

Detailed steps for successful installation of an IR furnace. Includes both standard and optional equipment.

## **1.1 Unpacking the Equipment**

### **1.1.1 Un-banding and Verification**

Remove the banding from the shipping container and carefully disassemble. Refer to the Equipment List in this manual and verify the model of your furnace system and good receipt of all options, accessories, and special configurations, which were ordered according to the original purchase order or specification. If any item listed is unaccounted for, immediately notify the carrier and the LCI FurnacePros Technical Support.

### **1.1.2 Furnace Cabinet Enclosure Considerations**

The furnace enclosure helps provide control of the furnace process environment. However, it is not a structural enclosure.

**WARNING:** Do not step or stand on the furnace top covers or on Load stations. All connections to the furnace shall be self-supporting and shall not impose an additional load on the furnace enclosure.

### **1.1.3 Machine Inspection**

Remove the upper and lower side covers from both sides of the machine. Inspect all lamp connections for soundness and for loose hardware that may have become dislodged during shipment. Inspect the lower electrical compartment for shipping damage, loose connections, or components. Finally, inspect the furnace interior, checking for broken lamps, foreign objects, or any components that may have come loose during shipment. Report any shipping damage immediately to the FurnacePros Technical Support Department.

## **1.2 Installation Requirements**

### **1.2.1 Machine Location**

**Furnace Environment Considerations.** Location of the machine is important. The furnace environment should be clean and dry, especially if the furnace is to be used for to create low oxygen or other controlled environment. The lower the moisture levels in the room where the furnace is located, the easier it will be to achieve low oxygen and moisture levels in the furnace.

Locate furnace away from fans, blowers or other equipment or drafts that can influence atmospheric conditions inside the furnace.

**Installing Through a Wall.** If installing the furnace through a wall between two rooms, make sure that the room pressures are equalized to avoid influencing the furnace atmosphere.

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### 1.2.2 Lifting and Machine Placement

Locate the machine on an unyielding floor in the final installation position so that the access panels along the length of the furnace can be removed for calibration, servicing and maintenance. Lift the machine at the approximate locations shown on the installation drawing (see Documentation Section), and slide the shipment skid out from under the machine. Do not attempt to lift the machine at one point or at points other than recommended; failure to follow these instructions invites frame damage and will void the warranty.

**NOTE:** The lifting device must extend under the machine and support both sides of the frame structure. Ref. drawing 803-091734 Furnace Arrangement for location.

Remove the base covers and adjust the leveling screws to level the frame within 0.06 inch overall. Each of the leveling screws should support an equal amount of weight.

After the frame is level. Adjust the chamber leveling screws to 0.06 inch overall.



Figure 1.2.1 Leveling Feet



Figure 1.2.2 Leveling Chamber Supports

### 1.2.3 Removal of Shipping Restraint Screws

Large furnaces operating at high temperatures experience considerable growth from thermal expansion. All models are equipped with support slides which allow stress free expansion to take place. To secure the process chamber during shipment, restraining brackets (labeled SHIPPING BRACKET) attach directly between the chamber and frame.

Before operating the furnace first remove the top hex nuts and washers which secure each bracket to the frame. Then remove the bracket and discard.



Figure 1.2.3 Shipping Brackets

**WARNING:** Failure to remove the top bracket invites structural damage and will void the warranty.

### 1.2.4 Providing Power

These machines are shipped wired for the voltage specified on the nameplate. The nameplate is located either:

**A** Adjacent to the power entrance hole in the lower electrical compartment. Electrical power, matching the specifications on the nameplate shall be connected to the contactor or circuit breaker located directly above the entrance hole. Connect electrical power through the Power Port shown on the Furnace Arrangement drawing (ref drawing 803-091734) to the main contactor, ref drawing 802-101770 POWER CONTROL SCHEMATIC.

**B** On top of the furnace behind the Over Temperature Monitor enclosure.



Figure 1.2.4 Power Port and Elapsed Time Meter



Figure 1.2.6 Elapsed Time Meter and Nameplate

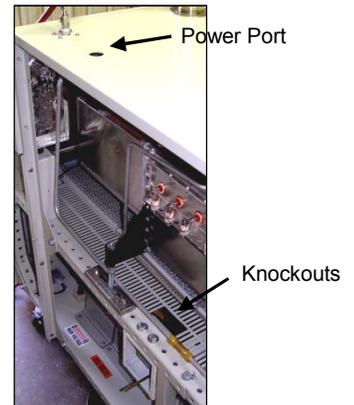


Figure 1.2.5 Disconnect Switch Location

### 1.2.5 3-Phase Disconnect Switch (included option).

Equipment furnished with an interlock 3-phase disconnect requires connection to the terminal block in the provided disconnect enclosure.

Remove the upper and lower panels, numbers 4 and 11 (ref 802-101401-01 PANEL LAYOUT). The disconnect switch must be turned to OFF to remove the lower panel.

Locate the disconnect enclosure behind the lower panel and remove its cover by loosening the two screws. Remove one of the knockouts in the top of the enclosure [use center 1" opening for four (4) #8 AWG wires or larger 1-1/4" knockout for up to four (4) #4 wires]. Pass the 3-phase power lines through the Power Port in the top of the furnace and into the disconnect box.

Connect three phase power lines to the provided terminal blocks. Replace the cover and the panels, making sure to properly engage the disconnect switch with the protruding switch shaft. Startup technician will make final connection at the contactor.



Figure 1.2.7 Disconnect Switch Enclosure



Figure 1.2.8 Enclosure Cover Removed

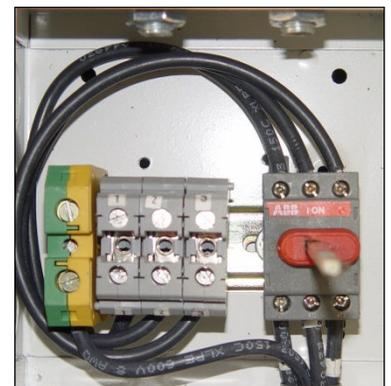


Figure 1.2.9 Disconnect Switch and Power Connection Terminal Blocks

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A ground terminal is provided for a safety ground. All city and local codes should be followed when wiring this system for power. See Facilities drawing 803-091734 and Engineering and Specifications sections of this manual for power requirements.

### 1.2.6 Providing Gas and Air

Oil-free dry nitrogen and shop air, at a maximum recommended dew point of 15°C (59°F), shall be brought to the machine through a customer supplied lines with a minimum inside diameter of 3/4 inch. Supply pressure shall not exceed 175 psig.

In addition to a supply line filters and condensate traps, regulators to reduce supply pressure to 70 psig must be installed on the supply line before entering the furnace. The supply temperature of both gas and air should be above the dew point of the room air to prevent condensation from forming on the feed lines and dripping into the furnace.



Figure 1.2.10 Air Connection

**WARNING:** The flowmeters on these furnaces are rated at 70 psi maximum. Operating above 70 psi exposes the operator to possible injury

### 1.2.7 Process Exhaust Requirements

In most applications, process exhaust and heat should be vented to the outside atmosphere. It is the customer's responsibility to review the process, local laws, and facility in deciding on an exhaust system. Insulated exhaust tubing and a collector hood with a 4 inch inside diameter, or larger, is routinely used. Do not make any direct connections to the chamber exhaust stacks. A minimum 8.0 inch clearance between the exhaust stacks and venting device is required. See Figure 1.2.11 Exhaust Connection and Figure 1.2.12 Exhaust Connection Detail for typical exhaust connections.



Figure 1.2.11 Exhaust Connection



Figure 1.2.12 Exhaust Connection Detail

### 1.2.8 Water Supply and Drain Connections (option, not applicable)

Clean water supply line shall be provided for Ultrasonic Cleaner Dryer (UCD) system. The water filter installed in the furnace as shipped is new, except for use in factory testing. The furnace is shipped with a spare water filter to be installed during startup, or as required.

Pipe water connection through rectangular opening in lower panel Figure 1.2.13 Water Connections and Air Purge. Supply pressure shall not exceed 100 psig.



Figure 1.2.13 Water Connections and Air Purge

Connect UCD drain line to accommodate maximum flow of water at 12 gpm at 40 psig.

Owner may wish to connect the condensate air purge to drain. Condensate purge may not release much water if the air supply is sufficiently dry and the system is purged at frequent enough intervals.

See 803-091734 for connection locations and sizes.

### 1.2.9 Installation of the Transport Belt (applies to split chambers only – not applicable)

A portion of the transport belt which goes through the furnace chamber was intentionally left uninstalled to protect the furnace interior during shipment. When installing the belt, it will be helpful to have an assistant available to help guide the belt into the furnace entrance.

The portion of the belt which goes through the furnace is rolled up and secured at the entrance end of the furnace. Unroll the belt and attach it securely to the pull wire that was left in the furnace chamber.

Pull the belt through the chamber from the exit end of the furnace, while an assistant guides the belt into the entrance.

Once the belt has been pulled completely through the chamber, remove and discard the pull wire. Splice as shown in Figure 1.2.14 Belt Splice.

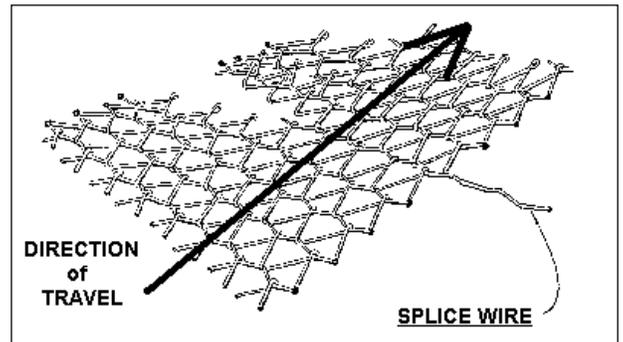


Figure 1.2.14 Belt Splice

### 1.2.10 Removal of Shipping Restraint Screws

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Figure 1.2.15 Shipping Brackets

**WARNING:** Failure to remove the top bracket invites structural damage and will void the warranty.

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### 1.2.11 Computer Power Options

The furnace is shipped with the computer powered through an unswitched connection labeled **Computer Unswitched**. In this mode the computer is prevented from inadvertent power down when the Furnace Power OFF button is pressed. However, if the computer has been powered down, Operator must open computer access door and start the computer just before restart of the furnace.

### 1.2.12 Installation of Owner Supplied UPS

If desired a uninterruptible power supply (UPS) can be installed by FurnacePros, or the Owner. See Sections 4 and 5 for information on computer power requirements necessary for sizing the UPS.

To install the UPS, locate the lower access panel located near the entrance of the furnace on the side opposite the Control Console. Install the UPS in this area on the furnace floor panel so that it is well supported. Provide power to the UPS through the standard 117 Vac socket labeled “COMPUTER UNSWITCHED”. Plug the UPS serial or USB connector into the rear panel of the computer tower.



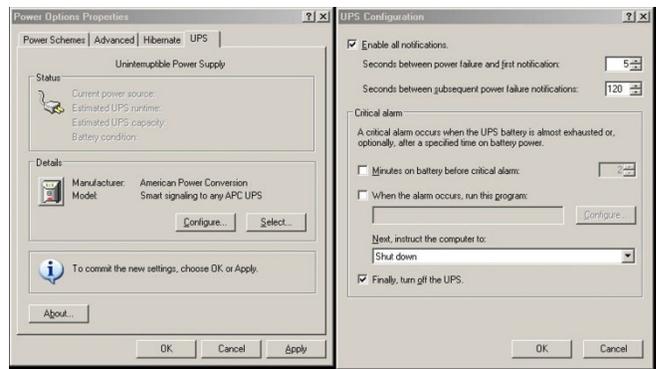
Figure 1.2.16 Computer “Unswitched”

To install the manufacturer’s software, insert the UPS Installation Disk in the optical drive accessed through the computer access opening below and left of the control console. Follow UPS manufacturer’s instructions for proper installation and configuration of the UPS to allow normal computer system shutdown in the event power is removed from the furnace system.

To install the UPS in WindowsXP, start the computer and insert the UPS Installation Disk in the computer optical drive accessed through the computer access door below and to the right of the Control Console.

To setup the UPS in WindowsXP:

- 1) Click on Start/Control Panel
- 2) Select Power Options
- 3) Select the UPS tab.
- 4) Select manufacture and model buttons and enter preferences to allow normal computer system shutdown in the event power is removed from the furnace system.



## 1.3 Machine Label

The furnace label shall generally appear as in Figure 1.3.1 and indicate the maximum power and current draw. Actual operation values are much lower and can be found in Section 4 Specifications.



Figure 1.3.1 Name Plate”

## **1.4 Startup**

### **1.4.1 Owner's Responsibility**

Prior to Startup, it is the Owner's responsibility to accomplish the Installation tasks described in sections 0 Detailed steps for successful installation of an IR furnace. Includes both standard and optional equipment.

Unpacking the Equipment through 1.2.8 Water Supply and Drain Connections and 1.2.12 Installation of Owner Supplied U, as applicable. When the FurnacePros Technical Support or Service technician visits the user's plant, the technician will require the help of at least one customer representative who will be responsible for the operation and maintenance of the furnace system.

### **1.4.2 Startup Tasks**

Tasks typically performed during startup by the FurnacePros Field Service representatives include:

- Checkout before first operation.
  - Remove shipping restraint screws
  - Verify transformer settings for customer supply power. Connect disconnect switch to main contactor for customer supply power.
  - Verify air and water hookup and regulator settings.
- Apply power, run through the installation checkout and test procedure.
  - Check/confirm voltages.
  - Re-calibrate all SCR's
  - Re-calibrate belt. Verify tracking.
  - Check operation of Ultrasonic Cleaner Dryer system
    - Verify valve and equipment sequencing, water pressure
    - Leak check water system
    - Verify timer settings for UCD clock start and drain
  - Check operation of Over Temperature system. Adjust as necessary.
  - Purge air tank. Leak check air system.
- Cycle machine to a fully operational state.
- Report to the customer any deficiencies noted in the installation of the machine.
- Instruct the appropriate personnel in the customer's plant how to operate the furnace system.
- If training has been included, a manufacturer's representative shall train the appropriate personnel in the customer's plant on furnace operation and necessary preventive maintenance.
- Owner preferences:
  - Install furnished spare water filter during startup?
  - Computer operation preference (switched/unswitched?).
  - Verify timer settings for UCD clock start and drain.
  - Furnace profile default settings.
- Replace Covers. Before operation for production, install any covers that were removed during the functional checkout.

**NOTE:** All functions must operate properly before proceeding. Refer to the Service Information section and correct any malfunctions before completion.

- Turn over the machine and documentation to the customer.

**Section 1**

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