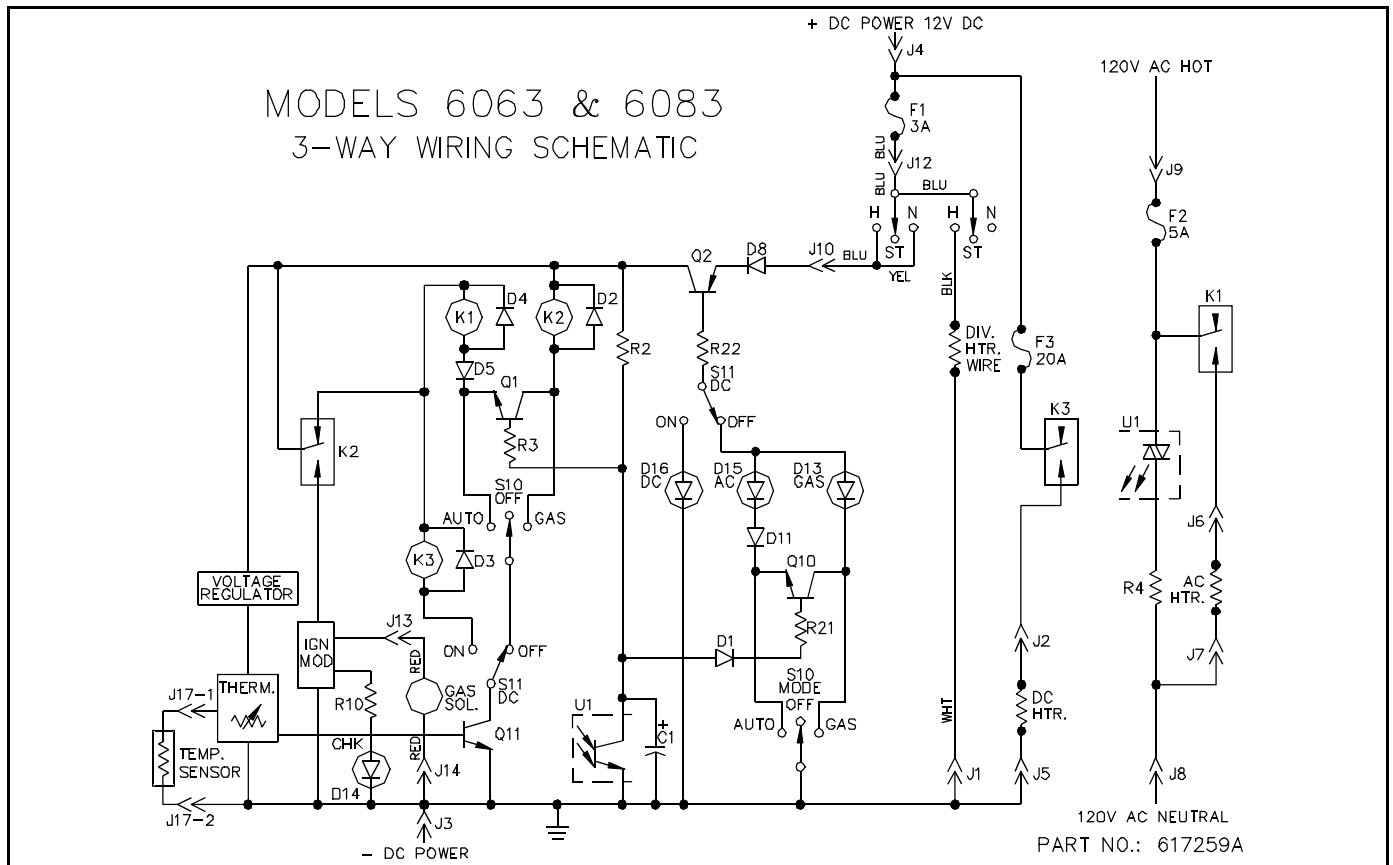
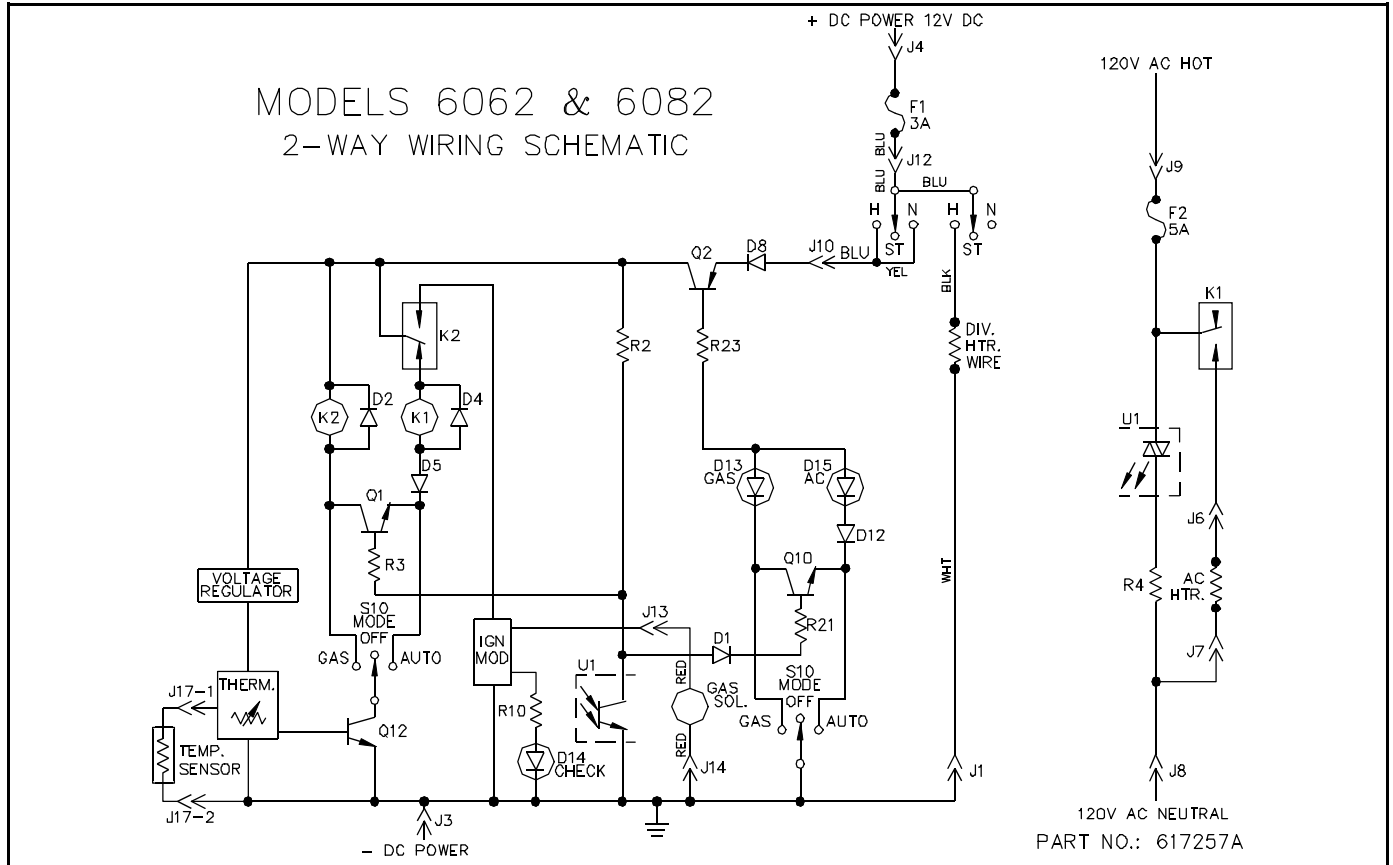
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