

# Service and Troubleshooting

## SINGLE STAGE GAS FURNACES

\*R9S92 / \*R9S96 / \*D9S96



### WARNING

ONLY PERSONNEL THAT HAVE BEEN TRAINED TO INSTALL, ADJUST, SERVICE, MAINTENANCE OR REPAIR (HEREINAFTER, "SERVICE") THE EQUIPMENT SPECIFIED IN THIS MANUAL SHOULD SERVICE THE EQUIPMENT.

THIS EQUIPMENT IS NOT INTENDED FOR USE BY PERSONS (INCLUDING CHILDREN) WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES, OR LACK OF EXPERIENCE AND KNOWLEDGE, UNLESS THEY HAVE BEEN GIVEN SUPERVISION OR INSTRUCTION CONCERNING USE OF THE APPLIANCE BY A PERSON RESPONSIBLE FOR THEIR SAFETY.

CHILDREN SHOULD BE SUPERVISED TO ENSURE THAT THEY DO NOT PLAY WITH THE EQUIPMENT.

THE MANUFACTURER WILL NOT BE RESPONSIBLE FOR ANY INJURY OR PROPERTY DAMAGE ARISING FROM IMPROPER SUPERVISION, SERVICE OR SERVICE PROCEDURES. IF YOU SERVICE THIS UNIT, YOU ASSUME RESPONSIBILITY FOR ANY INJURY OR PROPERTY DAMAGE WHICH MAY RESULT. IN ADDITION, IN JURISDICTIONS THAT REQUIRE ONE OR MORE LICENSES TO SERVICE THE EQUIPMENT SPECIFIED IN THIS MANUAL, ONLY LICENSED PERSONNEL SHOULD SERVICE THE EQUIPMENT. IMPROPER SUPERVISION, INSTALLATION, ADJUSTMENT, SERVICING, MAINTENANCE OR REPAIR OF THE EQUIPMENT SPECIFIED IN THIS MANUAL, OR ATTEMPTING TO INSTALL, ADJUST, SERVICE OR REPAIR THE EQUIPMENT SPECIFIED IN THIS MANUAL WITHOUT PROPER SUPERVISION OR TRAINING MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

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Pride and workmanship go into every product to provide our customers with quality products. It is possible, however, that during its lifetime a product may require service.

Products should be serviced only by a qualified service technician who is familiar with the safety procedures required in the repair and who is equipped with the proper tools, parts, testing instruments and the appropriate service manual. **REVIEW ALL SERVICE INFORMATION IN THE APPROPRIATE SERVICE MANUAL BEFORE BEGINNING REPAIRS.**

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### WARNING

DO NOT BYPASS SAFETY DEVICES.

# IMPORTANT INFORMATION



## WARNING

THIS FURNACE MAY BE PAIRED WITH A COOLING UNIT THAT USES R-32 REFRIGERANT. IF THE COOLING UNIT PAIRED WITH THIS FURNACE DOES NOT USE R-32, THE R-32 FUNCTION IN THE FURNACE CONTROL BOARD NEEDS TO BE TURNED OFF. PLEASE SEE THE ELECTRICAL AND THE R-32 SECTIONS FOR MORE DETAILS. REFRIGERANT SYSTEMS OTHER THAN 410A OR R-32 MAY REQUIRE AN ADDITIONAL MITIGATION CONTROL BOARD. REFER TO THE INSTALLATION MANUAL OF THE INDOOR EVAPORATOR COIL TO DETERMINE INSTALLATION REQUIREMENTS FOR THAT SUPPLIER'S REFRIGERANT DETECTION SYSTEM.



## WARNING

**HIGH VOLTAGE**  
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



## WARNING

TO PREVENT THE RISK OF PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, DO NOT STORE COMBUSTIBLE MATERIALS OR USE GASOLINE OR OTHER FLAMMABLE LIQUIDS OR VAPORS IN THE VICINITY OF THIS APPLIANCE.



## WARNING

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, TURN OFF THE MANUAL GAS SHUTOFF VALVE EXTERNAL TO THE FURNACE BEFORE TURNING OFF THE ELECTRICAL SUPPLY.



## WARNING

IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

- DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

- WHAT TO DO IF YOU SMELL GAS:

- DO NOT TRY TO LIGHT ANY APPLIANCE.
- DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.
- IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS. IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.

- INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.



## WARNING

THIS UNIT SHOULD NOT BE CONNECTED TO, OR USED IN CONJUNCTION WITH, ANY DEVICES THAT ARE NOT DESIGN CERTIFIED FOR USE WITH THIS UNIT OR HAVE NOT BEEN TESTED AND APPROVED BY THE MANUFACTURER. SERIOUS PROPERTY DAMAGE OR PERSONAL INJURY, REDUCED UNIT PERFORMANCE AND/OR HAZARDOUS CONDITIONS MAY RESULT FROM THE USE OF DEVICES THAT HAVE NOT BEEN APPROVED OR CERTIFIED BY THE MANUFACTURER.



## ANGER PELIGRO



### CARBON MONOXIDE POISONING HAZARD

Special Warning for Installation of Furnace or Air Handling Units in Enclosed Areas such as Garages, Utility Rooms or Parking Areas

Carbon monoxide producing devices (such as an automobile, space heater, gas water heater, etc.) should not be operated in enclosed areas such as unventilated garages, utility rooms or parking areas because of the danger of carbon monoxide (CO) poisoning resulting from the exhaust emissions. If a furnace or air handler is installed in an enclosed area such as a garage, utility room or parking area and a carbon monoxide producing device is operated therein, there must be adequate, direct outside ventilation.

This ventilation is necessary to avoid the danger of CO poisoning which can occur if a carbon monoxide producing device continues to operate in the enclosed area. Carbon monoxide emissions can be (re)circulated throughout the structure if the furnace or air handler is operating in any mode.

CO can cause serious illness including permanent brain damage or death.

B10259-216

### RIESGO DE INTOXICACIÓN POR MONÓXIDO DE CARBONO

Advertencia especial para la instalación de calentadores ó manejadoras de aire en áreas cerradas como estacionamientos ó cuartos de servicio.

Los equipos ó aparatos que producen monóxido de carbono (tal como automóvil, calentador de gas, calentador de agua por medio de gas, etc) no deben ser operados en áreas cerradas debido al riesgo de envenenamiento por monóxido de carbono (CO) que resulta de las emisiones de gases de combustión. Si el equipo ó aparato se opera en dichas áreas, debe existir una adecuada ventilación directa al exterior.

Esta ventilación es necesaria para evitar el peligro de envenenamiento por CO, que puede ocurrir si un dispositivo que produce monóxido de carbono sigue operando en el lugar cerrado.

Las emisiones de monóxido de carbono pueden circular a través del aparato cuando se opera en cualquier modo.

El monóxido de carbono puede causar enfermedades severas como daño cerebral permanente ó muerte.

B10259-216

### RISQUE D'EMPOISONNEMENT AU MONOXYDE DE CARBONE

Avertissement special au sujet de l'installation d'appareils de chauffage ou de traitement d'air dans des endroits clos, tels les garages, les locaux d'entretien et les stationnements.

Evitez de mettre en marche les appareils produisant du monoxyde de carbone (tels que les automobile, les appareils de chauffage autonome, etc.) dans des endroits non ventilés tels que les d'empoisonnement au monoxyde de carbone. Si vous devez faire fonctionner ces appareils dans un endroit clos, assurez-vous qu'il y ait une ventilation directe provenant de l'exterieur.

Cette ventilation est nécessaire pour éviter le danger d'intoxication au CO pouvant survenir si un appareil produisant du monoxyde de carbone continue de fonctionner au sein de la zone confinée.

Les émissions de monoxyde de carbone peuvent être recirculées dans les endroits clos, si l'appareil de chauffage ou de traitement d'air sont en marche.

Le monoxyde de carbone peut causer des maladies graves telles que des dommages permanents au cerveau et même la mort.

B10259-216

OUTSIDE THE U.S., call 1-713-861-2500.

(Not a technical assistance line for dealers.) Your telephone company will bill you for the call.

# PRODUCT IDENTIFICATION

# NOMENCLATURE

The model and manufacturing number are used for positive identification of component parts used in manufacturing. Please use these numbers when requesting service or parts information.

| <b>G</b>                                         |  | <b>R</b> | <b>9</b> | <b>S</b> | <b>96</b> | <b>060</b> | <b>3</b> | <b>B</b> | <b>N</b> | <b>A</b> | <b>A</b>                         |
|--------------------------------------------------|--|----------|----------|----------|-----------|------------|----------|----------|----------|----------|----------------------------------|
| 1                                                |  | 2        | 3        | 4        | 5,6       | 7,8,9      | 10       | 11       | 12       | 13       | 14                               |
| <b>Brand</b>                                     |  |          |          |          |           |            |          |          |          |          | <b>Minor Revision</b>            |
| G - Goodman                                      |  |          |          |          |           |            |          |          |          |          | A - Initial Release              |
| A - Amana                                        |  |          |          |          |           |            |          |          |          |          | B - 1st Revision                 |
| <b>Configuration</b>                             |  |          |          |          |           |            |          |          |          |          | <b>Major Revision</b>            |
| M - Upflow/Horizontal R410A                      |  |          |          |          |           |            |          |          |          |          | A - Initial Release              |
| C - Downflow/Horizontal R410A                    |  |          |          |          |           |            |          |          |          |          | B - 1st Revision                 |
| R - Upflow/ Horizontal R32                       |  |          |          |          |           |            |          |          |          |          |                                  |
| D - Downflow/Horizontal R32                      |  |          |          |          |           |            |          |          |          |          |                                  |
| <b>MOTOR</b>                                     |  |          |          |          |           |            |          |          |          |          | <b>NOx</b>                       |
| 9 - Multi-Speed ECM (9 taps) / Non-Communicating |  |          |          |          |           |            |          |          |          |          | N - Natural Gas ≥ 40 NG/J NOx    |
| V - Variable-Speed ECM / Communicating           |  |          |          |          |           |            |          |          |          |          | N - Low NOx (90%+) ≤ 40 NG/J NOx |
|                                                  |  |          |          |          |           |            |          |          |          |          | X - Low NOx (80%) ≤ 40 NG/J NOx  |
|                                                  |  |          |          |          |           |            |          |          |          |          | U - Ultra Low NOx ≤ 14 NG/J NOx  |
| <b>Gas Valve</b>                                 |  |          |          |          |           |            |          |          |          |          | <b>Cabinet Width</b>             |
| S - Single Stage                                 |  |          |          |          |           |            |          |          |          |          | A - 14"                          |
| T - Two Stage                                    |  |          |          |          |           |            |          |          |          |          | B - 17.5"                        |
|                                                  |  |          |          |          |           |            |          |          |          |          | C - 21"                          |
|                                                  |  |          |          |          |           |            |          |          |          |          | D - 24.5"                        |
| <b>AFUE</b>                                      |  |          |          |          |           |            |          |          |          |          | <b>Maximum CFM</b>               |
| 80 - 80% AFUE                                    |  |          |          |          |           |            |          |          |          |          | 3 - 1200 CFM                     |
| 92 - 92% AFUE                                    |  |          |          |          |           |            |          |          |          |          | 4 - 1600 CFM                     |
| 96 - 96% AFUE                                    |  |          |          |          |           |            |          |          |          |          | 5 - 2000 CFM                     |
| 97 - 97% AFUE                                    |  |          |          |          |           |            |          |          |          |          |                                  |
| <b>MBTU/h</b>                                    |  |          |          |          |           |            |          |          |          |          |                                  |
| 030 - 30,000 BTU/h                               |  |          |          |          |           |            |          |          |          |          |                                  |
| 080 - 80,000 BTU/h                               |  |          |          |          |           |            |          |          |          |          |                                  |
| 040 - 40,000 BTU/h                               |  |          |          |          |           |            |          |          |          |          |                                  |
| 100 - 100,000 BTU/h                              |  |          |          |          |           |            |          |          |          |          |                                  |
| 060 - 60,000 BTU/h                               |  |          |          |          |           |            |          |          |          |          |                                  |
| 120 - 120,000 BTU/h                              |  |          |          |          |           |            |          |          |          |          |                                  |

# SYSTEM OPERATION



## WARNING

### HIGH VOLTAGE!

TO AVOID THE RISK OF INJURY, ELECTRICAL SHOCK OR DEATH, THE FURNACE MUST BE ELECTRICALLY GROUNDED IN ACCORDANCE WITH THE LOCAL CODES OR IN THEIR ABSENCE, WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.



## 115 VOLT LINE VOLTAGE CONNECTION OF ACCESSORIES (HUMIDIFIER AND ELECTRONIC AIR CLEANER)

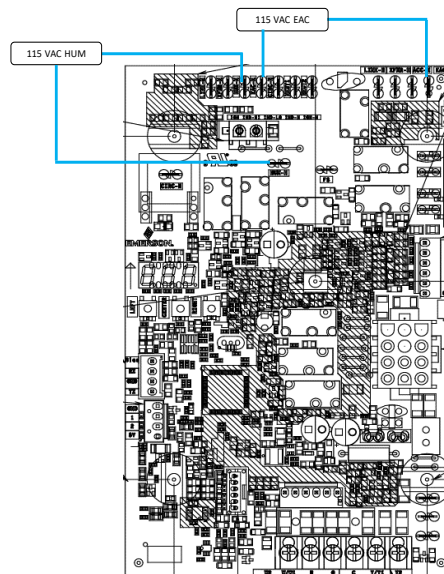
The furnace integrated control module is equipped with line voltage accessory terminals for controlling power to an optional field-supplied humidifier and/or electronic air cleaner.

Turn OFF power to the furnace before installing any accessories. Follow the humidifier or air cleaner manufacturers' instructions for locating, mounting, grounding, and controlling these accessories. Accessory wiring connections are to be made through the ¼" quick connect terminals provided on the furnace integrated control module. The humidifier hot terminal is identified as 120V HUM-H, its neutral terminal is identified as 120V HUM-N. The electronic air cleaner hot terminal is identified as EAC-H, its neutral terminal is identified as 120V EAC-N. All field wiring must conform to applicable codes. Connections should be made as shown (See Figure 32).

If it is necessary for the installer to supply additional line voltage wiring to the inside of the furnace, the wiring must conform to all local codes, and have a minimum temperature rating of 105°C. All line voltage wire splices must be made inside the furnace junction box.

The integrated control module humidifier terminal 120V HUM-H is energized with 115 volts whenever the induced draft blower is energized. This terminal can also be used to provide 115 volt power to a humidifier transformer. The remaining primary transformer wire would be connected to the Line N on the control board. The integrated control module electronic air cleaner terminals EAC-H is energized with 115 volts whenever the circulator blower is energized.

**NOTE: Wire routing must not to interfere with circulator blower operation, filter removal, or routine maintenance.**



## CONNECTION OF 24 VOLT HUMIDIFIER

The integrated control module single humidifier terminal "24 V HUM" is energized with 24 volts whenever the induced draft blower is energized. Connect the common side of the 24 volt humidifier to the "C" terminal of the thermostat terminal strip on the control board.

## LOW VOLTAGE VENTILATION

The Ventilation connections provide dry contact for field ventilator wiring connections. These connections are normally open and energize during the R-32 fault/alarm condition. VT IN and VT OUT connections are provided on the control board and are shown in the image below.

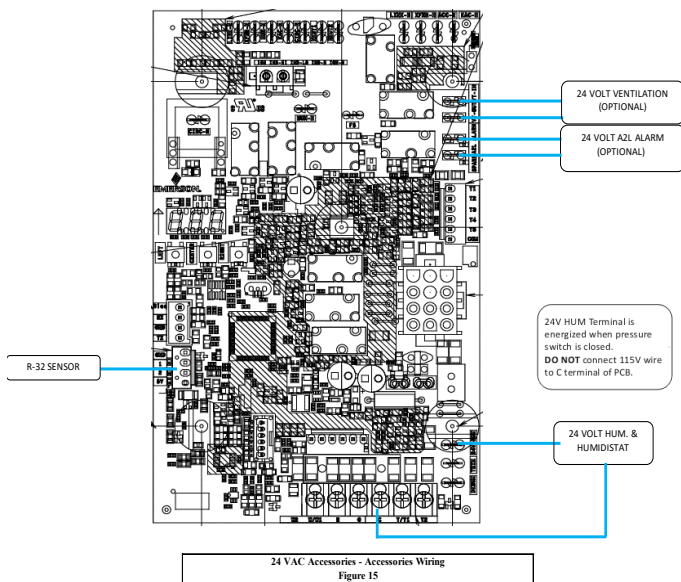
## LOW VOLTAGE A2L ALARM

The A2L alarm connection provides 24VAC for field alarm wiring connections. These connections are normally open and energize during the R-32 fault/alarm condition. An A2L Alarm connection is provided on the control board and is shown in the image below.

## FIELD INSTALLED ACCESSORIES

Additional accessories that do not have dedicated terminals on the furnace control board may require an additional daughter board to be installed. Please refer to the instructions on the accessory daughter board for additional information.

# SYSTEM OPERATION



To ensure proper unit grounding, the ground wire should run from the furnace ground screw located inside the furnace junction box all the way back to the electrical panel.

**NOTE: Do not use gas piping as an electrical ground. To confirm proper unit grounding, turn off the electrical power and perform the following check.**

1. Measure resistance between the neutral (white) connection and one of the burners. Resistance should measure 10 ohms or less.

This furnace is equipped with a blower door interlock switch which interrupts unit voltage when the blower door is opened for servicing. Do not defeat this switch.

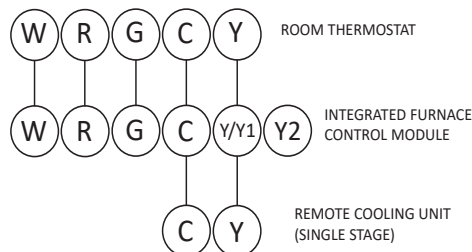
## 24 VOLT THERMOSTAT WIRING

**Important Note: Wiring routing must not interfere with circulator blower operation, filter removal or routine maintenance.**

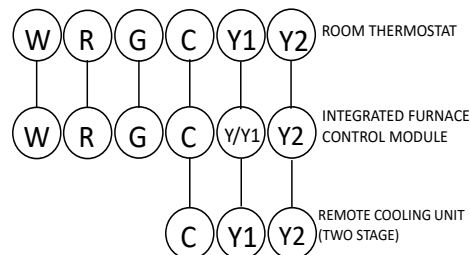
Low voltage connections can be made through either the right or left side panel. Thermostat wiring entrance holes are located in the blower compartment. The following figure shows connections for a “heat/cool system”.

This furnace is equipped with a 40 VA transformer to facilitate use with most cooling equipment. Consult the wiring diagram, located on the blower compartment door, for further details of 115 Volt and 24 Volt wiring.

## Thermostat Wiring Diagrams



### Thermostat - Single-Stage Heating with Single-Stage Cooling



### Thermostat - Single-Stage Heating with Two-Stage Cooling

**WARNING**

**HIGH VOLTAGE!**  
TO AVOID PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, DISCONNECT ELECTRICAL POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING.

## FOSSIL FUEL APPLICATIONS

This furnace can be used in conjunction with a heat pump in a fossil fuel application. A fossil fuel application refers to a combined gas furnace and heat pump installation which uses an outdoor temperature sensor to determine the most cost efficient means of heating (heat pump or gas furnace).

A heat pump thermostat is required to properly use a single-stage furnace in conjunction with a heat pump. Refer to the fossil fuel kit installation instructions for additional thermostat requirements.

Strictly follow the wiring guidelines in the fossil fuel kit installation instructions. All furnace connections must be made to the furnace two-stage integrated control module and the “FURNACE” terminal strip on the fossil fuel control board.

# SYSTEM OPERATION



## CAUTION

TO PREVENT UNRELIABLE OPERATION OR EQUIPMENT DAMAGE, THE GAS MANIFOLD PRESSURE MUST BE AS SPECIFIED ON THE UNIT RATING PLATE. ONLY MINOR ADJUSTMENTS SHOULD BE MADE BY ADJUSTING THE GAS VALVE PRESSURE REGULATOR.



## WARNING

POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH MAY OCCUR IF THE CORRECT CONVERSION KITS ARE NOT INSTALLED. THE APPROPRIATE KITS MUST BE APPLIED TO ENSURE SAFE AND PROPER FURNACE OPERATION. ALL CONVERSIONS MUST BE PERFORMED BY A QUALIFIED INSTALLER OR SERVICE AGENCY.

### FURNACE STARTUP

1. Close the manual gas shutoff valve external to the furnace.
2. Turn off the electrical power to the furnace.
3. Set the room thermostat to the lowest possible setting.
4. Remove the burner compartment door.

**NOTE: This furnace is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.**

5. Move the furnace gas valve manual control to the OFF position.
6. Wait five minutes then smell for gas. Be sure check near the floor as some types of gas are heavier than air.
7. If you smell gas after five minutes, immediately follow the safety instructions in the *Safety Considerations* on page 2 of this manual. If you do not smell gas after five minutes, move the furnace gas valve manual control to the ON position.
8. Replace the burner compartment door.
9. Open the manual gas shutoff valve external to the furnace.
10. Turn on the electrical power to the furnace.
11. Adjust the thermostat to a setting above room temperature.
12. After the burners are lit, set the thermostat to desired temperature.

**NOTE:** This furnace is equipped with a control board that is capable of monitoring for R-32 refrigerant leaks in the indoor refrigeration unit. Please verify that the R-32 sensor wire is plugged in to the furnace control board before startup, if applicable. If furnace is not paired with an R-32 Refrigeration system, the default settings in the furnace control board will need to be changed. Please see the R-32 section for additional information.

### GAS HEAT SEQUENCE OF OPERATION

#### Call for Heat

- On a call for heat, the thermostat contacts close & the control board receives 24 VAC on the W terminal.
- The control board microcomputer runs its self-check routine.
- The control verifies the limit switch is closed (24 VAC on Pin 8 of the 12 Pin connector).
- The control verifies that pressure switch circuit is open (0 VAC on Pin 5).
- The control module performs a gas valve circuitry check to verify gas valve relay state and presence of voltage at the valve.
- The system will energize the Induced draft blower.
- The pre-purge period begins once the pressure switch is detected closed (24 VAC on Pin 5).
- After the completion of pre-purge, the control will energize the igniter.
- After completion of the ignitor warm-up period:
  - The gas valve is energized.
  - The ignitor is de-energized as soon as flame is sensed.
- After 30 seconds the indoor blower is energized on heating speed.
- When the thermostat is satisfied:
  - The gas valve is de-energized.
- The inducer remains energized for the post purge period (15 seconds).
- The indoor blower runs for the selected off delay period (90 seconds by default, adjustable from 30 – 180 seconds).

# SYSTEM OPERATION

## HEATING MODE SPEED SELECTION

To change the main blower speed in HEATING mode, follow the following steps:

1. Press left or right button till LED displays “gA1” (for single stage HEATING). Press center button and LED will display the selected speed number as Fxx (xx: Blower speed number).
2. The control shall rotate available speed number every time Left/Right buttons are pressed. Table below shows the available speeds for Low & High heat mode.
3. When the center button is pressed, the current displayed speed shall be selected, and control shall apply the newly selected speed in next heating call.

**NOTE: Always refer to the Heating Chart to choose from available heating speeds.**

| THERMOSTAT CALL | AVAILABLE SPEEDS |
|-----------------|------------------|
| W/W1            | F01              |
|                 | F02 (DEFAULT)    |
|                 | F03              |
|                 | F04              |

Heating Speed Table for 1 Stage IFC

## CONTINUOUS FAN MODE SPEED SELECTION

To change the main blower speed in circulation mode, follow the following steps:

1. Press the left or right button until LED displays “FSd”. Press the center button and LED will display the selected speed number as Fxx (xx: Blower speed number from 1 to 9). F01 is the default speed for circulation.
2. The control will rotate available speed number every time left/right buttons are pressed. All 9 speeds are available for circulation.
3. When the center button is pressed, the current displayed speed will be selected, and control will immediately apply that speed setting.

| THERMOSTAT CALL | AVAILABLE SPEEDS |
|-----------------|------------------|
| G               | F01 (DEFAULT)    |
|                 | F02              |
|                 | F03              |
|                 | F04              |
|                 | F05              |
|                 | F06              |
|                 | F07              |
|                 | F08              |
|                 | F09              |

Circulation Speed Table

## COOLING MODE SEQUENCE OF OPERATION

### Low Stage Cooling Mode Sequence:

On a call for low stage cooling, the Y/Y1 or Y/Y1 and G thermostat contacts close signaling the furnace control board with 24 VAC on Y/Y1 or Y/Y1 and G terminals.

- The 7-Segment will display the cool mode: 1 A C
- The compressor and condenser fan are energized.
- The circulator fan is energized at low cool speed after a cool on delay. The electronic air cleaner will also be energized.
- After the thermostat is satisfied, the compressor is de-energized and the Cool Mode Fan Off Delay period begins.
- Following the Cool Mode Fan Off Delay period, the cool circulator and air cleaner relay are de-energized.

### 2nd Stage Cooling Mode Sequence:

On a call for 2nd stage cooling, the Y2 or Y2 and G thermostat contacts close signaling the furnace control board with 24 VAC on Y2 or Y2 and G terminals.

- The 7-Segment will display the cool mode: 2 A C
- The compressor and condenser fan are energized.
- The circulator fan is energized at cool speed after a cool on delay. The electronic air cleaner will also be energized.
- After the thermostat is satisfied, the compressor is de-energized and the Cool Mode Fan Off Delay period begins.
- Following the Cool Mode Fan Off Delay period, the cool circulator and air cleaner relay are de-energized

## COOLING MODE SPEED SELECTION

To change the main blower speed in COOLING mode, follow the following steps:

1. Press the left or right button until LED displays “AC1” (for single stage COOLING) or “AC2” (for two-stage COOLING). Press the center button and LED will display the selected speed number as Fxx (xx: Blower speed number from 1 to 9).
2. The control will rotate available speed number every time left/right buttons are pressed. All 9 speeds are available for both Single and Two Stage cooling.
3. When the center button is pressed, the current displayed speed will be selected, and control will apply the newly selected speed in next cooling call.

# SYSTEM OPERATION

| THERMOSTAT CALL | AVAILABLE SPEEDS |
|-----------------|------------------|
| Y/Y1            | F01              |
|                 | F02              |
|                 | F03              |
|                 | F04 (DEFAULT)    |
|                 | F05              |
|                 | F06              |
|                 | F07              |
|                 | F08              |
|                 | F09              |

Single-Stage Cooling Speed Table for 2 Stage IFC

| THERMOSTAT CALL | AVAILABLE SPEEDS |
|-----------------|------------------|
| Y2              | F01              |
|                 | F02              |
|                 | F03              |
|                 | F04              |
|                 | F05 (DEFAULT)    |
|                 | F06              |
|                 | F07              |
|                 | F08              |
|                 | F09              |

Two-Stage Cooling Speed Table for 2 Stage IFC

## FURNACE SHUTDOWN

1. Set the thermostat to the lowest setting. The integrated control will close the gas valve and extinguish flame. Following a 15 second delay, the induced draft blower will be de-energized. After the blower off delay time expires, the blower de-energizes.
2. Remove the burner compartment door and move the furnace gas valve manual control to the OFF position.
3. Close the manual gas shutoff valve external to the furnace.
4. Replace the burner compartment door.

## R-32 INFORMATION

### R-32 FUNCTION

This furnace is equipped with a control board that is capable of shutting off the gas heat and turning on the blower fan in case of an R-32 refrigerant leak in the indoor evaporator coil. If the cooling unit that is paired with this furnace does not utilize R-32 as the refrigerant, the R-32 functionalities in the furnace control board will need to be turned off for the furnace to run properly.

R-32 function on the control board is ON by default. The R-32 function can be disabled through the furnace control by entering the A2L Function Enabled menu and selecting “no”. If A2L function is disabled, the furnace control will ignore all A2L functions. If A2L function is enabled, the control will monitor the R-32 sensor information.

To enter the A2L Function Enabled menu, press the left or right button until LED displays “A2E”. Press the center button and the LED will display the selected option (yes or no). Press the left or right button to select one of the two options and press the center button to confirm the option.

### R-32 SENSOR WIRE ROUTING

**IMPORTANT NOTE: Wiring routing must not interfere with circulator blower operation, filter removal or routine maintenance. Wire should not be routed near hot surfaces and should be protected from sharp edges. Extra precaution should be taken to avoid routing near the outlet flue pipe.**

The R-32 Sensor wire coming from the indoor evaporator coil will need to be routed into the furnace and connected to the connection point on the furnace control board. This wire should be routed alongside the thermostat wires through the low voltage openings in the left or right side of the furnace blower compartment. Please see the electrical section for the location of the R-32 Sensor connection on the control board.

### FURNACE START UP

During furnace start up, the furnace control will identify the connected R-32 sensor and will start monitoring the sensor communication. A green LED located next to the sensor connection will indicate if there is communication between the furnace control and the R-32 sensor. The LED will be ON during the duration of the startup and then will either start blinking or turn OFF. The blinking LED signifies that communication with the R-32 sensor is present. The LED OFF signifies that there is no signal with the sensor.

If there are no alarms or faults, the furnace will go into regular run mode after a warm up period. The furnace control monitors the R-32 sensor once per second.

# SYSTEM OPERATION

## R-32 REFRIGERANT LEAK

If the R-32 sensor on the indoor evaporator coil detects a specified concentration of R-32 refrigerant, the furnace will enter Mitigation Mode to dilute the refrigerant concentrations in case of a leak. In Mitigation Mode, the furnace will do the following:

1. Display the A2L Refrigerant Leakage error code (EAL).
2. Shut down the gas operation.
3. Energize the optional ventilation and alarm outputs.
4. Run the fan at max CFM airflow.

Once the R-32 sensor stops detecting a leak, the fan will continue to run for 5 minutes. After the 5 minutes, if there are no other alarms or faults, the control will de-energize the optional ventilation and alarm outputs and then go back to the original operating mode per the thermostat.

## A2L VERIFICATION

The A2L Function Verification menu allows the installer to verify if the R-32 function operates properly. This menu simulates the refrigerant leak process and is only able to be used when there are no active alarms or faults. To verify the R-32 functions, enter the A2L Function Verification menu and select "YES". To enter the A2L Function Verification menu, press the left or right button until LED displays "A2u". Press the center button and the LED will display the selected option (yes or no). Press the left or right button to select one of the two options and press the center button to confirm the option.

Once "YES" is selected, the furnace will do the following:

1. Display the A2L Refrigerant Leakage code (EAL).
2. Shut down the gas operation.
3. Energize the optional ventilation and alarm outputs.
4. Run the fan at max CFM airflow.

The control will exit the verification function if:

1. The 5 minute timeout expires or
2. An alarm or fault is detected or
3. The user turns OFF the A2L Function Verification.

# SCHEDULED MAINTENANCE



## WARNING

### HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



## MAINTENANCE

Improper filter maintenance is the most common cause of inadequate heating or cooling performance. Filters should be cleaned (permanent) or replaced (disposable) every two months or as required. It is the owner's responsibility to keep air filters clean. When replacing a filter, it must be replaced with a filter of the same type and size.

### FILTER REMOVAL

Depending on the installation, differing filter arrangements can be applied. Filters can be installed in the central return register, the bottom of the blower compartment (upflow only), a side panel external filter rack kit (upflow only), or the ductwork above a counterflow furnace. A media air filter or electronic air cleaner can be used as an alternate filter. The filter sizes given in the *Product Design* section of this manual or the product *Specification Sheet* must be followed to ensure proper unit performance. Refer to the following information for removal and installation of filters.

### FILTER REMOVAL PROCEDURE

#### MEDIA AIR FILTER OR ELECTRONIC AIR CLEANER REMOVAL

Follow the manufacturer's directions for service.

#### HORIZONTAL UNIT FILTER REMOVAL

Filters in horizontal installations are located in the central return register.

### INDUCED DRAFT AND CIRCULATION BLOWERS

The bearings in the induced draft blower and circulator blower motors are permanently lubricated by the manufacturer. No further lubrication is required. Check motor windings for accumulation of dust which may cause overheating. Clean as necessary.

### CONDENSATE DRAINAGE SYSTEM (QUALIFIED SERVICER ONLY)

The drain tubes, standpipe, and field supplied drain line must be checked annually and cleaned as often as necessary to ensure proper condensate drainage.

### FLAME SENSOR (QUALIFIED SERVICER ONLY)

Under some conditions, the fuel or air supply can create a nearly invisible coating on the flame sensor. This coating acts as an insulator, causing a drop in the flame sensing signal. If this occurs, a qualified servicer must carefully

clean the flame sensor with steel wool. After cleaning, the flame sensor output should be as listed on the specification sheet.

## BURNERS



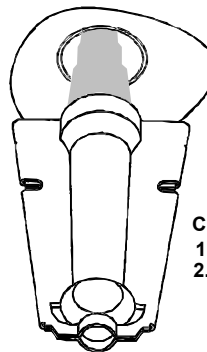
## WARNING

### HIGH VOLTAGE

ELECTRICAL COMPONENTS ARE CONTAINED IN BOTH COMPARTMENTS. TO AVOID ELECTRICAL SHOCK, INJURY OR DEATH, DO NOT REMOVE ANY INTERNAL COMPARTMENT COVERS OR ATTEMPT ANY ADJUSTMENT. CONTACT A QUALIFIED SERVICE AGENT AT ONCE IF AN ABNORMAL FLAME APPEARANCE SHOULD DEVELOP.



Periodically during the heating season make a visual check of the burner flames. Turn the furnace on at the thermostat. Wait a few minutes since any dislodged dust will alter the normal flame appearance. Flames should be stable, quiet, soft and blue with slightly orange tips. They should not be yellow. They should extend directly outward from the burner ports without curling downward, floating or lifting off the ports.



Check the burner flames for:

1. Stable, soft and blue
2. Not curling, floating, or lifting off.

Burner Flame

## TEST EQUIPMENT

Proper test equipment for accurate diagnosis is as essential as regular hand tools.

The following is a must for every service technician and service shop.

1. Thermometers or thermocouple meter (optional) - To measure temperatures.
2. Multi-Meter - To measure amperage and voltage, and to test continuity, capacitors and motor windings.
3. Manometer - To measure static pressure, pressure drop across coils, filters and draft, and to measure inlet and manifold gas pressures.

Other recording type instruments can be essential in solving abnormal problems, however, in many instances they may be rented from local sources.

Proper equipment promotes faster, more efficient service and accurate repairs resulting in fewer call backs.

# SCHEDULED MAINTENANCE

## HEATING PERFORMANCE TEST

Before attempting to diagnose an operating fault code, run a Heating Performance Test to determine if the heating system is performing within 5% of the BTU input found on the rating plate of the unit being tested. To conduct a heating performance test, the BTU input to the unit must be calculated (see Clocking a Gas Meter). Before clocking a gas meter, contact your local utility to provide the caloric value (BTU content) of the natural gas in the area.

It is also important to confirm the airflow (CFM) is within the temperature rise range (see Airflow Data in spec sheet) and external static pressure range (approximately 0.5" water column). How-to instructions can be found in the service manual under Checking External Static Pressure and Checking Temperature Rise.

## CLOCKING A GAS METER

1. Turn off all gas appliances in the home.
2. Turn on the furnace. Ensure the furnace is operating at a 100% firing rate on 2 stage and modulating furnace product.
3. Once heating cycle is at a steady state (typically 15 minutes of operation), use a stopwatch to time how long it takes the smallest unit of measure dial on the gas meter to make a full revolution. In Table 1, one cubic foot is selected. The smallest unit of measure will vary depending on the gas meter.

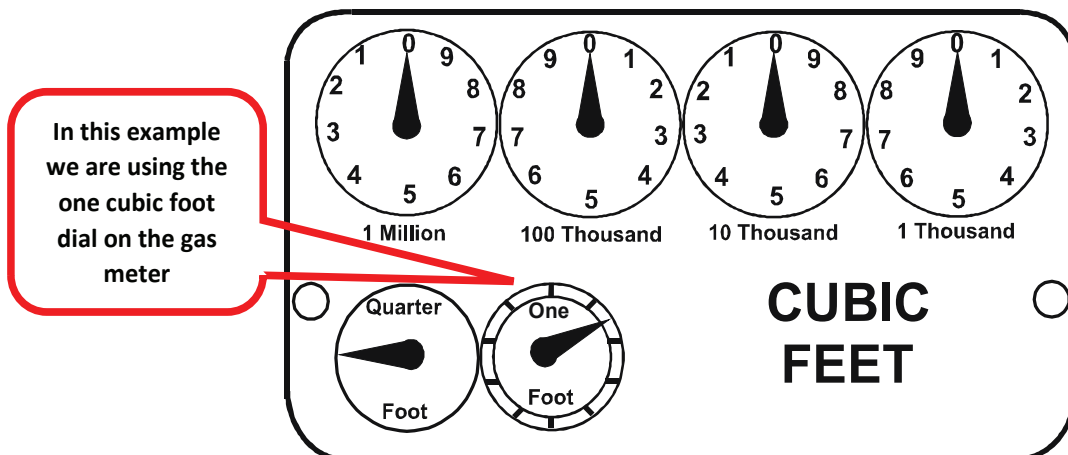


TABLE 1

# SCHEDULED MAINTENANCE

4. Using Table 2 below, find the number of seconds it took for the dial to make a full revolution. To the right of that number of seconds and below the Size of Test Dial (selected in step 3 and shown in Table 1) will be the Cubic Feet per Hour (CFH).

Locate 40 seconds for one revolution in the chart below

Then locate the 1 cu ft dial column and select the corresponding CFH from the 40 seconds for one revolution row

| GAS RATE -- CUBIC FEET PER HOUR |                   |           |         |         |         |                            |                   |           |         |         |         |
|---------------------------------|-------------------|-----------|---------|---------|---------|----------------------------|-------------------|-----------|---------|---------|---------|
| Seconds for One Revolution      | Size of Test Dial |           |         |         |         | Seconds for One Revolution | Size of Test Dial |           |         |         |         |
|                                 | 1/4 cu/ft         | 1/2 cu/ft | 1 cu/ft | 2 cu/ft | 5 cu/ft |                            | 1/4 cu/ft         | 1/2 cu/ft | 1 cu/ft | 2 cu/ft | 5 cu/ft |
| 10                              | 90                | 180       | 360     | 720     | 1800    | 36                         | 25                | 50        | 100     | 200     | 500     |
| 11                              | 82                | 164       | 327     | 655     | 1636    | 37                         | --                | --        | 97      | 195     | 486     |
| 12                              | 75                | 150       | 300     | 600     | 1500    | 38                         | 23                | 47        | 95      | 189     | 474     |
| 13                              | 69                | 138       | 277     | 555     | 1385    | 39                         | --                | --        | 92      | 185     | 462     |
| 14                              | 64                | 129       | 257     | 514     | 1286    | 40                         | 22                | 45        | 90      | 180     | 450     |
| 15                              | 60                | 120       | 240     | 480     | 1200    | 41                         | --                | --        | --      | 176     | 439     |
| 16                              | 56                | 113       | 225     | 450     | 1125    | 42                         | 21                | 43        | 86      | 172     | 429     |
| 17                              | 53                | 106       | 212     | 424     | 1059    | 43                         | --                | --        | --      | 167     | 419     |
| 18                              | 50                | 100       | 200     | 400     | 1000    | 44                         | --                | 41        | 82      | 164     | 409     |
| 19                              | 47                | 95        | 189     | 379     | 947     | 45                         | 20                | 40        | 80      | 160     | 400     |
| 20                              | 45                | 90        | 180     | 360     | 900     | 46                         | --                | --        | 78      | 157     | 391     |
| 21                              | 43                | 86        | 171     | 343     | 857     | 47                         | 19                | 38        | 76      | 153     | 383     |
| 22                              | 41                | 82        | 164     | 327     | 818     | 48                         | --                | --        | 75      | 150     | 375     |
| 23                              | 39                | 78        | 157     | 313     | 783     | 49                         | --                | --        | --      | 147     | 367     |
| 24                              | 37                | 75        | 150     | 300     | 750     | 50                         | 18                | 36        | 72      | 144     | 360     |
| 25                              | 36                | 72        | 144     | 288     | 720     | 51                         | --                | --        | --      | 141     | 355     |
| 26                              | 34                | 69        | 138     | 277     | 692     | 52                         | --                | --        | 69      | 138     | 346     |
| 27                              | 33                | 67        | 133     | 265     | 667     | 53                         | 17                | 34        | --      | 136     | 340     |
| 28                              | 32                | 64        | 129     | 257     | 643     | 54                         | --                | --        | 67      | 133     | 333     |
| 29                              | 31                | 62        | 124     | 248     | 621     | 55                         | --                | --        | --      | 131     | 327     |
| 30                              | 30                | 60        | 120     | 240     | 600     | 56                         | 16                | 32        | 64      | 129     | 321     |
| 31                              | --                | --        | 116     | 232     | 581     | 57                         | --                | --        | --      | 126     | 316     |
| 32                              | 28                | 56        | 113     | 225     | 563     | 58                         | --                | 31        | 62      | 124     | 310     |
| 33                              | --                | --        | 109     | 218     | 545     | 59                         | --                | --        | --      | 122     | 305     |
| 34                              | 26                | 53        | 106     | 212     | 529     | 60                         | 15                | 30        | 60      | 120     | 300     |
| 35                              | --                | --        | 103     | 206     | 514     |                            |                   |           |         |         |         |

TABLE 2

5. Use this formula to verify the Cubic Feet per Hour (CFH) input determined in step 4 is correct:

$$(3600 \times \text{Gas Meter Dial Size}) / \text{Time (seconds)} = \text{Cubic Feet per Hour (CFH)}$$

3600 is used as there are 60 seconds in a minute and 60 minutes in an hour.  
60x60=3600

6. Check with your local utility for actual BTU content (caloric value) of natural gas in the area (the average is 1025 BTU's).
7. Use this formula to calculate the BTU/HR input (See BTU/HR Calculation Example):  
**Cubic Feet per Hour (CFH) x BTU content of your natural gas = BTU/HR input**
8. Should the figure you calculated not fall within five (5) percent of the nameplate rating of the unit, adjust the gas valve pressure regulator or resize orifices. To adjust the pressure regulator on the gas valve, turn downward (clockwise) to increase pressure and input, and upward (counterclockwise) to decrease pressure and input. A properly operating unit must have the BTU per hour input and CFM of air, within the limits shown to prevent short cycling of the equipment. As the external static pressure goes up, the temperature rise will also increase. Consult the proper tables for temperature rise limitation.

# SCHEDULED MAINTENANCE

## **BTU/HR Calculation Example:**

The unit being tested takes 40 seconds for the 1 cubic foot dial to make one complete revolution. Using the chart, this translates to 90 cubic feet per hour. Based upon the assumption that one cubic foot of natural gas has 1,025 BTU's (Check with your local utility for actual BTU content), the **calculated input is 92,250 BTU's per hour.**

**Furnace Nameplate Input in this example:** 90,000 BTU/HR

**Calculated Gas Input in this example:** 92,250 BTU/HR

**This example is within the 5% tolerance input and does not need adjustment.**

|                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>CAUTION</b>                                                                                                                                                            |
| <b>ALWAYS CONNECT A MANOMETER TO THE OUTLET TAP AT THE GAS VALVE BEFORE ADJUSTING THE PRESSURE REGULATOR. IN NO CASE SHOULD THE FINAL MANIFOLD PRESSURE VARY MORE THAN PLUS OR MINUS .2 INCHES WATER COLUMN FROM 3 INCHES WATER COLUMN FOR NATURAL GAS.</b> |

A properly operating unit must have the BTU per hour input and CFM of air, within the limits shown to prevent short cycling of the equipment. As the external static pressure goes up, the temperature rise will also increase. Consult the proper tables for temperature rise limitation.

|                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>CAUTION</b>                                                                                                                                                                                                        |
| <b>ALWAYS CONNECT A MANOMETER TO THE OUTLET TAP AT THE GAS VALVE BEFORE ADJUSTING THE PRESSURE REGULATOR. IN NO CASE SHOULD THE FINAL MANIFOLD PRESSURE VARY MORE THAN PLUS OR MINUS .3 INCHES WATER COLUMN FROM 3.5 INCHES WATER COLUMN FOR NATURAL GAS OR 10 INCHES WATER COLUMN FOR PROPANE GAS.</b> |

Since normally propane gas is not installed with a gas meter, clocking will be virtually impossible. The gas orifices used with propane are calculated for 2500 BTU per cubic foot gas and with proper inlet pressures and correct piping size, full capacity will be obtained.

With propane gas, no unit gas valve regulator is used; however, the second stage supply line pressure regulator should be adjusted to give 10" water column with all other gas consuming appliances running.

The dissipation of the heat transferred to the heat exchanger is now controlled by the amount of air circulated over its surface.

The amount (CFM) of air circulated is governed by the external static pressure in inches of water column of duct work, cooling coil, registers, etc., applied externally to the unit versus the motor speed tap (direct drive) or pulley adjustments of the motor and blower (belt drive).

A properly operating unit must have the BTU per hour input and CFM of air, within the limits shown to prevent short cycling of the equipment. As the external static pressure goes up, the temperature rise will also increase. Consult the proper tables for temperature rise limitation.

# SERVICING

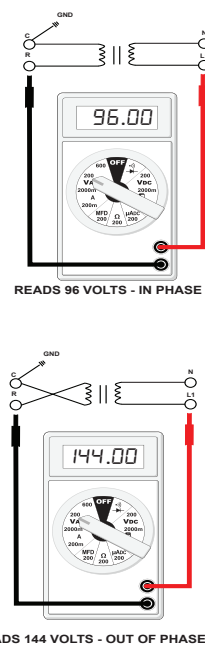
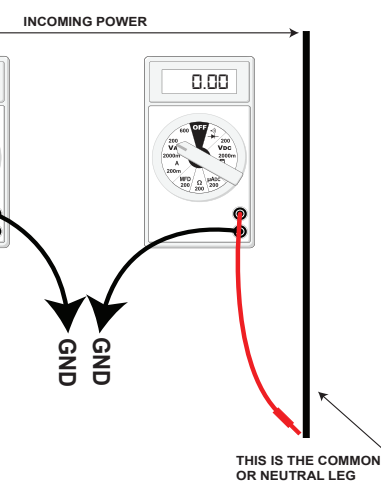
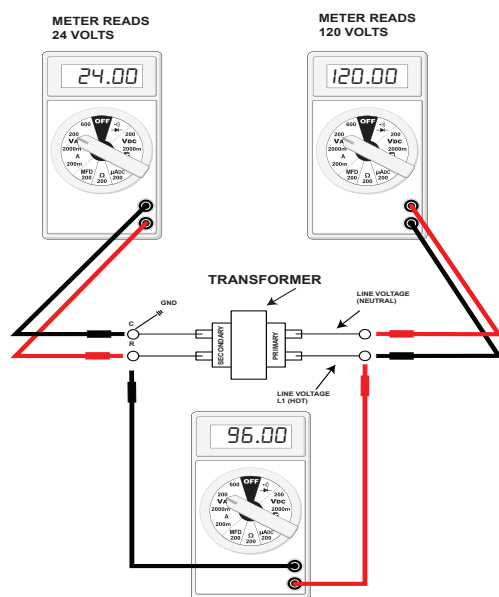
As more and more electronics are introduced to the Heating Trade, Polarization of incoming power and phasing of primary to secondary voltage on transformers becomes more important.

Polarization has been apparent in the Appliance industry since the introduction of the three prong plug, however, the Heating Industry does not use a plug for incoming power, but is hard wired.

Some of the electronic boards being used today, with flame rectification, will not function properly and/or at all without polarization of incoming power. Some also require phasing between the primary and secondary sides of step-down transformers.

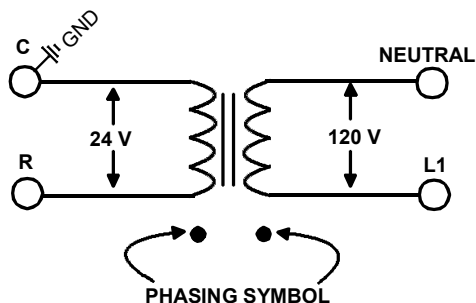
We recommend that these two items be checked during normal installation and/or service calls. See as follows:

## CHECKING FOR PHASING - PRIMARY TO SECONDARY OF UNMARKED TRANSFORMERS\*



If meter reads approximately 96 volts - the primary to secondary are in phase - if reads approximately 144 volts out of phase - reverse low voltage wires.

**\*NOTE:** For flame rectification the common side of the secondary voltage (24 V) is cabinet grounded. If you were to bench test a transformer the primary neutral and secondary common must be connected together for testing purposes.



These then should be wired to the furnace accordingly.

Some transformers will display phasing symbols as shown in the illustration to the left to assist in determining proper transformer phasing.

Checking for polarization and phasing should become a habit in servicing. Let's start now.

# SERVICING

## CHECKING VOLTAGE



### WARNING

#### HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



1. Remove the burner door on furnaces to gain entry to the Junction Box.
2. Remove cover from the Junction Box and gain access to incoming power lines.

With Power ON:



### WARNING

LINE VOLTAGE NOW PRESENT.

3. Using a voltmeter, measure the voltage across the hot and neutral connections.  
**NOTE:** To energize the furnace, the Door Interlock Switch must be engaged at this point.
4. No reading - indicates open wiring, open fuse, no power, or faulty Door Interlock Switch from unit to fused disconnect service. Repair as needed.
5. With ample voltage at line voltage connectors, energize the furnace blower motor by jumpering terminals R to G on the integrated ignition control.
6. With the blower motor in operation, the voltage should be 120 volts  $\pm$  10 percent.
7. If the reading falls below the minimum voltage, check the line wire size. Long runs of undersized wire can cause low voltage. If wire size is adequate, notify the local power company of the condition.
8. After completing check and/or repair, replace Junction Box cover and reinstall the service panel doors.
9. Turn on electrical power and verify proper unit operation.

## CHECKING WIRING



### WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

1. Check wiring visually for signs of overheating, damaged insulation and loose connections.
2. Use an ohmmeter to check continuity of any suspected open wires.
3. If any wires must be replaced, replace with AWM, 105°C. 2/64 thick insulation of the same gauge or its equivalent.

## CHECKING THERMOSTAT, WIRING



### WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

1. Remove the blower compartment door to gain access to the thermostat low voltage wires located at the furnace integrated control module terminals.
2. Remove the thermostat low voltage wires at the furnace control panel terminal board.
3. Jumper terminals R to W (or W1 and W2 for two-stage models) on the integrated ignition control.

With Power On (and Door Interlock Switch closed):



### WARNING

LINE VOLTAGE NOW PRESENT.

4. Induced Draft Motor must run and pull in pressure switch.
5. If the hot surface ignitor heats and at the end of the ignitor warm-up period the gas valve opens and the burners ignite, the trouble is in the thermostat or wiring.
6. With power off, check the continuity of the thermostat and wiring. Repair or replace as necessary. If checking the furnace in the air conditioning mode, proceed as follows.
7. With power off, Jumper terminals R to Y to G.
8. Turn on the power.
9. If the furnace blower motor starts and the condensing unit runs, then the trouble is in the thermostat or wiring. Repair or replace as necessary.
10. After completing check and/or repair of wiring and check and/or replacement of thermostat, reinstall blower compartment door.
11. Turn on electrical power and verify proper unit operation.

## CHECKING TRANSFORMER AND CONTROL CIRCUIT

A step-down transformer 120 volt primary to 24 volt secondary, 40 VA (Heating and Cooling Models) supplies ample capacity of power for either operation.



### WARNING

#### HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



# SERVICING

1. Remove blower compartment door to gain access to the thermostat low voltage wires located at the furnace integrated control module.
2. Remove the thermostat low voltage wires at the furnace integrated control module terminals.

With Power On (and Door Interlock Switch closed):



## WARNING

LINE VOLTAGE NOW PRESENT.

3. Use a voltmeter, check voltage across terminals R and C. Must read 24 VAC.
4. No voltage indicates faulty transformer, open fuse, bad wiring, bad splice, or open door interlock switch.
5. Check transformer primary voltage at incoming line voltage connections, fuse, splices, and blower door interlock switch.
6. If line voltage is available to the primary side of transformer and not at secondary side, the transformer is inoperative. Replace.
7. After completing check and/or replacement of transformer and check and/or repair of control circuit, reinstall blower compartment door.
8. Turn on electrical power and verify proper unit operation.

## CHECKING AIR CIRCULATOR BLOWER MOTOR (MULTI-SPEED ECM MOTOR)



## WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

1. Remove blower compartment door to gain access to the circulator blower motor and integrated ignition control.
2. Check for any obstruction that would keep the fan wheel / fan motor from turning.
3. Check wiring, the motor has two wiring harnesses, a main harness and a control harness. The main pin harness has: White neutral wire connected to the Neutral terminal on the control board. Black wire connected to the CIRC H terminal on the control board. Red wire connected to the COM terminal, which is a female spade connection next to the T1 – T5.  
Green ground wire connected to cabinet ground. The control harness has:  
Blue wire connected to T1 on the control board.  
Red wire connected to T2 on the control board.  
Orange wire connected to T3 on the control board.  
Black wire connected to T4 on the control board.  
Yellow wire connects to T5 on control board.

4. The multi-speed ECM motor requires a line voltage power supply (black connected to CIRC H and white connected to neutral on the control board) as well as a signal on one of the speed taps (T1-T5).
5. The speed tap voltage is 6-17 vDC and can vary depending on speed selection. The voltage reading from any one of the speed taps is referenced between the female COM terminal next to the speed taps on the control board.

### 9-Tap Blower Motor Connector Description

| CONNECTOR ID | DESCRIPTION   | CONNECTOR VOLTAGE (REFERENCE) |
|--------------|---------------|-------------------------------|
| L            | LINE, L1      | LINE, L1                      |
| G            | GROUND        | CHASSIS GROUND                |
| N            | LINE, L2      | LINE, L2                      |
| C            | SIGNAL COMMON | COMMON                        |
| 1            | TAP 1         | 6 - 17 VDC                    |
| 2            | TAP 2         | 6 - 17 VDC                    |
| 3            | TAP 3         | 6 - 17 VDC                    |
| 4            | TAP 4         | 6 - 17 VDC                    |
| 5            | TAP 5         | 6 - 17 VDC                    |

### 9-Tap Energized Tap Signal

| Speed | 9-Tap Mode (Energized Tap Signal) |     |     |     |     |
|-------|-----------------------------------|-----|-----|-----|-----|
|       | 1                                 | 2   | 3   | 4   | 5   |
| 1     | ON                                | OFF | OFF | OFF | OFF |
| 2     | OFF                               | ON  | OFF | OFF | OFF |
| 3     | OFF                               | x   | ON  | OFF | OFF |
| 4     | OFF                               | x   | x   | ON  | OFF |
| 5     | OFF                               | x   | x   | x   | ON  |
| 6     | ON                                | ON  | OFF | OFF | OFF |
| 7     | ON                                | x   | ON  | OFF | OFF |
| 8     | ON                                | x   | x   | ON  | OFF |
| 9     | ON                                | x   | x   | x   | ON  |

ON = The tap is energized (6 -17vDC)

OFF = The tap is not energized

x = The tap can be either ON or OFF

## CHECKING DUCT STATIC

The maximum and minimum allowable external static pressures are found in the specification section. These tables also show the amount of air being delivered at a given static by a given motor speed or pulley adjustment.

The furnace motor cannot deliver proper air quantities (CFM) against statics other than those listed.

Too great of an external static pressure will result in insufficient air that can cause excessive temperature rise, resulting in limit tripping, etc. Whereas not enough static may result in motor overloading.

# SERVICING

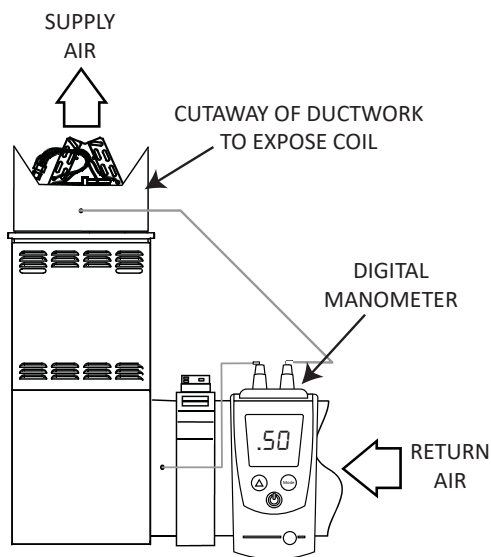
To determine proper air movement, proceed as follows:

1. With clean filters in the furnace, use a manometer to measure the static pressure of the return duct at the inlet of the furnace. (Negative Pressure)
2. Measure the static pressure of the supply duct. (Positive Pressure)
3. Add the two (2) readings together for total external static pressure.

**NOTE: Both readings may be taken simultaneously and read directly on the manometer if so desired. If an air conditioner coil or Electronic Air Cleaner is used in conjunction with the furnace, the readings must also include these components, as shown in the following drawing.**

4. Consult proper tables for the quantity of air.

If the total external static pressure exceeds the minimum or maximum allowable statics, check for closed dampers, registers, undersized and/or oversized poorly laid out duct work.



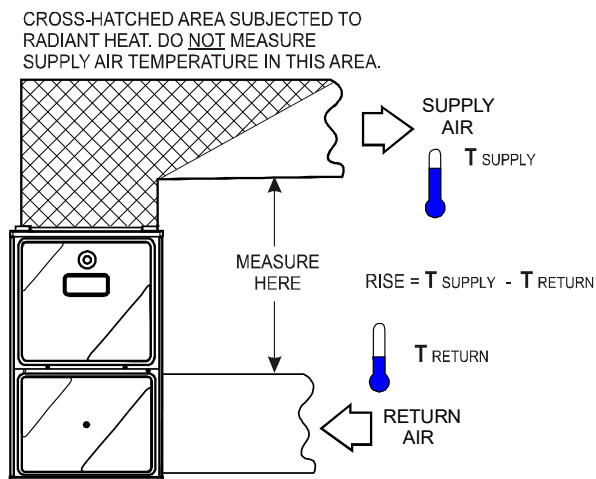
Checking Static Pressure

## CHECKING TEMPERATURE RISE

The more air (CFM) being delivered through a given furnace, the less the rise will be; so the less air (CFM) being delivered, the greater the rise. The temperature rise should be adjusted in accordance to a given furnace specifications and its external static pressure. An incorrect temperature rise may result in condensing in or overheating of the heat exchanger. An airflow and temperature rise table is provided in the blower performance specification section. Determine and adjust temperature rise as follows:

1. Operate furnace with burners firing for approximately ten minutes. Check BTU input to furnace - do not exceed input rating stamped on rating plate. Ensure all registers are open and all duct dampers are in their final (fully or partially open) position.

2. Place thermometers in the return and supply ducts as close to the furnace as possible. Thermometers must not be influenced by radiant heat by being able to "see" the heat exchanger.

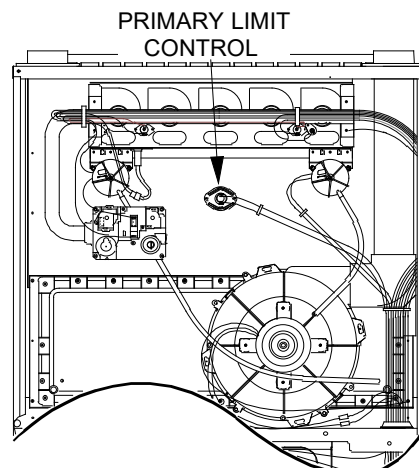


Checking Temperature Rise

3. Subtract the return air temperature from the supply air temperature to determine the air temperature rise. Allow adequate time for thermometer readings to stabilize.
4. Adjust temperature rise by adjusting the circulator blower speed. Increase blower speed to reduce temperature rise. Decrease blower speed to increase temperature rise. Refer to *Circulator Blower Speed* section in the Product Design section of this manual for speed changing details. Temperature rise is related to the BTUH output of the furnace and the amount of air (CFM) circulated over the heat exchanger. Measure motor current draw to determine that the motor is not overloaded during adjustments.

## CHECKING PRIMARY LIMIT CONTROL

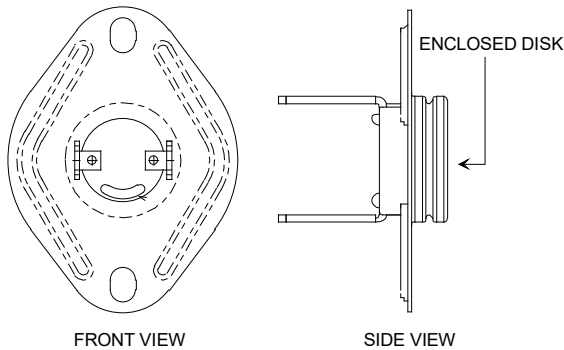
Primary limit switches are nonadjustable, automatic reset, bi-metal type limit controls. Refer to the following drawing for the location of the primary limit.



Primary Limit Control Location

# SERVICING

The following drawing illustrates the style of limit switches used on the 90% furnaces.



**Primary Limit Control Style  
(90% Furnaces)**



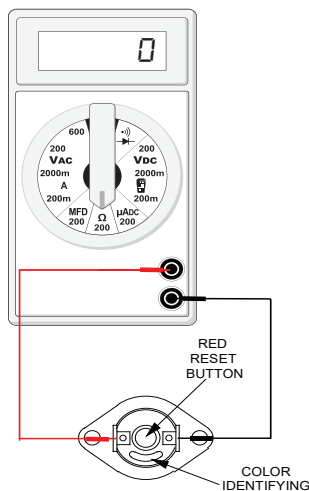
## WARNING

### HIGH VOLTAGE

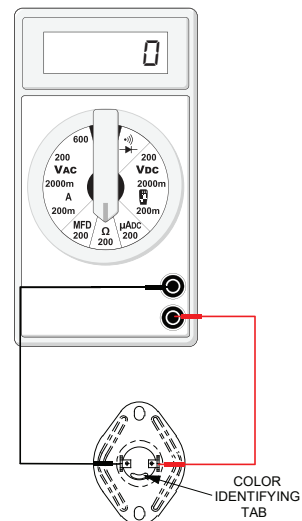
**DISCONNECT ALL POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**



1. Remove burner compartment door to gain access to the primary limit.
2. Remove low voltage wires at limit control terminals.
3. With an ohmmeter, test between these two terminals as shown in the following drawing. The ohmmeter should read continuous unless heat exchanger temperature is above limit control setting. If not as above, replace the control.



**Testing Primary Limit Control**

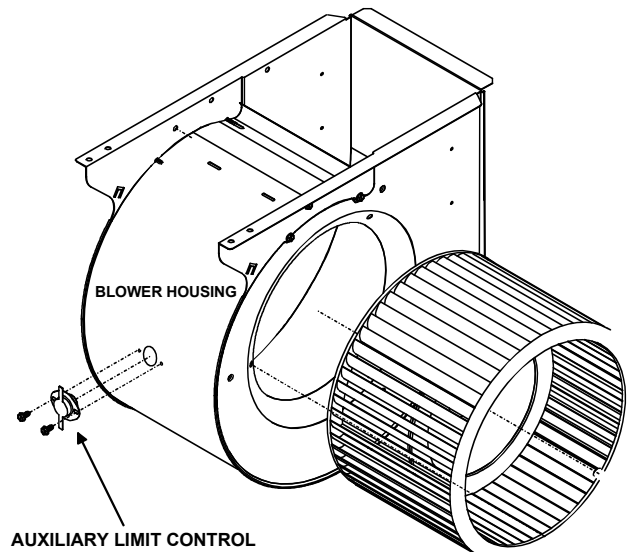


**Testing Primary Limit Control  
(90% Furnaces)**

4. After completing check and/or replacement of primary limit control, reinstall burner compartment door.
5. Turn on electrical power and verify proper unit operation.

## CHECKING AUXILIARY LIMIT CONTROL

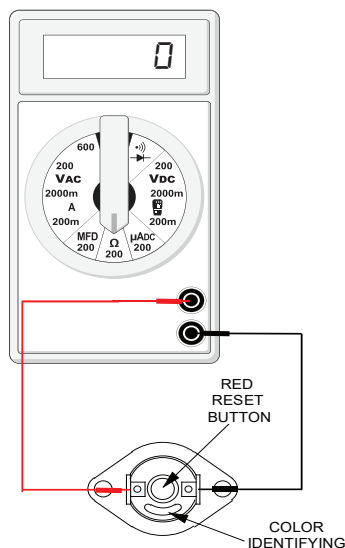
Auxiliary limit switches are nonadjustable, automatic reset, bi-metal type limit controls. This control is located in the blower compartment of the furnace and are attached to the blower housing.



**Auxiliary Limit Control Location**

1. Remove blower compartment door to gain access to the auxiliary limits.
2. Remove low voltage wires at limit control terminals.
3. With an ohmmeter, test between these two terminals as shown in the following drawing. The ohmmeter should read continuous unless limit control is open due to excessive heat from the heat exchanger. If the limit does not automatically reset, replace the control.

# SERVICING



Testing Auxiliary Limit Control



## WARNING

### HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



## WARNING

TO AVOID POSSIBLE FIRE, ONLY RESET THE AUXILIARY LIMIT CONTROL ONCE. IF IT SHOULD OPEN A SECOND TIME, A QUALIFIED SERVICER MUST DETERMINE WHY THE AUXILIARY LIMIT OPENED BEFORE RESET-  
TING AGAIN.

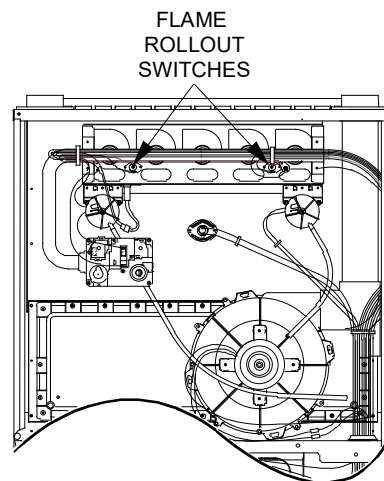


## WARNING

DO NOT BYPASS ANY SAFETY CIRCUIT.

## CHECKING FLAME ROLLOUT CONTROL

A temperature activated manual reset control is mounted to the manifold assembly on 90% furnaces, as shown in the following illustrations.



Flame Rollout Switch Location

The control is designed to open should a flame roll out occur. An overfiring condition or flame impingement on the heat shield may also cause the control to open. If the rollout control opens, the air circulation blower will run continuously.

If a rollout switch has tripped, it is important to find out why. Possible causes could be flame impingement, orifice plate out of position, burners with excessive cross-over slot dimension, overfiring, improper orifices, improper gas pressure, air leaking from around the heat exchanger into the burner compartment or air leaking through the heat exchanger itself.

1. Remove burner compartment door to gain access to the rollout switch(es) mounted to burner bracket.
2. Reset the manual rollout switch.
3. Remove wires from rollout switch.
4. Using an ohmmeter, check for continuity across the switch.
5. If the switch will not close after manually resetting, it must be replaced.
6. Measure the voltage between each side of the rollout switch and ground during ignition attempt.
7. After check and/or replacement of rollout switch, re-install burner compartment door and verify proper unit operation.



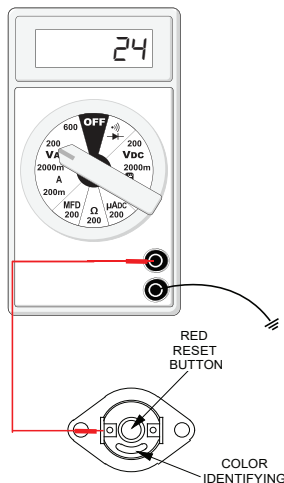
## WARNING

LINE VOLTAGE NOW PRESENT.

The servicer should reset the ignition control by opening and closing the thermostat circuit. Then look for the ignitor glowing which indicates there is power to the ignition control. Measure the voltage between each side of the rollout control and ground while the ignition control tries to power the gas valve.

# SERVICING

8. Measure the voltage between each side of the rollout control and ground during the ignition attempt. Refer to the following figure.



Checking Flame Rollout Switch

- a. If no voltage is measured on either side of control it indicates ignition control or wiring to control problem.
  - b. If voltage is measured on one side of the control and not the other it indicates the control is open.
  - c. If voltage is measured on both sides of the control the wiring to gas valve or valve is at fault.
3. After check and/or replacement of rollout switch, reinstall burner compartment door and verify proper unit operation.

## INDUCED DRAFT BLOWER MOTOR



### WARNING

#### HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



1. Remove burner compartment door to gain access to the induced draft blower motor.
2. Disconnect the motor wire leads from its connection point at the induced draft motor.
3. Using a ohmmeter, test for continuity between each of the motor leads.
4. Touch one probe of the ohmmeter to the motor frame (ground) and the other probe in turn to each lead. If the windings do not test continuous or a reading is obtained to ground, replace the motor.
5. If the windings have a continuity reading, reconnect wires. Turn power on to the furnace and turn the thermostat on in the heating mode. Check voltage for 120V at the induced draft motor terminals during the

trial for ignition. If you have 120V and the motor does not run, replace the induced draft motor.

6. After completing check and/or replacement of induced draft motor, reinstall burner compartment door.
7. Turn on electrical power and verify proper unit operation.

## CHECKING GAS VALVE (REDUNDANT)

A combination redundant operator type gas valve which provides all manual and automatic control functions required for gas fired heating equipment is used.

The valve provides control of main burner gas flow, pressure regulation, and 100 percent safety shut-off.



### WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

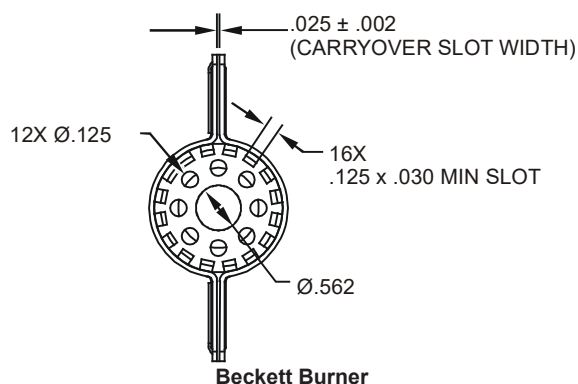
Single stage gas valves should be tested on the furnace with 24 VAC connected to the gas valve and manometers reading supply line and manifold pressures.

## CHECKING MAIN BURNERS

The main burners are used to provide complete combustion of various fuels in a limited space, and transfer this heat of the burning process to the heat exchanger.

Proper ignition, combustion, and extinction are primarily due to burner design, orifice sizing, gas pressure, primary and secondary air, vent and proper seating of burners.

Burners have been redesigned for 34.5" chassis furnaces. Overall length and width dimensions remain the same as 40" model burners. The burners used 34.5" models have burner head insert with larger diameter center hole and a larger number of surrounding holes.



Beckett Burner



### WARNING

DISCONNECT ALL GAS AND ELECTRICAL POWER SUPPLY.

# SERVICING

In checking main burners, look for signs of rust, oversized and undersized carry over ports restricted with foreign material, etc, refer to previous drawing. Burner cross-over slots should not be altered in size.

## CHECKING ORIFICES

Single stage furnaces are factory equipped with #45 gas orifices.

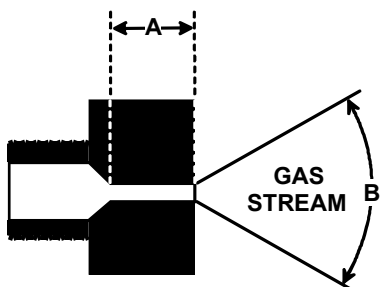
Orifices should be treated with care in order to prevent damage. They should be removed and installed with a box-end wrench in order to prevent distortion. In no instance should an orifice be peened over and redrilled. This will change the angle or deflection of the vacuum effect or entraining of primary air, which will make it difficult to adjust the flame properly.



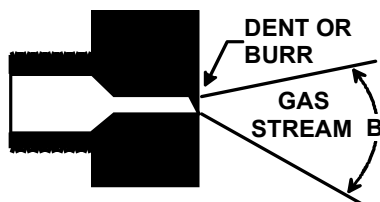
### WARNING

DISCONNECT ALL GAS AND ELECTRICAL POWER SUPPLY.

1. Check orifice visually for distortion and/or burrs.
2. Check orifice size with orifice sizing drills.
3. If resizing is required, a new orifice of the same physical size and angle with proper drill size opening should be installed.



The length of Dimension "A" determines the angle of Gas Stream "B".



A dent or burr will cause a severe deflection of the gas stream.

## CHECKING GAS PRESSURE

### GAS SUPPLY PRESSURE MEASUREMENT



### CAUTION

TO PREVENT UNRELIABLE OPERATION OR EQUIPMENT DAMAGE, THE INLET GAS SUPPLY PRESSURE MUST BE AS SPECIFIED ON THE UNIT RATING PLATE WITH ALL OTHER HOUSEHOLD GAS FIRED APPLIANCES OPERATING.

Gas inlet and manifold pressures should be checked and adjusted in accordance to the type of fuel being consumed. The line pressure supplied to the gas valve must be within the range specified below. The supply pressure can be measured at the gas valve inlet pressure tap or at a hose fitting installed in the gas piping drip leg. The supply pressure must be measured with the burners operating. To measure the gas supply pressure, use the following procedure.



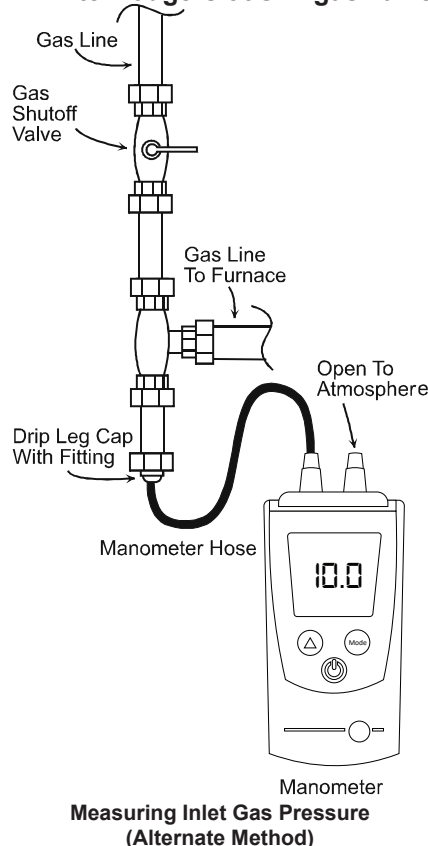
### WARNING

DISCONNECT ELECTRICAL POWER AND SHUT OFF GAS SUPPLY.

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated manometer (or appropriate gas pressure gauge) at either the gas valve inlet pressure tap or the gas piping drip leg as shown in the following figures.

**NOTE:** At either location, a hose fitting must be installed prior to making the hose connection.

**NOTE:** Use adapter kit #0151K00000S to measure gas pressure on White-Rodgers 36G22 gas valves.



3. Turn ON the gas and electrical power supply and operate the furnace and all other gas consuming appliances on the same gas supply line.

# SERVICING

4. Measure furnace gas supply pressure with burners firing. Supply pressure must be within the range specified in the following table.

| INLET GAS SUPPLY PRESSURE |                     |                     |
|---------------------------|---------------------|---------------------|
| Natural Gas               | Minimum: 4.5" w.c.  | Maximum: 10.0" w.c. |
| Propane Gas               | Minimum: 11.0" w.c. | Maximum: 13.0" w.c. |

If supply pressure differs from above, make necessary adjustments to pressure regulator, gas piping size, etc., and/or consult with local gas utility.


**WARNING**

**HIGH VOLTAGE**  
**DISCONNECT ALL POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**



5. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall plug before turning on gas to furnace.
6. Turn OFF any unnecessary gas appliances started in step 3.
7. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
8. Turn on electrical power and verify proper unit operation.

## GAS MANIFOLD PRESSURE MEASUREMENT AND ADJUSTMENT


**CAUTION**

**TO PREVENT UNRELIABLE OPERATION OR EQUIPMENT DAMAGE, THE GAS MANIFOLD PRESSURE MUST BE AS SPECIFIED ON THE UNIT RATING PLATE. ONLY MINOR ADJUSTMENTS SHOULD BE MADE BY ADJUSTING THE GAS VALVE PRESSURE REGULATOR.**

**NOTE: Use adapter kit #0151K00000S to measure gas pressure on White-Rodgers 36J22 gas valves.**

Only small variations in gas pressure should be made by adjusting the gas valve pressure regulator. The manifold pressure must be measured with the burners operating. To measure and adjust the manifold pressure, use the following procedure.


**WARNING**

**HIGH VOLTAGE**  
**DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING.**

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated manometer (or appropriate gas pressure gauge) at the gas valve outlet pressure tap. Refer to *Measuring Gas Pressure: Single Stage Valves* figure for single stage valve outlet pressure tap connections.


**WARNING**

**LINE VOLTAGE NOW PRESENT.**

3. Turn ON the gas and electrical power supply and operate the furnace.
4. Measure gas manifold pressure with burners firing. Adjust manifold pressure using the table below.

| Manifold Gas Pressure |            |
|-----------------------|------------|
| Natural Gas           | 3.5" w.c.  |
| Propane Gas           | 10.0" w.c. |

The final manifold pressure must not vary more than  $\pm 0.3$ " w.c. from the above specified pressures. Any necessary major changes in gas flow rate should be made by changing the size of the burner orifice.

5. White-Rodgers 36J22 Valves:
  - a. Back outlet pressure test screw (inlet/outlet pressure boss) out one turn (counterclockwise, not more than one turn).
  - b. Attach a hose and manometer to the outlet pressure outlet pressure boss.
  - c. Turn ON the gas supply.
  - d. Turn on power and close thermostat "R" and "W1" contacts to provide a call for heat.
  - e. Measure the gas manifold pressure with burners firing. Adjust manifold pressure using the *Manifold Gas Pressure* table shown below.
  - f. Remove regulator cover screw from the outlet pressure regulator adjust tower and turn screw clockwise to increase pressure or counterclockwise to decrease pressure. Replace regulator cover screw.
  - g. Turn off all electrical power and gas supply to the system.
  - h. Remove the manometer hose from the hose barb fitting or outlet pressure boss.
  - i. Turn outlet pressure test screw in to seal pressure port (clockwise, 7 in-lb minimum).

# SERVICING



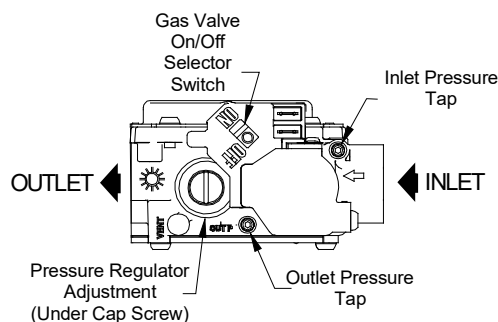
## WARNING

### HIGH VOLTAGE

DISCONNECT ALL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



6. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
7. Turn on electrical power and verify proper unit operation.



White-Rodgers Model 36J22 (Single-Stage)

## CHECKING HOT SURFACE IGNITOR

Single stage furnaces use a 120 volt silicon carbide igniter (p/n 0130F00008) with 17-second warm up time.



## WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

1. Remove burner compartment door to gain access to the ignitor.
2. Ignitor cool - approximately 70 - 77°F.
3. Disconnect the ignitor from the Ignition Control.
4. Using an ohmmeter measure the resistance of the ignitor: at room temperature a normal reading will be 37 - 68 ohms.
5. Reconnect ignitor.



## WARNING

LINE VOLTAGE NOW PRESENT.

6. Place unit in heating cycle, measure current draw of ignitor during preheat cycle.

## CHECKING FOR FLASHBACK

Flashback will also cause burning in the burner venturi, but is caused by the burning speed being greater than the gas-air flow velocity coming from a burner port.

Flashback may occur at the moment of ignition, after a burner heats up or when the burner turns off. The latter is known as extinction pop.

Since the end results of flashback and delayed ignition can be the same (burning in the burner venturi) a definite attempt should be made to determine which has occurred. If flashback should occur, check for the following:

1. Improper gas pressure - adjust to proper pressure (See *CHECKING GAS PRESSURE*).
2. Check burner for proper alignment and/or replace burner.
3. Improper orifice size - check orifice for obstruction.

## CHECKING PRESSURE SWITCH

The pressure control is a safety device to prevent the combustion cycle from occurring with inadequate venting caused by a restricted or blocked vent pipe.



## WARNING

### HIGH VOLTAGE

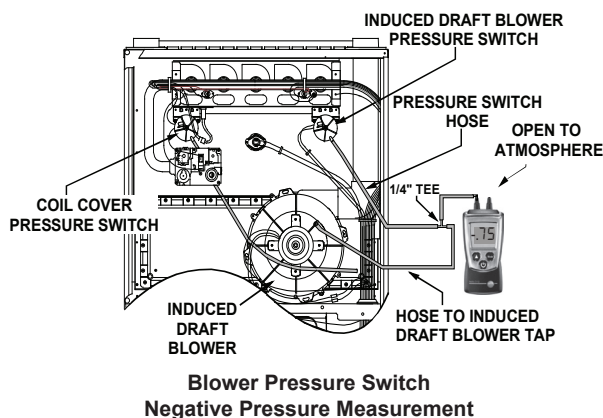
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



1. Remove burner compartment door to gain access to pressure switch(es).
2. Remove wires from the pressure switch(es) electrical terminals.
3. Remove the pressure control hose from the control and interconnect with a manometer as shown in the following figures.

With a call for heat and the inducer running, check across the pressure switch contacts with an ohm meter. If the contacts are not closed, compare the negative reading on the manometer with the rating on the pressure switch to determine whether the switch is defective or if the negative pressure is inadequate to close the switch.

# SERVICING



## HIGH ALTITUDE APPLICATION (USA)

A high altitude kit is required for installations above 7,000 ft. Refer to the accessory matrix in this manual to determine the proper natural gas and LP gas high altitude kit for your furnace.

## CHECKING FOR DELAYED IGNITION

Delayed ignition is a delay in lighting a combustible mixture of gas and air which has accumulated in the combustion chamber.

Furnace design makes this extremely unlikely unless safety controls have been by-passed or tampered with. Never by-pass or alter furnace controls.

If delayed ignition should occur, the following should be checked:

1. Improper gas pressure - adjust to proper pressure (See *CHECKING GAS PRESSURE*).
2. Improper burner positioning - burners should be in locating slots, level front to rear and left to right.
3. Carry over (lighter tube or cross lighter) obstructed - clean.
4. Main burner orifice(s) deformed, or out of alignment to burner - replace.

## CHECKING INTEGRATED IGNITION CONTROL BOARDS

**NOTE:** Failure to earth ground the furnace, reversing the neutral and hot wire connection to the line (polarity), or a high resistance connection in the neutral line may cause the control to lockout due to failure to sense flame.

The ground wire must run from the furnace all the way back to the electrical panel. Proper grounding can be confirmed by disconnecting the electrical power and measuring resistance between the neutral (white) connection and the burner closest to the flame sensor. Resistance should be less than 2 ohms.

The ignition control is a combination electronic and electromechanical device and is not field repairable. Complete unit must be replaced.



### WARNING

LINE VOLTAGE NOW PRESENT.

These tests must be completed within a given time frame due to the operation of the ignition control.

The ignition control is capable of diagnosing many furnace failures to help in troubleshooting. The trial for ignition period is 4 seconds.

The indicator light/display may be viewed by looking through the sight glass in the blower compartment door. If the blower compartment door is removed, failure to hold the door switch closed while removing the blower compartment door will result in the loss of the stored failure code. In most cases recycling the ignition control will result in the same failure code originally displayed.



### WARNING

LINE VOLTAGE NOW PRESENT.

These tests must be completed within a given time frame due to the operation of the ignition control.

1. Check for 120 volts from Line 1 (Hot) to Line 2 (Neutral) at the ignition control. No voltage, check the door switch connections and wire harness for continuity.
2. Check for 24 volts from W to C terminal on the ignition control. No voltage. Check transformer, room thermostat, and wiring. If you have 24 volts coming off the transformer but receive approximately 13 volts on the terminal board between (C) and (R), check for blown fuse.
3. Check for 120 volts to the induced draft blower by measuring voltage between Pin 1 (on the 2-pin connector) and Line (Neutral) on the control board. No voltage, replace ignition control.
4. If voltage is present in Steps 1 through 3 and the induced draft blower is operating, check for 120 volts to the ignitor during the preheat cycle. Measure voltage between Pin 2 (on the 2-pin connector) and Line (Neutral) on the control board. No voltage, check pressure switch.



### WARNING

TO AVOID THE RISK OF ELECTRICAL SHOCK, WIRING TO THE UNIT MUST BE PROPERLY POLARIZED AND GROUNDED. DISCONNECT POWER BEFORE PERFORMING SERVICE LISTED BELOW.

# SERVICING

5. After the ignitor warm-up time, begin checking for 24 volts to the gas valve. Voltage will be present for seven seconds only if proof of flame has been established.

## CHECKING FLAME SENSOR

A flame sensing device is used in conjunction with the ignition control module to prove combustion. If proof of flame is not present the control will de-energize the gas valve and “retry” for ignition or lockout.



### WARNING

#### HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



1. Connect a micro-amp meter in series with this wire and the sensor terminal.
2. Be sure the positive side of the meter is to the sensor (depending on the model) and the negative side of the meter is to sensor terminal.



### WARNING

LINE VOLTAGE NOW PRESENT.

3. Place the unit into a heating cycle.
4. As soon as flame is established a micro-amp reading should be evident once proof of flame (micro-amp reading) is established, the hot surface ignitor will be de-energized.
5. The Integrated Ignition controls will have 3 to 8 micro-amps. If the micro-amp reading is less than 1, check for high resistance wiring connections, sensor to burner gap, dirty flame sensor, or poor grounding.
6. If absolutely no reading, check for continuity on all components and if good - replace ignition control module.

**NOTE: Contaminated fuel or combustion air can create a nearly invisible coating on the flame sensor. This coating works as an insulator causing a loss in the flame sense signal. If this situation occurs the flame sensor must be cleaned with steel wool.**



### WARNING

#### HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



### CAUTION

IF YOU MUST HANDLE THE IGNITOR, HANDLE WITH CARE. TOUCHING THE IGNITOR BODY WITH BARE FINGERS, ROUGH HANDLING, OR VIBRATION COULD RESULT IN EARLY IGNITOR FAILURE. ONLY A QUALIFIED SERVICER SHOULD EVER HANDLE THE IGNITOR.

## ANNUAL INSPECTION

The furnace should be inspected by a qualified installer, or service agency at least once per year. This check should be performed at the beginning of the heating season. This will ensure that all furnace components are in proper working order and that the heating system functions appropriately. Pay particular attention to the following items. Repair or service as necessary.

- Flue pipe system. Check for blockage and/or leakage. Check the outside termination and the connections at and internal to the furnace.
- Combustion air intake pipe system (where applicable). Check for blockage and/or leakage. Check the outside termination and the connection at the furnace.
- Heat exchanger. Check for corrosion and/or buildup within the heat exchanger passageways.
- Burners. Check for proper ignition, burner flame, and flame sense.
- Drainage system. Check for blockage and/or leakage. Check hose connections at and internal to furnace.
- Wiring. Check electrical connections for tightness and/or corrosion. Check wires for damage.
- Filters.
- R-32 Sensor Wire. Check R-32 sensor wire connection for tightness and check wire for damage.

## AIR FILTER



### WARNING

NEVER OPERATE FURNACE WITHOUT A FILTER INSTALLED AS DUST AND LINT WILL BUILD UP ON INTERNAL PARTS RESULTING IN LOSS OF EFFICIENCY, EQUIPMENT DAMAGE, AND POSSIBLE FIRE.

Filters must be used with this furnace. Filters do not ship with these furnaces but must be provided by the installer for proper furnace operation.

Remember that dirty filters are the most common cause of inadequate heating or cooling performance.

| Cooling & Circulation Airflow |                 |       |                                                |      |      |      |      |       |      |       |      |       |      |       |
|-------------------------------|-----------------|-------|------------------------------------------------|------|------|------|------|-------|------|-------|------|-------|------|-------|
| MODEL                         | THERMOSTAT CALL | TAP # | EXTERNAL STATIC PRESSURE (INCHES WATER COLUMN) |      |      |      |      |       |      |       |      |       |      |       |
|                               |                 |       | 0.1                                            | 0.2  | 0.3  | 0.4  | 0.5  |       | 0.6  |       | 0.7  |       | 0.8  |       |
|                               |                 |       | CFM                                            | CFM  | CFM  | CFM  | CFM  | Watts | CFM  | Watts | CFM  | Watts | CFM  | Watts |
| *D9S960403B*                  | Y/Y1, Y2, G     | F01   | 632                                            | 574  | 510  | 448  | 388  | 80    | 332  | 85    | 277  | 89    | 234  | 93    |
|                               |                 | F02   | 727                                            | 677  | 623  | 565  | 510  | 101   | 455  | 106   | 403  | 111   | 351  | 116   |
|                               |                 | F03   | 878                                            | 839  | 797  | 751  | 701  | 146   | 653  | 151   | 607  | 157   | 561  | 162   |
|                               |                 | F04^  | 948                                            | 910  | 870  | 828  | 785  | 169   | 739  | 175   | 693  | 181   | 652  | 187   |
|                               |                 | F05   | 1106                                           | 1076 | 1044 | 1010 | 974  | 243   | 939  | 250   | 899  | 256   | 860  | 263   |
|                               |                 | F06   | 1156                                           | 1125 | 1096 | 1063 | 1028 | 268   | 996  | 276   | 960  | 282   | 927  | 290   |
|                               |                 | F07   | 1237                                           | 1205 | 1174 | 1145 | 1115 | 317   | 1081 | 324   | 1050 | 332   | 1016 | 341   |
|                               |                 | F08   | 1334                                           | 1306 | 1275 | 1249 | 1220 | 385   | 1194 | 391   | 1163 | 398   | 1136 | 408   |
|                               |                 | F09   | 1382                                           | 1354 | 1327 | 1302 | 1276 | 418   | 1246 | 424   | 1219 | 432   | 1190 | 439   |
| *D9S960603B*                  | Y/Y1, Y2, G     | F01   | 771                                            | 698  | 632  | 560  | 491  | 104   | 428  | 110   | 372  | 115   | 307  | 119   |
|                               |                 | F02   | 1197                                           | 1150 | 1102 | 1057 | 1014 | 254   | 968  | 262   | 926  | 272   | 877  | 279   |
|                               |                 | F03   | 1309                                           | 1264 | 1224 | 1180 | 1141 | 318   | 1098 | 325   | 1058 | 334   | 1018 | 343   |
|                               |                 | F04^  | 1138                                           | 1091 | 1043 | 993  | 949  | 227   | 901  | 235   | 853  | 243   | 805  | 249   |
|                               |                 | F05   | 944                                            | 884  | 824  | 774  | 716  | 151   | 660  | 158   | 605  | 163   | 554  | 169   |
|                               |                 | F06   | 963                                            | 907  | 852  | 803  | 745  | 160   | 689  | 166   | 639  | 173   | 587  | 179   |
|                               |                 | F07   | 1332                                           | 1289 | 1245 | 1200 | 1160 | 327   | 1120 | 335   | 1081 | 343   | 1036 | 353   |
|                               |                 | F08   | 1366                                           | 1319 | 1277 | 1235 | 1192 | 347   | 1154 | 354   | 1117 | 363   | 1074 | 371   |
|                               |                 | F09   | 1468                                           | 1436 | 1393 | 1359 | 1323 | 418   | 1285 | 427   | 1248 | 436   | 1210 | 445   |
| *D9S960804C*                  | Y/Y1, Y2, G     | F01   | 873                                            | 778  | 682  | 630  | 578  | 90    | 490  | 94    | 419  | 100   | 347  | 105   |
|                               |                 | F02   | 1442                                           | 1386 | 1335 | 1280 | 1221 | 288   | 1157 | 297   | 1110 | 307   | 1054 | 316   |
|                               |                 | F03   | 1643                                           | 1588 | 1534 | 1478 | 1415 | 339   | 1357 | 350   | 1299 | 361   | 1246 | 375   |
|                               |                 | F04^  | 1600                                           | 1555 | 1505 | 1460 | 1412 | 375   | 1364 | 384   | 1309 | 395   | 1260 | 403   |
|                               |                 | F05   | 1338                                           | 1269 | 1206 | 1133 | 1063 | 211   | 999  | 220   | 934  | 229   | 861  | 239   |
|                               |                 | F06   | 1796                                           | 1744 | 1691 | 1638 | 1584 | 430   | 1532 | 441   | 1473 | 453   | 1422 | 462   |
|                               |                 | F07   | 1874                                           | 1823 | 1775 | 1729 | 1675 | 482   | 1621 | 492   | 1567 | 500   | 1512 | 517   |
|                               |                 | F08   | 1798                                           | 1754 | 1719 | 1672 | 1627 | 500   | 1585 | 510   | 1546 | 520   | 1497 | 530   |
|                               |                 | F09   | 1991                                           | 1947 | 1900 | 1854 | 1808 | 573   | 1759 | 585   | 1707 | 592   | 1655 | 606   |
| *D9S961005C*                  | Y/Y1, Y2, G     | F01   | 1176                                           | 1107 | 1037 | 969  | 891  | 184   | 825  | 194   | 753  | 201   | 692  | 207   |
|                               |                 | F02   | 1773                                           | 1721 | 1671 | 1621 | 1571 | 465   | 1521 | 474   | 1470 | 485   | 1421 | 495   |
|                               |                 | F03   | 1709                                           | 1658 | 1607 | 1556 | 1503 | 426   | 1451 | 436   | 1399 | 445   | 1349 | 455   |
|                               |                 | F04^  | 1651                                           | 1597 | 1542 | 1491 | 1437 | 392   | 1384 | 401   | 1332 | 410   | 1278 | 421   |
|                               |                 | F05   | 1467                                           | 1409 | 1352 | 1307 | 1240 | 297   | 1182 | 306   | 1124 | 315   | 1063 | 325   |
|                               |                 | F06   | 1834                                           | 1785 | 1738 | 1691 | 1643 | 513   | 1593 | 522   | 1545 | 532   | 1502 | 543   |
|                               |                 | F07   | 1924                                           | 1881 | 1836 | 1796 | 1750 | 583   | 1701 | 592   | 1652 | 602   | 1606 | 614   |
|                               |                 | F08   | 2028                                           | 1994 | 1937 | 1899 | 1863 | 683   | 1814 | 690   | 1769 | 702   | 1724 | 713   |
|                               |                 | F09   | 2193                                           | 2145 | 2106 | 2076 | 2032 | 844   | 1998 | 852   | 1945 | 862   | 1903 | 874   |
| *D9S961205D*                  | Y/Y1, Y2, G     | F01   | 1187                                           | 1101 | 1013 | 931  | 847  | 165   | 764  | 174   | 677  | 180   | 604  | 186   |
|                               |                 | F02   | 1973                                           | 1916 | 1864 | 1810 | 1756 | 502   | 1702 | 513   | 1650 | 525   | 1590 | 536   |
|                               |                 | F03   | 1918                                           | 1859 | 1807 | 1748 | 1696 | 463   | 1643 | 476   | 1591 | 486   | 1531 | 497   |
|                               |                 | F04^  | 1835                                           | 1776 | 1720 | 1657 | 1602 | 414   | 1544 | 425   | 1483 | 436   | 1428 | 447   |
|                               |                 | F05   | 1236                                           | 1152 | 1073 | 990  | 919  | 181   | 834  | 190   | 749  | 198   | 679  | 204   |
|                               |                 | F06   | 1521                                           | 1459 | 1391 | 1327 | 1253 | 271   | 1187 | 281   | 1116 | 291   | 1053 | 302   |
|                               |                 | F07   | 1673                                           | 1609 | 1549 | 1493 | 1430 | 345   | 1362 | 354   | 1305 | 365   | 1242 | 375   |
|                               |                 | F08   | 2033                                           | 1981 | 1929 | 1878 | 1822 | 541   | 1771 | 553   | 1716 | 565   | 1669 | 578   |
|                               |                 | F09   | 2257                                           | 2201 | 2151 | 2099 | 2057 | 704   | 2008 | 719   | 1959 | 732   | 1906 | 742   |

**NOTE:**  
^ Default speed

| HEATING AIFLOW                                                   |                     |       |                                                 |      |      |      |      |      |      |      |      |      |      |      |      |       |               |
|------------------------------------------------------------------|---------------------|-------|-------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|---------------|
| MODEL                                                            | THERMOSTA<br>T CALL | TAP # | EXTERNAL STATIC PRESSURE, (INCHES WATER COLUMN) |      |      |      |      |      |      |      |      |      |      |      |      |       | TEMP<br>RANGE |
|                                                                  |                     |       | 0.1                                             |      | 0.2  |      | 0.3  |      | 0.4  |      | 0.5  |      | 0.6  | 0.7  | 0.8  |       |               |
|                                                                  |                     |       | CFM                                             | RISE | CFM  | RISE | CFM  | RISE | CFM  | RISE | CFM  | RISE | CFM  | CFM  | CFM  |       |               |
| *D9S960403<br>B                                                  | WW1                 | F01** | 632                                             | N/A  | 574  | N/A  | 510  | N/A  | 448  | N/A  | 388  | N/A  | 332  | 277  | 234  | 35-65 |               |
|                                                                  |                     | F02^  | 727                                             | 48   | 677  | 51   | 623  | 54   | 565  | 60   | 510  | 65   | 455  | 403  | 351  |       |               |
|                                                                  |                     | F03   | 878                                             | 41   | 839  | 42   | 797  | 45   | 751  | 47   | 701  | 51   | 653  | 607  | 561  |       |               |
|                                                                  |                     | F04   | 948                                             | 38   | 910  | 39   | 870  | 41   | 828  | 43   | 785  | 45   | 739  | 693  | 652  |       |               |
| *D9S960603<br>B                                                  | WW1                 | F01** | 771                                             | N/A  | 698  | N/A  | 632  | N/A  | 560  | N/A  | 491  | N/A  | 428  | 372  | 307  | 35-65 |               |
|                                                                  |                     | F02^  | 1197                                            | 45   | 1150 | 46   | 1102 | 48   | 1057 | 50   | 1014 | 53   | 968  | 926  | 877  |       |               |
|                                                                  |                     | F03   | 1309                                            | 41   | 1264 | 42   | 1224 | 44   | 1180 | 45   | 1141 | 47   | 1098 | 1058 | 1018 |       |               |
|                                                                  |                     | F04   | 1138                                            | 47   | 1091 | 49   | 1043 | 51   | 993  | 54   | 949  | 56   | 901  | 853  | 805  |       |               |
| *D9S960804<br>C                                                  | WW1                 | F01** | 873                                             | N/A  | 778  | N/A  | 682  | N/A  | 630  | N/A  | 578  | N/A  | 490  | 419  | 347  | 40-70 |               |
|                                                                  |                     | F02^  | 1442                                            | 49   | 1386 | 51   | 1335 | 53   | 1280 | 56   | 1221 | 58   | 1157 | 1110 | 1054 |       |               |
|                                                                  |                     | F03   | 1643                                            | 43   | 1588 | 45   | 1534 | 46   | 1478 | 48   | 1415 | 50   | 1357 | 1299 | 1246 |       |               |
|                                                                  |                     | F04   | 1600                                            | 44   | 1555 | 46   | 1505 | 47   | 1460 | 49   | 1412 | 50   | 1364 | 1309 | 1260 |       |               |
| *D9S961005C<br>*                                                 | WW1                 | F01** | 1176                                            | N/A  | 1107 | N/A  | 1037 | N/A  | 969  | N/A  | 891  | N/A  | 825  | 753  | 692  | 40-70 |               |
|                                                                  |                     | F02^  | 1773                                            | 50   | 1721 | 52   | 1671 | 53   | 1621 | 55   | 1571 | 57   | 1521 | 1470 | 1421 |       |               |
|                                                                  |                     | F03** | 1709                                            | 52   | 1658 | 54   | 1607 | 55   | 1556 | 57   | 1503 | 59   | 1451 | 1399 | 1349 |       |               |
|                                                                  |                     | F04   | 1651                                            | 54   | 1597 | 56   | 1542 | 58   | 1491 | 60   | 1437 | 62   | 1384 | 1332 | 1278 |       |               |
| *D9S961205D<br>*                                                 | WW1                 | F01** | 1187                                            | N/A  | 1101 | N/A  | 1013 | N/A  | 931  | N/A  | 847  | N/A  | 764  | 677  | 604  | 45-75 |               |
|                                                                  |                     | F02^  | 1973                                            | 54   | 1916 | 56   | 1864 | 57   | 1810 | 59   | 1756 | 61   | 1702 | 1650 | 1590 |       |               |
|                                                                  |                     | F03   | 1918                                            | 56   | 1859 | 57   | 1807 | 59   | 1748 | 61   | 1696 | 63   | 1643 | 1591 | 1531 |       |               |
|                                                                  |                     | F04   | 1835                                            | 58   | 1776 | 60   | 1720 | 62   | 1657 | 64   | 1602 | 67   | 1544 | 1483 | 1428 |       |               |
| NOTE:<br>^DEFAULT & RECOMMENDED<br>**NOT RECOMMENDED FOR HEATING |                     |       |                                                 |      |      |      |      |      |      |      |      |      |      |      |      |       |               |

| Cooling & Circulation Airflow |                 |       |                                                |      |      |      |      |       |      |       |      |       |      |       |
|-------------------------------|-----------------|-------|------------------------------------------------|------|------|------|------|-------|------|-------|------|-------|------|-------|
| MODEL                         | THERMOSTAT CALL | TAP # | EXTERNAL STATIC PRESSURE (INCHES WATER COLUMN) |      |      |      |      |       |      |       |      |       |      |       |
|                               |                 |       | 0.1                                            | 0.2  | 0.3  | 0.4  | 0.5  |       | 0.6  |       | 0.7  |       | 0.8  |       |
|                               |                 |       | CFM                                            | CFM  | CFM  | CFM  | CFM  | Watts | CFM  | Watts | CFM  | Watts | CFM  | Watts |
| *R9S920403A*                  | Y/Y1, Y2, G     | F01   | 610                                            | 559  | 513  | 467  | 419  | 84    | 368  | 89    | 316  | 95    | 285  | 98    |
|                               |                 | F02   | 925                                            | 887  | 852  | 818  | 787  | 181   | 754  | 187   | 720  | 192   | 685  | 200   |
|                               |                 | F03   | 846                                            | 808  | 772  | 737  | 703  | 149   | 667  | 155   | 630  | 161   | 594  | 167   |
|                               |                 | F04^  | 781                                            | 739  | 701  | 663  | 625  | 129   | 586  | 133   | 547  | 139   | 508  | 144   |
|                               |                 | F05   | 1038                                           | 1003 | 970  | 940  | 909  | 232   | 879  | 239   | 849  | 245   | 820  | 251   |
|                               |                 | F06   | 1106                                           | 1072 | 1041 | 1011 | 981  | 271   | 953  | 278   | 926  | 285   | 898  | 291   |
|                               |                 | F07   | 1215                                           | 1180 | 1151 | 1121 | 1095 | 336   | 1066 | 343   | 1043 | 352   | 1017 | 361   |
|                               |                 | F08   | 1238                                           | 1210 | 1180 | 1153 | 1126 | 360   | 1099 | 368   | 1073 | 376   | 1047 | 383   |
|                               |                 | F09   | 1319                                           | 1299 | 1273 | 1246 | 1220 | 429   | 1194 | 436   | 1169 | 444   | 1146 | 455   |
| *R9S920603B*                  | Y/Y1, Y2, G     | F01   | 723                                            | 663  | 604  | 539  | 476  | 93    | 404  | 99    | 347  | 104   | 291  | 110   |
|                               |                 | F02   | 1052                                           | 1010 | 962  | 920  | 875  | 181   | 829  | 189   | 785  | 198   | 740  | 206   |
|                               |                 | F03   | 1125                                           | 1084 | 1042 | 1003 | 964  | 211   | 918  | 218   | 875  | 227   | 834  | 237   |
|                               |                 | F04^  | 1206                                           | 1166 | 1129 | 1091 | 1054 | 249   | 1012 | 258   | 977  | 267   | 947  | 277   |
|                               |                 | F05   | 901                                            | 854  | 809  | 758  | 703  | 136   | 653  | 145   | 604  | 151   | 552  | 159   |
|                               |                 | F06   | 948                                            | 900  | 855  | 810  | 762  | 149   | 708  | 156   | 662  | 164   | 608  | 172   |
|                               |                 | F07   | 1273                                           | 1237 | 1206 | 1169 | 1128 | 286   | 1094 | 294   | 1057 | 302   | 1020 | 311   |
|                               |                 | F08   | 1365                                           | 1321 | 1292 | 1251 | 1219 | 331   | 1184 | 341   | 1152 | 349   | 1120 | 358   |
|                               |                 | F09   | 1426                                           | 1387 | 1360 | 1326 | 1292 | 374   | 1257 | 383   | 1226 | 392   | 1193 | 400   |
| *R9S920803B*                  | Y/Y1, Y2, G     | F01   | 718                                            | 662  | 611  | 551  | 486  | 99    | 419  | 104   | 358  | 111   | 300  | 115   |
|                               |                 | F02   | 1373                                           | 1341 | 1307 | 1279 | 1253 | 410   | 1226 | 414   | 1197 | 420   | 1172 | 428   |
|                               |                 | F03   | 1309                                           | 1265 | 1232 | 1192 | 1162 | 324   | 1129 | 332   | 1093 | 337   | 1057 | 347   |
|                               |                 | F04^  | 1233                                           | 1194 | 1165 | 1131 | 1097 | 309   | 1070 | 317   | 1039 | 324   | 1008 | 330   |
|                               |                 | F05   | 874                                            | 828  | 791  | 750  | 703  | 147   | 655  | 153   | 602  | 157   | 547  | 164   |
|                               |                 | F06   | 950                                            | 908  | 865  | 826  | 786  | 168   | 739  | 175   | 689  | 181   | 638  | 188   |
|                               |                 | F07   | 1097                                           | 1056 | 1019 | 988  | 952  | 236   | 921  | 243   | 880  | 248   | 842  | 255   |
|                               |                 | F08   | 1166                                           | 1127 | 1092 | 1060 | 1027 | 268   | 994  | 276   | 960  | 281   | 926  | 286   |
|                               |                 | F09   | 1407                                           | 1373 | 1338 | 1308 | 1282 | 424   | 1253 | 431   | 1229 | 438   | 1203 | 446   |
| *R9S920804C*                  | Y/Y1, Y2, G     | F01   | 804                                            | 740  | 670  | 586  | 501  | 93    | 407  | 98    | 347  | 103   | 0    | 0     |
|                               |                 | F02   | 1422                                           | 1375 | 1332 | 1288 | 1245 | 271   | 1200 | 281   | 1154 | 290   | 1108 | 299   |
|                               |                 | F03   | 1502                                           | 1455 | 1410 | 1365 | 1322 | 304   | 1278 | 314   | 1237 | 325   | 1195 | 335   |
|                               |                 | F04^  | 1567                                           | 1519 | 1476 | 1441 | 1402 | 339   | 1360 | 349   | 1319 | 361   | 1278 | 371   |
|                               |                 | F05   | 1347                                           | 1299 | 1253 | 1205 | 1157 | 238   | 1111 | 245   | 1063 | 255   | 1013 | 263   |
|                               |                 | F06   | 1692                                           | 1648 | 1609 | 1567 | 1529 | 406   | 1490 | 416   | 1451 | 428   | 1413 | 440   |
|                               |                 | F07   | 1772                                           | 1728 | 1689 | 1652 | 1614 | 456   | 1574 | 462   | 1534 | 474   | 1498 | 486   |
|                               |                 | F08   | 1793                                           | 1753 | 1720 | 1679 | 1643 | 470   | 1604 | 479   | 1562 | 489   | 1524 | 500   |
|                               |                 | F09   | 1875                                           | 1833 | 1797 | 1759 | 1727 | 529   | 1686 | 539   | 1652 | 552   | 1616 | 563   |
| *R9S920805C*                  | Y/Y1, Y2, G     | F01   | 869                                            | 782  | 684  | 575  | 482  | 100   | 395  | 104   | 331  | 110   | 122  | 58    |
|                               |                 | F02   | 1823                                           | 1776 | 1720 | 1679 | 1642 | 409   | 1597 | 424   | 1553 | 442   | 1504 | 456   |
|                               |                 | F03   | 1778                                           | 1729 | 1690 | 1648 | 1605 | 398   | 1558 | 412   | 1497 | 425   | 1449 | 439   |
|                               |                 | F04^  | 1722                                           | 1660 | 1609 | 1553 | 1507 | 350   | 1455 | 369   | 1402 | 383   | 1350 | 395   |
|                               |                 | F05   | 1498                                           | 1442 | 1388 | 1332 | 1278 | 264   | 1215 | 277   | 1154 | 290   | 1090 | 301   |
|                               |                 | F06   | 1634                                           | 1583 | 1536 | 1489 | 1440 | 325   | 1387 | 339   | 1330 | 351   | 1275 | 365   |
|                               |                 | F07   | 1925                                           | 1879 | 1836 | 1795 | 1752 | 471   | 1711 | 489   | 1664 | 503   | 1621 | 521   |
|                               |                 | F08   | 1993                                           | 1941 | 1899 | 1852 | 1813 | 508   | 1778 | 525   | 1741 | 545   | 1693 | 560   |
|                               |                 | F09   | 2216                                           | 2172 | 2131 | 2087 | 2046 | 663   | 2011 | 681   | 1973 | 697   | 1935 | 717   |

# AIRFLOW TABLES

# R9S92

| MODEL            | THERMO<br>STAT<br>CALL | TAP#            | EXTERNAL STATIC PRESSURE (INCHES WATER COLUMN) |      |      |      |      |       |      |       |      |       |      |       |
|------------------|------------------------|-----------------|------------------------------------------------|------|------|------|------|-------|------|-------|------|-------|------|-------|
|                  |                        |                 | 0.1                                            | 0.2  | 0.3  | 0.4  | 0.5  |       | 0.6  |       | 0.7  |       | 0.8  |       |
|                  |                        |                 | CFM                                            | CFM  | CFM  | CFM  | CFM  | Watts | CFM  | Watts | CFM  | Watts | CFM  | Watts |
| *R9S921<br>004C* | Y/Y1, Y2,<br>G         | F01             | 809                                            | 740  | 669  | 603  | 536  | 98    | 449  | 105   | 377  | 110   | 319  | 115   |
|                  |                        | F02             | 1754                                           | 1707 | 1673 | 1640 | 1604 | 487   | 1568 | 493   | 1538 | 505   | 1509 | 514   |
|                  |                        | F03             | 1648                                           | 1620 | 1586 | 1552 | 1515 | 426   | 1480 | 435   | 1449 | 442   | 1412 | 454   |
|                  |                        | F04^            | 1558                                           | 1517 | 1479 | 1441 | 1403 | 368   | 1366 | 378   | 1330 | 386   | 1295 | 396   |
|                  |                        | F05             | 1303                                           | 1255 | 1210 | 1167 | 1125 | 241   | 1081 | 250   | 1041 | 260   | 999  | 271   |
|                  |                        | F06             | 1406                                           | 1362 | 1321 | 1281 | 1240 | 283   | 1197 | 291   | 1157 | 301   | 1118 | 311   |
|                  |                        | F07             | 1445                                           | 1403 | 1363 | 1324 | 1287 | 307   | 1247 | 315   | 1208 | 325   | 1167 | 336   |
|                  |                        | F08             | 1778                                           | 1743 | 1700 | 1669 | 1634 | 508   | 1600 | 518   | 1568 | 530   | 1542 | 544   |
|                  |                        | F09             | 1824                                           | 1785 | 1747 | 1714 | 1680 | 536   | 1647 | 548   | 1617 | 559   | 1585 | 568   |
| *R9S921<br>005C* | Y/Y1, Y2,<br>G         | F01             | 906                                            | 813  | 717  | 613  | 519  | 103   | 439  | 109   | 368  | 114   | 0    | 0     |
|                  |                        | F02             | 1871                                           | 1818 | 1769 | 1720 | 1667 | 435   | 1614 | 446   | 1565 | 459   | 1511 | 468   |
|                  |                        | F03             | 1831                                           | 1782 | 1729 | 1679 | 1624 | 413   | 1571 | 424   | 1520 | 437   | 1465 | 449   |
|                  |                        | F04^            | 1653                                           | 1596 | 1538 | 1480 | 1422 | 324   | 1362 | 335   | 1306 | 346   | 1247 | 357   |
|                  |                        | F05             | 1496                                           | 1437 | 1376 | 1315 | 1250 | 259   | 1189 | 269   | 1126 | 279   | 1056 | 288   |
|                  |                        | F06             | 1640                                           | 1587 | 1527 | 1471 | 1414 | 314   | 1357 | 324   | 1294 | 336   | 1235 | 347   |
|                  |                        | F07             | 1955                                           | 1937 | 1909 | 1860 | 1813 | 513   | 1765 | 527   | 1712 | 541   | 1662 | 553   |
|                  |                        | F08             | 2086                                           | 2039 | 1991 | 1944 | 1896 | 574   | 1855 | 588   | 1810 | 593   | 1763 | 607   |
|                  |                        | F09             | 2222                                           | 2178 | 2133 | 2088 | 2043 | 683   | 1998 | 699   | 1954 | 711   | 1910 | 727   |
| *R9S921<br>205D* | Y/Y1, Y2,<br>G         | F01             | 1056                                           | 962  | 866  | 772  | 666  | 130   | 574  | 136   | 501  | 143   | 429  | 150   |
|                  |                        | F02             | 2096                                           | 2050 | 2005 | 1948 | 1899 | 532   | 1848 | 545   | 1800 | 559   | 1755 | 575   |
|                  |                        | F03             | 2023                                           | 1973 | 1927 | 1877 | 1829 | 488   | 1781 | 501   | 1731 | 515   | 1680 | 532   |
|                  |                        | F04^            | 1946                                           | 1900 | 1848 | 1795 | 1741 | 441   | 1689 | 455   | 1637 | 470   | 1584 | 485   |
|                  |                        | F05             | 1231                                           | 1151 | 1078 | 992  | 913  | 171   | 812  | 181   | 725  | 189   | 651  | 196   |
|                  |                        | F06             | 1503                                           | 1440 | 1382 | 1318 | 1251 | 256   | 1179 | 270   | 1108 | 281   | 1039 | 293   |
|                  |                        | F07             | 1704                                           | 1646 | 1586 | 1532 | 1473 | 328   | 1412 | 340   | 1346 | 357   | 1284 | 372   |
|                  |                        | F08             | 1831                                           | 1775 | 1720 | 1668 | 1610 | 388   | 1560 | 401   | 1511 | 413   | 1457 | 430   |
|                  |                        | F09             | 2222                                           | 2173 | 2125 | 2078 | 2029 | 607   | 1980 | 622   | 1933 | 636   | 1884 | 652   |
|                  |                        | NOTE:           |                                                |      |      |      |      |       |      |       |      |       |      |       |
|                  |                        | ^ Default speed |                                                |      |      |      |      |       |      |       |      |       |      |       |

| HEATING AIFLOW |                 |       |                                                 |      |      |      |      |      |      |      |      |      |      |      |      | TEMP RANGE |
|----------------|-----------------|-------|-------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------------|
| MODEL          | THERMOSTAT CALL | TAP # | EXTERNAL STATIC PRESSURE, (INCHES WATER COLUMN) |      |      |      |      |      |      |      |      |      |      |      |      |            |
|                |                 |       | 0.1                                             |      | 0.2  |      | 0.3  |      | 0.4  |      | 0.5  |      | 0.6  | 0.7  | 0.8  |            |
|                |                 |       | CFM                                             | RISE | CFM  | RISE | CFM  | RISE | CFM  | RISE | CFM  | RISE | CFM  | CFM  | CFM  |            |
| *R9S920403A*   | W/W1            | F01^^ | 610                                             | 56   | 559  | N/A  | 513  | N/A  | 467  | N/A  | 419  | N/A  | 368  | 316  | 285  | 30-60      |
|                |                 | F02^  | 925                                             | 37   | 887  | 38   | 852  | 40   | 818  | 42   | 787  | 43   | 754  | 720  | 685  |            |
|                |                 | F03   | 846                                             | 40   | 808  | 42   | 772  | 44   | 737  | 46   | 703  | 49   | 667  | 630  | 594  |            |
|                |                 | F04   | 781                                             | 44   | 739  | 46   | 701  | 49   | 663  | 51   | 625  | 55   | 586  | 547  | 508  |            |
| *R9S920603B*   | W/W1            | F01^^ | 723                                             | N/A  | 663  | N/A  | 604  | N/A  | 539  | N/A  | 476  | N/A  | 404  | 347  | 291  | 35-65      |
|                |                 | F02^  | 1052                                            | 49   | 1010 | 51   | 962  | 53   | 920  | 56   | 875  | 58   | 829  | 785  | 740  |            |
|                |                 | F03   | 1125                                            | 45   | 1084 | 47   | 1042 | 49   | 1003 | 51   | 964  | 53   | 918  | 875  | 834  |            |
|                |                 | F04   | 1206                                            | 42   | 1166 | 44   | 1129 | 45   | 1091 | 47   | 1054 | 48   | 1012 | 977  | 947  |            |
| *R9S920803B*   | W/W1            | F01^^ | 718                                             | N/A  | 662  | N/A  | 611  | N/A  | 551  | N/A  | 486  | N/A  | 419  | 358  | 300  | 35-65      |
|                |                 | F02^  | 1373                                            | 50   | 1341 | 51   | 1307 | 52   | 1279 | 53   | 1253 | 54   | 1226 | 1197 | 1172 |            |
|                |                 | F03   | 1309                                            | 52   | 1265 | 54   | 1232 | 55   | 1192 | 57   | 1162 | 59   | 1129 | 1093 | 1057 |            |
|                |                 | F04   | 1233                                            | 55   | 1194 | 57   | 1165 | 59   | 1131 | 60   | 1097 | 62   | 1070 | 1039 | 1008 |            |
| *R9S920804C*   | W/W1            | F01^^ | 804                                             | N/A  | 740  | N/A  | 670  | N/A  | 586  | N/A  | 501  | N/A  | 407  | 347  | N/A  | 35-65      |
|                |                 | F02^  | 1422                                            | 48   | 1375 | 50   | 1332 | 51   | 1288 | 53   | 1245 | 55   | 1200 | 1154 | 1108 |            |
|                |                 | F03   | 1502                                            | 45   | 1455 | 47   | 1410 | 48   | 1365 | 50   | 1322 | 52   | 1278 | 1237 | 1195 |            |
|                |                 | F04   | 1567                                            | 44   | 1519 | 45   | 1476 | 46   | 1441 | 47   | 1402 | 49   | 1360 | 1319 | 1278 |            |
| *R9S920805C*   | W/W1            | F01^^ | 869                                             | N/A  | 782  | N/A  | 684  | N/A  | 575  | N/A  | 482  | N/A  | 395  | 331  | 122  | 25-55      |
|                |                 | F02^  | 1823                                            | 37   | 1776 | 38   | 1720 | 40   | 1679 | 41   | 1642 | 41   | 1597 | 1553 | 1504 |            |
|                |                 | F03   | 1778                                            | 38   | 1729 | 39   | 1690 | 40   | 1648 | 41   | 1605 | 42   | 1558 | 1497 | 1449 |            |
|                |                 | F04   | 1722                                            | 40   | 1660 | 41   | 1609 | 42   | 1553 | 44   | 1507 | 45   | 1455 | 1402 | 1350 |            |
| *R9S921004C*   | W/W1            | F01^^ | 809                                             | N/A  | 740  | N/A  | 669  | N/A  | 603  | N/A  | 536  | N/A  | 449  | 377  | 319  | 35-65      |
|                |                 | F02^  | 1754                                            | 49   | 1707 | 50   | 1673 | 51   | 1640 | 52   | 1604 | 53   | 1568 | 1538 | 1509 |            |
|                |                 | F03   | 1648                                            | 52   | 1620 | 53   | 1586 | 54   | 1552 | 55   | 1515 | 56   | 1480 | 1449 | 1412 |            |
|                |                 | F04   | 1558                                            | 55   | 1517 | 56   | 1479 | 58   | 1441 | 59   | 1403 | 61   | 1366 | 1330 | 1295 |            |
| *R9S921005C*   | W/W1            | F01^^ | 906                                             | N/A  | 813  | N/A  | 717  | N/A  | 613  | N/A  | 519  | N/A  | 439  | 368  | N/A  | 35-65      |
|                |                 | F02^  | 1871                                            | 46   | 1818 | 47   | 1769 | 48   | 1720 | 50   | 1667 | 51   | 1614 | 1565 | 1511 |            |
|                |                 | F03   | 1831                                            | 47   | 1782 | 48   | 1729 | 49   | 1679 | 51   | 1624 | 52   | 1571 | 1520 | 1465 |            |
|                |                 | F04^^ | 1653                                            | 52   | 1596 | 53   | 1538 | 55   | 1480 | 58   | 1422 | 60   | 1362 | 1306 | 1247 |            |
| *R9S921205D*   | W/W1            | F01^^ | 1056                                            | N/A  | 962  | N/A  | 866  | N/A  | 772  | N/A  | 666  | N/A  | 574  | 501  | 429  | 35-65      |
|                |                 | F02^  | 2096                                            | 49   | 2050 | 50   | 2005 | 51   | 1948 | 52   | 1899 | 54   | 1848 | 1800 | 1755 |            |
|                |                 | F03   | 2023                                            | 51   | 1973 | 52   | 1927 | 53   | 1877 | 54   | 1829 | 56   | 1781 | 1731 | 1680 |            |
|                |                 | F04^^ | 1946                                            | 53   | 1900 | 54   | 1848 | 55   | 1795 | 57   | 1741 | 59   | 1689 | 1637 | 1584 |            |
|                |                 |       | NOTE:                                           |      |      |      |      |      |      |      |      |      |      |      |      |            |
|                |                 |       | ^DEFAULT & RECOMMENDED                          |      |      |      |      |      |      |      |      |      |      |      |      |            |
|                |                 |       | ^^NOT RECOMMENDED FOR HEATING                   |      |      |      |      |      |      |      |      |      |      |      |      |            |

| Cooling & Circulation Airflow |                 |       |                                                |      |      |      |      |       |      |       |      |       |      |       |
|-------------------------------|-----------------|-------|------------------------------------------------|------|------|------|------|-------|------|-------|------|-------|------|-------|
| MODEL                         | THERMOSTAT CALL | TAP # | EXTERNAL STATIC PRESSURE (INCHES WATER COLUMN) |      |      |      |      |       |      |       |      |       |      |       |
|                               |                 |       | 0.1                                            | 0.2  | 0.3  | 0.4  | 0.5  |       | 0.6  |       | 0.7  |       | 0.8  |       |
|                               |                 |       | CFM                                            | CFM  | CFM  | CFM  | CFM  | Watts | CFM  | Watts | CFM  | Watts | CFM  | Watts |
| *R9S960403A*                  | Y/Y1, Y2, G     | F01   | 705                                            | 661  | 617  | 564  | 509  | 103   | 455  | 108   | 405  | 115   | 362  | 120   |
|                               |                 | F02   | 1079                                           | 1055 | 1027 | 994  | 965  | 256   | 935  | 264   | 906  | 271   | 863  | 277   |
|                               |                 | F03   | 915                                            | 881  | 846  | 814  | 780  | 174   | 737  | 180   | 695  | 186   | 652  | 193   |
|                               |                 | F04^  | 887                                            | 855  | 823  | 790  | 751  | 164   | 705  | 170   | 666  | 176   | 608  | 183   |
|                               |                 | F05   | 1135                                           | 1106 | 1078 | 1049 | 1021 | 281   | 994  | 290   | 965  | 299   | 933  | 306   |
|                               |                 | F06   | 1189                                           | 1163 | 1138 | 1111 | 1085 | 321   | 1059 | 331   | 1032 | 341   | 1001 | 349   |
|                               |                 | F07   | 1266                                           | 1243 | 1218 | 1197 | 1172 | 372   | 1148 | 383   | 1123 | 394   | 1099 | 400   |
|                               |                 | F08   | 1313                                           | 1288 | 1261 | 1239 | 1215 | 403   | 1189 | 412   | 1165 | 422   | 1143 | 432   |
|                               |                 | F09   | 1342                                           | 1324 | 1305 | 1280 | 1263 | 440   | 1239 | 452   | 1216 | 463   | 1193 | 473   |
| *R9S960603B*                  | Y/Y1, Y2, G     | F01   | 758                                            | 696  | 636  | 572  | 512  | 104   | 460  | 110   | 412  | 115   | 354  | 121   |
|                               |                 | F02   | 1218                                           | 1178 | 1140 | 1100 | 1060 | 275   | 1016 | 284   | 977  | 292   | 937  | 299   |
|                               |                 | F03   | 1164                                           | 1123 | 1084 | 1042 | 1003 | 249   | 960  | 258   | 920  | 268   | 871  | 276   |
|                               |                 | F04^  | 1121                                           | 1083 | 1041 | 996  | 953  | 230   | 906  | 236   | 861  | 245   | 818  | 252   |
|                               |                 | F05   | 902                                            | 851  | 801  | 746  | 689  | 145   | 637  | 153   | 585  | 158   | 542  | 164   |
|                               |                 | F06   | 960                                            | 917  | 864  | 812  | 764  | 164   | 708  | 171   | 661  | 179   | 614  | 184   |
|                               |                 | F07   | 1273                                           | 1240 | 1207 | 1171 | 1128 | 309   | 1089 | 318   | 1051 | 327   | 1012 | 336   |
|                               |                 | F08   | 1335                                           | 1301 | 1266 | 1228 | 1192 | 347   | 1154 | 356   | 1118 | 365   | 1078 | 373   |
|                               |                 | F09   | 1427                                           | 1390 | 1362 | 1327 | 1297 | 408   | 1260 | 414   | 1224 | 423   | 1193 | 434   |
| *R9S960803B*                  | Y/Y1, Y2, G     | F01   | 715                                            | 658  | 589  | 524  | 465  | 93    | 412  | 99    | 360  | 104   | 279  | 108   |
|                               |                 | F02   | 1415                                           | 1385 | 1355 | 1322 | 1291 | 394   | 1255 | 403   | 1219 | 407   | 1186 | 417   |
|                               |                 | F03   | 1388                                           | 1360 | 1325 | 1291 | 1259 | 375   | 1223 | 385   | 1191 | 393   | 1157 | 403   |
|                               |                 | F04^  | 1290                                           | 1252 | 1215 | 1182 | 1143 | 311   | 1107 | 319   | 1071 | 329   | 1032 | 337   |
|                               |                 | F05   | 916                                            | 867  | 817  | 767  | 710  | 147   | 657  | 154   | 608  | 159   | 563  | 166   |
|                               |                 | F06   | 985                                            | 940  | 892  | 842  | 797  | 169   | 746  | 176   | 693  | 184   | 649  | 190   |
|                               |                 | F07   | 1118                                           | 1078 | 1037 | 992  | 952  | 222   | 910  | 230   | 863  | 239   | 822  | 247   |
|                               |                 | F08   | 1191                                           | 1153 | 1114 | 1074 | 1034 | 255   | 993  | 264   | 951  | 272   | 911  | 281   |
|                               |                 | F09   | 1471                                           | 1440 | 1409 | 1377 | 1347 | 427   | 1314 | 436   | 1283 | 446   | 1247 | 456   |
| *R9S960804C*                  | Y/Y1, Y2, G     | F01   | 1019                                           | 952  | 878  | 796  | 706  | 138   | 619  | 144   | 542  | 150   | 485  | 157   |
|                               |                 | F02   | 1791                                           | 1743 | 1700 | 1663 | 1626 | 472   | 1583 | 487   | 1538 | 499   | 1489 | 510   |
|                               |                 | F03   | 1625                                           | 1559 | 1512 | 1468 | 1425 | 359   | 1370 | 369   | 1325 | 385   | 1271 | 395   |
|                               |                 | F04^  | 1537                                           | 1490 | 1447 | 1403 | 1354 | 326   | 1301 | 337   | 1247 | 347   | 1190 | 357   |
|                               |                 | F05   | 1289                                           | 1234 | 1180 | 1122 | 1058 | 217   | 991  | 226   | 917  | 234   | 840  | 242   |
|                               |                 | F06   | 1431                                           | 1375 | 1329 | 1283 | 1227 | 276   | 1169 | 285   | 1108 | 295   | 1043 | 304   |
|                               |                 | F07   | 1836                                           | 1784 | 1741 | 1703 | 1664 | 496   | 1628 | 515   | 1585 | 528   | 1537 | 540   |
|                               |                 | F08   | 1919                                           | 1890 | 1846 | 1807 | 1771 | 566   | 1735 | 585   | 1694 | 600   | 1650 | 613   |
|                               |                 | F09   | 1952                                           | 1921 | 1885 | 1843 | 1804 | 590   | 1769 | 611   | 1731 | 629   | 1691 | 643   |

## AIRFLOW TABLES

# R9S96

[illegible]

| HEATING AIFLOW |                     |                               |                                                 |      |      |      |      |      |      |      |      |      |      |      |      |       |            |
|----------------|---------------------|-------------------------------|-------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|------------|
| MODEL          | THERMOSTA<br>T CALL | TAP #                         | EXTERNAL STATIC PRESSURE, (INCHES WATER COLUMN) |      |      |      |      |      |      |      |      |      |      |      |      |       | TEMP RANGE |
|                |                     |                               | 0.1                                             |      | 0.2  |      | 0.3  |      | 0.4  |      | 0.5  |      | 0.6  | 0.7  | 0.8  |       |            |
|                |                     |                               | CFM                                             | RISE | CFM  | RISE | CFM  | RISE | CFM  | RISE | CFM  | RISE | CFM  | CFM  | CFM  |       |            |
| *R9S960403A    | W/W1                | F01^^                         | 705                                             | 50   | 661  | 54   | 617  | N/A  | 564  | N/A  | 509  | N/A  | 455  | 405  | 362  | 25-55 |            |
|                |                     | F02^                          | 1079                                            | 33   | 1055 | 34   | 1027 | 35   | 994  | 36   | 965  | 37   | 935  | 906  | 863  |       |            |
|                |                     | F03                           | 915                                             | 39   | 881  | 40   | 846  | 42   | 814  | 44   | 780  | 46   | 737  | 695  | 652  |       |            |
|                |                     | F04                           | 887                                             | 40   | 855  | 42   | 823  | 43   | 790  | 45   | 751  | 47   | 705  | 666  | 608  |       |            |
| *R9S960603B    | W/W1                | F01^^                         | 758                                             | N/A  | 696  | N/A  | 636  | N/A  | 572  | N/A  | 512  | N/A  | 460  | 412  | 354  | 35-65 |            |
|                |                     | F02^                          | 1218                                            | 44   | 1178 | 45   | 1140 | 47   | 1100 | 48   | 1060 | 50   | 1016 | 977  | 937  |       |            |
|                |                     | F03                           | 1164                                            | 46   | 1123 | 47   | 1084 | 49   | 1042 | 51   | 1003 | 53   | 960  | 920  | 871  |       |            |
|                |                     | F04                           | 1121                                            | 48   | 1083 | 49   | 1041 | 51   | 996  | 54   | 953  | 56   | 906  | 861  | 818  |       |            |
| *R9S960803B    | W/W1                | F01^^                         | 715                                             | N/A  | 658  | N/A  | 589  | N/A  | 524  | N/A  | 465  | N/A  | 412  | 360  | 279  | 35-65 |            |
|                |                     | F02^                          | 1415                                            | 50   | 1385 | 51   | 1355 | 52   | 1322 | 54   | 1291 | 55   | 1255 | 1219 | 1186 |       |            |
|                |                     | F03                           | 1388                                            | 51   | 1360 | 52   | 1325 | 54   | 1291 | 55   | 1259 | 57   | 1223 | 1191 | 1157 |       |            |
|                |                     | F04                           | 1290                                            | 55   | 1252 | 57   | 1215 | 59   | 1182 | 60   | 1143 | 62   | 1107 | 1071 | 1032 |       |            |
| *R9S960804C    | W/W1                | F01^^                         | 1019                                            | N/A  | 952  | N/A  | 878  | N/A  | 796  | N/A  | 706  | N/A  | 619  | 542  | 485  | 25-55 |            |
|                |                     | F02^                          | 1791                                            | 40   | 1743 | 41   | 1700 | 42   | 1663 | 43   | 1626 | 44   | 1583 | 1538 | 1489 |       |            |
|                |                     | F03                           | 1625                                            | 44   | 1559 | 46   | 1512 | 47   | 1468 | 48   | 1425 | 50   | 1370 | 1325 | 1271 |       |            |
|                |                     | F04                           | 1537                                            | 46   | 1490 | 48   | 1447 | 49   | 1403 | 51   | 1354 | 53   | 1301 | 1247 | 1190 |       |            |
| *R9S960805C    | W/W1                | F01^^                         | 1029                                            | N/A  | 959  | N/A  | 890  | N/A  | 811  | N/A  | 727  | N/A  | 647  | 579  | 511  | 25-55 |            |
|                |                     | F02^                          | 1814                                            | 39   | 1766 | 40   | 1722 | 41   | 1679 | 42   | 1637 | 43   | 1595 | 1555 | 1511 |       |            |
|                |                     | F03                           | 1893                                            | 38   | 1844 | 39   | 1803 | 39   | 1763 | 40   | 1723 | 41   | 1685 | 1641 | 1604 |       |            |
|                |                     | F04                           | 1738                                            | 41   | 1680 | 42   | 1637 | 43   | 1596 | 45   | 1554 | 46   | 1510 | 1469 | 1420 |       |            |
| *R9S961005C*   | W/W1                | F01^^                         | 1008                                            | N/A  | 934  | N/A  | 855  | N/A  | 779  | N/A  | 702  | N/A  | 628  | 557  | 493  | 30-60 |            |
|                |                     | F02^                          | 2026                                            | 44   | 1981 | 45   | 1929 | 46   | 1901 | 47   | 1858 | 48   | 1819 | 1773 | 1733 |       |            |
|                |                     | F03                           | 1921                                            | 46   | 1879 | 47   | 1840 | 48   | 1791 | 50   | 1751 | 51   | 1705 | 1656 | 1610 |       |            |
|                |                     | F04                           | 1804                                            | 49   | 1755 | 51   | 1710 | 52   | 1664 | 53   | 1619 | 55   | 1574 | 1526 | 1479 |       |            |
| *R9S961205D*   | W/W1                | F01^^                         | 1118                                            | N/A  | 1035 | N/A  | 952  | N/A  | 860  | N/A  | 750  | N/A  | 663  | 590  | 519  | 35-65 |            |
|                |                     | F02^                          | 2143                                            | 50   | 2095 | 51   | 2047 | 52   | 2002 | 53   | 1954 | 55   | 1891 | 1850 | 1802 |       |            |
|                |                     | F03                           | 2025                                            | 53   | 1977 | 54   | 1930 | 55   | 1897 | 56   | 1848 | 58   | 1798 | 1750 | 1703 |       |            |
|                |                     | F04^^                         | 1906                                            | 56   | 1877 | 57   | 1828 | 58   | 1778 | 60   | 1726 | 62   | 1674 | 1622 | 1568 |       |            |
|                |                     | NOTE:                         |                                                 |      |      |      |      |      |      |      |      |      |      |      |      |       |            |
|                |                     | ^DEFAULT & RECOMMENDED        |                                                 |      |      |      |      |      |      |      |      |      |      |      |      |       |            |
|                |                     | ^^NOT RECOMMENDED FOR HEATING |                                                 |      |      |      |      |      |      |      |      |      |      |      |      |       |            |

# 1 STAGE STATUS CODES

| Menu Description                               | LED Display |                            | Notes                                                                                              |
|------------------------------------------------|-------------|----------------------------|----------------------------------------------------------------------------------------------------|
|                                                | Main Menu   | Option Menu                |                                                                                                    |
| Active Alarm menu                              | <b>Er r</b> | <b>Exx</b>                 | ( xx: code numbers )                                                                               |
| Last 10 Faults                                 | <b>F10</b>  | <b>Exx</b>                 | ( xx: code numbers )                                                                               |
| Code Release Number                            | <b>Cr</b>   | CR Number                  |                                                                                                    |
| Reset to Factory Default                       | <b>rFd</b>  | <b>yes, no</b>             |                                                                                                    |
| Blower Speed for Continuous Fan Mode           | <b>FSd</b>  | <b>Fxx</b>                 | ( xx: Blower Speed Number F01, F02.. )                                                             |
| Blower Speed for 1st Stage Compressor Mode     | <b>AC1</b>  | <b>Fxx</b>                 | ( xx: Blower Speed Number F01, F02.. )                                                             |
| Blower Speed for 2nd Stage Compressor Mode     | <b>AC2</b>  | <b>Fxx</b>                 | ( xx: Blower Speed Number F01, F02.. )                                                             |
| Cool On Delay                                  | <b>Cnd</b>  | Delay, Seconds             | Default set at 7 Secs,<br>Adjustments can be made in 7<br>Secs increments from 0 to 35<br>Secs     |
| Cool Off Delay                                 | <b>Cf d</b> | Delay, Seconds             | Default set at 65 Secs,<br>Adjustments can be made in 5<br>Secs increments from 0 to 120<br>Secs   |
| Blower Speed for Gas Heat Mode                 | <b>gAF</b>  | <b>Fxx</b>                 | ( xx: Blower Speed Number F01, F02.. )                                                             |
| Gas Heat On Delay                              | <b>gnd</b>  | Delay, Seconds             | Default set at 30 Secs,<br>Adjustments can be made in 5<br>Secs increments from 5 to 30<br>Secs    |
| Gas heat Off Delay                             | <b>gFd</b>  | Delay, Seconds             | Default set at 90 Secs,<br>Adjustments can be made in 30<br>Secs increments from 30 to 180<br>Secs |
| Automatic Heat Staging - For Two Stage Control | <b>AHS</b>  | no, 10, 20, 30,<br>60, Aut | Refer to Section " CHANGING<br>HEATING MODE SETTING"                                               |
| A2L Function Verification                      | <b>A2u</b>  | <b>yes, no</b>             | Refer to the R-32 Information<br>Section                                                           |
| A2L Function Enabled                           | <b>A2E</b>  | <b>yes, no</b>             | Refer to the R-32 Information<br>Section                                                           |

## 1 STAGE STATUS CODES

## STATUS MENU

| Mode                            | Main Menu   |
|---------------------------------|-------------|
| Idle                            | <i>1 dL</i> |
| Continuous Fan                  | <i>FAh</i>  |
| Compressor Cooling, Low Stage   | <i>1AC</i>  |
| Compressor Cooling, High Stage  | <i>2AC</i>  |
| Gas heat - Single Stage Control | <i>9H</i>   |
| OEM test Mode                   | <i>EDL</i>  |

# 1 STAGE TROUBLESHOOTING CODES

| Symptom                                                                                    | LED Status | Fault Description                                                                                                                                            | Possible Causes                                                                                                                                                                                                                                                                                                                                                   | Corrective Action(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Notes & Cautions                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Normal operation.                                                                          | IdL        | Idle                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Normal operation.</li> </ul>                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• None</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Normal operation.</li> </ul>                                                                                                                                                                                                                     |
| Furnace fails to operate.<br><br>Integrated control module LED display provides no signal. | nonE       | No 120VAC power to furnace or no 24 volt power to integrated control module.                                                                                 | <ul style="list-style-type: none"> <li>• Blown fuse or tripped circuit breaker.</li> <li>• Manual disconnect switch turned OFF, door switch open or 24 volt wire improperly connected or loose.</li> <li>• Furnace electrical supply shared with other devices.</li> <li>• Integrated control module is non-functional.</li> </ul>                                | <ul style="list-style-type: none"> <li>• Check furnace breaker to see if it has tripped. Reset breaker if tripped.</li> <li>• Check 120VAC power to furnace, primary side of the 24 volt transformer and integrated control module.</li> <li>• Check for possible shorts in 120VAC circuit. Repair as necessary.</li> <li>• If transformer has 120VAC on the primary side, confirm transformer has 24 volts on the secondary side.</li> <li>• Verify 24 volt wires from the transformer to the furnace control board are not damaged and are properly connected to the 12-pin harness. Make repairs or wiring corrections if needed.</li> <li>• If all wiring connections have been verified, replace the furnace control board.</li> </ul> | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• Make wiring repairs or wiring corrections as needed.</li> <li>• Read precautions in "Electrostatic Discharge" section of manual.</li> <li>• Replace control with correct replacement part.</li> </ul> |
| Furnace fails to operate and goes into a hard lockout.                                     | EbL        | Circulator blower motor is consuming very little current after heat ON delay - below expected value.                                                         | <ul style="list-style-type: none"> <li>• Loose wiring connections to and from the blower motor.</li> <li>• Circulator blower motor 120 volt L1 wire is not plugged into the CIRC-H connection on the integrated control board.</li> <li>• Heating blower speed not set correctly.</li> <li>• Circulator blower motor failure.</li> </ul>                          | <ul style="list-style-type: none"> <li>• Check for loose wiring connections to and from the circulator blower motor.</li> <li>• Verify 120 volt L1 wire from blower motor is plugged into the CIRC-H connection on the integrated control board.</li> <li>• Verify blower voltage, amps and proper speed setting. Replace blower motor if necessary.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• Replace blower motor with correct replacement part.</li> </ul>                                                                                                                                        |
| Furnace fails to operate and goes into a hard lockout.                                     | EbU        | Circulator blower motor is consuming too much current during inducer pre-purge is higher than expected value.                                                | <ul style="list-style-type: none"> <li>• Circulator blower motor power wiring reversed on integrated control board.</li> </ul>                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Check for loose wiring connections to and from the circulator blower motor.</li> <li>• Check for miswired connections on the integrated control board.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> </ul>                                                                                                                                                                                                       |
| Furnace fails to operate.                                                                  | Ed8        | Invalid Call (check ODS setting)                                                                                                                             | <ul style="list-style-type: none"> <li>• ODS setting does not match outdoor unit.</li> </ul>                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Setup ODS to match outdoor unit.</li> <li>• Setup TON airflow to match outdoor unit.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Set system to IdL before setting ODS and TON</li> </ul>                                                                                                                                                                                          |
| Furnace fails to operate.                                                                  | EE0        | <p>Furnace lockout due to excessive number of ignition "retries" (3 total).</p> <p>Failure to establish flame.</p> <p>Loss of flame after establishment.</p> | <ul style="list-style-type: none"> <li>• No gas or improper gas pressure to burners.</li> <li>• Bad igniter or igniter alignment.</li> <li>• Orifices restricted.</li> <li>• Coated/oxidized or improperly connected flame sensor.</li> <li>• Restriction in flue and/or lack of combustion air.</li> <li>• Improper induced draft blower performance.</li> </ul> | <ul style="list-style-type: none"> <li>• Locate and correct gas interruption.</li> <li>• Check front cover pressure switch operation and verify proper drainage (hose, wiring, contact operation).</li> <li>• Replace or realign igniter.</li> <li>• Check flame sense signal. Clean sensor if coated and/or oxidized.</li> <li>• Check flue piping for blockage, proper length, elbows and termination.</li> <li>• Verify proper induced draft blower performance.</li> </ul>                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• Igniter is fragile, handle with care.</li> <li>• Clean flame sensor with steel wool.</li> <li>• See "Vent/Flue Pipe" section for piping details.</li> </ul>                                           |
| Furnace fails to operate.                                                                  | EE1        | Pressure switch circuit closed at start of heating cycle.                                                                                                    | <ul style="list-style-type: none"> <li>• Pressure switch contacts sticking.</li> <li>• Short in pressure switch circuit wiring.</li> </ul>                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Replace pressure switch.</li> <li>• Repair short in wiring.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• Replace pressure switch with proper replacement part.</li> </ul>                                                                                                                                      |

# 1 STAGE TROUBLESHOOTING CODES

| Symptom                                                                                | LED Status | Fault Description                    | Possible Causes                                                                                                                                                                                                                                                                                                                                               | Corrective Action(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Notes & Cautions                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------|------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Induced draft blower runs continuously with no further furnace operation.              | EE2        | Pressure switch circuit open.        | <ul style="list-style-type: none"> <li>• Pressure switch hose blocked, pinched, or connected improperly.</li> <li>• Blocked flue pipe and/or inlet air pipe, blocked drain system or weak induced draft blower.</li> <li>• Incorrect pressure switch set point or malfunctioning switch contacts.</li> <li>• Loose or improperly connected wiring.</li> </ul> | <ul style="list-style-type: none"> <li>• Inspect pressure switch hose. Repair/replace if necessary.</li> <li>• Inspect flue and/or inlet air piping for blockage, proper length, elbows and termination. Correct as necessary.</li> <li>• Check drain system. Correct as necessary.</li> <li>• Check induced draft blower performance. Correct as necessary.</li> <li>• Check pressure switch operation. Replace as needed.</li> <li>• Tighten or correct wiring connections.</li> </ul> | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• Replace pressure switch with proper replacement part.</li> <li>• Replace induced draft blower with proper replacement part.</li> </ul>                          |
| Circulator blower runs continuously with no furnace operation.                         | EE3        | Primary limit circuit open.          | <ul style="list-style-type: none"> <li>• Insufficient conditioned air over the heat exchanger.</li> <li>• Blocked filters, restrictive ductwork.</li> <li>• Improper circulator blower speed or failed circulator blower motor.</li> <li>• Loose or improperly connected wiring in high limit circuit.</li> </ul>                                             | <ul style="list-style-type: none"> <li>• Check filters and ductwork for blockage. Clean filters or remove obstruction.</li> <li>• Check circulator blower speed and performance. Correct speed or replace blower motor if necessary.</li> <li>• Tighten or correct wiring connections.</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• See Specification Sheet applicable for your model for allowable temp rise range and proper circulator speed.</li> </ul>                                         |
| Induced draft blower and circulator blower run continuously with no furnace operation. | EE4        | Flame sensed with no call for heat.  | <ul style="list-style-type: none"> <li>• Short to ground in flame sense circuit.</li> <li>• Lingered burner flame.</li> <li>• Slow closing gas valve.</li> </ul>                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Correct short at flame sensor or in flame sensor wiring.</li> <li>• Check for lingering flame.</li> <li>• Verify proper operation of gas valve.</li> </ul>                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> </ul>                                                                                                                                                                 |
| No furnace operation.                                                                  | EE5        | Open fuse.                           | <ul style="list-style-type: none"> <li>• Short in low voltage wiring</li> <li>• Back of control board is touching mounting panel because standoffs are missing.</li> </ul>                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Locate and correct short in low voltage wiring.</li> <li>• Replace the missing standoffs.</li> </ul>                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• Replace fuse with 3-amp automotive type.</li> </ul>                                                                                                             |
| Normal furnace operation with weak flame signal.                                       | EE6        | Flame sense micro amp signal is low. | <ul style="list-style-type: none"> <li>• Flame sensor is coated/oxidized.</li> <li>• Flame sensor incorrectly positioned in burner flame.</li> <li>• Lazy burner flame due to improper gas pressure or combustion air.</li> </ul>                                                                                                                             | <ul style="list-style-type: none"> <li>• Clean flame sensor if coated or oxidized.</li> <li>• Inspect flame sensor for proper alignment.</li> <li>• Compare current gas pressure to rating plate and adjust as needed.</li> </ul>                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> <li>• Clean flame sensor with steel wool.</li> <li>• See "Vent/Flue Pipe" section for piping details.</li> <li>• See rating plate for proper gas pressure.</li> </ul> |
| Furnace fails to operate.                                                              | E10        | Grounding fault                      | <ul style="list-style-type: none"> <li>• Poor neutral connection.</li> </ul>                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• Verify neutral wire connection to furnace and continuity to ground source.</li> </ul>                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> </ul>                                                                                                                                                                 |
| Furnace fails to operate.                                                              | E11        | Open rollout switch.                 | <ul style="list-style-type: none"> <li>• Gas pressure too high.</li> <li>• Burners mis-aligned.</li> <li>• Restricted heat exchanger or venting.</li> </ul>                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Check and correct gas pressure.</li> <li>• Check and correct burner alignment.</li> <li>• Check and correct restriction</li> </ul>                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> </ul>                                                                                                                                                                 |
| Furnace fails to operate.                                                              | EEA        | Polarity if 115 volt AC is reversed. | <ul style="list-style-type: none"> <li>• Polarity of 115 volt AC power to furnace or integrated control module is reversed.</li> <li>• Poor furnace ground.</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Review wiring diagram to correct polarity.</li> <li>• Verify proper ground. Correct if necessary.</li> <li>• Check and correct wiring.</li> </ul>                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Turn power OFF prior to repair.</li> </ul>                                                                                                                                                                 |

# 1 STAGE TROUBLESHOOTING CODES

| Symptom                       | LED Status | Fault Description                                                              | Possible Causes                                                                                                                                                                     | Corrective Action(s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Notes & Cautions                                                                                                                                                                                                                      |
|-------------------------------|------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Furnace fails to operate.     | EEb        | Integrated Control Board is not energizing the gas valve when it should be on. | <ul style="list-style-type: none"> <li>Miswired gas valve circuit.</li> <li>Open gas valve circuit.</li> <li>Gas valve relay on integrated control board stuck open.</li> </ul>     | <ul style="list-style-type: none"> <li>Check wiring in gas valve circuit.</li> <li>Replace integrated control board.</li> <li>Do NOT replace the gas valve.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> </ul>                                                                                                                                                     |
| Furnace fails to operate.     | EEC        | Gas valve is energized when it should be off.                                  | <ul style="list-style-type: none"> <li>Miswired gas valve circuit.</li> <li>Shorted gas valve wiring.</li> </ul>                                                                    | <ul style="list-style-type: none"> <li>Cycle 120VAC power to the furnace control. If EEC error code is still active, turn off power to the furnace and continue diagnosis.</li> </ul> <p>NOTE: This error code is a wiring issue external to the furnace control board.</p> <ul style="list-style-type: none"> <li>Inspect system wiring for damage and repair if needed.</li> <li>If EEC error code is still active, replace system wiring harness.</li> </ul> <p>NOTE: After replacing system wire harness, if EEC is still active, replace integrated control board.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> </ul>                                                                                                                                                     |
| Furnace fails to operate.     | EEE        | Furnace control board has detected an internal fault.                          | <ul style="list-style-type: none"> <li>120VAC power wiring loose or damaged.</li> <li>Poor ground wire.</li> <li>Damaged or miswired 120V or 24V wiring on the furnace.</li> </ul>  | <ul style="list-style-type: none"> <li>Turn off power to the furnace for at least 3 minutes, then turn power back on (to see if the EEE code will reset).</li> <li>Inspect 120V and 24V wiring to the furnace and on the furnace for signs of damage or miswiring.</li> <li>Replace integrated control board.</li> <li>Do not replace additional components based on this error code.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace the integrated control board with proper replacement part.</li> <li>Do not replace additional components based on this error code.</li> </ul> |
| Twinning feature not working. | EEH        | Error with Twinning function.                                                  | <ul style="list-style-type: none"> <li>Both furnaces not on the same 120VAC power from the breaker panel.</li> <li>Low voltage wiring error or loose wiring connections.</li> </ul> | <ul style="list-style-type: none"> <li>Verify both furnaces are on the same 120VAC power from the breaker panel.</li> <li>Turn off power to both furnaces. Disconnect the twinning wire between the two furnace control boards. Turn power back on to both furnaces.</li> <li>Confirm both furnaces are powered and the furnace control boards do not have any active error codes. If one of the controls displays the EEH, (without the twinning wire) replace only that control board.</li> <li>3) Turn power off to both furnaces again. Re-connect the twinning wires between both furnace control boards. Verify the twinning wire is properly connected and not damaged. Replace the wire if necessary. Turn power back on to both furnaces.</li> <li>4) Confirm thermostat wiring is correct per the installation manual. Provide a G (Fan Only) signal to the main furnace control. Check if the twinned furnace starts running the blower at the same speed as the main furnace.</li> <li>5) If the twinned furnace is not operating the fan and the EEH fault is still active, Replace one of the furnace control boards. If EEH is still active, replace the second furnace control board.</li> </ul> | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace the integrated control board with proper replacement part.</li> </ul>                                                                         |

# 1 STAGE TROUBLESHOOTING CODES

| Symptom                                              | LED Status | Fault Description                                                                                           | Possible Causes                                                                                                                                                                                    | Corrective Action(s)                                                                                                                                                                                                                                                                                                                                                         | Notes & Cautions                                                                                                                                                                                                                     |
|------------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Furnace fails to operate.                            | EEJ        | Inducer motor relay error.                                                                                  | <ul style="list-style-type: none"> <li>Inducer motor relay issue in the integrated control board.</li> </ul>                                                                                       | <ul style="list-style-type: none"> <li>Replace integrated control board</li> <li>Do not replace additional components based on this error code.</li> </ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace the integrated control board with proper replacement part.</li> <li>Do not replace additional components based on this error code</li> </ul> |
| Furnace fails to operate.                            | EEL        | Problem with igniter circuit.                                                                               | <ul style="list-style-type: none"> <li>Improperly connected igniter.</li> <li>Shorted igniter.</li> <li>Poor furnace ground.</li> <li>Igniter relay fault on integrated control module.</li> </ul> | <ul style="list-style-type: none"> <li>Check and correct wiring from integrated control board to igniter.</li> <li>Diagnose and replace shorted igniter as needed.</li> <li>Verify and correct furnace ground wiring.</li> <li>Check igniter output from control. Replace if necessary.</li> </ul>                                                                           | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace igniter with correct replacement part.</li> <li>Replace control with correct replacement part.</li> </ul>                                    |
| Furnace fails to operate.                            | EEn        | Igniter open.                                                                                               | <ul style="list-style-type: none"> <li>Loose or incorrect wiring from integrated control board to igniter.</li> <li>Damaged igniter.</li> </ul>                                                    | <ul style="list-style-type: none"> <li>Check and correct wiring from integrated control board to igniter.</li> <li>Replace igniter if necessary.</li> </ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace igniter with correct replacement part.</li> </ul>                                                                                            |
| Furnace stops heating and only the fan is operating. | EAF        | Furnace has lost communication with the R-32 sensor and the furnace is in mitigation mode.                  | <p><b>Furnace may not be paired with R-32 Cooling Unit. Refer to the R-32 Information Section.</b></p> <ul style="list-style-type: none"> <li>Loose or damaged R-32 sensor wire.</li> </ul>        | <ul style="list-style-type: none"> <li>Verify wire connection to R-32 sensor is not loose.</li> <li>Verify the R-32 sensor wire is not damaged.</li> <li>Replace R-32 sensor if necessary.</li> </ul>                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace R-32 sensor with proper replacement part.</li> </ul>                                                                                         |
| Furnace stops heating and only the fan is operating. | EAL        | R-32 sensor has detected a refrigerant leak and furnace is in mitigation mode.                              |                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Investigate the indoor coil for a refrigerant leak.</li> <li>Furnace will resume normal operation once a leak is no longer detected and the 5-minute delay period is over.</li> </ul>                                                                                                                                                 | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> </ul>                                                                                                                                                    |
| Furnace stops heating and only the fan is operating. | EAS        | R-32 sensor has detected a fault and furnace is in mitigation mode.                                         |                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Investigate the R-32 sensor.</li> <li>Replace the R-32 sensor if necessary.</li> </ul>                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace R-32 sensor with proper replacement part.</li> </ul>                                                                                         |
| Furnace stops heating and only the fan is operating. | EAr        | The furnace control board has detected an issue with the internal A2L relay and is running mitigation mode. |                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Disconnect any wire connected to the ALARM terminal of the furnace control.</li> <li>Cycle power to the furnace. If the error code clears, there is an issue with the wiring connected to the ALARM terminal. Repair wiring if necessary.</li> <li>If the error code does not clear, replace the integrated control board.</li> </ul> | <ul style="list-style-type: none"> <li>Turn power OFF prior to repair.</li> <li>Replace the integrated control board with proper replacement part.</li> </ul>                                                                        |

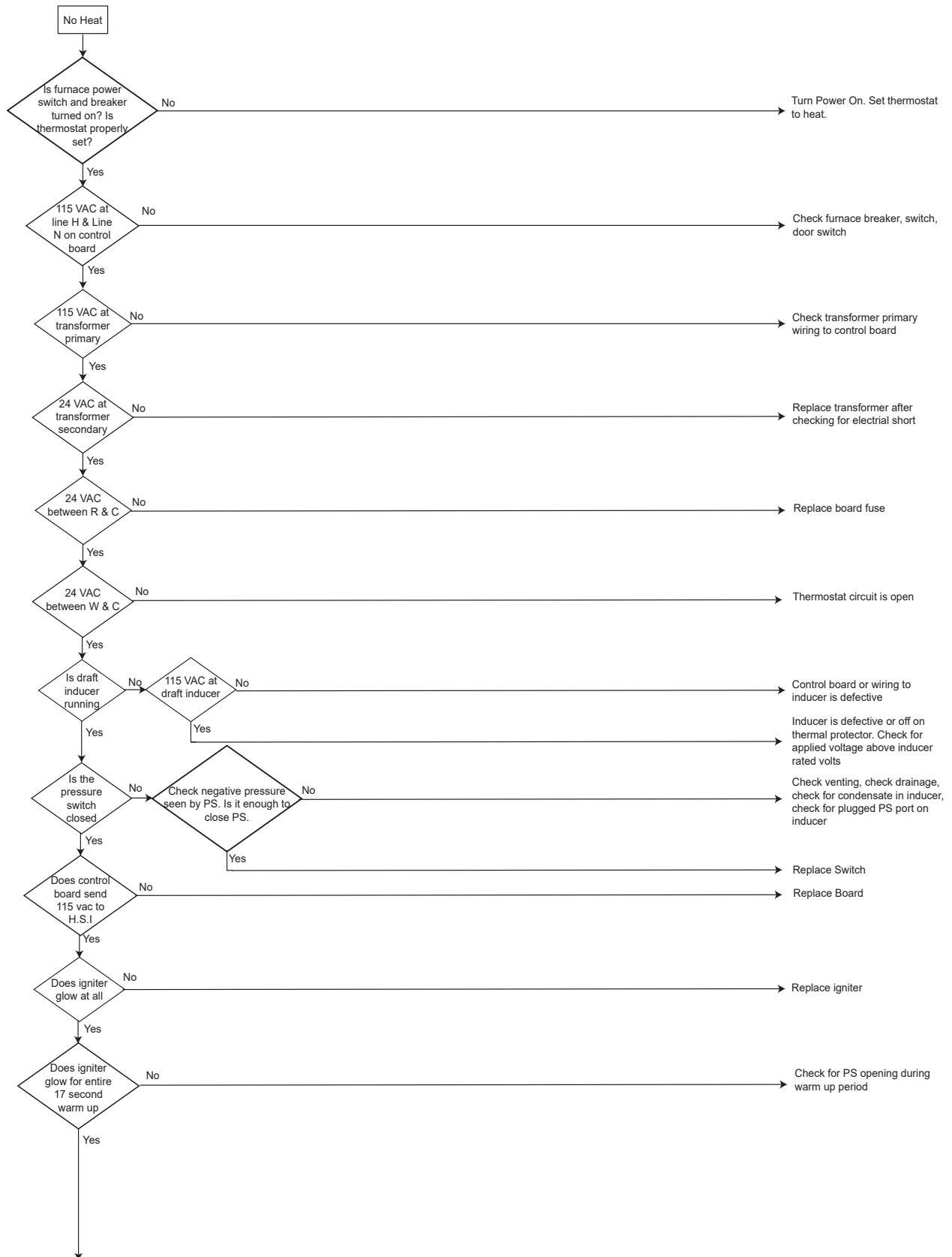
## To VIEW & CLEAR FAULT CODES

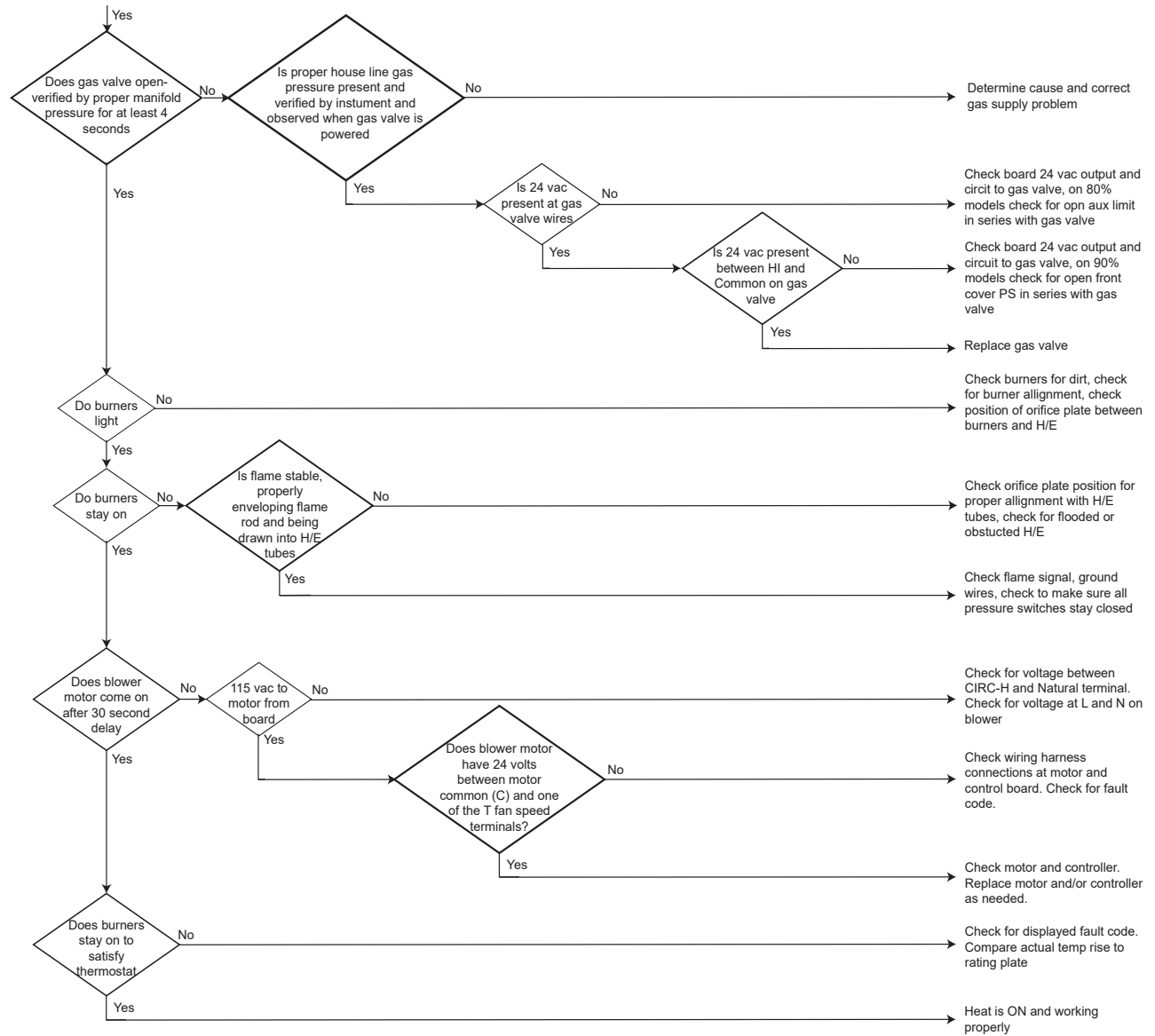
Press either the Left or Right button until **F ID** is displayed.

Press the center button to view stored faults.

Press and hold the center button for 5 to 30 seconds.

All stored faults will be erased, and the display will flash - - - three times and return to **F ID**.

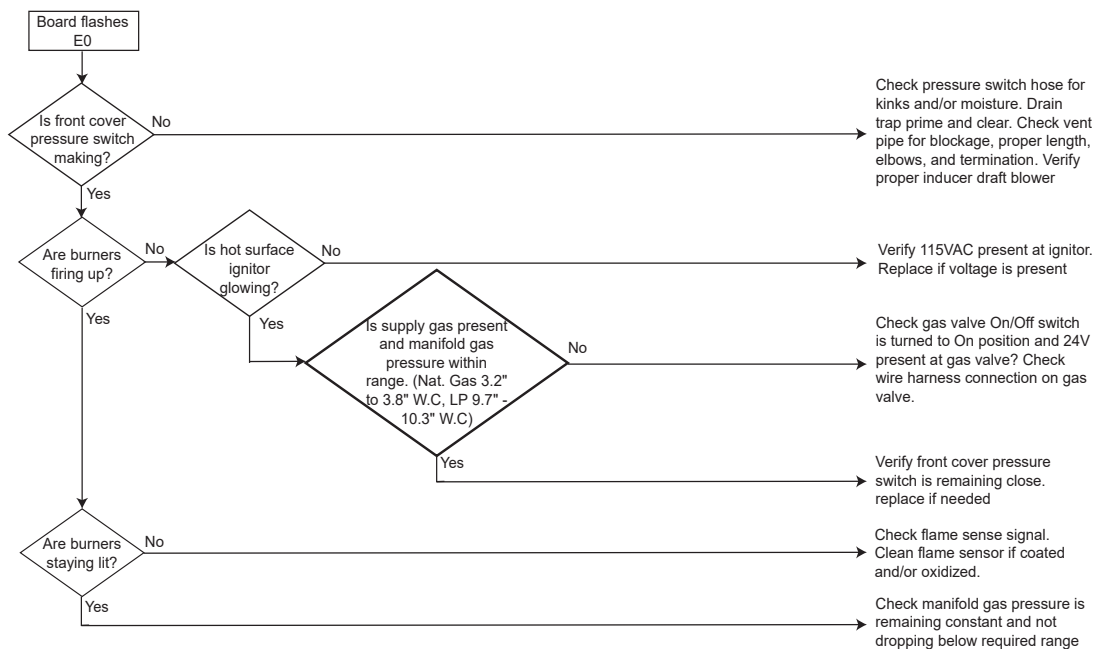




## Troubleshooting

## Error Codes - (E0 - 90%)

|                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Error Code:</b><br>E0 - Lockout due to an excessive number of ignition retries (3 total)                                            |
| <b>Applicable Models:</b><br>All 90% models                                                                                            |
| <b>Method of Error Detection:</b><br>Furnace fails to ignite after 3 retries                                                           |
| <b>Error Decision Conditions:</b><br>No gas or low gas pressure at manifold. Bad hot surface ignitor - not glowing, dirty flame sensor |



## Troubleshooting

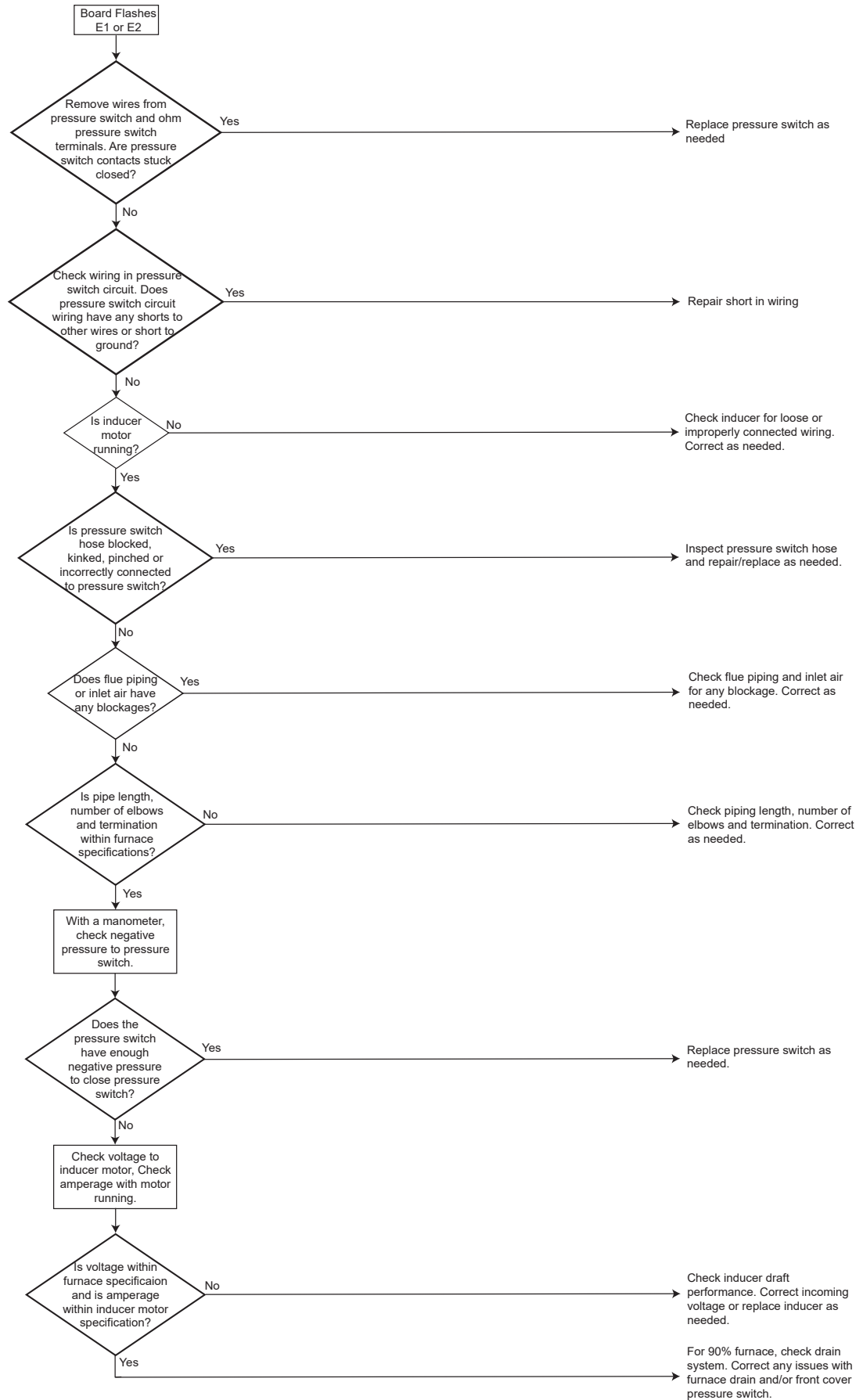
## Error Code E1, E2 1-Stage

**Error Code:**  
E1 - Pressure switch circuit closed at the start of heating cycle  
E2 - Pressure switch closed circuit is not closed

**Applicable Models:**  
(For Goodman/Amana® brand 1-stage)  
  
(For Goodman/Amana brand ULN)  
  
(For Daikin 1-stage)  
  
(For Daikin ULN)

**Method of Error Detection:**  
Pressure switch during heating operation

**Error Decision Conditions:**  
Pressure switch circuit closed when it should be open.  
Pressure switch circuit open when it should be closed.

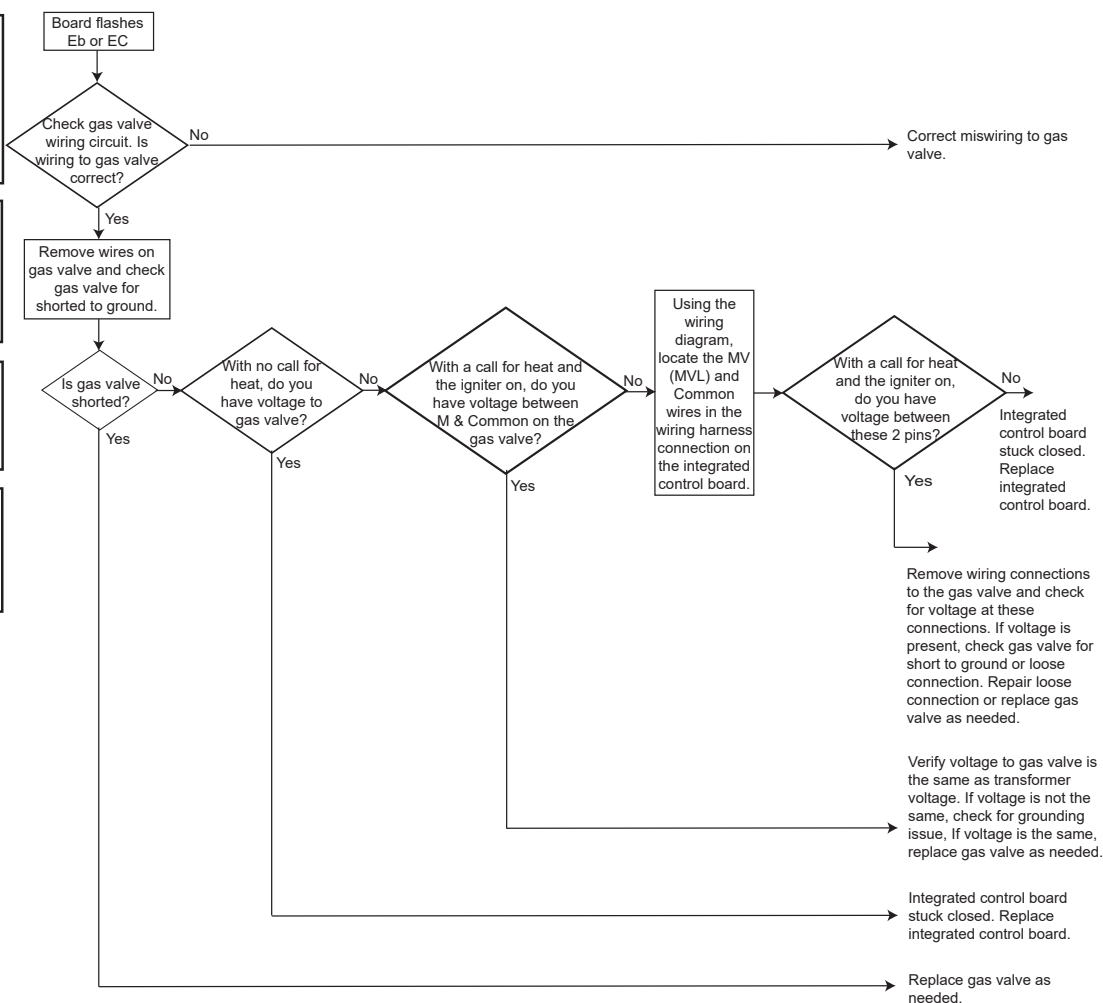


**Error Code:**  
Eb - Gas valve is not energized when it should be. External Gas Valve Error.  
EC - Gas valve is energized when it should not be. Internal Gas Valve Error.

**Applicable Models:**  
(for Goodman/Amana brand)  
All furnace models  
(for Daikin)  
All furnace models, except Daikin modulating furnaces

**Method of Error Detection:**  
No voltage to gas valve when voltage should be present.  
Voltage to gas valve with no call for heat.

**Error Decision Conditions:**  
No voltage reading at gas valve with a call for heat.  
Voltage reading at gas valve with no call for heat.

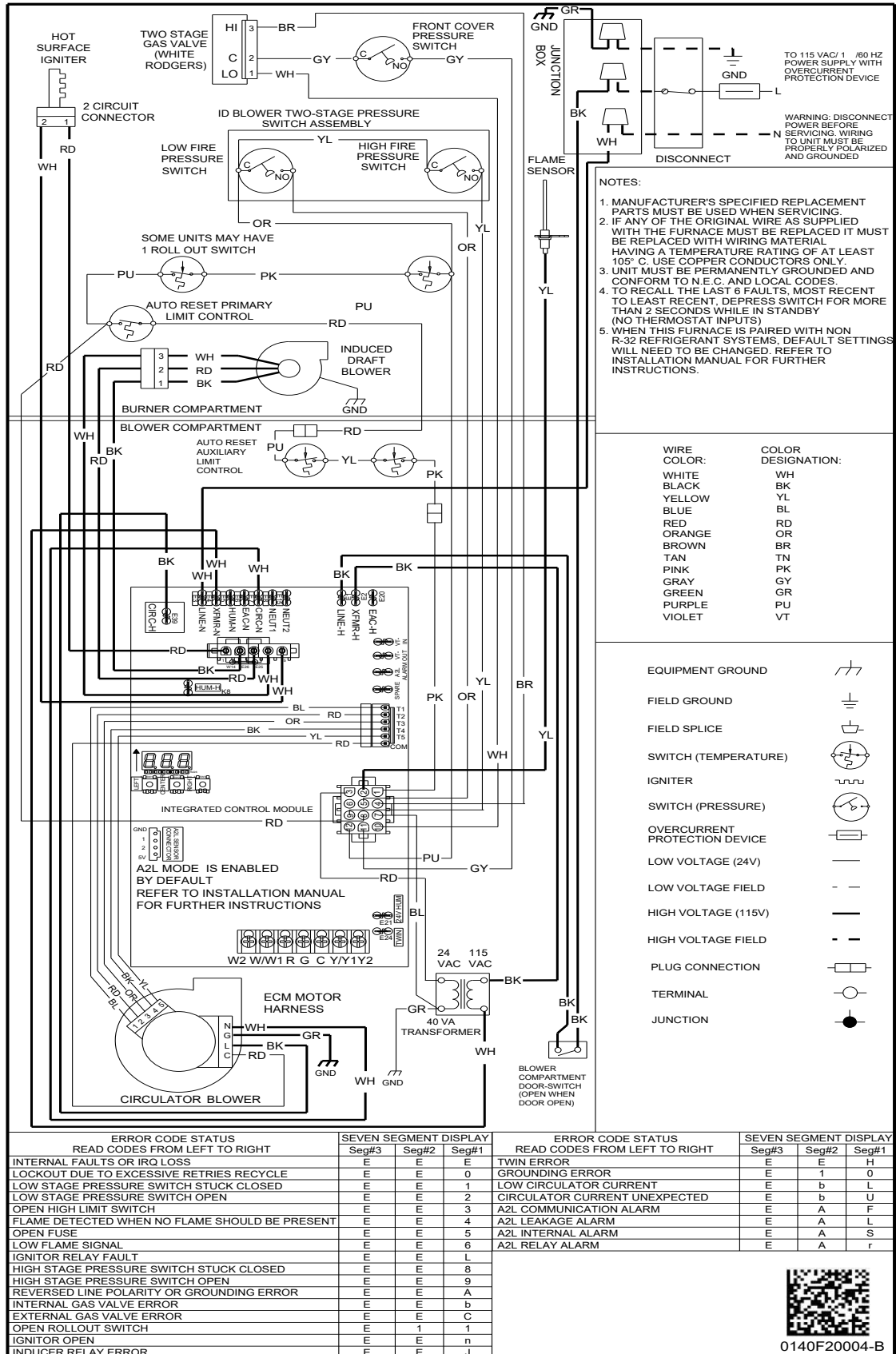


# WIRING DIAGRAMS



**HIGH VOLTAGE!**  
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

**WARNING**



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.