



## **ELECTRIC FURNACE ECF3**

10KW, 15KW, 18KW,  
20KW, 23KW, 27KW

### **INSTALLATION, OPERATION & MAINTENANCE MANUAL**



An ISO 9001-2008 Certified Company

2201 Dwyer Ave  
Utica, NY 13501

[www.ecrinternational.com](http://www.ecrinternational.com)

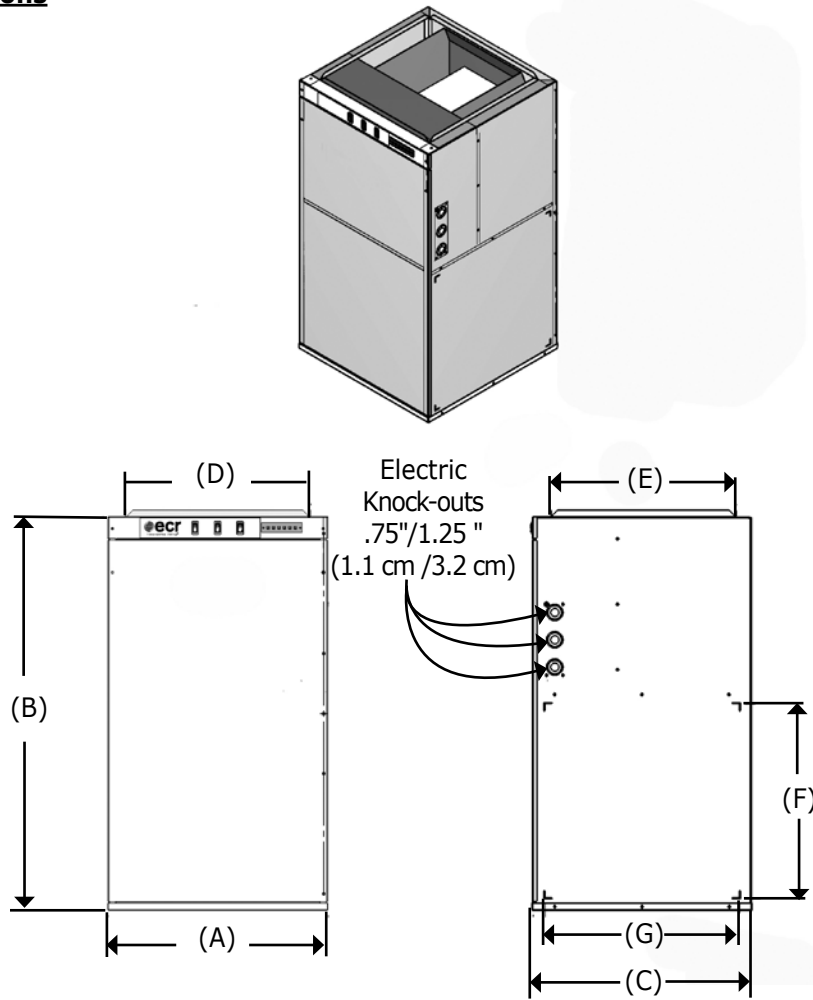
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## **ECF - DIMENSIONS**

**FIGURE 1-1 ECF Dimensions**



| <b>Table 1-1 : Physical Data</b> |       |                  |                  |                  |                             |                             |                     |                    |
|----------------------------------|-------|------------------|------------------|------------------|-----------------------------|-----------------------------|---------------------|--------------------|
| Size                             | TON   | Width<br>(A)     | Height<br>(B)    | Depth<br>(C)     | W/A<br>(DxE)                | C/A<br>(FxG)                | Weight              |                    |
|                                  |       |                  |                  |                  |                             |                             | Shipping            | Unit               |
| <b>10kw</b>                      | 3 TON | 20"<br>(50.8 cm) | 36"<br>(91.4 cm) | 20"<br>(50.8 cm) | 17"x17"<br>(43.2 x 43.2 cm) | 18"x18"<br>(45.7 x 45.7 cm) | 87 lb<br>(39.5 kg)  | 79 lb<br>(35.8)    |
| <b>15kw</b>                      | 3 TON | 20"<br>(50.8 cm) | 36"<br>(91.4 cm) | 20"<br>(50.8 cm) | 17"x17"<br>(43.2 x 43.2 cm) | 18"x18"<br>(45.7 x 45.7 cm) | 89 lb<br>(40.4kg)   | 81 lb<br>(36.7 kg) |
| <b>18kw</b>                      | 3 TON | 20"<br>(50.8 cm) | 36"<br>(91.4 cm) | 20"<br>(50.8 cm) | 17"x17"<br>(43.2 x 43.2 cm) | 18"x18"<br>(45.7 x 45.7 cm) | 91 lb<br>(41.2 kg)  | 83 lb<br>(37.6 kg) |
| <b>20kw</b>                      | 3 TON | 20"<br>(50.8 cm) | 36"<br>(91.4 cm) | 20"<br>(50.8 cm) | 17"x17"<br>(43.2 x 43.2 cm) | 18"x18"<br>(45.7 x 45.7 cm) | 91 lb<br>(41.2 kg)  | 83 lb<br>(37.6 kg) |
| <b>23kw</b>                      | 3 TON | 20"<br>(50.8 cm) | 36"<br>(91.4 cm) | 20"<br>(50.8 cm) | 17"x17"<br>(43.2 x 43.2 cm) | 18"x18"<br>(45.7 x 45.7 cm) | 93 lb<br>(42.2 kg)  | 85 lb<br>(38.6 kg) |
| <b>23kw</b>                      | 5 TON | 20"<br>(50.8 cm) | 36"<br>(91.4 cm) | 20"<br>(50.8 cm) | 17"x17"<br>(43.2 x 43.2 cm) | 18"x18"<br>(45.7 x 45.7 cm) | 98 lb<br>(44.5 kg)  | 90 lb<br>(40.8 kg) |
| <b>27kw</b>                      | 5 TON | 20"<br>(50.8 cm) | 36"<br>(91.4 cm) | 20"<br>(50.8 cm) | 17"x17"<br>(43.2 x 43.2 cm) | 18"x18"<br>(45.7 x 45.7 cm) | 100 lb<br>(45.4 kg) | 92 lb<br>(41.7 kg) |

# IMPORTANT SAFETY INFORMATION

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## READ AND SAVE THESE INSTRUCTIONS.

### 1.1 General


Furnace installation shall be completed by qualified agency. See glossary for additional information.




**This is the safety alert symbol. Symbol alerts you to potential personal injury hazards. Obey all safety messages following this symbol to avoid possible injury or death.**

### 1.2 Become Familiar With Symbols Identifying Potential Hazards.

|   |
|---|
|  <b>DANGER</b> |
| Indicates a hazardous situation which, if not avoided, will result in death or serious injury       |

|  |
|--|
|  <b>WARNING</b> |
| Indicates a hazardous situation which, if not avoided, could result in death or serious injury.      |

|  |
|--|
|  <b>CAUTION</b> |
| Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.     |

|   |
|---|
| <b>NOTICE</b>   |
| Used to address practices not related to personal injury. |

## INTRODUCTION

### **WARNING**

Electrical shock hazard. Disconnect power before installation, servicing, maintenance or field wiring. Replace all panels before operating. If not avoided, could result in death or serious injury.

### **WARNING**

Electric shock hazard. Jumpers shall not be used to simulate heat demand which, if not avoided, could result in death or serious injury.

### **1.3 Important Safety Considerations:**

- Wear safety glasses and gloves when performing installation, servicing or cleaning.
- Repairs shall be performed by a qualified service agency.
- Furnace should be inspected by a qualified service agency annually.
- Performance decrease may be result of unbalanced static pressure or dirty air filters.
- Where required by the authority having jurisdiction, installation shall conform to CSA C22.1.
- All installations, including but not limited to electrical protective devices and wire sizing, shall conform to the authority having jurisdiction. In the absence of local codes installation shall follow the Canadian Electrical Code.

### **2.1 Introduction**

- Each unit is inspected before shipment.
- Safe and dependable operation depends upon proper installation and compliance with all national, local codes and standards.

### **2.2 General Requirements And Specifications**

- Location - Locate unit centrally to area being heated.
- Positions - Units are 4 position multipoise. May be installed in upflow, downflow, horizontal left or horizontal right position.
  - A. Horizontally: position so door is not on top, door should be located at side of furnace .
  - B. Downflow: use "L" or "T" shaped plenum with no openings or registers directly below furnace.
- Installation Clearances -
  - A. Approved for 0" clearance. Check data label attached to furnace for additional clearance information.
  - B. Temperature Rise - Shipped to operate at 0.20" (5mm) W.C. (50Pa) external static pressure.
  - C. Certified for operation up to 0.50" (13mm) W.C. (125 Pa).
  - D. Check temperature rise, see Table 2-2 page 5, if necessary adjust motor speeds to achieve proper temperature rise.
- Service Clearance
  - A. Service from front of unit.
  - B. 24" (610mm) minimum service clearance from front.

## REQUIREMENTS AND SPECIFICATIONS

**Table 2-1 : Requirements and Specifications**

| <b>ELECTRICAL SPECIFICATIONS (240 VOLT/60HZ)</b> |                 |                              |                       |                     |                     |
|--|-----------------|------------------------------|-----------------------|---------------------|---------------------|
| <b>Model</b>                                     | <b>Max Amps</b> | <b>Min. Circuit Ampacity</b> | <b>Max. Fuse Size</b> | <b>Wire Size Al</b> | <b>Wire Size CU</b> |
| <b>ECF310</b>                                    | 45              | 56.3                         | 60                    | 3                   | 4                   |
| <b>ECF315</b>                                    | 65.9            | 82.3                         | 90                    | 1                   | 3                   |
| <b>ECF318</b>                                    | 78.4            | 97.9                         | 100                   | 1/0                 | 1                   |
| <b>ECF320</b>                                    | 86.7            | 108.4                        | 125                   | 2/0                 | 1                   |
| <b>ECF323</b>                                    | 99.2            | 124.0                        | 125                   | 3/0                 | 1/0                 |
| <b>ECF323</b>                                    | 99.8            | 124.8                        | 125                   | 3/0                 | 1/0                 |
| <b>ECF327</b>                                    | 116.5           | 145.6                        | 150                   | 4/0                 | 3/0                 |

## REQUIREMENTS AND SPECIFICATIONS

| <b>Table 2-2 : Requirements and Specifications</b> |                  |                      |                     |                             |           |               | <b>TEMPERATURE RISE RANGE<br/>(.20 to .50" W.C.)</b> |           |              |
|--|------------------|----------------------|---------------------|-----------------------------|-----------|---------------|--|-----------|--------------|
| <b>240 VOLTS SINGLE PHASE</b>                      |                  |                      |                     |                             |           |               | <b>°C</b>  | <b>°F</b> | <b>Speed</b> |
| <b>Model</b>                                       | <b>Output KW</b> | <b># Elements</b>    | <b>Output †BTUH</b> | <b>Amps Including Motor</b> | <b>HP</b> | <b>Blower</b> |  |           |              |
| <b>ECF310</b>                                      | <b>10kw</b>      | 2 x 5 kW             | 34120               | 45.0                        | 1/3       | 10-8          | 23°-30°C   | 41°-54°F  | Low          |
| <b>ECF315</b>                                      | <b>15kw</b>      | 3 x 5 kW             | 51180               | 65.9                        | 1/3       |               | 24°-28°C   | 43°-50°F  | Med-Low      |
| <b>ECF318</b>                                      | <b>18kw</b>      | 2 x 5 kW<br>2 x 4 kW | 61420               | 78.4                        | 1/3       |               | 29°-33°C   | 52°-60°F  | Med-Low      |
| <b>ECF320</b>                                      | <b>20kw</b>      | 4 x 5 kW             | 68240               | 87.3                        | 1/3       |               | 32°-37°C   | 58°-66°F  | Med-Low      |
| <b>ECF323</b>                                      | <b>23kw</b>      | 3 x 5 kW<br>2 x 4 kW | 78480               | 99.2                        | 1/3       |               | 37° 42°C   | 67°-76°F  | Med-Low      |
|  |                  |                      |                     | 99.8                        | 3/4       | 23°-26°C      | 41°-46°F   | Med-Low   |              |
| <b>ECF327</b>                                      | <b>27kw</b>      | 3 x 5 kW<br>3 x 4 kW | 92130               | 116.5                       | 3/4       | 12-10T        | 26°-30°C   | 47°-54°F  | Med-Low      |

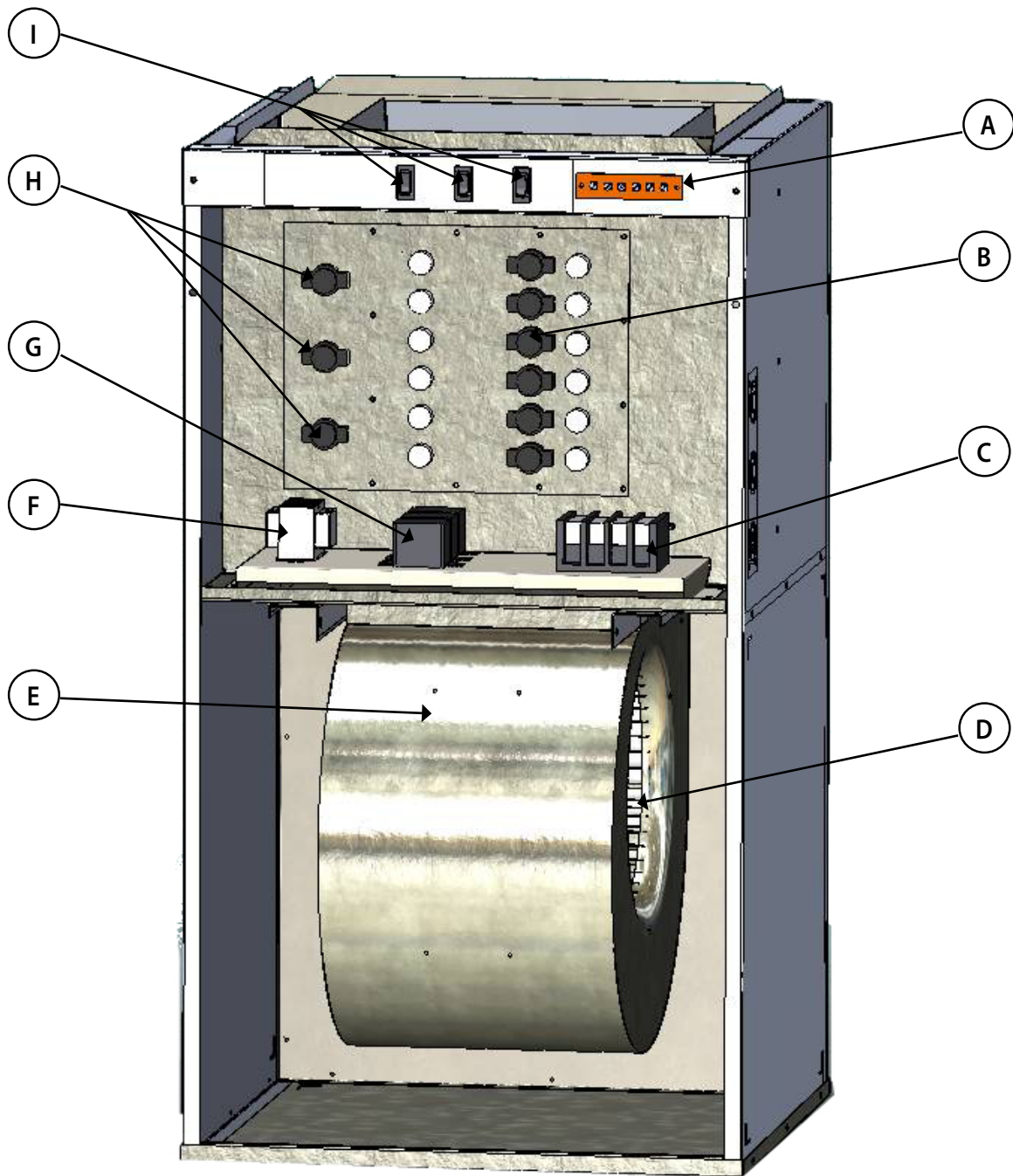
† For 208 V Multiply by .867, for 220 V Multiply by .917, for 230 V Multiply by .958  
Factory Settings. Subject to change without notice.

| <b>Table 2-2 continued: Requirements and Specifications</b> |           |  |       |       |       |       |
|---|-----------|--|-------|-------|-------|-------|
| <b>10-8 Blower - 1/3 HP</b>                                 |           |  |       |       |       |       |
| Speed   | Flow Rate | Static Pressure (Inches of Water Column) |       |       |       |       |
|   |           | 0.1                                      | 0.2   | 0.3   | 0.4   | 0.5   |
| LOW**   | CFM       | 757                                      | 757   | 724   | 691   | 578   |
|   | L/s       | 357.3                                    | 357.3 | 341.7 | 326.1 | 272.8 |
| MED-LOW   | CFM       | 1135                                     | 1092  | 1047  | 1000  | 952   |
|   | L/s       | 535.7                                    | 515.4 | 494.1 | 472   | 449.3 |
| MED-HIGH  | CFM       | 1328.5                                   | 1292  | 1236  | 1196  | 1156  |
|   | L/s       | 627                                      | 609.8 | 583.3 | 564.5 | 545.6 |
| HIGH  | CFM       | 1544                                     | 1497  | 1449  | 1368  | 1364  |
|   | L/s       | 728.7                                    | 706.5 | 683.9 | 645.6 | 643.7 |
| <b>12-10T Blower - 3/4 HP</b>                               |           |  |       |       |       |       |
| LOW   | CFM       | 1560                                     | 1498  | 1477  | 1410  | 1364  |
|   | L/s       | 736.2                                    | 707   | 697.1 | 665.5 | 643.7 |
| MED-LOW   | CFM       | 1860                                     | 1791  | 1700  | 1622  | 1582  |
|   | L/s       | 877.8                                    | 845.3 | 802.3 | 765.5 | 746.6 |
| MED-HIGH  | CFM       | 2060                                     | 1962  | 1800  | 1780  | 1740  |
|   | L/s       | 972.2                                    | 926   | 849.5 | 840.1 | 821.2 |
| HIGH  | CFM       | 2090                                     | 2027  | 2010  | 1930  | 1800  |
|   | L/s       | 986.4                                    | 956.6 | 948.6 | 910.9 | 849.5 |

\*\* Avoid using low speed for second stage heating speed with 1/3 HP blower with models ECF318, ECF320, and ECF323

Formulas will assist with design of ductwork and air delivery.  
CFM = Bonnet Output [BTUH] / (1.085 x System Temperature rise [°F])  
System Temperature Rise [°F] = Bonnet Output [BTUH] / (1.085 x CFM)

## **COMPONENT LISTING**



***A. Thermostat Strip***

***B. Limit Switches***

***C. Terminal Block/Circuit  
Breakers (If equipped)***

***D. Blower Motor***

***E. Blower***

***F. Transformer***

***G. Blower Relays***

***H. Sequencers***

***I. Control Switches***

# OPERATION AND INSTALLATION OPTIONS

## 3.1 Operating Options

- Shipped in "Standard Heating Mode" for single stage operation.
  - A. Fan Control Switch- Automatic
  - B. Energy Saver Switch - Cold Weather (N/A on ECF310)
  - C. Mode Selector Switch - Heating
- Blower will run at factory heating speed on call for heat.
- May change from Standard Heating Mode using controls built into furnace as follows:
  - A. FAN CONTROL SWITCH** - Used to control low speed fan for constant circulation between heating cycles.
    - AUTOMATIC - Blower motor will run only during heating cycle (unless Mode Selector Switch is in VENTILATION position).
    - CONTINUOUS LOW SPEED - Blower motor will run continuously on low speed between heating cycles (unless Mode Selector Switch is in VENTILATION position).
  - B. ENERGY SAVER SWITCH** - Reduces heating capacity and energy consumption for milder weather. (Not used on ECF10 models. See Table 3-1.)
    - COLD WEATHER – Allows all heating elements to be energized to provide full heating capacity.
    - MILD WEATHER – Disables some heating elements to provide longer heat cycle at lower heating capacity. Blower operates on low speed in MILD WEATHER mode with single stage thermostat.
    - When using a two stage thermostat leave this switch in the MILD WEATHER position. Two stage thermostat controls element staging and blower speed.
  - C. MODE SELECTOR SWITCH** - Used to control heating speed fan for constant circulation between heating cycles.
    - HEATING – Blower motor will run only during the heating cycle (unless the Fan Control Switch is in Continuous Low Speed position).
    - VENTILATION – Blower motor will run continuously on heating speed between heating cycles. Overrides Fan Control Switch.

| <b>TABLE 3-1 -Mild Weather Heating Output</b> |                          |                            |
|---|--------------------------|----------------------------|
| MODEL   | MILD Heating Output [kW] | MILD Heating Output [BTUH] |
| ECF315  | 10                       | 34120                      |
| ECF318  | 10                       | 34120                      |
| ECF320  | 10                       | 34120                      |
| ECF323  | 14                       | 47770                      |
| ECF327  | 19                       | 64830                      |

## 4.1 Installation Information

- Cold Air Return
- Side Mounting
    - A. Duct can be attached to either side of furnace.
    - B. Four cutouts available for side or bottom return.
    - C. Mount optional filter frame to furnace over opening with open side of frame facing front.
    - D. Attach 18" x 18" (457mm x 457mm) air duct to flanges on filter frame (optional).

## 4.2 Electrical Wiring - Power Supply

- Furnace shipped completely factory wired.
- From separate breaker, two wire plus ground supply wire is required.
- Ground conductor must be firmly attached to ground lug in furnace and supply wires to terminal block in furnace.
- Wiring shall conform to latest editions of CEC, NEC, local codes and authority having jurisdiction.
- Copper or aluminum wire of appropriate size may be used.

## 4.3 Connecting and Adjusting Low Voltage Single Stage Thermostat

Choose a single stage heating thermostat configured for fossil fueled (gas/oil) heating systems. Many thermostats have a Gas/Electric switch. This switch should be in Gas or Fossil Fuel position. This allows furnace fan to operate at appropriate heating speed for energized heating stage. An electric heat thermostat or thermostat with Gas/Electric switch in Electric position will energize the G terminal on call for heat causing fan to always operate at cooling speed regardless of energized heating stage.

- Use only class 1 wires inside furnace compartments
- Attach thermostat wires to low voltage terminal, located on top front of furnace.
- Follow all diagrams and instructions supplied by the Thermostat manufacturer.
- R & W1 terminals control single stage heating
- R & Y terminals control cooling.
- Y single stage cooling as first and only stage.
- Two stage cooling, Y first stage, Y<sub>2</sub> connected externally second stage.
- R & G control cooling speed fan.

### **NOTICE**

Set heat anticipator in Thermostat properly before turning furnace ON to prevent damage to thermostat.

## **OPERATION AND INSTALLATION OPTIONS**

- Heat Anticipator Setting - Verify current draw with AC meter, set at 2A range.
  - A. Set anticipator at highest setting.
  - B. Disconnect W<sub>1</sub> thermostat wire from furnace low voltage terminal.
  - C. Connect AC meter between W1 terminal on circuit board and loose W<sub>1</sub> wire.
  - D. Start furnace, turn thermostat up and allow it to run, with element ON, for 3-4 minutes.
  - E. Read current draw on meter and reset anticipator to match meter reading.

### **5.1 Mobile Home Use**

- Models 10,15,18,20 furnaces are certified for "L" and "T" shape shallow duct installation.
- Recommended minimum size floor opening 14-1/4" x 14-1/4" (362mm x 362mm).
- Duct system shall be designed with external static pressure of system not exceeding maximum external static pressure of 0.50" (13mm) W.C. (125Pa).

**Table 5-1 SHALLOW DUCT AREA REQUIREMENTS**

| DUCT DEPTH | DUCT WIDTH  |
|------------|-------------|
| 4" (102mm) | 16" (406mm) |
| 5" (127mm) | 13" (330mm) |
| 6" (152mm) | 10" (254mm) |



## OPTIONAL EQUIPMENT

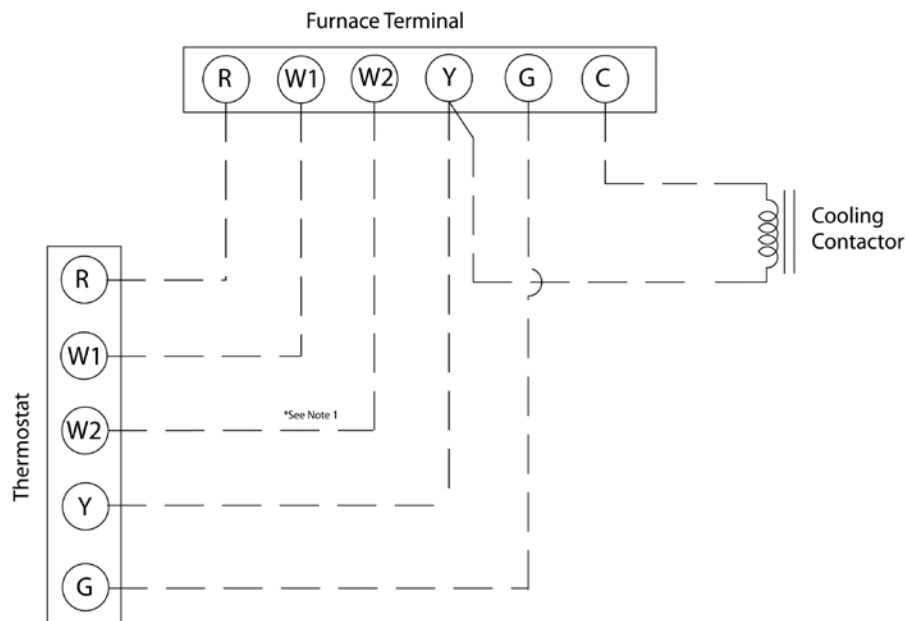
### 6.1 Optional Equipment

- Two-Stage or Outdoor Thermostat
  - A. Place Energy Saver Switch in MILD position.
  - B. Follow manufacturer's directions supplied with thermostat.
  - C. See Table 6-1 for heat supply when in use.

| <b>TABLE 6-1 - HEAT SUPPLY WITH USE OF TWO STAGE OR OUTDOOR THERMOSTAT</b> |                               |
|--|-------------------------------|
| MILD (First Stage)   | COLD (Second Stage)           |
| <b>ECF315/318/320</b>  |                               |
| Low Speed Blower and Element 1 on in 10 seconds                            | Blower to Heating Speed       |
| Element 2 on in 30 seconds   | Elements 3/4 on in 45 seconds |
| <b>ECF323</b>  |                               |
| Low Speed Blower and Element 1 on in 10 seconds                            | Blower to Heating Speed       |
| Element 2 on in 30 seconds   | Elements 3/4 on in 45 seconds |
| Element 5 on in 45 seconds   |                               |
| <b>ECF327</b>  |                               |
| Low Speed Blower and Element 1 on in 10 seconds                            | Blower to Heating Speed       |
| Element 2 on in 30 second  | Elements 5/6 on in 45 seconds |
| Elements 3/4 on in 45 seconds  |                               |
| Timings are approximate.   |                               |

- Air Conditioning
  - A. Furnace comes complete with all controls for addition of air conditioning.
  - B. Evaporator coil may be installed by local contractor with sheet metal plenum.
  - C. Coil shall be centered over outlet of furnace 4" (102mm) to 6" (152mm) above top of furnace.
  - D. No air may bypass cooling coil during operation.
  - E. Bypass damper for heating if: discharge opening is larger than the coil, and ductwork is correspondingly larger than coil.
  - F. Air flow is directed through the coil when damper closed in summer.
  - G. Air flow to bypass coil in winter when damper is open.
  - H. See *figure 6-1* for typical air conditioning field wiring connections.
  - I. A-Coil to be downstream of furnace.
- Electronic Air Cleaners and/or Powered Furnace Humidifiers
  - A. Units operate at 120V and cannot be directly powered through the furnace.
- Air Filter Kit please see Parts List.

**FIGURE 6-1 Wiring Diagram 24V (with Air Conditioning)**



\*Note 1 : If equipped with 2 stage heating thermostat

## **GENERAL MAINTENANCE**

### **7.1 General Maintenance**

- MOTOR - Motor is lubricated for life and needs no oiling.
- FILTERS -. Inspect and replace when dirty. If using continuous blower operation inspect twice a year or more if necessary ( filters are field supplied and required for all installations).

NOTE: Each element has automatic reset thermal cut-out which is set to open at 165°F (74°C). Element will be de-energized if it opens, until cut-out resets.

#### **WARNING**

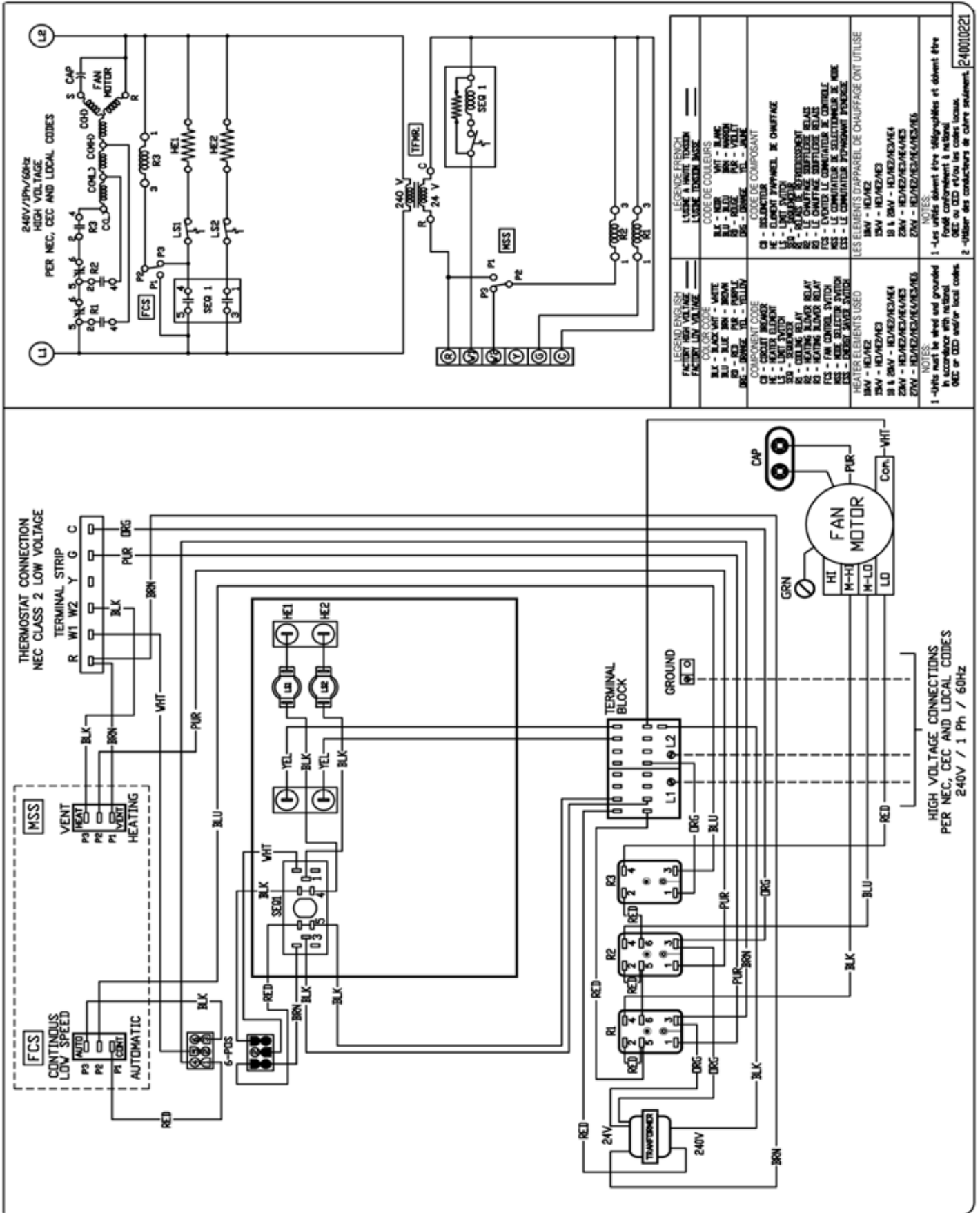
Turn OFF 240 V power supply before removing front panel, failure to do so could result in death or serious injury.

Limit opens when airflow is reduced because of blocked ductwork or very dirty filters.

# WIRING DIAGRAMS

## 8.1 FIGURE - ECF310 Wiring Diagram

ECF3 Wiring Diagram / ECF3 Diagramme d'Installation électrique

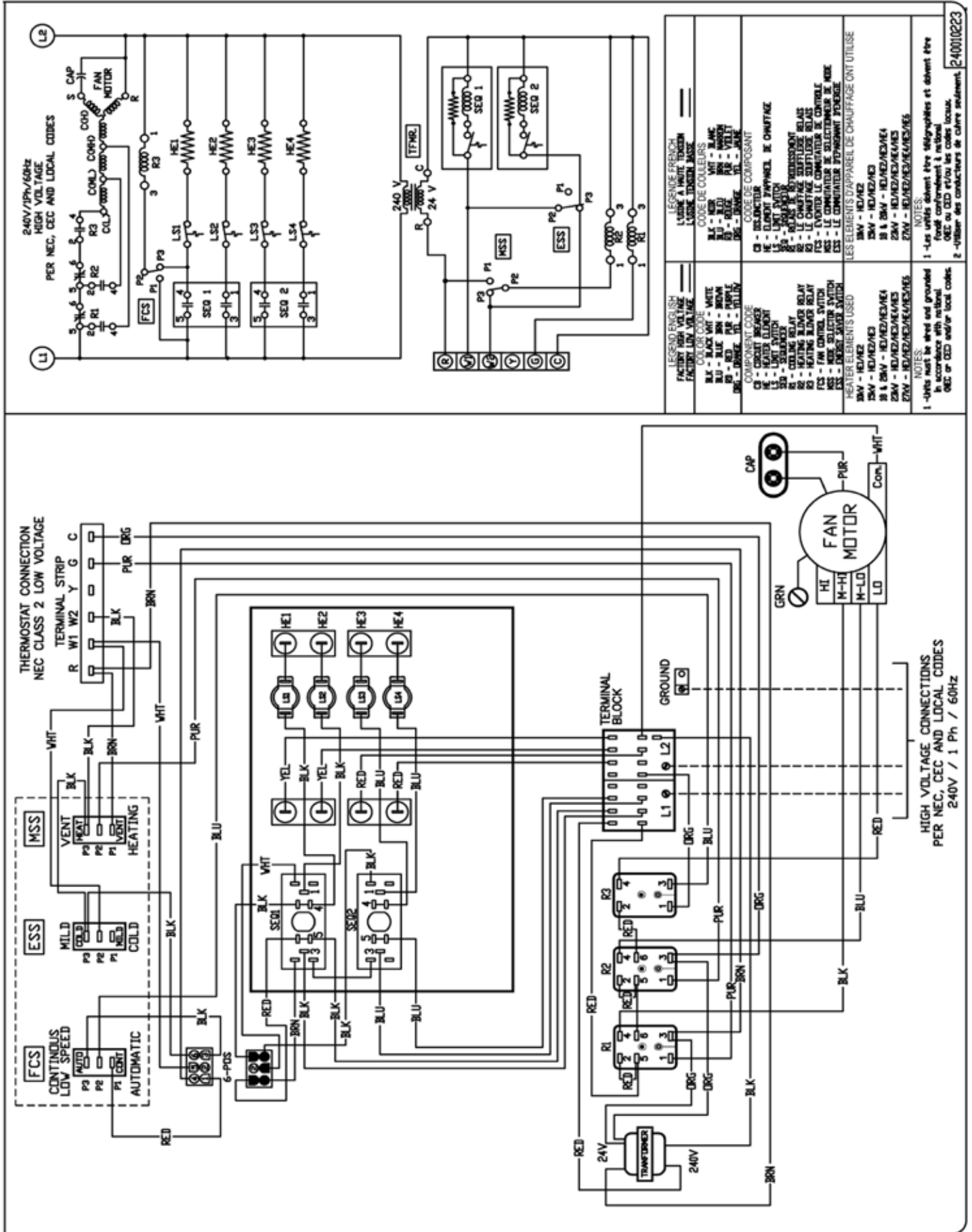




# WIRING DIAGRAMS

## 8.3 FIGURE - ECF318/ECF320 Wiring Diagram

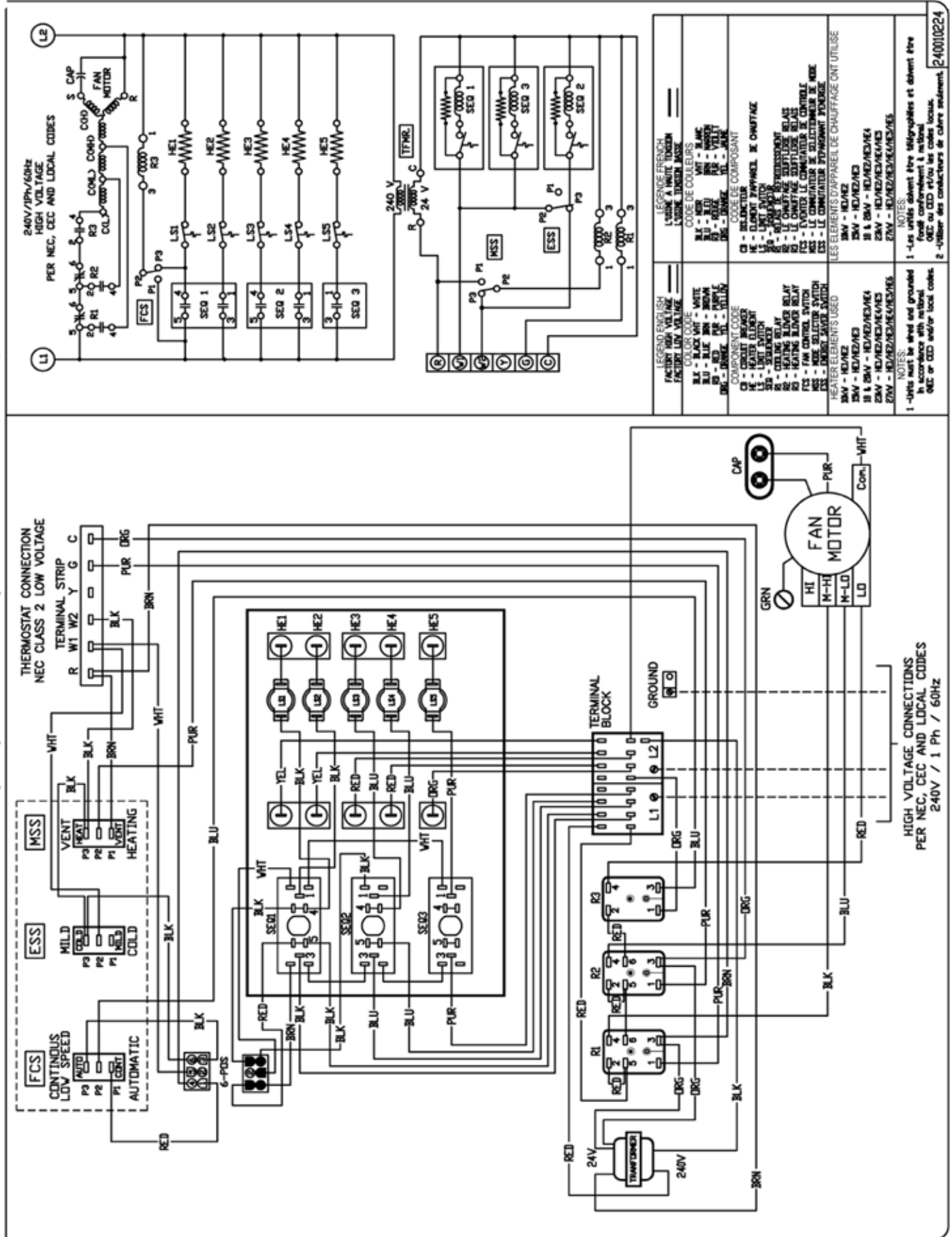
ECF3 Wiring Diagram / ECF3 Diagramme d'Installation électrique



# WIRING DIAGRAMS

## 8.4 FIGURE - ECF323 Wiring Diagram

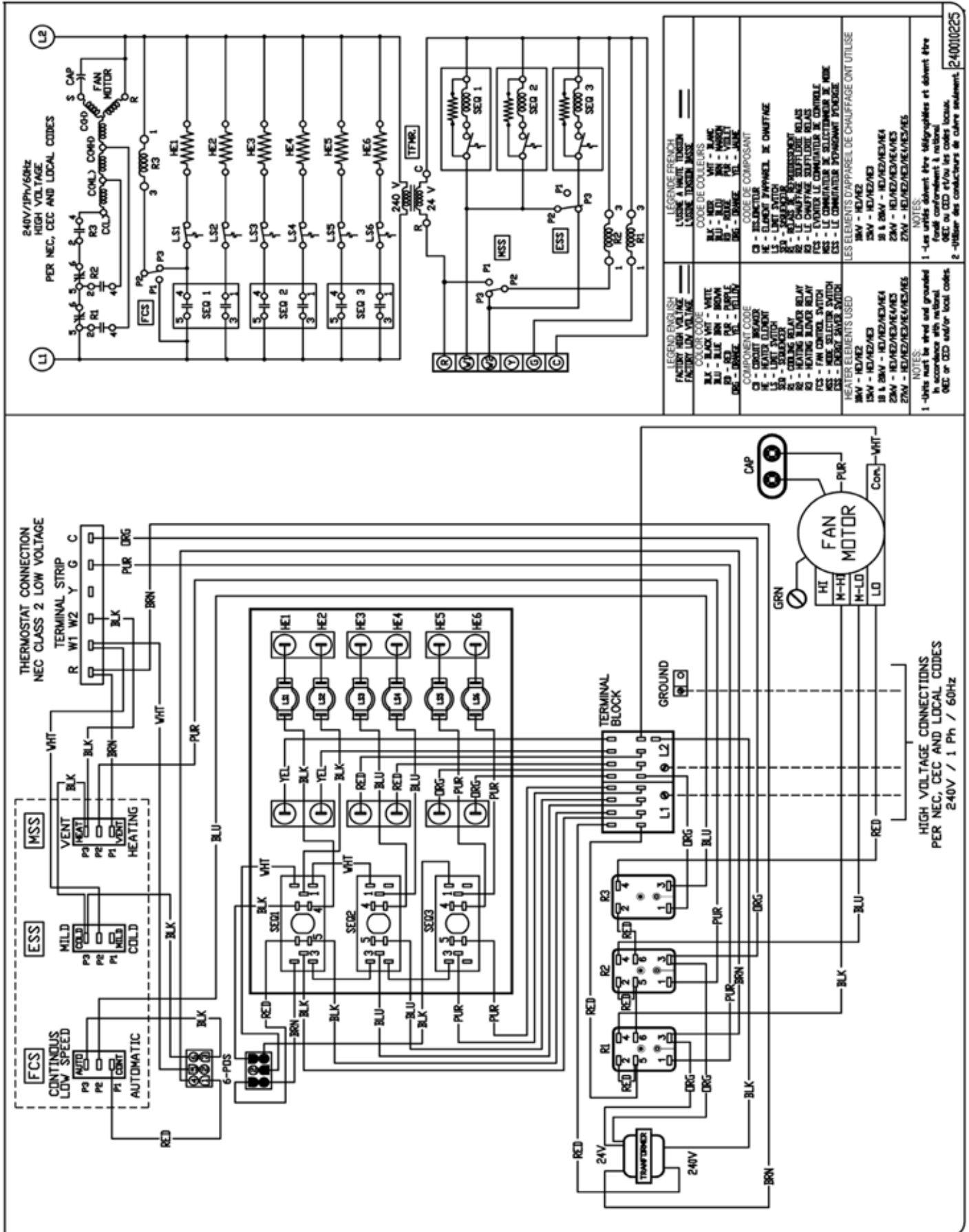
ECF3 Wiring Diagram / ECF3 Diagramme d'Installation électrique



# WIRING DIAGRAMS

## 8.5 FIGURE - ECF327 Wiring Diagram

ECF3 Wiring Diagram / ECF3 Diagramme d'Installation électrique



## TROUBLESHOOTING

### 9.1 Troubleshooting

- Identify if problem results from furnace, thermostat or thermostat wiring using voltmeter.
- If furnace will **not start**: Turn thermostat to highest setting. If there is 24 Volts between  $W_1$  and C terminal thermostat has closed, indicates fault is in furnace. If there is NOT 24 Volts between  $W_1$  and C terminal , problem exists with thermostat or its connecting wiring.
- If furnace will **not turn OFF**: Turn thermostat to lowest setting. If there is NOT 24 volts between  $W_1$  and C and furnace continues to run, thermostat has opened properly and fault exists within furnace. If there is 24 Volts between  $W_1$  and C, fault exists in thermostat or its connecting wiring.
- After fault area is identified by use of volt meter, Table 9-1 can be used to verify internal components.

**TABLE 9-1 TROUBLESHOOTING**

| PROBLEM  | Check   |
|--|---|
| Furnace will not turn <b>ON</b>                                  | Thermostat - is there a call for heat?  |
|  | Circuit breaker or fuse is open   |
|  | Motor seized or Capacitor failed  |
|  | Fan Control Switch failed   |
|  | Sequencers failed   |
|  | Transformer failed  |
| Motor Runs Continuously  | Fan Control Switch is in CONTINUOUS LOW SPEED position                                    |
|  | Mode Selector Switch is in VENTILATION position   |
|  | Thermostat wires incorrectly attached to furnace  |
| Elements on, motor does not run                                  | Motor seized or capacitor failed  |
| Motor <b>ON</b> and <b>OFF</b> in long or short cycles           | Heat anticipator in thermostat incorrectly set or may be defective.                       |
| Must set thermostat much higher (lower) than desired temperature | Thermostat is not level or is out of calibration  |
| Not enough Heat  | Defective element or relays confirm all elements are energized                            |
|  | Energy Saver Switch in MILD position  |
|  | Safety limits opening, possible duct obstruction or dirty filters, air flow is restricted |
|  | Defective or incorrectly wired two-stage or outdoor thermostat. Confirm $W_2$ energized   |
|  | Lack of enough cold air returns in house  |
| Improper operation of two-stage or thermostat                    | Energy Saver Switch not in MILD position  |



## **GLOSSARY**

### **Glossary**

- **ANSI** - American National Standards Institute, Inc. As voice of U.S. standards and conformity assessment system, American National Standards Institute (ANSI) empowers its members and constituents to strengthen U.S. marketplace position in global economy while helping to assure safety and health of consumers and protection of environment.
- **AUTHORITY HAVING JURISDICTION** - Individual or organization that adopts and enforces codes, rules, and by-laws which govern various concerns of community. Commonly referred to as "final authority" for any matters relating to LIFE SAFETY and BUILDING CONSTRUCTION within that specific community.
- **BTU** - Abbreviation for British Thermal Unit, which is quantity of heat required to raise temperature of 1 pound of water 1 degree Fahrenheit.
- **CEC**- Canadian Electrical Code, Electrical standards are part of our everyday lives. From the products you buy to make your life more enjoyable to the systems of lines and towers that deliver the electricity to power these products, Canadian Standards Associations (CSA) offers over 700 CSA electrical standards and application tools to keep you safer.
- **CFM** - A standard measurement of airflow that indicates how many cubic feet of air pass by a stationary point in one minute. The higher the number, the more air is being forced through the system. The volumetric flow rate of a liquid or gas in cubic feet per minute. 1 CFM equals approximately 2 liters per second.
- **CSA** - CSA International is a Nationally Recognized Testing Laboratory (NRTL) accredited by OSHA and ANSI in the U.S. and by SCC in Canada. CSA International can test and certify your products following standardized test protocols-in laboratories across North America.
- **HIGH-VOLTAGE** - Circuit involving potential of not more than 600 volts and having circuit characteristics in excess of those of low-voltage circuit.
- **LITER PER SECOND (L/s)** - A standard measurement of airflow that indicates how many liters of air pass by a stationary point in one second. The higher the number, the more air is being forced through the system. The volumetric flow rate of a liquid or gas in Liters/second. 1L/s equals approximately .5 CFM.
- **NEC** - National Electric Code The NEC is developed by NFPA's Committee on the National Electrical Code, which consists of 19 code-making panels and a technical correlating committee. Work on the NEC is sponsored by the National Fire Protection Association. The NEC is approved as an American national standard by the American National Standards Institute (ANSI). It is formally identified as ANSI/NFPA 70.
- **NFPA 70** - Is a United States standard for the safe installation of electrical wiring and equipment. It is part of the National Fire Codes series published by the National Fire Protection Association (NFPA). "National Electrical Code" and "NEC" are registered trademarks of the NFPA. While the NEC is not itself a U.S. law, NEC use is commonly mandated by state or local law, as well as in many jurisdictions outside of the United States. [1] The NEC codifies the requirements for safe electrical installations into a single, standardized source.
- **QUALIFIED AGENCY** - Any individual or firm or company that either in person or through representative is engaged in and responsible for (a) installation, testing, or replacement of gas piping or (b) connection, installation, testing, repair, or servicing of appliances and equipment that is experienced in such work, that is familiar with all precautions required and that has complied with all requirements of authority having jurisdiction.
- **SCC** - The Standards Council of Canada (SCC) facilitates the development and use of national and international standards and accreditation services to enhance Canada's competitiveness and social well-being.
- **External Static Pressure** - This is the difference between the air pressure measured at the inlet of the furnace and outlet of the furnace. Usually expressed in inches of water column (" W.C.).
- **Temperature rise** - The difference between the temperature of the air entering the furnace, and the temperature of the air exiting the furnace. Sometime referred to as  $\Delta t$ .
- **W.C.** - Water Column is a pressure measurement. This is the pressure exerted by a vertical column of water, usually expressed in "inches".





## CUSTOMER SERVICE

When contacting Customer Service you will be asked for the following information. Record here for your convenience.

Installer\_\_\_\_\_

Date of Installation\_\_\_\_\_

Model #\_\_\_\_\_

S/N#\_\_\_\_\_



Check our web-site frequently for updates: [www.ecrinternational.com](http://www.ecrinternational.com)

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**web site: [www.ecrinternational.com](http://www.ecrinternational.com)**