

## 1.1 Unpacking the Equipment

### 1.1.1 Machine Placement

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 FurnacePros Technical Support.

## 1.2 Installation Requirements

### 1.2.1 Machine Placement

The machine should be located on an unyielding floor in the final installation position so that the access panels along the length of the furnace can be removed for the upgrade work, service and maintenance. If lifting is required, lift the machine at the approximate locations shown on the original installation drawing. 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.

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

### 1.2.2 Machine Inspection

Whenever, the furnace has been moved, remove the upper and lower side covers from both sides of the machine and inspect all lamp connections for soundness and for loose hardware that may have become dislodged during the move or shipment. Inspect the lower electrical compartment for shipping damage, loose connections, or components. Finally, inspect the furnace interior, checking for broken lamps, foreign

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objects, or any components that may have come loose during shipment. Report any shipping damage immediately to the FurnacePros Technical Support Department.

### 1.2.3 Providing Power

These machines are shipped wired for the voltage specified on the nameplate located 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. A ground terminal is provided for a safety ground. All city and local codes should be followed when wiring this system for power. See Engineering and Specifications sections of this manual for power requirements.



Figure 1.2.3 Power Port and Elapsed Time Meter

### 1.2.4 Providing Gas and Air

Oil-free dry shop air, at a maximum recommended dew point of 15°C (59°F), shall be brought to the machine through a customer supplied line with a minimum inside diameter of 3/4 inch.

In addition to a supply line filter and condensate trap, a regulator limiting the supply pressure to 70-110 psig is required. 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 1.2.4 Air Connection

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

The air filters installed in the furnace as shipped are new, except for use in testing and product curing. The furnace is shipped with a spare air filter kit to be installed during startup, or as required. Open the lower panel below the flowmeters to access the furnace filter and regulator.

### 1.2.5 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.

### 1.2.6 Installation of the Transport Belt

A portion of the transport belt which goes through the furnace chamber is intentionally removed to protect the furnace interior during shipment. When reinstalling 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 1.2.5 Belt Splice.

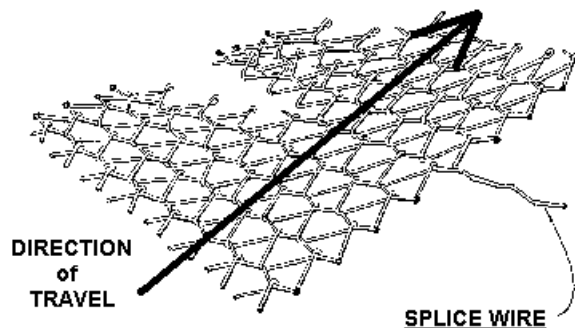


Figure 1.2.5 Belt Splice

### 1.2.7 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 (painted red) attach directly between the chamber and frame. The screws which secure these brackets to the frame must be removed before bringing the furnace up to operating temperature.



Figure 1.2.6 Shipping Brackets

**WARNING:** Failure to remove slide restraint screws invites structural damage and will void the warranty.

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### 1.2.8 Installation of Owner Supplied UPS for Computer

The furnace is shipped with the computer powered through an unswitched connection. If desired a uniform power supply (UPS) for the computer and monitor 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 to the Computer Receptacle Strip. Plug the UPS serial or USB connector into the rear panel of the computer tower.

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 optical drive accessed through the computer access opening below and left 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.

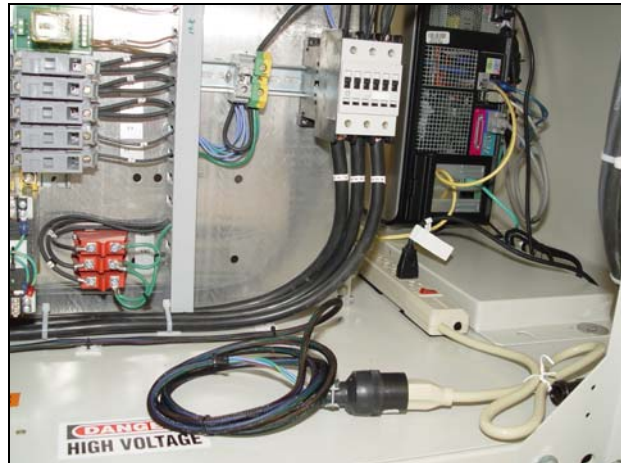


Figure 1.2.7 Computer "Unswitched" (default)

## 1.3 Controls Upgrade Tasks

### 1.3.1 Preparation

The following items will be completed by KYOCERA prior to FurnacePros arrival:

- 1) KYOCERA shall remove damaged aluminum Closed Atmosphere Cooling system from furnace.

### 1.3.2 Prepare New Computer and PLC Interface Components

The following items were completed by FurnacePros at FurnacePros facility:

- 1) Prepare new Dell Optiplex RAID1 PC, load latest drivers, OS updates and furnace control software.
- 2) Configure PLC LCM4. Configure and install M4SENET-100 Ethernet card in LCM4. Setup PS5 power supply.
- 3) Download new furnace program from PC to new PLC LCM4/M4SENET-100.
- 4) Test PC with PLC and all peripherals with installed software with Mystic modules
- 5) Prepare Hardware and Software documentation.

## 1.3.3 Install New Computer and PLC Interface

The following items will be completed by FurnacePros at KYOCERA's facility:

- 1) Remove computer.
- 2) Wire PC and monitor power strip to transformer TR0 "always on" 117 VAC terminals inside RTC furnace.
- 3) Turn on main breaker, powering up TR0 and base control system.

Note: This is new wiring of the computer equipment to the furnace lower electrical panel provides unswitched 117 VAC power to PC and monitor so that they stay "on", regardless of control panel ON/OFF pushbutton selection, as long as power is supplied to furnace from the facility's main circuit breaker. This arrangement facilitates reliable startup and shutdown of the PC under the Windows XP operating system, allow the PC and monitor to be used without powering up the furnace, and extend PC life and reliability.

- 4) Install new computer.
- 5) Plug PC and monitor into "always on" power strip.
- 6) Mount PLC LCM4 Controller and Power Supply. Connect to existing Mystic Remote Interface and new computer.
  - a. Verify PC with PLC operation with existing Mystic analog and digital bricks.
  - b. Turn on S-1215 via "ON" button on console.
  - c. Test/verify PLC software and Ethernet connection to PC.
- 7) Verify PROCESS READY by starting up furnace.

## 1.3.4 Cooling Sections

- 1) Remove current water cooled section of furnace
  - a. Remove all existing water plumbing inside furnace
  - b. Disconnect process gas lines from cooling section
  - c. Disconnect belt and pull it back from cooling section
  - d. Remove all 3 existing 30" water cooled modules
  - e. Remove furnace "rapid cool" exit baffle water cooling capability. but retain rest of the exit baffle
  - f. Retain cooling section exit baffle
- 2) Install 3 new Stainless Steel cold wall water cooling modules
  - a. Connect and seal flanges between furnace exit baffle, modules, tunnel, and cooling exit baffle.
  - b. Reconnect belt through new cooling section
  - c. Install new water plumbing
  - d. Splice belt and pull it straight
  - e. Connect all temperature sensors
  - f. Connect existing process gas flow meters: Cooling 1 to water cooling 1, Cooling 2 to water cooling 2, and Cooling 3 to water cooling 3 and cooling tunnel

## 1.3.5 Thermocouples and Lamps

- a. Remove existing chamber thermocouples
- b. Install and set height of new thermocouples
- c. Install light tower lamps and test
- d. Install new control panel lamps and momentary switch

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### 1.4 Startup Tasks

Startup services are to be performed by FurnacePros. Tasks typically performed during startup by the Service technician include:

- 1) Prepare the machine for operation.
- 2) Apply power and bring up the machine to a fully operational state.
- 3) Run through the installation test and checkout procedure. Calibrate Belt Speed and SCR's
- 4) Report to the customer any deficiencies noted in the installation of the machine.
- 5) Instruct the appropriate personnel in the customer's plant how to set up and run the furnace system.
- 6) 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.
- 7) Replace Covers. Before operation for production, install any covers that were removed during the functional checkout.

<p><b>NOTE:</b> All functions must operate properly before continuing. Refer to the Service Information section and correct any malfunctions before proceeding.</p>
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- 8) Turn over the machine and documentation to the customer.