

# **STEFFES**

## **Heating Systems**

*"Manufactured in North America"*

# **COMFORT PLUS COMMERCIAL HYDRONIC HEATING SYSTEM**

*Owner's and Installer's Manual*



**Models: 7120, 7130 & 7140**

*Applicable to Software Version 2.0X*





## IMPORTANT

- ◆ The equipment described herein is intended for installation by a qualified technician in compliance with applicable local, state, and national codes and requirements.
- ◆ To insure proper installation and operation of this product, completely read all instructions prior to attempting to assemble, install, operate, maintain or repair this product. Upon unpacking of the system, inspect all parts for damage prior to installation and start-up.
- ◆ This manual should be retained by the owner upon completion of the installation and made available to service personnel as required.
- ◆ **Disclaimer:** In compiling this manual, Steffes Corporation has used its best judgement based upon information available, but disclaims any responsibility or liability for any errors or miscalculations contained herein, or any revisions hereof, or which result, in whole or in part, from the use of this manual or any revisions hereof.

After the heating system is installed, Steffes disclaims any responsibility or liability for mold/mildew growth and/or any damages caused by either. We strongly recommend that the user follow the moisture, mold and mildew prevention guidelines of the Environmental Protection Agency (EPA), available at <http://www.epa.gov>.

### For Customer Use

*Please record your model and serial number below. This number is found on the identification label located on the lower left side of the Comfort Plus Commercial Hydronic heating system. Retain this information for future reference.*

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_



### RECOGNIZE THESE SYMBOLS AS SAFETY PRECAUTIONS

It is important, both for your personal safety and to avoid possible damage to the equipment and your property, that you observe the safety instructions given following these symbols.

## SAFETY PRECAUTIONS

1. DO NOT energize this heating system while disassembled or without the ceramic heat storage brick in place.
2. DO NOT operate this heating system without the factory provided pressure relief valve in place.
3. DO NOT use or store materials that may produce explosive or flammable gases near the system.
4. DO NOT violate the placement and clearance requirements specified in this manual. (Page 3.02-3.03)
5. DO NOT place anything on top of the system.
6. Disconnect power to all circuits before servicing as this heating system may be connected to more than one branch circuit.
7. Use caution when working around the heating system as inlet and outlet piping can be very hot.
8. Installation of and/or service to this system should be performed by a qualified technician in compliance with information contained herein and with national, state, and local codes and requirements.
9. A repeated message display of “CORE FAIL” indicates a need for service by a qualified technician.



### WARNING



**Risk of explosion. Can cause injury or death. Operating the system without the pressure relief valve installed can cause an explosion. Connect the pressure relief valve in a vertical, upright position with the supplied fittings. DO NOT modify this assembly. DO NOT cap, plug, or otherwise obstruct the outlet of the pressure relief valve.**



**Risk of fire. Can cause injury or death. Violation of the clearance requirements can cause improper operation of the equipment. Maintain the placement and clearance requirements specified.**



**Risk of personal injury. Plumbing and other surfaces can be hot. Use caution when working near the system.**

## SAFETY DEVICES

The Comfort Plus Commercial Hydronic incorporates safety devices to ensure normal operating temperatures are maintained. The chart below describes these safety devices:

DEVICENAME	FUNCTION	LOCATION ON SYSTEM
Core Charging High Limit Switches (Auto Reset)	These limit switches monitor brick core charging and interrupt power to the heating elements if the normal operating temperature is exceeded.	In the limit bar panel on the left side of the brick storage cavity.
Heat Exchanger Limit Switch (Manual Reset)	This linear limit switch monitors the temperature of the water in the exchanger and interrupts power to the core blower if a water temperature of 250°F is exceeded. If this limit switch opens, contact a qualified service technician.	Inside base on left side.
Outlet Water Temperature Limit Switch (Auto Reset)	This linear limit switch monitors the temperature of the water in the exchanger and interrupts power to the core blower if a water temperature of 225°F is exceeded.	Inside base on left side.
Pressure Relief Valve	If the water pressure exceeds 75 psig, the pressure relief valve opens. Once water pressure of less than 75 psig is achieved, the valve closes. (30 psig option available.)	Factory provided, field installed to outlet port of furnace.



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## Warranty

# 1

## Operation

### GENERAL OPERATION

The Comfort Plus Commercial Hydronic system stores demand free or off-peak electricity in the form of heat.

Operation of the heating system is automatic. During hours when energy costs are lower the system converts electricity to heat which is then stored in its ceramic brick core. The amount of heat stored in the brick core of the system varies in relation to outdoor temperature, current building load, utility peak conditions, and/or the heating requirements.

A heat call from the thermostat or main system control energizes the primary water loop pump. The variable speed core blower automatically adjusts its speed to achieve the desired outlet water temperature. The heated water is then pumped to the area (zone) from which the heat call originated.

The versatility of this system allows it to fit many applications. The system is designed for use as either a sole heating source ("stand alone" furnace) for make up air heating or as a supplement to another ducted heating system such as a heat pump.

### SYSTEM USE DURING CONSTRUCTION PHASE

Like most heating equipment manufacturers, Steffes strongly recommends that "Construction Heating Units" be used instead of the permanent heating system during the construction phase of a new home. Use of the permanent heating system during the construction phase may contaminate the duct system and/or internal areas of the heating system. This may cause poor indoor air quality issues and/or improper system operation once the home is completed. A suitable alternative heating system must be used during the construction phase.

### SYSTEM START-UP

On start-up of the Comfort Plus Commercial Hydronic, odors relating to first time operation of the heating components may be experienced. Allow the system to charge to its maximum brick core charge level, on start-up, to expel these odors. If the system has not been used for an extended period of time, dust may accumulate in the system. Upon restart, there may also be an odor as these dust particles are expelled.

During operation, the system may produce minor expansion noises. These noises are the result of the internal components reacting to the temperature changes.

### TURNING SYSTEM "OFF" AND "ON"

The system is fully automatic and does not need to be manually disabled. Talk to your installer or energy management person for additional information.

## CONTROL PANEL

Operation of the Comfort Plus Commercial Hydronic system is automatic. All operational functions are stored in its microprocessor in function locations and are factory preset. If necessary, the installer can adjust them through the control panel. (See Figure 1.)

### Four-Digit LED Display

The four digit LED displays specific operating information. During an editing process, the function locations and the values set in these locations are displayed for viewing and adjusting purposes.

### AM and PM Indicator Lights

The AM and PM indicator lights are only utilized if the Steffes Time Clock Module is being installed. With this module installed, the system displays time on AM/PM intervals and the corresponding light flashes. The system can be configured to display military time, in which case both the AM and PM lights illuminate.

### Mode (Edit) Button

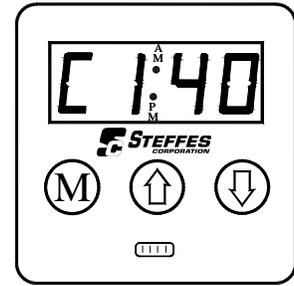
Activates the editing menu for changing the operating information of the system.

### Up and Down Arrow Buttons

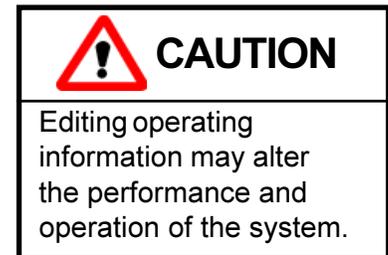
Used to scroll up or down when viewing or changing operating functions.

### Interface Port

**FOR SERVICE USE ONLY!** Allows technician external access for updating software and troubleshooting.

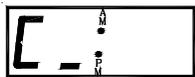


CONTROL PANEL  
FIGURE 1



## OPERATING STATUS

The Comfort Plus Commercial Hydronic system is set to display various operating information as described below. Press and release the up arrow to view this data.



**Operating Mode** - Indicates the current operating mode of the system.

C = Off-Peak (Charge) Time

P = On-Peak (Control) Time

A = Anticipated Peak Time



**A bar illuminates on the lower portion of the display's second digit whenever one or more heating elements are energized.**



**Outdoor Temperature** - "O" followed by a number indicates current outdoor temperature.



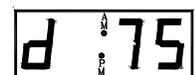
**Heat Call Status** - Indicates the current heat call status being received from the room thermostat. Refer to pages 3.11 and 3.12 for more information on heat call inputs.



**Brick Core Charge Level** - "CL" (charge level) followed by a number indicates the current percentage of heat stored in the brick core. "CL:\_" represents zero percent and "CL: F" represents a full core charge level.



**Targeted Brick Core Charge Level** - "tL" (target level) followed by a number indicates the current percentage of brick core charge being targeted by the system. A display of "tL:\_" indicates a target level of zero percent and "tL: F" indicates a full core charge target level.



**Load Control** - Current demand (kW) divided by 10. A value of "d 75" is equal to a demand of 750kW.

## TEMPERATURE CONTROL

Temperature set point is adjusted at the wall thermostat(s) or the main system control. If temperature in the area drops below the desired set point, a heat call is initiated and the primary loop pump is energized. The variable speed core blower automatically adjusts speed in relation to brick core temperature to achieve the desired outlet water temperatures. The heated water is then pumped to the area (zone) from which the call originated.

The versatility of this system allows it to fit many applications. The Comfort Plus Commercial Hydronic is designed for use as either the sole heating source (“stand alone” furnace) or as a supplement to ducted heating systems such as heat pumps.

The Steffes Air Handler can be interfaced with a standard heat pump system and will provide comfort modulation. The system will monitor the outlet air temperature and modulate in heat from the Comfort Plus Commercial Hydronic as needed to maintain the desired output air temperature. If one of the zones is a water coil used to temper duct temperatures, an optional duct sensor (Order Item# 1041536) can be used.

## BRICK CORE CHARGE CONTROL

The amount of heat stored in the brick core varies in relation to outdoor temperature, current building load, utility peak conditions, and/or the heating requirements. The outdoor sensor, if installed, monitors outdoor temperature and provides this information to the system. As the outdoor temperature decreases, heating requirements increase and the system stores more heat accordingly.



**The amount of heat stored in the system can also be regulated by a signal from a BACnet control, energy management system, or serial communication input.**

## CHARGE CONTROL OVERRIDE

If desired, the Comfort Plus Commercial Hydronic system can be programmed to allow a charge control override. This override allows the user to force the system to target a full core charge level and can be initiated or cancelled at any time. If an override is initiated, the system targets a full core charge level during the next off-peak period. It continues to charge during off-peak hours until it achieves full (maximum) core charge or until the override is cancelled. Once full charge is achieved or the override is cancelled, the system charges according to the standard configuration.

## MAINTENANCE AND CLEANING

Any air filter(s) in the system should be replaced on a regular basis to ensure proper operation and to maintain overall efficiencies. No additional routine maintenance is required.

If utilizing a heat pump or air conditioning system with the Comfort Plus Commercial Hydronic system, the indoor coil should be cleaned periodically as dirt accumulation may reduce system efficiency. It is important to follow the manufacturer’s maintenance and cleaning recommendations for these devices.

# 2

## Optional Accessories

### SINGLE ELECTRICAL FEED KIT

The Steffes Comfort Plus Commercial systems have built-in circuit breakers. They are factory configured to be field connected to multiple line voltage circuits. If single feed to the element and blowers/control circuits is desired, the single feed kit is available to allow the system to be powered with a one, larger line voltage circuit. Contact the factory for ordering details.



When using single feed, the neutral conductor **MUST** be sized in accordance with all applicable local, state, and national codes and regulations.



208/240 Volt Only

### PRIMARY LOOP KIT

The Comfort Plus Commercial Hydronic system requires a primary water loop which serves to regulate heat transfer from the unit's heat exchanger. To minimize installation time and costs for field design and engineering of this loop, Steffes Corporation offers a primary loop kit. The kit contains the components generally installed with hydronic heat systems.

Accessories



#### Features:

- ◆ Includes a 5-gallon diaphragm type expansion tank, Grundfos brand pump (circulator), air separator, air vent, pressure gauge, and pump connection conduit and fittings.
- ◆ Contains the appropriate valves to bleed air from the system during filling along with automatic purge during system operation and draining.
- ◆ Incorporates isolation flanges for quick and easy servicing of the primary loop pump (circulator).
- ◆ Offers troubleshooting isolation between the heating system and secondary zones.

Order Item #1302115

### STATIC HEAT RECOVERY UNIT

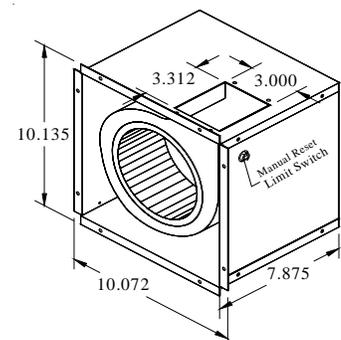


In applications using the Steffes Air Handler, the static heat recovery unit would not be used.

During operation of the Comfort Plus Commercial Hydronic system, some heat from the brick core storage will radiate through its outer panels. If the system is located in an area with minimal heating requirements, such as a utility room, the static heat recovery unit can maximize the system's efficiency by transferring this static heat to a more desirable location.

#### Features:

- ◆ Connects directly to the Comfort Plus Commercial Hydronic system to interface with the internal controls of the system for automatic operation.
- ◆ Specifications:
  - Wattage: 130 WATTS
  - Motor: .1 HP, 60 HZ
  - Voltage: 208/240 VAC
  - Maximum Static Pressure: .15 inches Water Column
  - CFM @.15 SP: 130 CFM



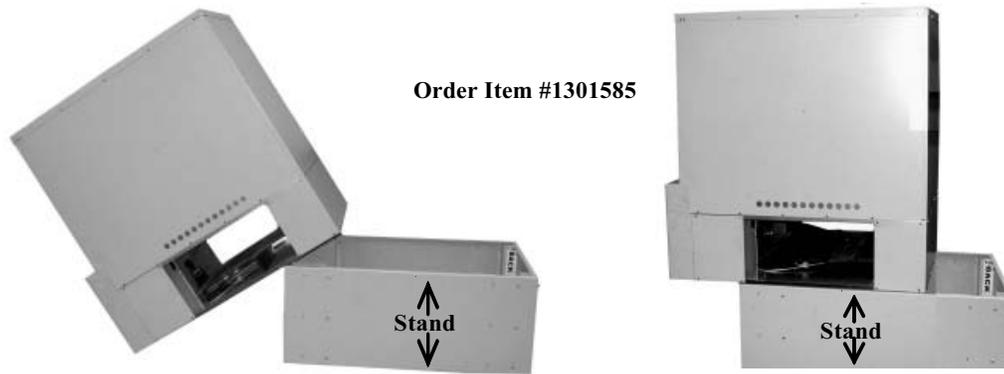
Order Item #1302110



If the area available to install the Comfort Plus Commercial Hydronic system is less than 100 square feet, Steffes Corporation recommends installing a low voltage cooling thermostat, connected between R and G on the 12-position terminal block, to maintain a temperature less than 85 degrees Fahrenheit.

## 18" STAND

Some applications (such as garages) may require that the heating appliance be elevated in order to meet building codes. The 18" stand can be used to elevate the 7140 series Comfort Plus Commercial Hydronic system. It is shipped as a kit and requires field assembly. Support for the optional air handler is not provided.



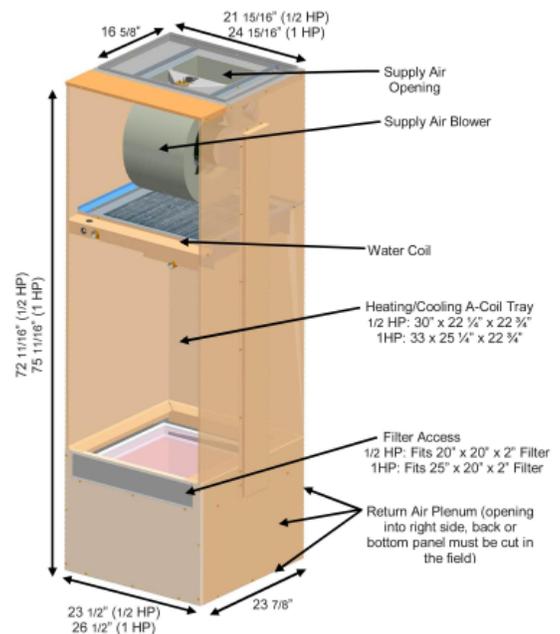
Order Item #1301585

## AIR HANDLER - VARIABLE SPEED

The Steffes Air Handler includes a return plenum, supply air blower, water coil, and air filter.

The air handler's variable speed blower incorporates an ECM motor that automatically adjusts its speed to achieve the appropriate CFM for the thermostat input received. Benefits include:

- ◆ Quieter operation
- ◆ Better dehumidification
- ◆ Offers greater operating efficiency by consuming 25% less energy during normal operating mode which provides for operating cost savings to the consumer. In continuous fan mode, low speed energy savings can be greater than 70% in comparison to a standard fixed motor speed.
- ◆ Interfaces with single or multi-speed air conditioner or heat pumps. With multi-speed systems, it operates at the lower speed most of the time. Only on extremely hot and cold days does it operate at a higher speed. This staged heating and cooling eliminates temperature swings, enhances comfort and optimizes efficiency.
- ◆ Improved air filtration in continuous fan mode
- ◆ Constant air flow over a wide range of static conditions, even if filters are dirty or registers are closed.



Accessories

	½ HP, 60 HZ Variable Speed ECM Air Handler	1 HP, 60 HZ Variable Speed ECM Air Handler
Order Item Number	1302132	1302134
Approximate Weight	200 lbs	228 lbs
Maximum Static Pressure (inches water column)	.75 inches H <sub>2</sub> O	.75 inches H <sub>2</sub> O
Maximum Water Coil Output	60,000 BTU/hr	90,000 BTU/hr
Maximum Outlet Temperature	120°F	120°F
A-Coil Tray Dimensions (HxWxD)	30" x 22 5/16" x 22 3/4"	33" x 25 5/16" x 22 3/4"
Voltage	240/208 VAC	240/208 VAC
Wattage	560W	1,050W
CFM ratings	1000, 1200, 1400, 1600	1200, 1400, 1600, 2000

- ◆ ½ HP variable speed accommodates most 1.5 to 4 ton heating/cooling systems
- ◆ 1 HP variable speed accommodates most 3 to 5 ton heating/cooling systems

## LOAD MANAGEMENT CONTROL

The Comfort Plus Commercial Hydronic system is an Electric Thermal Storage (ETS) heating system using electricity to provide a low cost heating solution for commercial, industrial, and large residential applications. ETS equipment is designed to store electricity, as heat, during hours when energy costs are lower and kW demand charges are not incurred. The Comfort Plus Commercial's thermal mass consists of a high-density ceramic brick capable of vast heat storage.

The system is designed to operate under one of three different load management control strategies.

### 1. BACNet Control

Steffes commercial heating furnaces are available with a BACNet control option. This device is easily integrated into most building automation systems to provide building managers full control and visibility of the heating system's operation. BACNet allows the following functions to be monitored with simple, twisted pair communication:

- Real time system monitoring
- Full thermostat control
- Monitoring of heat storage levels in the brick and all system temperatures
- Remote configuration, testing and adjustment
- Service requirement alerts



**Order Item #1301015**

### 2. On-Peak/Off-Peak Program

System responds to heat calls during the on-peak and off-peak periods; however, only energizes heating elements during the off-peak periods. The Comfort Plus Commercial system is controlled by an external control device such as a meter or time clock module.

### 3. 4-20 Milliamp Control (1-5 volt DC)

System receives a signal from an external load control device such as a building load management system. This external signal dictates the maximum amount of energy which can be consumed during a preset time interval.

### 4. Pulse Monitoring

- a) System monitors pulse outputs from the power company's electric meter. Program parameters such as desired maximum building kW and pulse ratios for the metering system being used are entered into the Comfort Plus Commercial system. The system then charges proportionally when demand free power is available. This keeps the total building kW usage at or below the desired level.
- b) External load management control modules are available when using pulse monitoring load control. Each module has eight (8) zones which can be controlled. The system must be configured to recognize the number of load management modules installed (maximum of two per system).

### LOAD MANAGEMENT CONTROL MODULE



**Order Item #1908140**

## SCR CONTROLLER

The Steffes SCR (Solid State Relay Panel) is an optional control device used with the Steffes ThermElect (8100 and 9100 Series) and Comfort Plus Commercial (6100 and 7100 Series) Heating Systems. It utilizes SCR technology to enable more precise balancing of a building's overall electric load by varying the amount of total element input that can be energized in a Steffes furnace at any given time in relation to the maximum allowable building load. The Steffes SCR optimizes a building's power quality and control.

The SCR Controller can only accept input signals from the Steffes furnace but it can respond to all types of control inputs to include 4 – 20 Milliamp, 1 – 5 Volt DC, electric meter pulsing, Bacnet or any building energy management system. With the 4 – 20mA or 1 – 5 volt DC signals, the SCR will provide an output directly proportional to the input signal. 4mA signal produces 0% output while 20mA signal produces 100% output. With the utility pulse meter input, the SCR output percentage will automatically adjust to maintain a total maximum system load as dictated by the furnace's set-up. With a Bacnet, the furnace can be commanded to varying input levels remotely.

SCR CONTROLLER



Order Item #1301016

## EXTERNAL DUCT SENSOR

The optional external duct sensor (Order Item #1041536) provides the ability to monitor the duct temperature at an area beyond fresh air makeup and/or beyond other devices and regulate the discharge air temperature accordingly.

The duct sensor feature is enabled if the 4 bit is set in Location 53 (L053). Once enabled, the Comfort Plus Commercial Hydronic system monitors temperature at both the duct sensor and the output sensor during Y, W, or E calls from the thermostat.

If there is a Y and a G call from the thermostat, the system operates the core blowers at the required speed to maintain the minimum output temperature as set in Location 48 (L048) at the duct sensor. If there is only one call from Y, W, or E, then the system will operate the core blowers at the required speed to maintain the maximum output temperature as set in Location 49 (L049) at the duct sensor. The system is set to turn off the core blowers if the output temperature at the output sensor exceeds 150 degrees Fahrenheit.

## CONTROL CIRCUIT STEP-DOWN TRANSFORMER

The internal controls and motors of all Comfort Plus Commercial Hydronic systems operate at 240 volts (two wire). In systems with 277/480 or 347/600 volt element circuits, a transformer must be installed per the installation instructions to supply this voltage to the system's controls. This transformer can be purchased as an optional device from Steffes Corporation or sourced from your local electrical supply outlet. See the matrix below for proper sizing.

Model	Primary Voltage	Secondary Voltage	KVA	Hevi Duty Item #	Steffes Item #
277/480V	480	240	2	HS1F1BS or equal	1017082
347/600V	600	240	2	HS10F2AS or equal	1017080

# 3

## Installation



### CAUTION

Risk of sharp edges. Can cause personal injury. Use caution when installing and/or servicing equipment.

### SHIPPING AND PACKAGING

The Comfort Plus Commercial Hydronic should always be transported in an upright position to avoid damage to internal components and insulation materials. The information below describes the items shipped with each system:

- ① INFORMATION PACKAGE**  
(includes Owner's Manual and Warranty Registration Card)



(adhered to outer side of shipping box)

- ② HEATING ELEMENTS**



MODEL	ELEMENTS
7120	8
7130	12
7140	16

(shipped inside the brick core)  
Refer to Pages 3.04-3.05

- ③ ELEMENT SCREW KIT**



(shipped inside the electrical compartment)  
Refer to Pages 3.04-3.05

- ④ OUTDOOR TEMPERATURE SENSOR**



(shipped inside the electrical compartment)  
Refer to Pages 3.08

- ⑤ JUNCTION BOX**



(shipped behind the exchanger access panel)  
See Figure 10, Page 3.07

- ⑥ PRESSURE RELIEF VALVE KIT**



(shipped behind the exchanger access panel)  
Refer to Page 3.11

- ⑦ CERAMIC BRICK**



**Full Brick**  
(shipped separately and packaged 4 brick per box)



**Half Brick**  
(shipped with brick and packaged in a white box consisting of 6 half brick and 1 full brick)

- ⑧ TRANSFORMER WIRING HARNESS**

(shipped in electrical panel)  
**(277V & 347V SYSTEMS ONLY)**

Model	Full Brick	Half Brick
7120	26 Boxes	1 Box
7130	37 Boxes	2 Boxes
7140	49 Boxes	2 Boxes

See Figure 4, Page 3.04

# PLACEMENT AND CLEARANCE REQUIREMENTS

The physical dimensions (Figure 2) of the Comfort Plus Commercial Hydronic system along with the clearances required (Figure 3) MUST be taken into consideration when choosing its location within a structure. The best installation location for this system is in a space requiring heat, so some amount of the heating requirements can be satisfied through static dissipation from the warm outer panels of the system. Standby heat dissipation of up to 2.5kW can be experienced in normal operation.

The minimum area required for the installation is 100 square feet. This area must remain free of debris and room air should be maintained at less than 85° Fahrenheit. If the system is being installed in an area with less than 400 square feet, ventilation MUST be provided. If less than 100 square feet, thermostatically controlled ventilation MUST be provided.

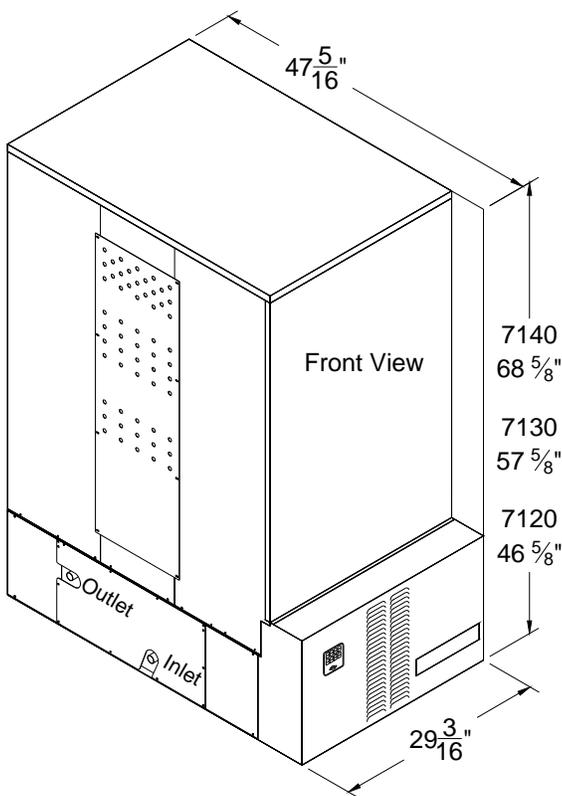


## WARNING

**Risk of fire. Can cause injury or death.**

- ◆ Violation of the clearance requirements or failure to provide proper ventilation can cause improper operation of the system. Maintain the placement and clearance requirements as specified and provide ventilation as necessary.
- ◆ Moving the system after install may result in equipment damage. Do NOT move system from original installed location.

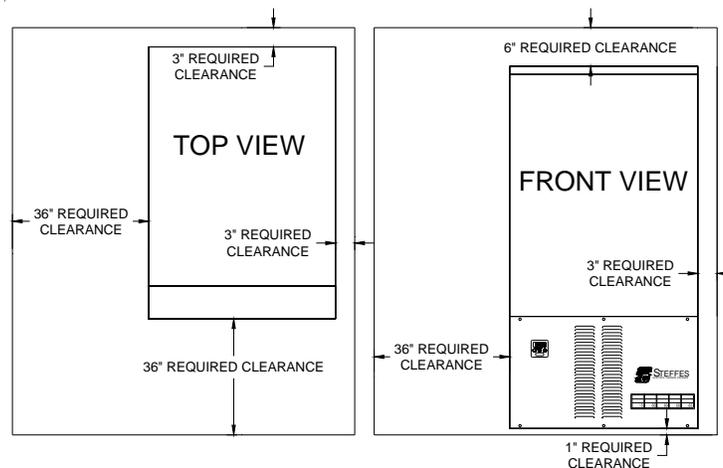
**MODEL 7100 DIMENSIONS  
FIGURE 2**



## MINIMUM CLEARANCE REQUIREMENTS

- ◆ Back and Right Side = 3 inches (from combustible material)
- ◆ Bottom = 1 inch clearance
- ◆ Top = 6 inches (from combustible material)
- ◆ Front = 36 inches (for ease in servicing)
- ◆ Left Side = 36 inches (for ease in servicing)

**MODEL 7100 REQUIRED CLEARANCES  
FIGURE 3**



**Installation**



**Minimum clearance requirements do NOT account for space needed for making electrical connections. If utilizing, the Air Handler, an additional 24-27 inches is required on the right hand side of the system.**

If the Comfort Plus Commercial Hydronic is installed in an area where radiant heat coming from the system is undesired or where room temperatures may reach 85° Fahrenheit or greater, it is strongly recommended to install a Static Heat Recovery unit or Air Handler. Refer to pages 2.01-2.02 for information on these options.

In addition to the physical space requirements, the weight of the Comfort Plus Commercial Hydronic must be taken into consideration when selecting the installation surface. A level concrete floor is the best installation surface, but most well supported surfaces are acceptable. If unsure of floor load capacity, consult a building contractor or architect.



**Special requirements need to be considered if placing the system in a garage or other area where combustible vapors may be present. Consult local, state, and national codes and regulations to ensure proper installation. An 18" stand (Order Item #1301585) is available to elevate the system.**

## INITIAL SET-UP

- Step 1** Remove the Information Package from the outside of the shipping box and unpackage the Comfort Plus Commercial Hydronic heating system.
- Step 2** Move the heating system into its installation location. The Comfort Plus Commercial Hydronic is capable of fitting through a 30" doorway (minimum) without disassembling. If it is necessary to disassemble the system, refer to the disassembly instructions (Page A.03) in this manual.
- Step 3** Once in place, adjust the leveling legs on the bottom of the system as necessary to prevent rocking. If not placed properly the system may bend or twist during the brick loading process, making element and brick core temperature sensor installation difficult.
- Step 4** Remove the painted front panel of the brick storage cabinet by removing the sheet metal screws along the top, bottom, and sides of the panel. Detach by pulling the bottom of the panel forward and down.
- Step 5** Locate the element wiring harnesses and the two brick core temperature sensors behind the front panel and disconnect them from their shipping position. Carefully position them to avoid damage during brick loading.
- Step 6** Remove the galvanized front panel and set it aside.
- Step 7** Carefully lift the two insulation blankets, one at a time starting at the bottom, and drape them over the top of the system.



**Use face mask, gloves, and long sleeved garments when handling insulation materials in compliance with generally accepted safety practices.**

- Step 8** Remove the front air channel by pulling out at the top.
- Step 9** Remove the heating elements from inside the brick core cavity.

### IMPORTANT

**To ensure proper operation, read and follow installation instructions carefully.**

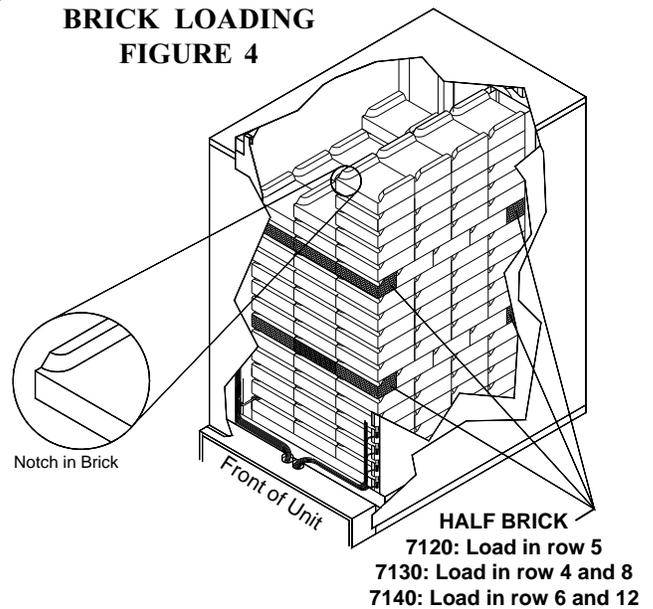
- ♦ **DO NOT install the Comfort Plus Commercial Hydronic system on its shipping pallet.**
- ♦ **DO NOT extend the leveling legs more than one inch.**
- ♦ **DO use and follow generally accepted safety practices when handling insulation material.**
- ♦ **DO have equipment installed by a qualified technician in compliance with all applicable codes and regulations.**

## BRICK LOADING

Load the brick, one row at a time, using a left side, right side, center pattern. Start at the back of the brick core and work forward. Make sure the brick are placed so the grooved side is facing up, the notch is facing forward, and the ridges are on the left and right. (See Figure 4.)

### **BRICK INSTALLATION TIPS:**

- Install bricks carefully to avoid damage to the insulation panels.
- Remove loose brick debris to prevent uneven stacking of brick, as this can make installation of the elements and the brick core temperature sensor(s) difficult.
- Brick rows **MUST** line up front to back and side to side.
- Half brick makes brick loading easier by evening out the stacks. Use **HALF BRICK** (white boxes) in the proper rows and positions as indicated in Figure 4. The back half of the brick **MUST** be installed in the back row and the front half (the notched brick piece) **MUST** be installed in the front row.



### **WARNING**

**Risk of fire. Can cause personal injury or death. DO NOT** operate the Comfort Plus Commercial Hydronic system if damage to the insulation panels on the inner sides of the brick core occurs.

## HEATING ELEMENT AND AIR CHANNEL INSTALLATION

**Step 1** After all brick are loaded, insert the heating elements between the brick layers, sliding them in until the element ends embed into the side cutouts of the brick cavity.

The elements **MUST** be installed so their threaded screw tabs on the wire connection terminals point forward and down. If they are installed with the screw tabs pointing upward, element-to-wiring harness connections will be difficult. Elements must be slid into the brick core properly to ensure correct clearance between the terminal connections and any surfaces within the system. Refer to the required element connection clearance information in Figure 5.



**In the 277/347 Comfort Plus Commercial Hydronic systems, the sixth element position up from the bottom of the furnace is left open.**

**Step 2** Install the front air channel with the air deflectors (arrow shaped pieces) facing inward and with the narrow ends of the deflectors pointing up. Place bottom portion in first (Figure 6).

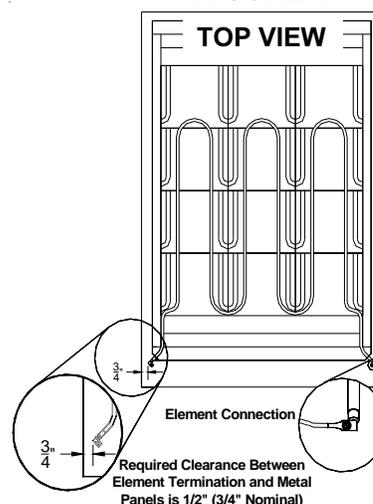


### **WARNING**

**HAZARDOUS VOLTAGE: Risk of electric shock. Can cause injury or death.**

- ♦ **DO NOT** remove the electrical panel cover while system is energized.
- ♦ **Position elements properly to avoid short circuiting them against metal surfaces.**
- ♦ **Protect element lead wires from front panel screws and any field installed screws to avoid short circuit.**

### **ELEMENT INSTALLATION FIGURE 5**



**Step 3** Lower the insulation blankets back into position, one at a time. Carefully tuck the sides of the insulation into the edges, corners, and around the exposed portions of the heating elements to ensure maximum efficiency.

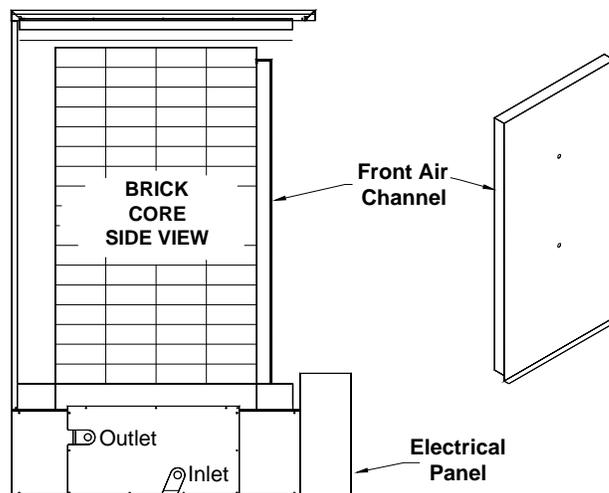
**Step 4** Reinstall the galvanized front panel and secure it to the system using the screws that were originally removed. Slide the bottom of this panel inside the lower lip of the brick cavity. The top rests on the outside of the cavity.

**Step 5** Remove the electrical panel cover and locate the element screw kit.

**Step 6** Carefully route wiring harnesses and connect them to the heating elements, using screws provided in the hardware package. Make connections with screw heads up and threads pointing down. Element screws should be tightened to 20 inch lbs. Refer to Element Installation (Figure 5) for proper positioning.

**Step 7** The brick core temperature sensor must be installed prior to putting the painted front panel in place.

**AIR CHANNEL PLACEMENT  
FIGURE 6**



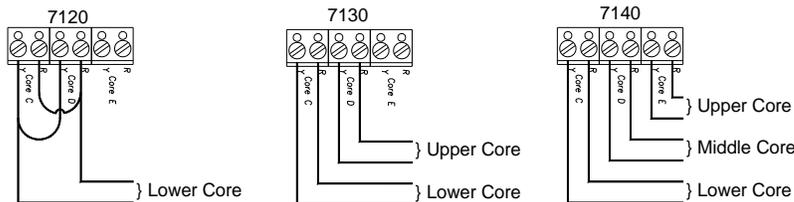
## BRICK CORE TEMPERATURE SENSOR INSTALLATION

**Step 1** Remove the screws by the brick core temperature sensor holes in the galvanized front panel.



**Model 7120 has one brick core temperature sensor and Models 7130 and 7140 each have an upper and a lower brick core temperature sensor.**

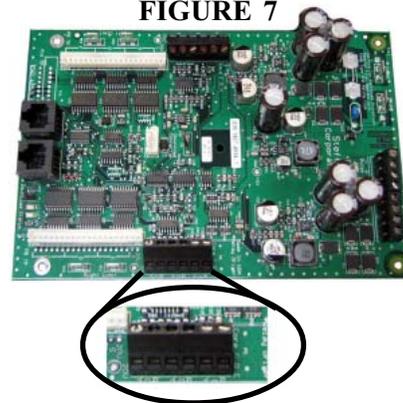
**Step 2** Insert the brick core temperature sensors through the holes in the galvanized front panel. Be sure the sensor(s) are connected to the relay driver board (Figure 7) as shown below. The sensor must pass through the blanket insulation and into the brick core. Holes have not been predrilled through the insulation. Use the sensor(s) to aid in making a passageway by rotating them side-to-side while gently pushing inward.



**CAUTION**

**Risk of improper operation. Proper installation of the brick core temperature sensor is critical to the operation of the heating system. Read and follow installation instructions carefully.**

**FIGURE 7**



**Step 3** Once the brick core sensor(s) are installed, put the screws back into position in the galvanized front panel to hold the sensors in position and to provide the electrical ground.

**Step 4** Check the non-insulated element terminations to make sure they do not come within 1/2" of any surface area on the system.

**Step 5** Re-install painted front panel using previously removed screws.

# LINE VOLTAGE ELECTRICAL CONNECTIONS



## WARNING

**HAZARDOUS VOLTAGE: Risk of electric shock. Can cause injury or death. Do not energize the system until installation is complete. Equipment MUST be installed by a qualified technician in compliance with all applicable local, state, and national codes and regulations.**

In standard configuration, the system is wired for connection to 240V; however, the element circuits can also be connected to 208V. A 208V connection derates the charging input of the system by 25%. If a system rated specifically for 208V is required, contact the factory. The controls circuit in the system **MUST** be connected to 240V/208V.



**277/480V and 347/600V Comfort Plus Commercial systems are configured to use single feed only.**



## IMPORTANT

- ◆ **To ensure proper operation and safety, all line voltage circuits must be segregated from low voltage wiring in the system.**
- ◆ **To reduce electro magnetic fields associated with electrical circuits and to avoid induced voltage on sensors and electronic devices, the circuit phases MUST be alternated as shown in Figure 9A.**

**208/240V System Connections Only:** The 60 amp breakers located in the electrical compartment feed the core charging (element) circuits. The 15 amp breaker feeds the controls and blowers circuit. All 240V/208V systems are factory configured to be field connected to multiple line voltage circuits. If a single feed line voltage circuit is desired, an optional single feed kit is available from the factory.

**277/480V and 347/600V System Connections Only:** The fuse block connection points and neutral connection block, located in the line voltage side of the electrical compartment, feed the core charging (heating element) circuits. This also provides power and the terminal block connections for the primary side of the optional control voltage step-down transformer. Adjacent to these terminals are the connection points for the transformer secondary. See Figure 9B.

To determine the correct wire size required for each circuit feeding the system, refer to the Specifications (Page A.01-A.02) and the system's identification label located on the lower left side of the system. (Reference Sample Label Figure 8.)

**Step 1** Route all line voltage wires through a knockout and into the electrical panel.

**Step 2** Make proper field wiring connections to the Comfort Plus Commercial system. Refer to the Line Voltage Wiring Diagrams (Pages A.04 - A.09) for more information on these connections.

### SAMPLE SYSTEM IDENTIFICATION LABEL

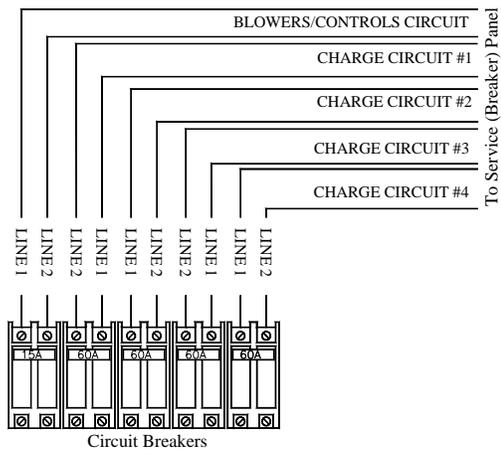
FIGURE 8

Manufactured in U.S.A		<b>STEFFES CORPORATION</b>		Electric Central Heating Furnace EPPS		<b>UL LISTED</b>	
Model	6140	SIN	208078446013786	Option	201G	U.S. Patents: 5201024, 5088493	
Maximum Discharge Air Temperature	190F				Canadian Patents - 2059158, 2060681		
Max External Static Pressure	0.75		Inches H <sub>2</sub> O				
Connections Required for Multi-Circuit Feed Control Circuit				Max Amps of Motors Included in Unit			
	N/A	Volts	N/A	Amps	N/A	Hz	
Min Circuit Ampacity	N/A	Amps			Core Blower #1	1.1	Amps 0.1 HP
Max Fuse Size	N/A	Amps			Core Blower #2	1.1	Amps 0.1 HP
Charge Circuit #1	N/A	Volts	N/A	Watts	House Blower	4.7	Amps 0.5 HP
Charge Circuit #2	N/A	Volts	N/A	Watts	Unit Clearance Requirements (4100 / 6100 series)		
Charge Circuit #3	N/A	Volts	N/A	Watts	Allow three (3) inches from back and sides, six (6) inches from top of unit to combustibles, and two (2) inches from left side of unit to ducting. Allow thirty-six (36) inches front clearance to provide space for servicing. No clearances are required from ducting or to floor services.		
Charge Circuit #4	N/A	Volts	N/A	Watts			
Connections Required for Single Circuit Feed							
	347/600	Volts	51	Amps	60	Hz	
Min Circuit Ampacity	63	Amps	3	Phase	4	Wire	
Max Fuse Size	80	Amps					

### 277/480V AND 347/600V THREE PHASE FIGURE 9B



### 208/240 SINGLE PHASE CIRCUIT PHASING CONNECTIONS FIGURE 9A



**The 60 AMP breakers are for internal component protection only. Sizing of the field wire and breaker size MUST be in compliance with all applicable local, state, and national codes and regulations.**

## JUNCTION BOX INSTALLATION

**Step 1** Attach the factory supplied junction box to the left side of the Comfort Plus Hydronic Commercial system as shown in Figure 16 (Page 3.12).

**Step 2** Make connections to the primary loop pump and air handler pump inside this junction box. The red and white wires connect to the primary loop pump and the black and white wires connect to the air handler pump. (See Figure 10.) The maximum connected amperage on either of these circuits is 1.2 amps.

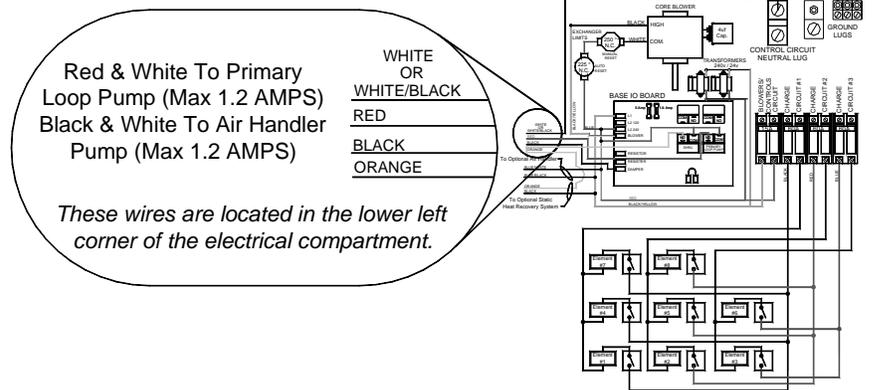
**Step 3** Attach the junction box cover using the screws provided.



**If utilizing the optional air handler, the orange wire can be used with the white wire to power a secondary pump for hydronic zones.**

## LINE VOLTAGE WIRING DIAGRAM

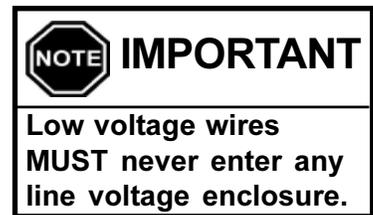
FIGURE 10



7120 Line Voltage Wiring Diagram 208/240 Volt  
Use copper or aluminum conductors rated at 75° C or higher for field connections of this device.

## LOW VOLTAGE ELECTRICAL CONNECTIONS - PEAK CONTROL

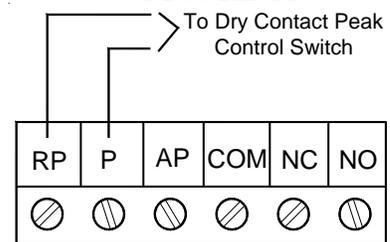
Steffes ETS heating equipment may be controlled by the Power Company via a peak control signal. This signal can be sent to the equipment using a Steffes Power Line Carrier control system, low voltage wiring, a Steffes Time Clock Module, or line voltage control. In applications utilizing automatic charge control, outdoor temperature information is required and can be received via an outdoor sensor or power line carrier control system.



The Comfort Plus Commercial Hydronic system is factory configured for low voltage peak control and is set to charge when the utility peak control switch closes. Refer to the Configuration Menu (Pages 3.14-3.15) for information on configuring the system for the application.

## PEAK CONTROL TERMINAL CONNECTIONS

FIGURE 11



### LOW VOLTAGE (HARD WIRED) PEAK CONTROL

If using the low voltage peak control option, the Comfort Plus Commercial Hydronic is direct wired to the power company's peak control switch. Field connections from the peak control switch are made to the low voltage terminal block through a low voltage knockout located on the left side of the electrical panel.

**6-Position Low Voltage Terminal Block Coding**

- RP = Peak Control Input Common
- P = Peak Control Input
- AP = Anticipated Peak (Pre-Peak) Control Input
- COM = Peak Control Output Common
- NC = Peak Control Output (Normally Closed)
- NO = Peak Control Output (Normally Open)

**Step 1** Route a low voltage circuit from the power company's load control or peak signaling device to the six (6) position low voltage terminal block inside the electrical compartment of the Comfort Plus Commercial Hydronic system through one of its low voltage wire knockouts.

**Step 2** Connect the field wiring to positions "RP" and "P" on the six (6) position low voltage terminal block. (See Figure 11.)



**To use the Comfort Plus to control other loads, refer to Auxiliary Load Control (Page 3.13).**

### **POWER LINE CARRIER (PLC) PEAK CONTROL**

The Steffes Power Line Carrier (PLC) control system has the ability to communicate with the Comfort Plus Commercial Hydronic system through the existing electrical circuits in the structure. With the power line carrier option, hard wired low voltage connections from the power company's peak signaling switch connect directly to the transmitting device. The switch signals peak control times to the transmitter, the transmitter sends the signals to the Comfort Plus Commercial Hydronic system, which receives this information and responds accordingly.

In addition to providing peak control signals, the transmitter also provides outdoor temperature information for automatic charge control, room temperature set back, and anticipated peak utility control signals (if applicable).

The PLC control is optional and must be ordered separately. If utilizing a PLC system, refer to the owner's manual for information on the installation and operation of the PLC control system.

### **TIME CLOCK MODULE PEAK CONTROL**

The Steffes Time Clock Module is another option for providing a peak control signal to the Comfort Plus Commercial Hydronic. It mounts inside the system's low voltage electrical compartment and interfaces with the relay board via an interface cable. Peak control times must be programmed into the system once the module is installed to enable the time clock feature. Refer to the instructions provided with the Time Clock Module for more information on the installation and operation of this device.

### **LINE VOLTAGE PEAK CONTROL**

Line voltage control is also an option, but is not the preferred method of control as it is usually more complex and expensive. If line voltage control is utilized, the controls circuit must be powered with an uninterrupted circuit. An external switching device, such as a relay panel, is necessary to directly control the heating element charging circuits. If relying on this method of control, the faceplate on the system **MUST** continuously display a brick core operating mode of "C" (charge) regardless of whether it is an off-peak or on-peak period.

## **LOW VOLTAGE ELECTRICAL CONNECTIONS - OUTDOOR TEMPERATURE SENSOR (OPTIONAL)**

The outdoor sensor monitors outdoor temperature and provides this information to the system. The system responds by automatically storing heat in its brick core according to outdoor temperature and heating requirements.

**Installation Methods:** Hard wired to system to the "OS" and "SC" terminals (default) **OR** connected to Power Line Carrier (PLC)

**Location of:** Must be placed in a location where it can accurately sense outdoor temperature and is not affected by direct sunlight or other abnormal temperature conditions.

- Wiring:**
- Route low voltage wire from the outdoor sensor to the electrical compartment through one of the low voltage wire knockouts.
  - Connect to "OS" and "SC" as shown in Figure 12 or to the two outdoor terminals as shown in Figures 13-15.
  - If sensor wiring is routed through an external wall, the opening through which the wire is routed **MUST** be sealed. Failure to do so may affect the accuracy of the sensor.
  - The outdoor sensor is supplied with a lead length of 40 ft. If a greater wire length is needed, it can be extended to a total of 250 ft.
  - No other loads can be controlled or supplied through this cable. It is for connection of the outdoor sensor **ONLY**.
  - This low voltage cable **MUST** not enter any line voltage enclosure.
  - Unshielded Class II (thermostat) wire can be used as extension wire provided it is segregated from any line voltage cabling.



### **IMPORTANT**

- ♦ **If connecting to a Steffes PLC system, follow the installation instructions in the PLC system's Owner's and Installer's Guide.**
- ♦ **Outdoor sensor wire MUST NEVER be combined with other control wiring in a multi-conductor cable.**

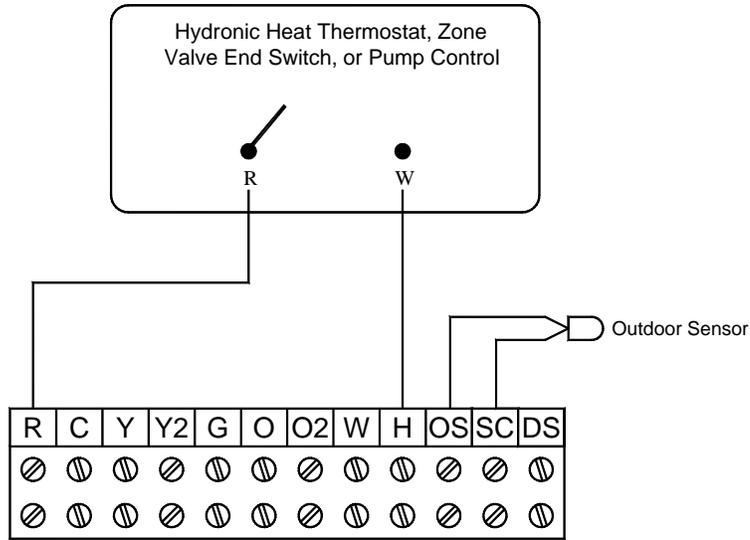
# LOW VOLTAGE ELECTRICAL CONNECTIONS - ROOM THERMOSTAT

A low voltage (24VAC) room thermostat may be used for room temperature control with the Comfort Plus Commercial Hydronic system. Steffes recommends using a digital thermostat. If utilizing a mechanical thermostat, a load resistor may be necessary due to the low current draw (.01 amps) on the heat call input circuit of the system. Contact the factory for information on thermostats available from Steffes.

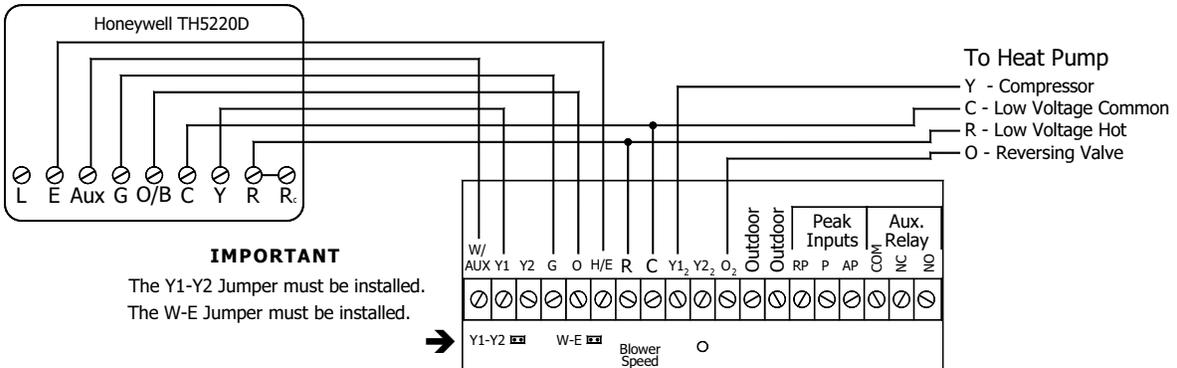
**NOTE IMPORTANT**

Low voltage wires **MUST** never enter any line voltage enclosure.

**LOW VOLTAGE CONNECTIONS  
HYDRONIC HEATING SINGLE ZONE SYSTEM  
FIGURE 12**



**SINGLE STAGE HEAT PUMP APPLICATION WITH VARIABLE SPEED BLOWER  
FIGURE 13**



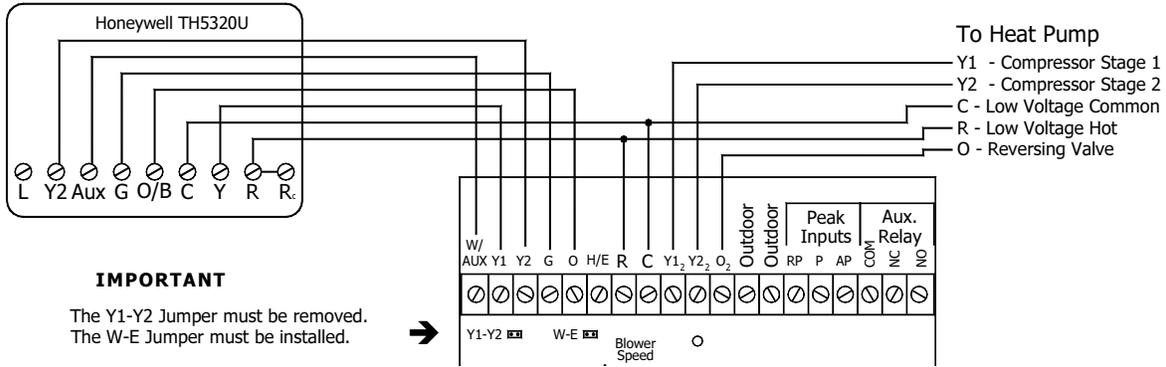
SINGLE STAGE HEAT PUMP					
Thermostat Stage	Thermostat Output	Heat Pump Stage	% of Selected CFM	Heat Call Status on Digital Display	Discharge Air Temperature Target
1	Y1/G	1	100%	HC1	L048
2	Aux/Y1/G	1	100%	HC3	L049
Fan	G	0	400 cfm	HCF	N/A
Cool	Y1/G/O	1	100%	COOL	N/A
Hydronic Heat Control	H/E	N/A	N/A	HC3	N/A

\*Contractor Use Only

**Installation**

## TWO STAGE HEAT PUMP APPLICATION WITH VARIABLE SPEED BLOWER

FIGURE 14

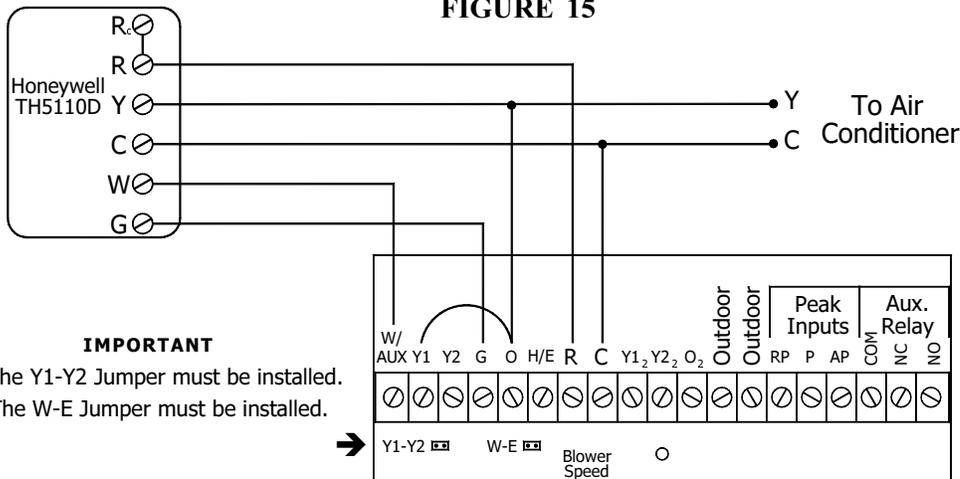


TWO STAGE HEAT PUMP					
Thermostat Stage	Thermostat Output	Heat Pump Stage	% of Selected CFM	Heat Call Status on Digital Display	Discharge Air Temperature Target
1	Y1/G	1	50%	HC1	L048
2	Y1/Y2/G	2	100%	HC1	L048
3	Aux/Y1/Y2/G	2	100%	HC3	L049
Fan	G	0	400 cfm	HCF	N/A
Cool 1	Y1/G/O	1	50%	COOL	N/A
Cool 2	Y1/Y2/G/O	2	100%	COOL	N/A
Hydronic Heat Control	H/E	N/A	N/A	HC3	N/A

\*Contractor Use Only

## STAND ALONE FURNACE APPLICATION WITH VARIABLE SPEED BLOWER CONNECTIONS SHOWN FOR SINGLE STAGE HEATING / SINGLE STAGE COOLING (UNCONTROLLED AIR CONDITIONING)

FIGURE 15



If installing a mechanical thermostat or thermostat with anticipator, a resistor kit is required (Order Item #1190015).

Installation

## AIR CONDITIONER/HEAT PUMP INTERFACE

The Comfort Plus Commercial Hydronic system can be used in conjunction with an air conditioner or a heat pump. Refer to the optional Air Handler (Page 2.02) and the Low Voltage Connections for Heat Pump Application Diagram (Figure 13-14), for more information on interfacing these systems with the Comfort Plus Commercial Hydronic. If multiple heat pumps are being interfaced, contact Steffes Corporation.

# PRESSURE RELIEF VALVE INSTALLATION



## WARNING

Risk of explosion. Can cause injury or death. The factory supplied pressure relief valve **MUST** be connected to the system with the supplied fittings.

- ◆ **DO NOT** modify this assembly.
- ◆ **DO NOT** cap, plug, or otherwise obstruct the outlet of the pressure relief valve.
- ◆ **DO** mount the pressure relief valve in a vertical, upright position.
- ◆ This pressure relief valve is sized to service the needs of the Comfort Plus Commercial Hydronic heating system. If multiple heating systems are being used, pressure relief valving for the other system **MUST** be provided separately.



**Step 1** Remove the exchanger access panel and locate the pressure relief valve assembly.

**Step 2** Connect the pressure relief valve to the outlet water port on the left side of the Comfort Plus Commercial Hydronic. It is extremely important that the following conditions for installation of this part are met:

- Ensure all connections, including the valve inlet are clean and free from any foreign material.
- Use pipe compound sparingly, or tape on external threads only.
- Mount the pressure relief valve in a vertical, upright, position directly to the outlet water port of the system. Under no circumstances should there be a flow restriction or valve of any type between the safety relief valve and the pressure vessel.

Pressure Relief Valve	Minimum BTU Rating	Maximum Operating Pressure
30 PSI	400,000	20 PSI
75 PSI	500,000	60 PSI



## CAUTION

**Risk of discharged hot water and/or steam. Can cause personal injury or property damage. During operation, the pressure relief valve may discharge large amounts of steam and/or hot water. To reduce the potential for bodily injury or property damage, install a discharge line.**

**Step 3** Use schedule 40 pipe to install a discharge line for the pressure relief valve. This discharge line **MUST**:

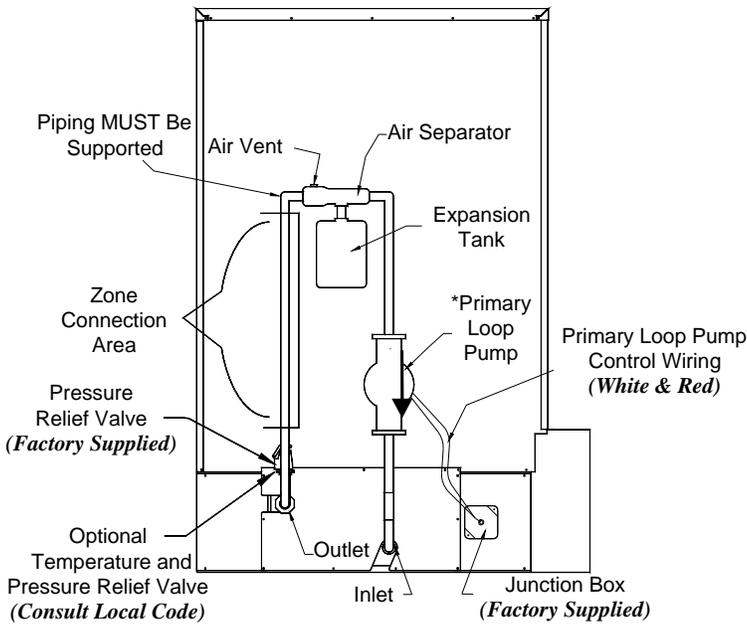
- be connected from the valve outlet with no intervening valve and directed downward to a safe point of discharge.
- allow complete drainage of both the valve and the discharge line.
- be independently supported and securely anchored to avoid applied stress on the valve.
- be as short and straight as possible.
- terminate freely to atmosphere where any discharge is clearly visible and is at no risk of freezing.
- terminate with a plain end that is not threaded.
- be constructed of a material suitable for exposure to temperatures of 375°F or greater.
- be, over its entire length, of a pipe size equal to or greater than that of the valve outlet.

## PLUMBING

The Comfort Plus Commercial Hydronic heating system **MUST** be plumbed with a primary loop and secondary (zone) loops. The primary loop needs to consist of a minimum of 10' of 1" pipe and requires its own pump\* (circulator). The secondary (zone) loops require additional pump(s) to operate effectively. Refer to Typical Primary Loop (Figure 16) and the Typical System Plumbing Diagrams (Figures 17 and 18) for installation information.

The primary loop serves to regulate heat transfer from the system's heat exchanger, therefore, the primary loop must be powered by Comfort Plus Commercial Hydronic control system.

**TYPICAL PRIMARY LOOP  
FIGURE 16**



PRESSURE DROP THROUGH HEAT EXCHANGER	
STATIC PRESSURE (Feet Water Column)	.1 ft @ 2 GPM
	.2 ft @ 4 GPM
Based on 80 degree entry water temperature with a 50% glycol mix.	.4 ft @ 6 GPM
	.7 ft @ 8 GPM
	1.1 ft @ 10 GPM

**PUMP SPECIFICATIONS**

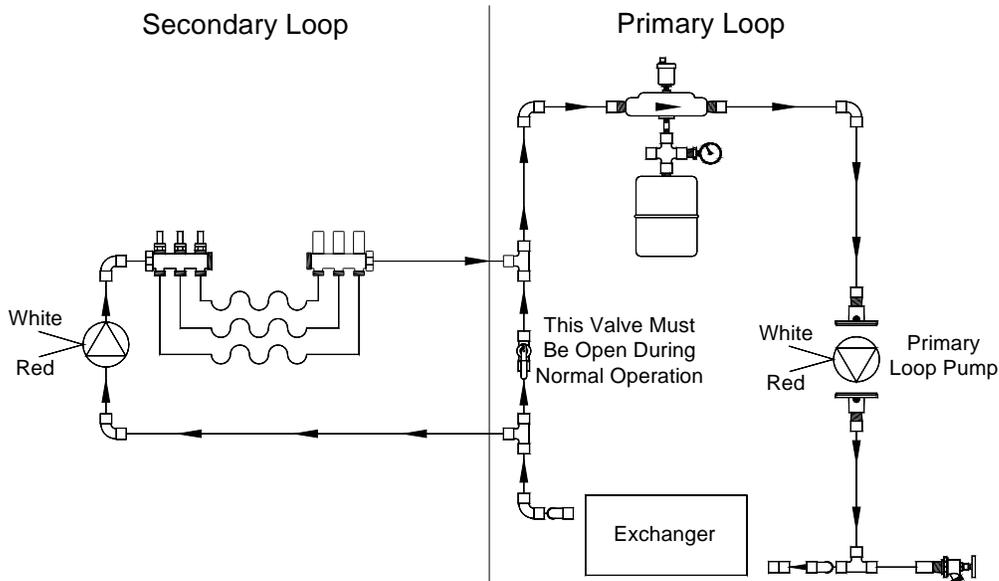
- Steffes recommends a Grundfos UP15-42F single speed 115VAC pump for the primary pump.
- Air Handler pump should NOT be a split phase pump.
- Air Handler pump should NOT have any type of auxiliary control built into or onto the pump.

**CAUTION**

**FREEZE PROTECTION:** Risk of frozen pipes. Can cause property damage. Hydronic heating system freeze-ups WILL cause extensive damage to the entire heating system and/or property. It is the responsibility of the installer to provide protection against freezing.

**PIPING SUPPORT:** Risk of exchanger damage. Can cause property damage or personal injury. DO NOT use the exchanger as support for piping. Support brackets should be in place to ensure proper operation of the system and to keep pressure off the inlet and outlet piping.

**TYPICAL SYSTEM PLUMBING  
SINGLE TEMPERATURE ZONES  
FIGURE 17**



**Installation**

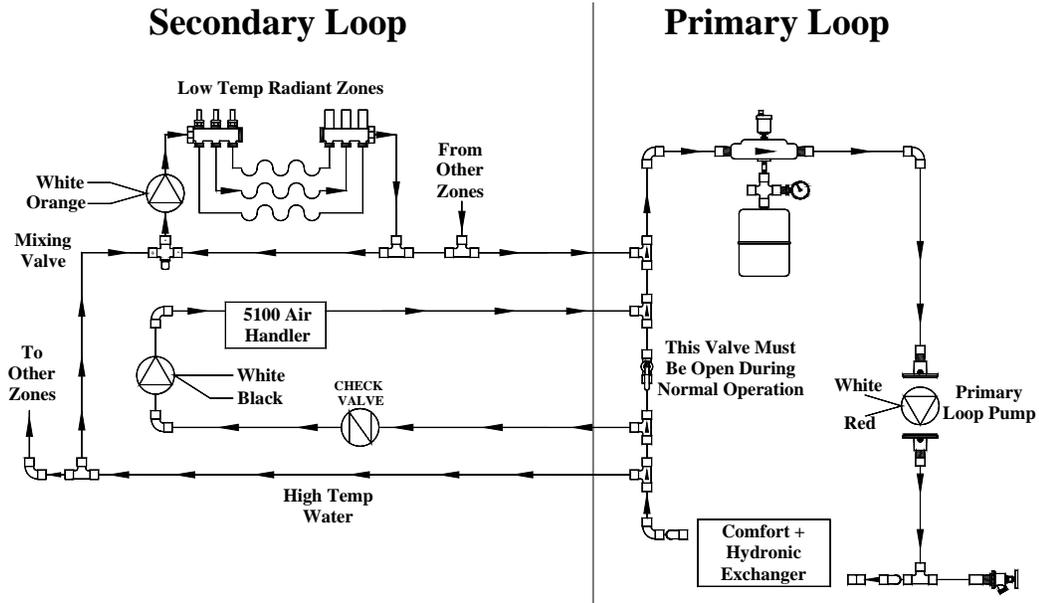


# IMPORTANT

It is the responsibility of the installer to prevent involuntary flow of water to the air handler. Not doing so may cause limit tripping and/or decrease heat pump efficiency. Use of a check valve, zone valve, or other device may help prevent involuntary flow.

TYPICAL SYSTEM PLUMBING  
(SHOWN WITH STEFFES AIR HANDLER)

FIGURE 18



Installation

## AUXILIARY LOAD CONTROL

The Comfort Plus Commercial Hydronic system can be used to provide control signals to other loads in the application. To do so, connect low voltage control wires to the "COM" and "NC" or the "COM" and "NO" positions of the six (6) position low voltage terminal block in the electrical compartment of the Comfort Plus Commercial Hydronic. (See Figure 19.) These contacts are rated for 30 volts, 3 amps maximum.

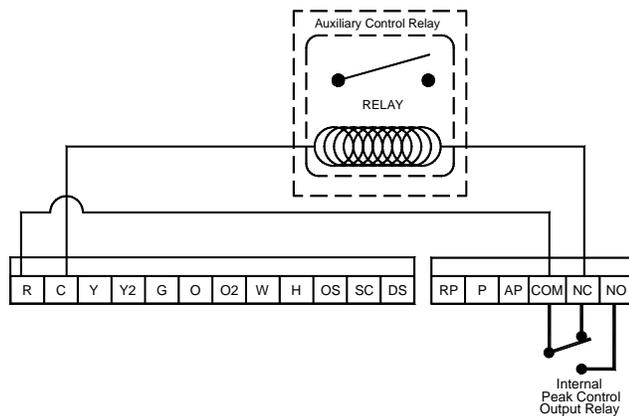


# IMPORTANT

Maximum external load should not exceed 60 VA on the system's class II transformer.

TYPICAL AUXILIARY LOAD CONTROL

FIGURE 19



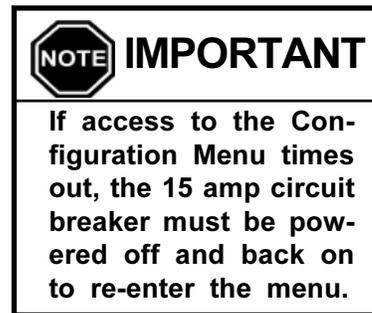
NOTE: During off-peak (charge) periods, the contact is closed between "COM" and "NC".

## CONFIGURATION MENU

The Steffes Comfort Plus Commercial Hydronic heating system has a Configuration Menu, which allows the system to be customized to the power company and consumer's needs. This menu can be accessed on start-up and allows configuration settings to be easily adjusted.

To access the Configuration Menu:

- Step 1** Energize the system. Access to the Configuration Menu is allowed for the first two (2) minutes of operation. If the system has been energized for more than two (2) minutes, the 15 amp circuit breaker must be powered off and back on to gain access to this menu.
- Step 2** Press and release the **M** button until the faceplate displays "CONF".
- Step 3** Press the up arrow once and the faceplate will display "C000". The faceplate will flash between "C000" and the corresponding configuration value.
- Step 4** If necessary, edit the configuration value by pressing and holding the **M** button while using the up or the down arrow button to change the value.
- Step 5** Once the value is correct, release the buttons and press the up arrow button to go to the next configuration (C001, C002, etc.)
- Step 6** Repeat steps 4 through 5 until all configuration settings have been adjusted to the desired values.
- Step 7** Once configured, use the down arrow to leave the Configuration Menu.



In most applications only a few, if any, configuration changes will be necessary. Following is a description of the configuration settings and their function:

- C000 Off-Peak Method of Charge Control** - Sets the method of brick core charging to be used during off-peak (charge) periods. System is configured for automatic charge control which is a value of five (5).
- C001 Start Brick Core Charge Set Point** - If utilizing automatic charge control as set in C000, this value indicates the outdoor temperature at which the system will start charging.
- C002 Full Brick Core Charge Set Point** - If utilizing automatic charge control as set in C000, this value indicates the outdoor temperature at which the system will target a full core charge.
- C003 Power Line Carrier (PLC) Channel Selection** - If using PLC communication, this setting must match the channel setting in the Steffes PLC transmitting device. A value of zero indicates power line carrier communication is disabled.
- C004 Optional Controls Configuration**
- | <u>Value</u> | <u>Configuration Description</u>       |
|--------------|--|
| 8            | No Outdoor Sensor/No Time Clock Module |
| 9            | Outdoor Sensor/No Time Clock Module    |
| 12           | No Outdoor Sensor/Time Clock Module    |
| 13           | Outdoor Sensor/Time Clock Module       |
- C005 Control Switch Configuration** – If utilizing power line carrier control, the Steffes Time Clock Module, line voltage peak control, or if the utility control switch opens for charging this value should be zero (0). For all other applications, this value should be one (1).

*Configuration Menu continued on next page...*

**C006 Output Control Configuration** - Configures the output controls of the Comfort Plus Commercial Hydronic system. To determine the value, check the options desired from the list below. Then, add the numbers from the “*Value*” column and enter the sum into this location. If not used in conjunction with a heat pump or air conditioner, the value in this location should be set to two (2).

<u>Value</u>	<u>Option Selected</u>
2	Comfort Plus Commercial Hydronic System (Model 7140)
8	Enables compressor control if there is a "COOL" call during a peak (control) time.
32	If it is a peak (control) period and the Comfort Plus Commercial Hydronic receives a cooling call, the compressor will turn off and on in 20 minute intervals (off 20 minutes, on 20 minutes, off 20 minutes, etc.).
128	Interfaces Comfort Plus Commercial Hydronic with a heat pump that has a reversing valve which is energized for heating.

**C007 Charge Factor** - This configuration should be set to a value of 30.



**C008 through C010 configurations are only applicable if the Comfort Plus Commercial Hydronic system is being used in conjunction with a heat pump.**

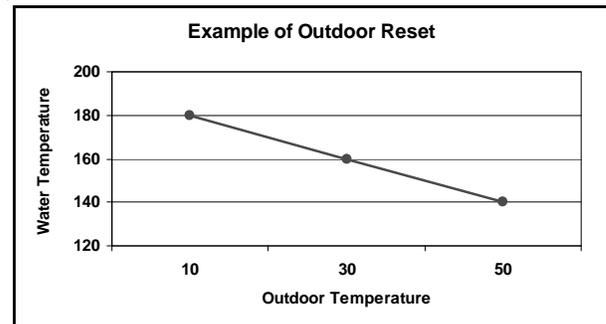
**C008 Heat Pump Compressor Outdoor Lock-Out Temperature for Off-Peak or Anticipated Peak Modes** - Indicates the outdoor temperature at which the heat pump’s compressor is locked out and not allowed to operate during an off-peak or anticipated peak period.

**C009 Heat Pump Compressor Outdoor Lock-Out Temperature for On-Peak Mode** - Indicates the outdoor temperature at which the heat pump’s compressor is locked out and not allowed to operate during an on-peak period.

**C010 Minimum Discharge Air Temperature** - Sets the minimum discharge air temperature the system targets during a Stage 1 heat call.



**C011 and C012 configurations must be set for the hottest temperature zone in the installation. C011 is the highest temperature the system will target and C012 is the lowest temperature the system will target during a heat call. Outdoor reset is done using these two temperatures. (See graph.)**



**C011 Maximum Outlet Water Temperature** - The value set indicates the maximum outlet water temperature to be targeted. The targeted outlet water temperature is affected by the values in C001 and C002. For example, if the value in C001 = 50; C002 = 10; C011 = 180; C012 = 140, then at an outdoor temperature of 30 degrees, the targeted outlet water temperature would be 160 degrees.

**C012 Minimum Outlet Water Temperature** - The value set indicates the minimum outlet water temperature to be targeted. The targeted outlet water temperature is affected by the values in C001 and C002. For example, if the value in C001 = 50; C002 = 10; C011 = 180; C012 = 140, then at an outdoor temperature of 30 degrees, the targeted outlet water temperature would be 160 degrees.

**C013-C021 Time Clock Module Configuration** - These configuration settings are used to configure the peak control times when utilizing the optional Steffes Time Clock Module. Refer to the installation and configuration instructions included with the module for more information.

### CAUTION

**Risk of high temperature water. Can cause property damage. Improper water temperature settings can result in damage to the floor covering. Make sure the maximum and minimum water temperatures are appropriate for the application.**

# INSTALLER'S FINAL CHECK-OUT PROCEDURE

**WARNING**

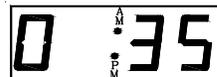
**HAZARDOUS VOLTAGE:**  
Risk of electric shock.  
Can cause injury or death. System may be connected to more than one branch circuit. Disconnect power to all circuits before servicing. Equipment must be serviced by a qualified technician.

**Step 1** Verify that the water pressure is correct for the application. The water pressure of the Comfort Plus Commercial Hydronic heating system should be between 12 and 20 psig.

**Step 2** Verify that the operating mode displayed on the control panel corresponds with the power company's peak control signal. Refer to the Operating Status section (Page 1.02) for more information on the proper operating mode.



**Step 3** Press the up arrow one time and verify that the outdoor temperature information displayed on the control panel is approximately the same as the current outdoor temperature. Refer to the Operating Status section (Page 1.02) for more information on the outdoor temperature display.



**Step 4** Press the up arrow again and the current heat call status will be displayed on the control panel. Refer to the Operating Status section (Page 1.02) for more information on the heat call status display.



**Step 5** Initiate a heat call from the room thermostat and verify that the Comfort Plus Commercial Hydronic system recognizes the appropriate heat call. Refer to the Operating Status section (Page 1.02) for information on the various heat call status displays. In applications utilizing the Air Handler, verify that the Air Handler and/or heat pump operates appropriately.

**Step 6** If utilizing the Air Handler, initiate a cooling call from the room thermostat and verify that the Comfort Plus Commercial Hydronic system recognizes the "COOL" call. Verify that the Air Handler, heat pump, and/or air conditioner operates appropriately.

**Step 7** Press the up arrow until the targeted brick core charge level is displayed on the control panel. With the system in an off-peak (charge) mode, initiate the charge control override. Refer to the Charge Control Override section (Page 1.03) for instructions on initiating the charge control override. Once initiated, the target level of the Comfort Plus Commercial Hydronic should be 100 percent, the control panel should display "tL: F", and all of the heating elements should be energized.



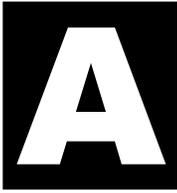
**Step 8** With an amp meter, verify that the amperage of the system is correct for the installation. Refer to the System Identification Label on the Comfort Plus Commercial Hydronic system for information regarding the proper amperage.

**Step 9** Cancel the charge control override and verify that all elements in the system de-energize. Refer to the Charge Control Override section (Page 1.03) for instructions on canceling the charge control override.

**Step 10** Verify that all hydronic heating zones are operating as intended.

**Step 11** Verify, once again, that the "Operating Mode" displayed on the control panel corresponds with the power company's peak control signal.

**Step 12** In applications utilizing the Steffes Power Line Carrier control system, complete the Installer's Final Check-out Procedure in the Owner's and Installer's Manual provided with that device.



# Appendix

## SPECIFICATIONS

**Model 7120**

Voltage	240			277			347	
Charging Input (kW)	14	19.2	24.8	19.2	20.48	24.8	19.2	26
Element Current Draw (Amps)	59	80	104	24	25	30	19	25
Phase	Single			Three			Three	
Number of Wires - See Note 1	2*			4			4	
Control Circuit Voltage (VAC) - See Note 2	208/240							
Minimum Circuit Ampacity (AMPS) for 240V Control Circuit	10							
Single Feed Minimum Circuit Ampacity (Amps) - See Note 2	83	110	140	34	36	43	28	36
Pump Voltage - See Note 2	120V (Neutral Conductor Required)							
Storage Capacity - See Note 3								
kWh	120							
BTU	409,440							
Approximate Installed Weight (lbs)	2,218							
Max Coil Dimensions (W x D x H) - See Note 4	½ HP: 21.2" x 21.2" x 24 ¼" 1 HP: 26.4" x 21.2" x 24 ½"							
Pipe Size (Inlet/Outlet)	1"							
Primary Loop Requirements	Minimum of 10' of 1" pipe							
Output Water Temp - Selection Range	50°F to 185°F							
Maximum Working Pressure	60 PSI / Optional 20 PSI							
Flow Rate (Primary Loop)	1 GPM per 10,000 BTU of required output at 20°F temperature rise (10 GPM maximum)							

\*The control circuit for 208 and 240 volt systems must be 3-wire.

**Model 7130**

Voltage	240		277			347	
Charging Input (kW)	28.8	37.2	28.8	30.72	37.2	28.8	37.2
Element Current Draw (Amps)	120	155	35	37	45	28	36
Phase	Single		Three			Three	
Number of Wires - See Note 1	2*		4			4	
Control Circuit Voltage (VAC) - See Note 2	208/240						
Minimum Circuit Ampacity (AMPS) for 240V Control Circuit	10						
Single Feed Minimum Circuit Ampacity (Amps) - See Note 2	160	204	49	52	61	39	49
Pump Voltage - See Note 2	120V (Neutral Conductor Required)						
Storage Capacity - See Note 3							
kWh	180						
BTU	614,160						
Approximate Installed Weight (lbs)	3,046						
Max Coil Dimensions (W x D x H) - See Note 4	½ HP: 21.2" x 21.2" x 24 ¼" 1 HP: 26.4" x 21.2" x 24 ½"						
Pipe Size (Inlet/Outlet)	1"						
Primary Loop Requirements	Minimum of 10' of 1" pipe						
Output Water Temp - Selection Range	50°F to 185°F						
Maximum Working Pressure	60 PSI / Optional 20 PSI						
Flow Rate (Primary Loop)	1 GPM per 10,000 BTU of required output at 20°F temperature rise (10 GPM maximum)						

\*The control circuit for 208 and 240 volt systems must be 3-wire.

**Model 7140**

<b>Voltage</b>	208	240		277		347	
<b>Charging Input (kW)</b>	36	36	42.75	38.4	46.5	36	46.5
<b>Element Current Draw (Amps)</b>	174	150	179	47	56	35	45
<b>Phase</b>	Single			Three			
<b>Number of Wires</b>	2*			4			
<b>Control Circuit Voltage (VAC) - See Note 2</b>	208/240						
<b>Minimum Circuit Ampacity (AMPS) for 240V Control Circuit</b>	10						
<b>Single Feed Minimum Circuit Ampacity (Amps) - See Note 2</b>	198	233	60	63	75	48	60
<b>Pump Voltage - See Note 2</b>	120V (Neutral Conductor Required)						
<b>Storage Capacity - See Note 3</b>							
kWh	240						
BTU	818,800						
<b>Approximate Installed Weight (lbs)</b>	3,894						
<b>Max Coil Dimensions (W x D x H) - See Note 4</b>	½ HP: 21.2" x 21.2" x 24 ¼" 1 HP: 26.4" x 21.2" x 24 ½"						
<b>Pipe Size (Inlet/Outlet)</b>	1"						
<b>Primary Loop Requirements</b>	Minimum of 10' of 1" pipe						
<b>Output Water Temp - Selection Range</b>	50°F to 185°F						
<b>Maximum Working Pressure</b>	60 PSI / Optional 20 PSI						
<b>Flow Rate (Primary Loop)</b>	1 GPM per 10,000 BTU of required output at 20°F temperature rise (10 GPM maximum)						

\*The control circuit for 208 and 240 volt systems must be 3-wire.

**Note 1:** 208V or 240V systems are factory configured to be field connected to multiple, single phase, line voltage circuits. If single feed to element and blowers/system controls circuit is desired, an optional single feed kit is available to order. Connection to 3-phase power is acceptable and can improve phase balancing.

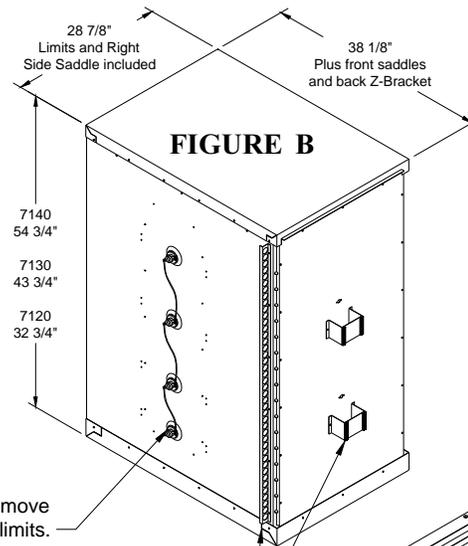
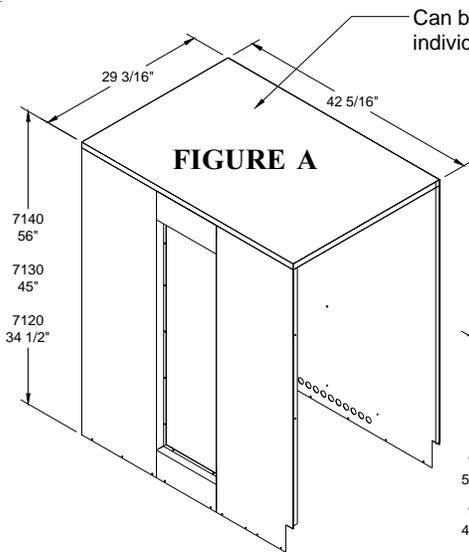
**Note 2:** Because 277V/480V and 347V/600V systems are configured for single feed, three phase line voltage connections only, a step down transformer must be field installed.

**Note 3:** The size and heating ability of the system required for an installation is dependent on the thermal load and the demand profile of the facility. The daily rate structure of the utility can also affect size of furnace needed in an application. If the unit is not installed within the heated area, heat lost statically must be taken into account when sizing a system. Contact Steffes Corporation for assistance in selecting an appropriately sized system.

**Note 4:** The indoor coil or outdoor compressor of an air conditioner or heat pump are not included with the furnace. The Steffes return air plenum (for use with the 6140) and the Steffes air handler (for use with the 7140 to allow it to provide forced air heating), are each configured to house an indoor coil and can be ordered from the factory as an optional accessory. Dimensions listed are that of the inner coil area in the plenum. For larger coils, field provisions to the factory built plenums are necessary or one will need to be custom built by the installer. (In heat pump applications, the indoor coil MUST be placed on the return air side.)

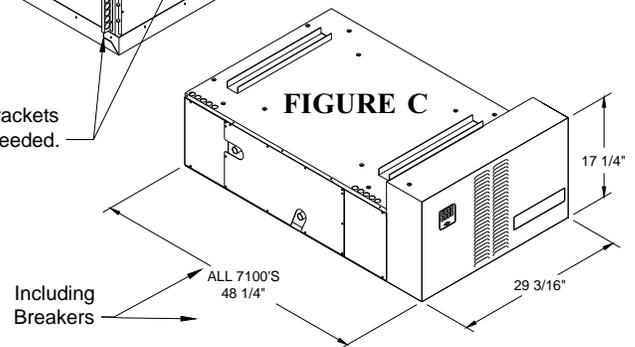
# DISASSEMBLING THE COMFORT PLUS COMMERCIAL HYDRONIC SYSTEM

- Step 1** Remove the painted front panel of the brick storage cabinet by removing the sheet metal screws along the top, bottom, and sides of the panel. Detach by pulling the bottom of the panel forward and down.
- Step 2** Remove the limit zone cover by removing the screws holding it in place.
- Step 3** Remove the screws around the perimeter of the limit zone and around the bottom of the left side, right side, and back upper panels.
- Step 4** Remove the one or two screws in the center of the upper right side panel.
- Step 5** From the back of the system, lift and remove the painted panels. (See Figure A.)
- Step 6** Locate the brick core temperature sensor(s) behind the front panel and disconnect them from their shipping position. Carefully lay the sensor(s) aside to avoid damaging them.
- Step 7** Carefully rock the brick core (Figure B) to one side and lift top portion up and off the base (Figure C.)
- Step 8** Move the Comfort Plus Commercial Hydronic heating system into the desired location, reassemble, and continue with the installation instructions in this manual.



Do not remove core limits.

Saddles and Z-brackets can be removed if needed.



## WARNING

**HEAVY OBJECT WARNING:**  
Can cause muscle strain or back injury.

- ◆ Use lifting aids to move system into place.
- ◆ Do NOT place object, hands, and/or body parts under the system when lifting.
- ◆ Use care to keep objects, hands, and/or body parts clear of system when lifting.

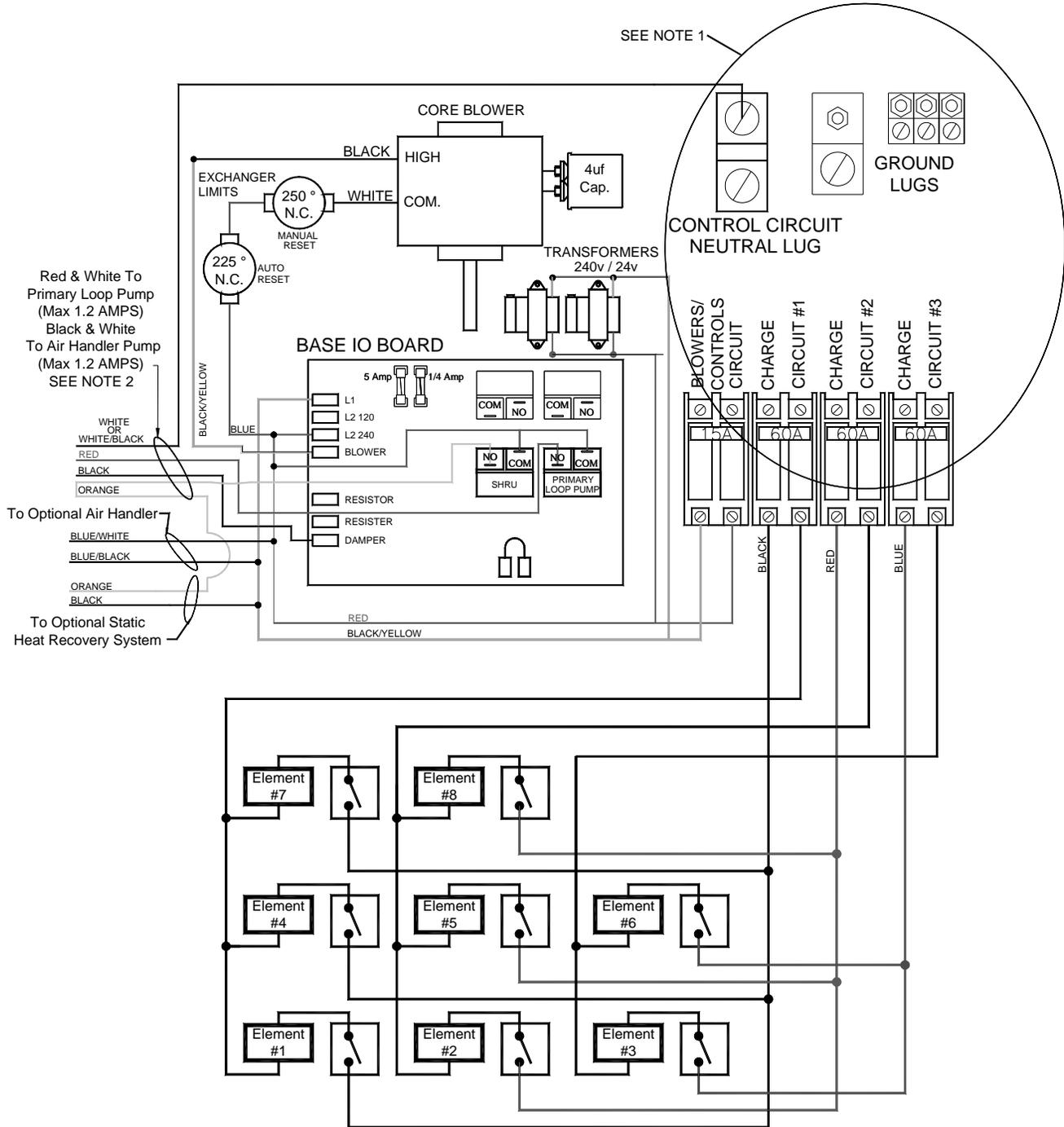
# INTERNAL SYSTEM WIRING DIAGRAMS - LINE VOLTAGE

## Line Voltage Wiring Diagram - Model 7120

240V OR 208V SYSTEMS ONLY



Use copper or aluminum conductors rated for 75°C or higher for field connection of this device.



**NOTE 1:** Line Voltage Field Wiring Connections. See Figure 8 for information on proper circuit phasing.

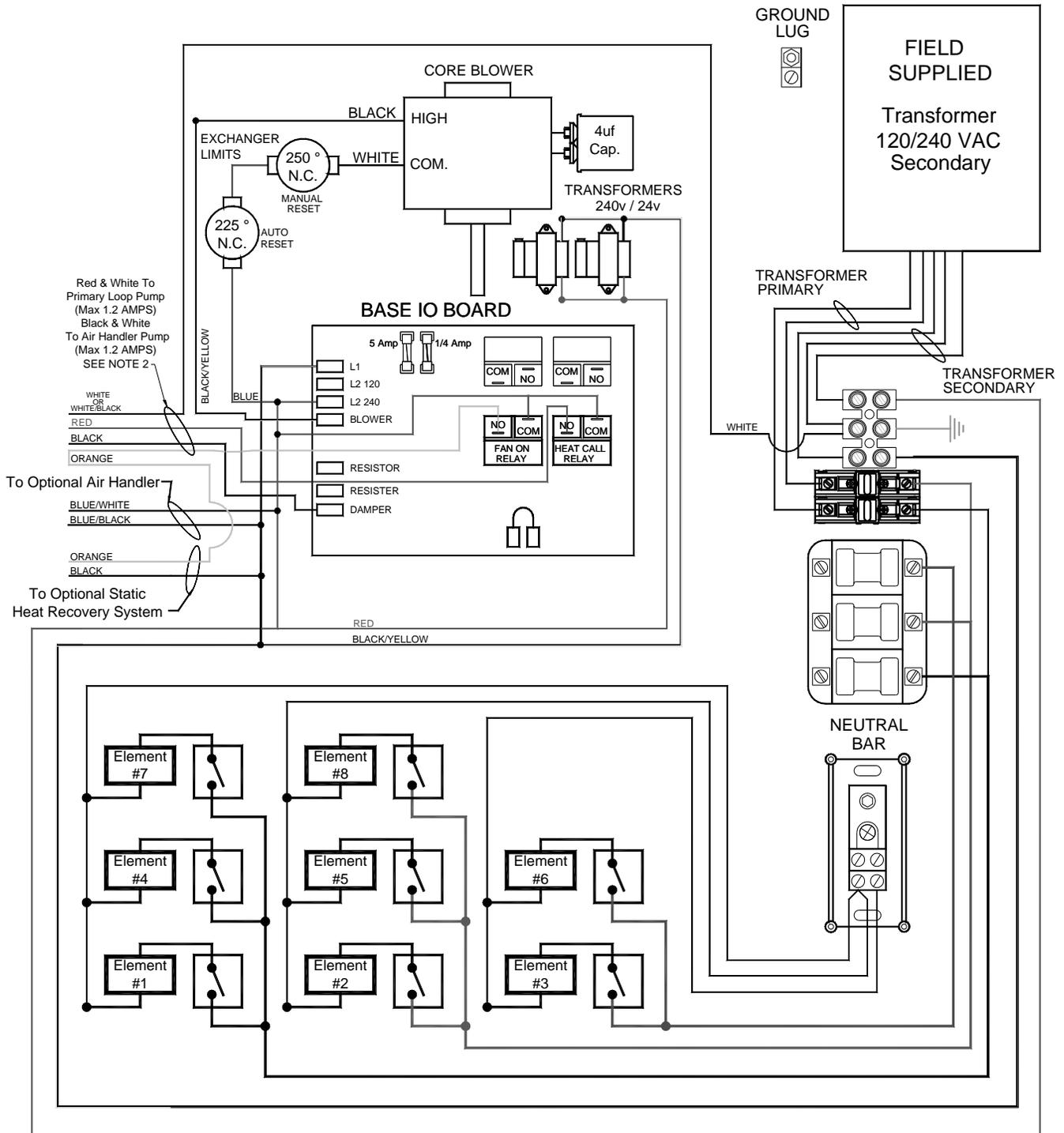
**NOTE 2:** For more information regarding pump (circulator) wiring, reference Figures 9, 15 and 16 in the Installation section of this manual.

# Line Voltage Wiring Diagram - Model 7120

277V AND 347V SYSTEMS ONLY



Use copper or aluminum conductors rated for 75°C or higher for field connection of this device.



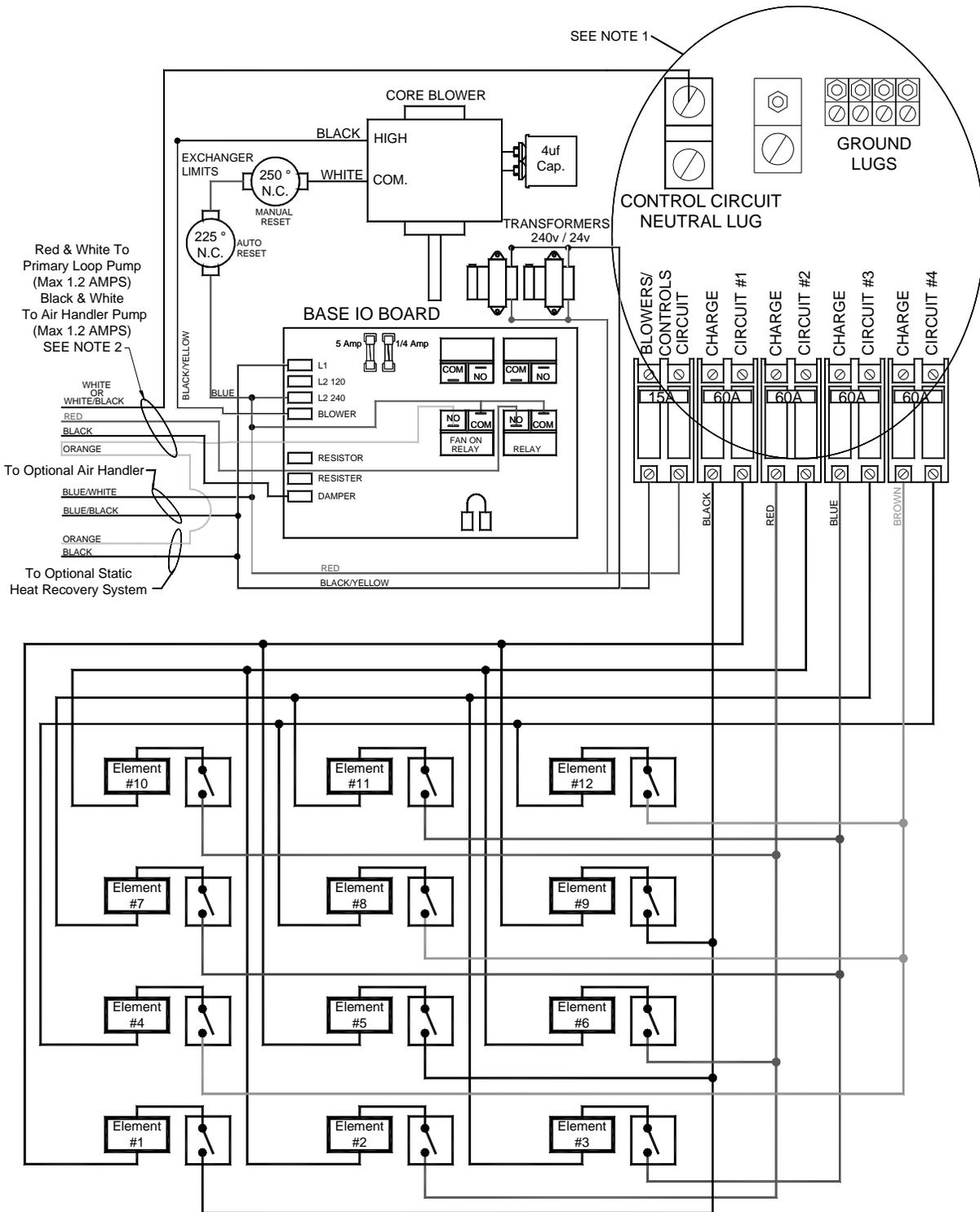
Appendix

# Line Voltage Wiring Diagram - Model 7130

## 208V AND 240V SYSTEMS ONLY



Use copper or aluminum conductors rated for 75°C or higher for field connection of this device.



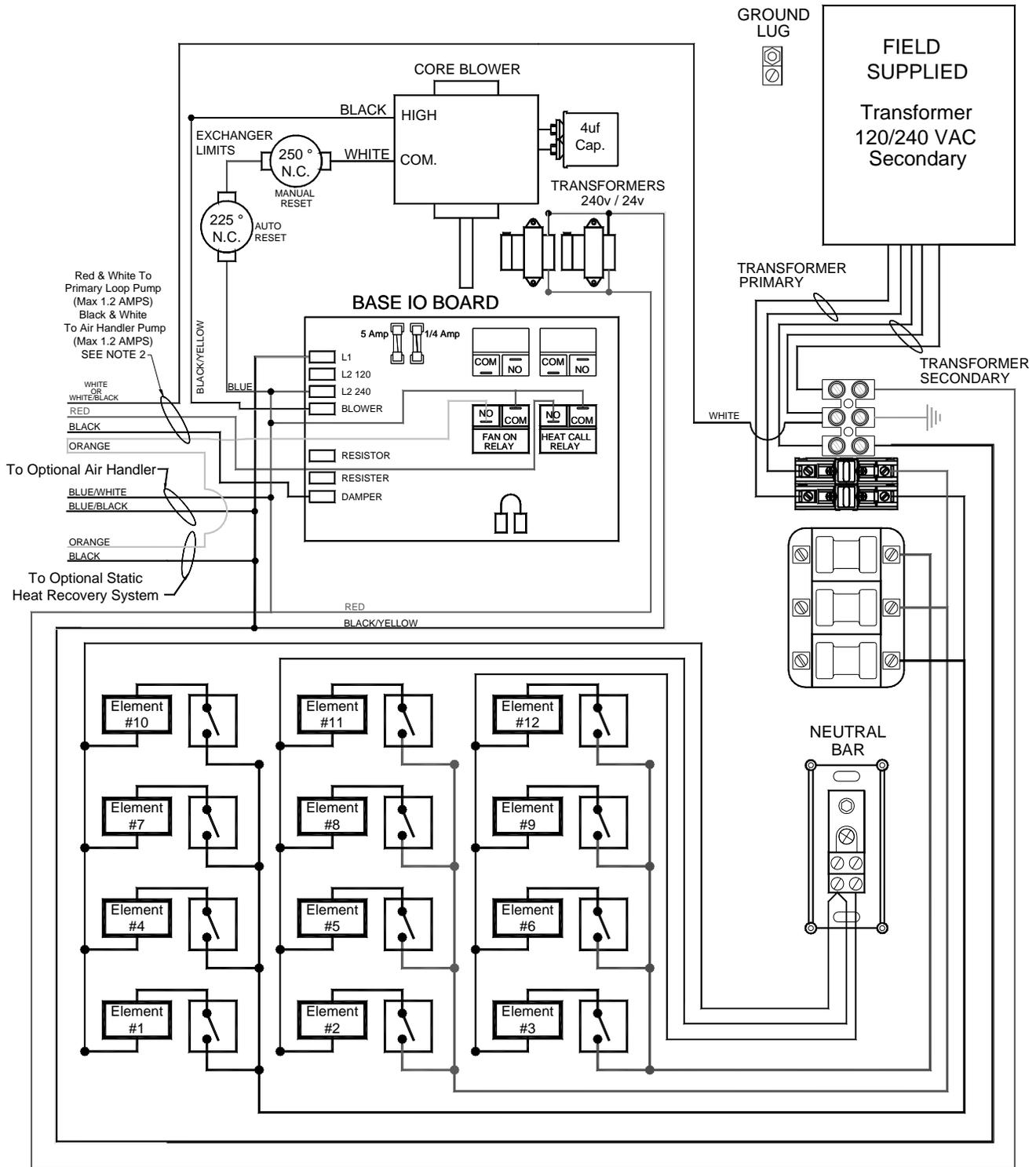
**NOTE 1: Line Voltage Field Wiring Connections. See Figure 8 for information on proper circuit phasing.**  
**NOTE 2: For more information regarding pump (circulator) wiring, reference Figures 9, 15 and 16 in the Installation section of this manual.**

# Line Voltage Wiring Diagram - Model 7130

277V AND 347V SYSTEMS ONLY



Use copper or aluminum conductors rated for 75°C or higher for field connection of this device.

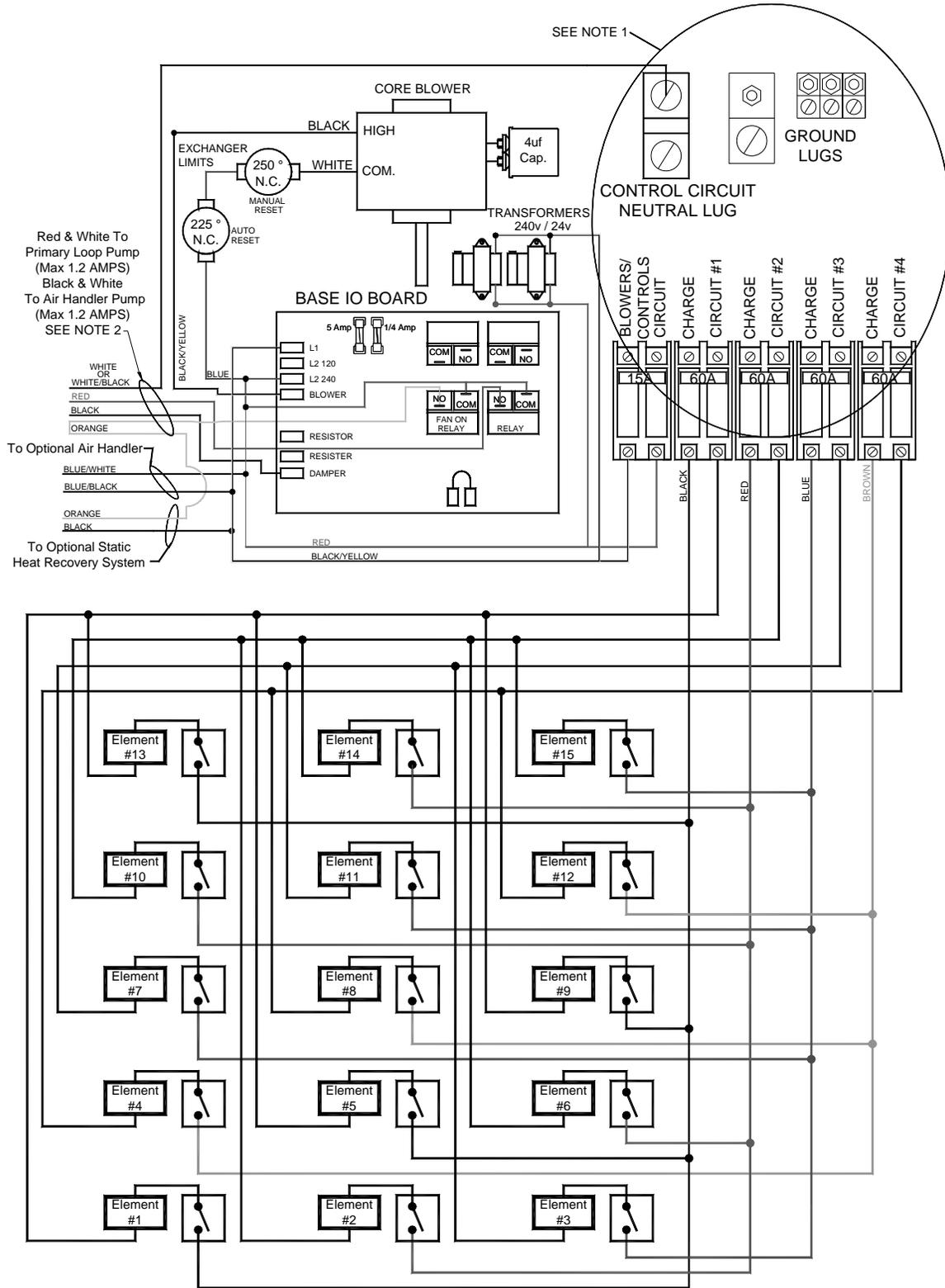


# Line Voltage Wiring Diagram - Model 7140

240V OR 208V SYSTEMS ONLY



Use copper or aluminum conductors rated for 75°C or higher for field connection of this device.



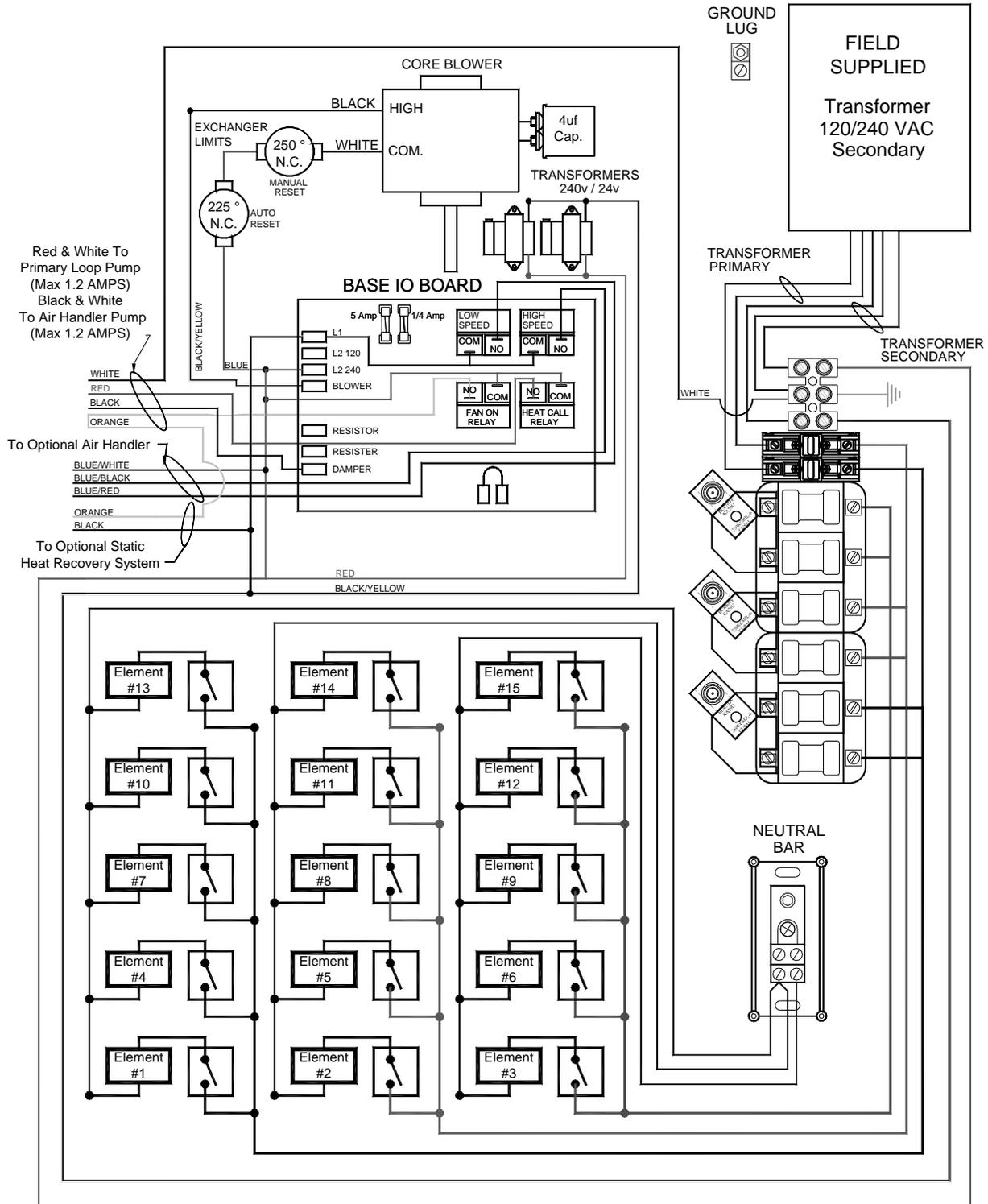
**NOTE 1: Line Voltage Field Wiring Connections.** See Figure 8 for information on proper circuit phasing  
**NOTE 2: For more information regarding pump (circulator) wiring,** reference Figures 9, 15 and 16 in the Installation section of this manual.

# Line Voltage Wiring Diagram - Model 7140

277V AND 347V SYSTEMS ONLY



Use copper or aluminum conductors rated for 75°C or higher for field connection of this device.



Appendix

# INTERNAL SYSTEM WIRING DIAGRAM - LOW VOLTAGE

The outdoor temperature sensor, room thermostat, and peak control device are connected via low voltage wiring.

## System Low Voltage Wiring Diagram - Model 7120

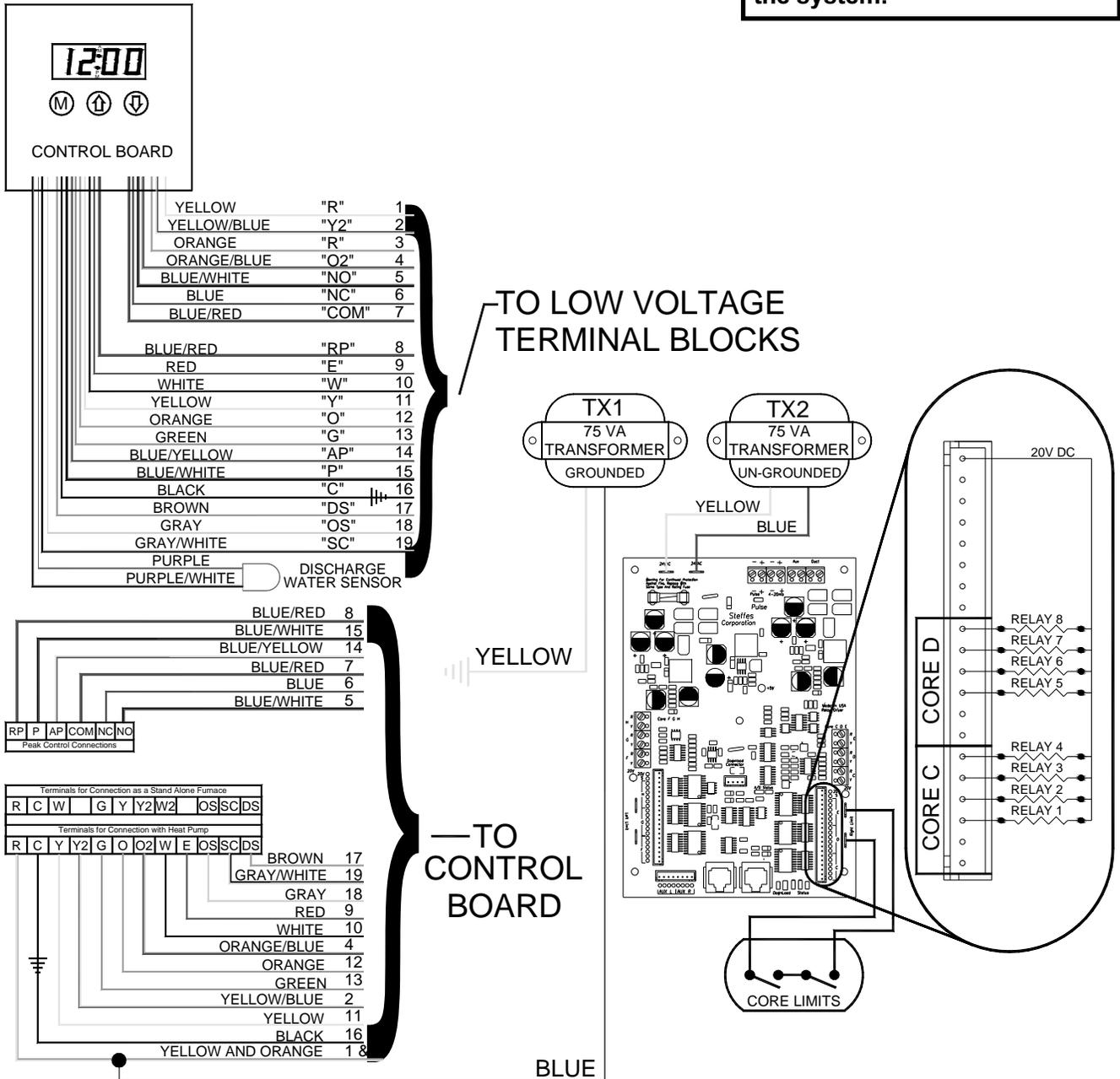


The "R" and "C" positions in the low voltage terminal strip may be used as a source of 24 VAC for powering external low voltage devices (60 VA maximum).



### WARNING

**HAZARDOUS VOLTAGE: Risk of electric shock. Can cause injury or death. All low voltage wiring must be segregated from line voltage circuits in the system.**



# System Low Voltage Wiring Diagram - Model 7120 with Variable Speed

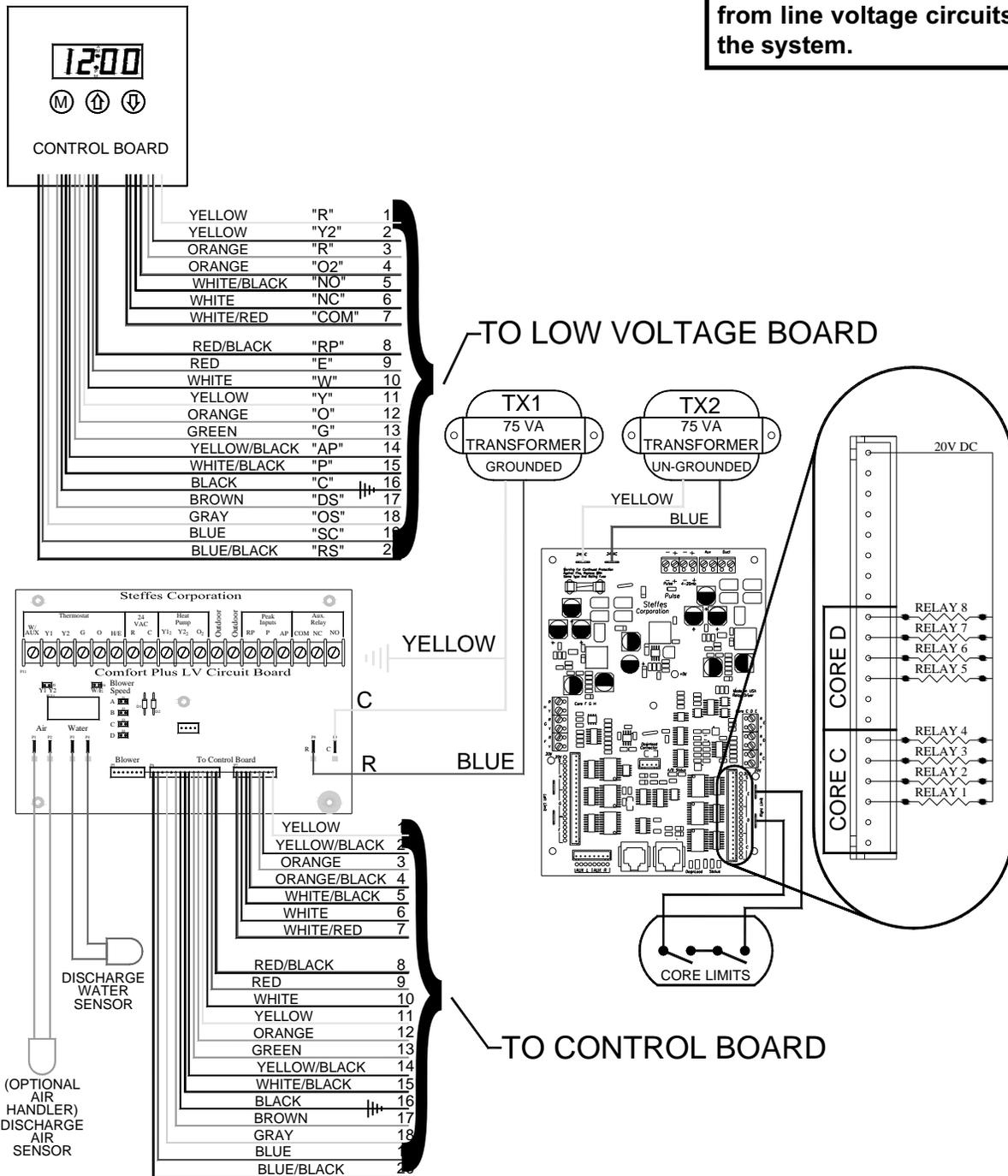


The "R" and "C" positions in the low voltage terminal strip may be used as a source of 24 VAC for powering external low voltage devices (60 VA maximum).



**WARNING**

**HAZARDOUS VOLTAGE:** Risk of electric shock. Can cause injury or death. All low voltage wiring must be segregated from line voltage circuits in the system.



**Appendix**

# System Low Voltage Wiring Diagram - 7130

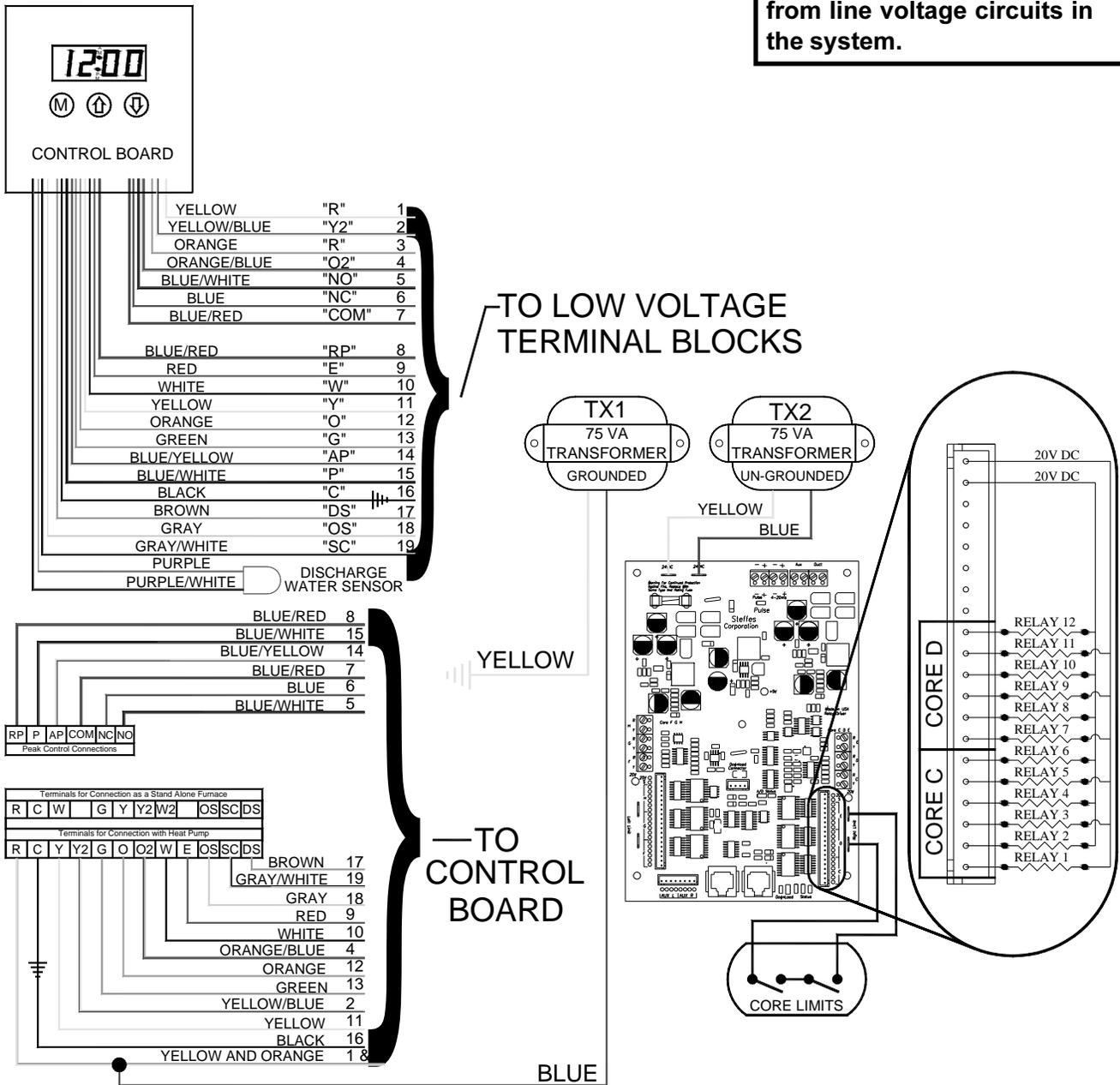


The "R" and "C" positions in the low voltage terminal strip may be used as a source of 24 VAC for powering external low voltage devices (60 VA maximum).



## WARNING

**HAZARDOUS VOLTAGE: Risk of electric shock. Can cause injury or death. All low voltage wiring must be segregated from line voltage circuits in the system.**



# System Low Voltage Wiring Diagram - 7130 with Variable Speed

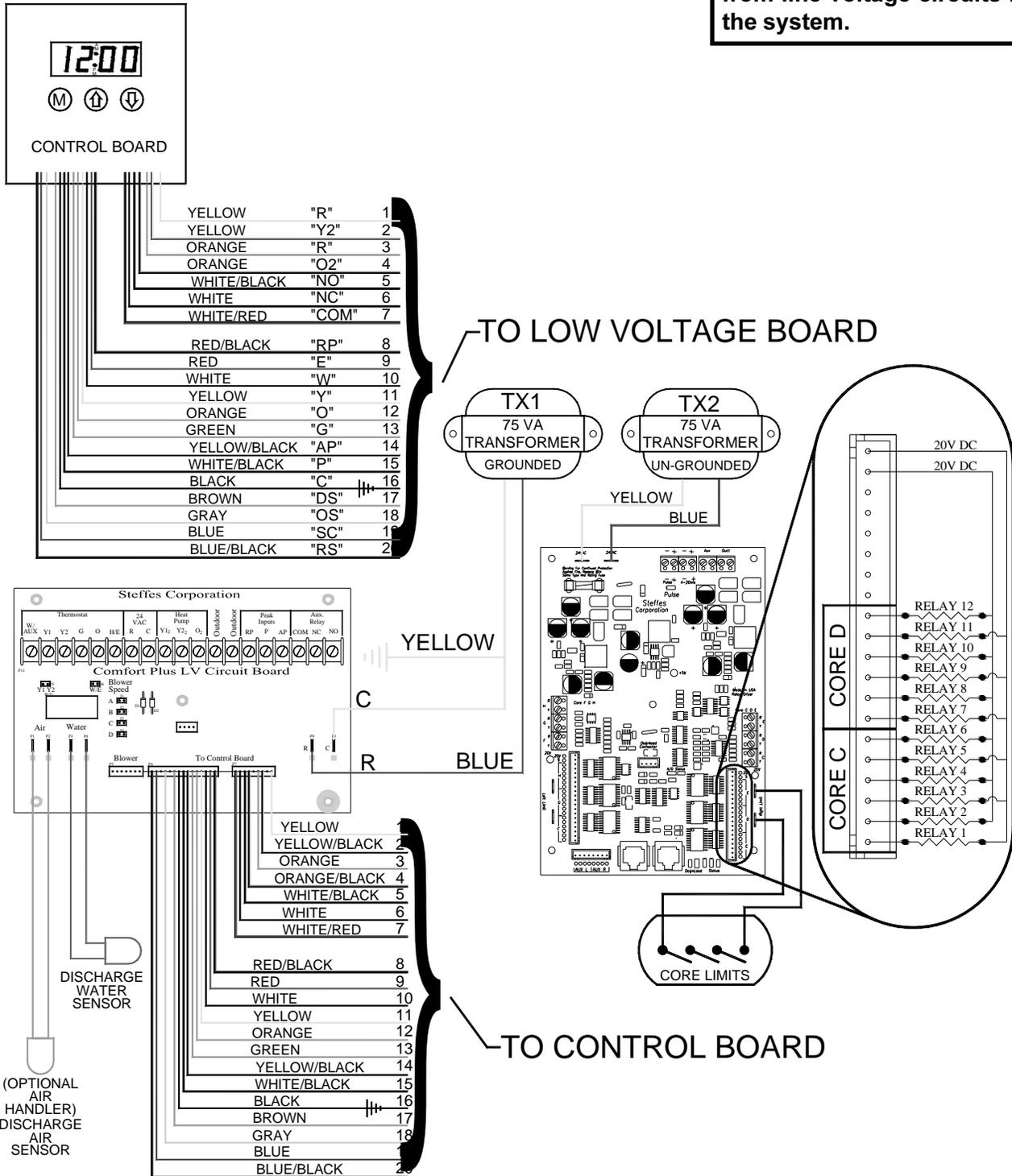


The "R" and "C" positions in the low voltage terminal strip may be used as a source of 24 VAC for powering external low voltage devices (60 VA maximum).



## WARNING

**HAZARDOUS VOLTAGE:** Risk of electric shock. Can cause injury or death. All low voltage wiring must be segregated from line voltage circuits in the system.



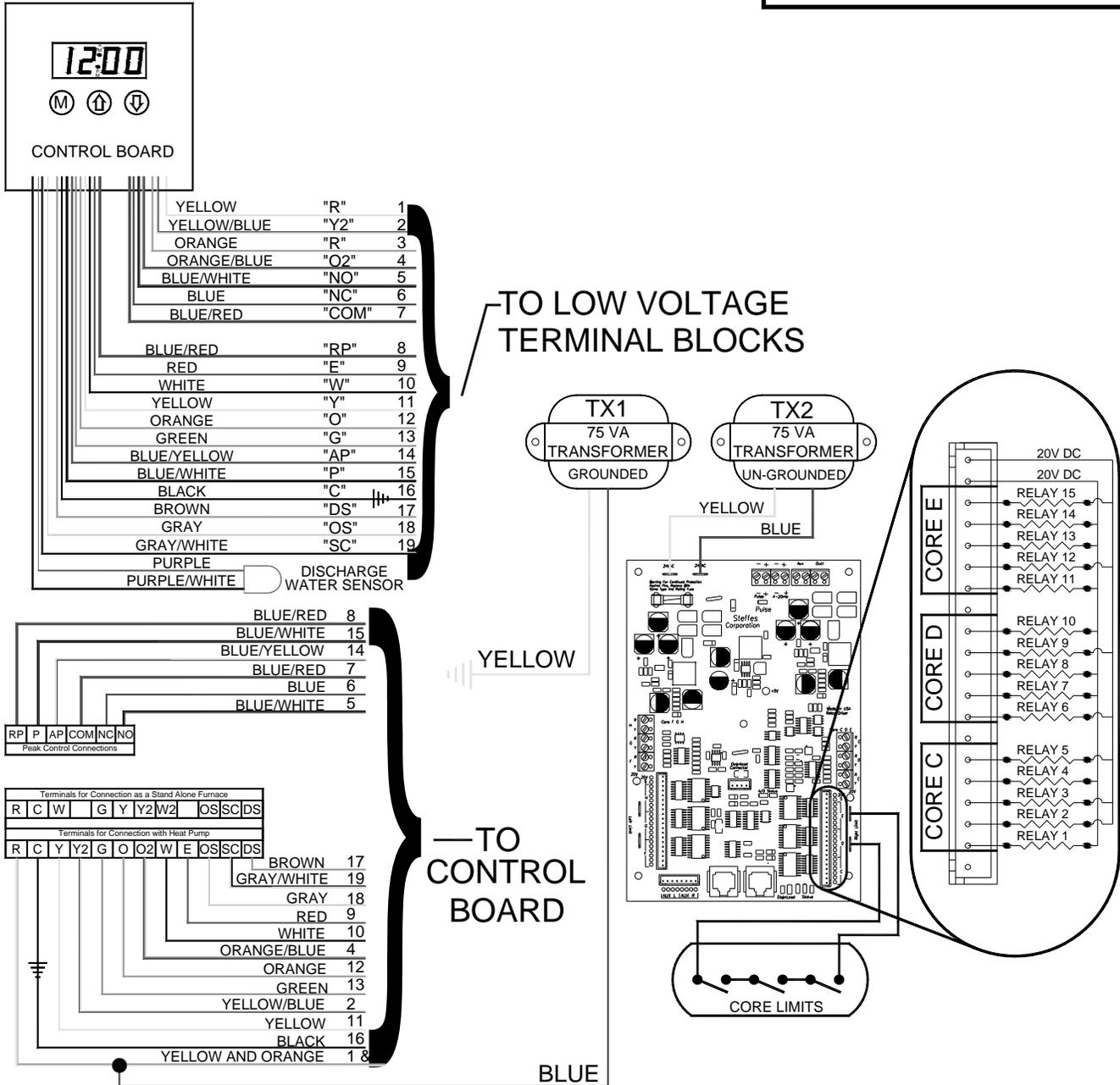
# System Low Voltage Wiring Diagram - 7140



The "R" and "C" positions in the low voltage terminal strip may be used as a source of 24 VAC for powering external low voltage devices (60 VA maximum).

WARNING

**HAZARDOUS VOLTAGE:** Risk of electric shock. Can cause injury or death. All low voltage wiring must be segregated from line voltage circuits in the system.



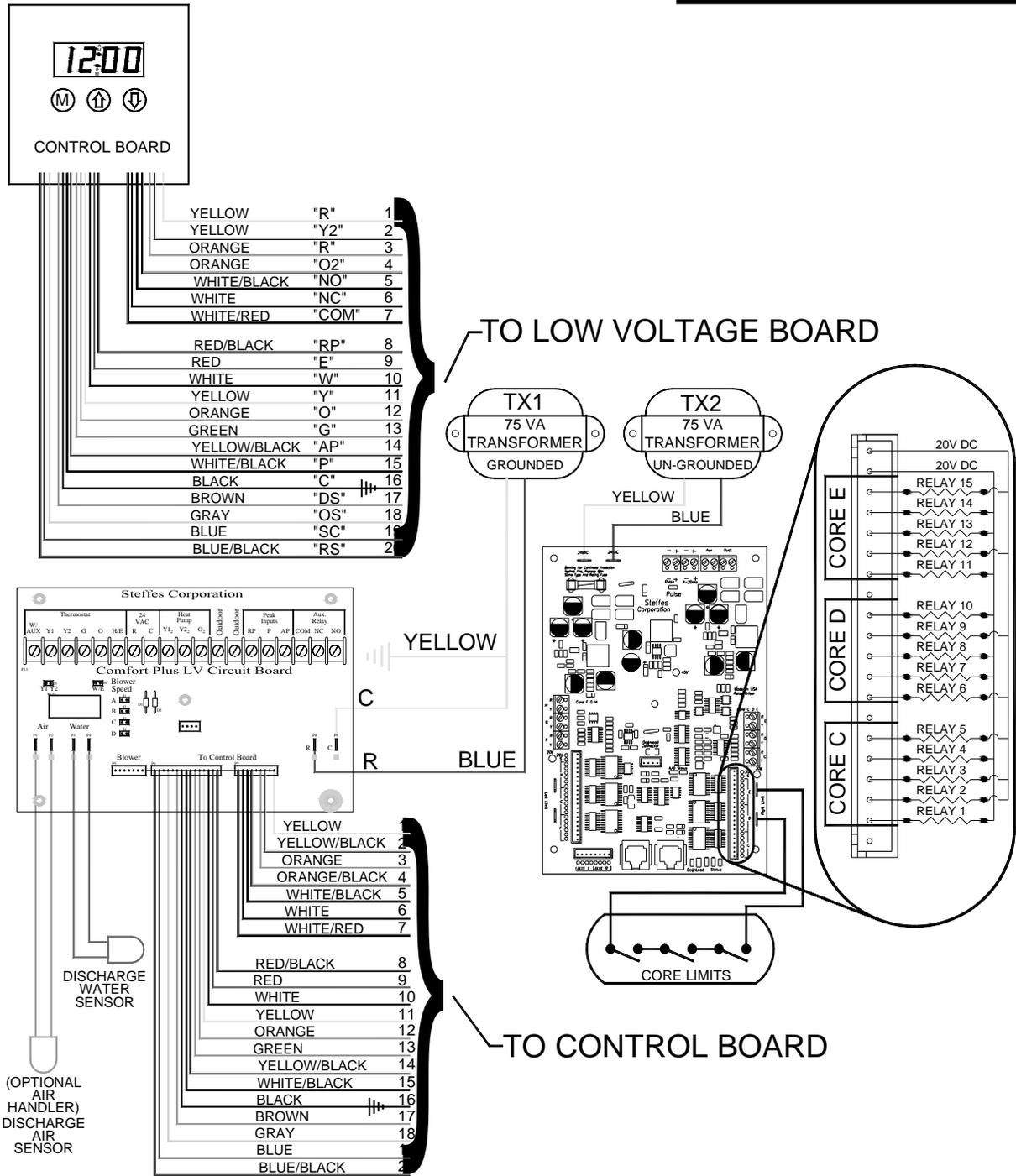
System Low Voltage Wiring Diagram - 7140 with Variable Speed



The "R" and "C" positions in the low voltage terminal strip may be used as a source of 24 VAC for powering external low voltage devices (60 VA maximum).

WARNING

**HAZARDOUS VOLTAGE: Risk of electric shock. Can cause injury or death. All low voltage wiring must be segregated from line voltage circuits in the system.**



## HELP MENU

The Comfort Plus Commercial Hydronic system contains a "HELP" menu which may be accessed through the control panel. To access the "HELP" menu, press and release the **M** button until the faceplate displays "HELP". Scroll through this menu by pressing either the up or the down arrow button.

### Display Reading

<u>Display Reading</u>	<u>Description</u>
Fxxx	Firmware Version Number - Indicates the version of software installed.
O xx	Outdoor Temperature - Indicates current outdoor temperature as recognized by the system.
tL:xx	Target Level - Indicates the percentage of brick core charge level the system is targeting. During peak periods the value displays as "tL_".
CL:xx	Charge Level - Indicates the percentage of heat storage currently in the brick core.
HE x	Heating Elements Active - Indicates the total number of heating elements currently energized.
PC x	Power Line Carrier Channel - Indicates the channel on which the system is set to receive PLC communication signal.
P x	Power Line Carrier Net Hit Rate Percentage - Indicates the percentage of "GOOD" communication packets received by the system from the PLC transmitter system.
PS x	Indicates which Specialty Timer the system is currently using. The value displayed will be zero if the Specialty Timer is not being utilized.
CC_x	Charge Mode Operation - Indicates the charge control method being utilized during off-peak periods.
CA_x	A-Peak Mode Operation - Indicates the charge control method being utilized during anticipated peak periods.
C1_x	Specialty Timer #1 Charge Mode - Specialty Applications Only
C2_x	Specialty Timer #2 Charge Mode - Specialty Applications Only
HUxx	Heat Usage - Indicates the amount of input being dissipated by the system.
A_xx	Target Discharge Air Temperature - Indicates the discharge air temperature that the system is targeting.
cxxx	Compressor Output Relay Delay Timer - Indicates time remaining before heat pump compressor is energized. "c ON" indicates the heat pump is energized.

## ERROR CODES

The Comfort Plus Commercial Hydronic system has an on-board diagnostic system to monitor various operating conditions. If operating conditions move outside the normal operating range, an error code is displayed on the faceplate. If there are multiple errors simultaneously, only the highest priority error code appears. Once corrected, the next highest priority code will be displayed. Error codes will be displayed on the faceplate as "Er—" (i.e., Er05).

<u>Error Code</u>	<u>Description</u>
03	Outlet water temperature is out of normal operating range. This can indicate an open sensor, a short in the wiring, or a circuit board which is out of calibration.
04	Discharge air temperature is out of normal operating range. This can indicate an open sensor, a short in the wiring, or a circuit board which is out of calibration.
05	Outdoor sensor (direct wired) temperature reading is out of normal operating range. The sensor circuit may be open or shorted, the processor control board may be out of calibration, or there may be an incorrect value in L035.


WARNING

**HAZARDOUS VOLTAGE:**  
**Risk of electric shock.**  
**Can cause injury or death. System may be connected to more than one branch circuit.**  
**Disconnect power to all circuits before servicing. Equipment must be serviced by a qualified technician.**

<u>Error Code</u>	<u>Description</u>
06	Outdoor sensor temperature from the transmitting device (PLC system) is out of normal operating range. Check the outdoor sensor attached to the transmitting device and the transmitter for proper operation.
07	Main processor control board temperature sensor is out of normal operating range. Verify that none of the clearances have been violated and inspect the condition of the processor control board.
08	Currently not utilized.
09	Currently not utilized.
10	Outlet water temperature has exceeded the maximum standard operating temperature.
20	There is no communication occurring between the Base I/O board and the processor control board. This can be caused by a defective board interface cable or an unresponsive Base I/O board.
21	There is no communication occurring with the first relay expansion board. The board interface cable may be defective or the first expansion board may be unresponsive.
22	There is no communication occurring with the second relay expansion board. The board interface cable may be defective or the second expansion board may be unresponsive.
23	There is no communication occurring with the Steffes time clock module.
24	Temperature sensor offset/reference is out of range and indicates one of the sensors is shorted to ground, the processor control board is out of calibration, or the blower/control circuit is connected to an improper input voltage.
25	Power line carrier system is active; however, no good data has been received.
26	Insufficient main control board memory. Contact a qualified service technician.
27	Insufficient permanent memory. Contact a qualified service technician.
28	Permanent memory change has been made. Press the <b>M</b> button to accept. This error message indicates a change has been made to the software program; therefore, it is important to verify that all location settings are correct for the application.
29	On-board communication system is not fully operable. Contact a qualified service technician.
30	Base I/O control board is in test mode. Check the jumper configuration.
31	Relay expansion board(s) are in test mode. Check the jumper configuration.
39	Indicates the value in Location 13 (L013) has been set to a value greater than the value in Location 12 (L012). The system will not charge until the value in L013 is set lower than L012.
40	Press and release the <b>M</b> button to clear the error. If the error code reappears, contact a qualified service technician.
41-44	Contact a qualified service technician.
Cold Core	Temperature of the brick core is below 40 degrees or the core sensing thermocouple may be open.
Core Fail	Core high limit switch may be open.
PLC Fail	The system is configured for power line carrier control; however, is not receiving a valid power line carrier communication signal.
LoAd CAP	All controllable loads have been shed and Maximum Load Capacity is still exceeded.

## GLOSSARY

**Air Separator** ~ Device used to remove air from the water so the air does not get into the closed loop system and cause damage to other components.

**Air Vent** ~ Device used to release air from the system. The air vent is generally mounted on top of the air separator.

**Anticipated Peak** ~ Used only by certain power companies as an alternative method of storing heat in the brick core. Indicated by an "A" on the system display.

**Automatic Charge Control** ~ Method of brick core charge regulation where a sensor monitors outdoor temperature and automatically adjusts the brick core charge target level accordingly. As the outdoor temperature drops, the target level rises.

**Brick Core Charge Level** ~ The amount of heat stored in the brick core of the system.

**Charge Period** ~ Off-peak time in which the system is allowed to store heat in its brick core. Indicated by a "C" on the system display.

**Control Panel** ~ Contains the buttons to adjust and the display to indicate system functions. Located on the front of the system.

**Control Period** ~ On-peak time in which the system is not allowed to store heat in its brick core. Indicated by a "P" on the system display.

**Edit Mode** ~ Process of changing or viewing the values in a microprocessor location. This is accomplished with the use of the mode button, the up arrow button, and the down arrow button.

**Expansion Tank** ~ When water is heated, expansion takes place. The expansion tank stores the excess water to maintain proper pressure in the system. In most applications, the expansion tank should be installed prior to the pump for optimum performance.

**Location (Function)** ~ Where the specific operating information of the system is stored. These locations are part of the microprocessor and are accessed through the control panel. Displayed as an "L" on the faceplate when in the edit mode.

**Location Value** ~ The specific information set and stored in a location on the system's microprocessor which defines system operation. A value for a specific location is accessed through the control panel.

**Manual Charge Control** ~ Method of brick core charge regulation where the owner must periodically adjust the brick core temperature setting in relation to the outdoor temperature.

**Microprocessor** ~ Device on the circuit board of the system which stores and processes the information for controlling the operation of the system.

**Off-peak** ~ The time during the day or night when the power company can supply electricity more economically and may offer a special incentive such as a reduced electric rate or billing credits for the electricity consumed during this time. Typically, electrical usage is not controlled during an off-peak time. (The system will provide heat to satisfy comfort requirements during this time as well as charge or store heat in its brick core.)

**On-peak** ~ The time during the day or night when the power company experiences a high demand for electricity. To limit demand, certain appliances are controlled to avoid usage by them and/or a premium for the electricity consumed during this time may be charged to discourage electrical usage. (The system is not allowed to charge or store heat in its brick core during on-peak periods.)

**Outdoor Sensor** ~ Device that senses outdoor air temperature and communicates this information to the system for automatic charge control.

**Pressure Relief Valve** ~ Device that protects the system against the dangers of thermal expansion. If system pressure exceeds normal operating conditions, the relief valve opens and releases excessive pressure from the system.

**Room Temperature Set Point** ~ The targeted room temperature the system is to maintain. If the thermostat(s) senses a temperature below this point, a heat call is initiated.

# **W** Warranty

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Registering your purchase is an essential step to ensure warranty coverage. A Warranty Registration card is included with the Owner's Manual. Simply complete, detach the bottom portion, and return the card today. Retain the top portion of the card for your files.

## **WARRANTY STATEMENT**

Steffes Corporation ("Steffes") warrants that the Steffes Electric Thermal Storage Heating Appliance is free from defects in materials and workmanship under normal use and service. Steffes' obligation under this Warranty is limited to the repair or replacement of the appliance or parts only which prove to be defective under normal use within **two (2) years** of the date of installation and which Steffes' examination of the returned appliance or part(s) shall verify to Steffes' satisfaction that it is defective. Optional Steffes controls and accessories have a **three (3) year** warranty coverage period. The user shall be responsible for any labor costs associated with the repair or replacement of the appliance or part(s), including the cost of returning the defective appliance or part(s) to Steffes Corporation.

This Warranty is void if the heating appliance is moved from the premises in which it was originally installed. This Warranty shall not apply to an appliance or part which has been altered in any respect, or improperly installed, serviced or used, or has been subject to accident, negligence, abuse or misuse.

**THE ABOVE WARRANTY BY STEFFES IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN OR ORAL, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.**

The user assumes all risk and liability whatsoever resulting from the use of this heating appliance. In no event shall Steffes be liable for any indirect, special or consequential damages or lost profits.

This Limited Warranty contains the complete and exclusive statement of Steffes' obligations with respect to the heating appliance and any parts thereof. The provisions hereof may not be modified in any respect except in writing and signed by a duly authorized officer of Steffes.

*Thank you for purchasing Steffes ETS heating equipment. We welcome your comments relating to the Comfort Plus and this manual. Enjoy your new purchase!*



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