

Bench Series Ovens Operating Manual

ER Models 21 /31 /51



Standard Contents

- (1) Bench ER Series Oven
- (2) Adjustable chrome wire shelf
- (4) Shelf brackets

Approvals:

Underwriter's UL / CUL, United States/ Canadian for laboratory equipment.

Compliance: UL Standard 61010-1
IEC 61010-1.

 **NOT FOR USE WITH FLAMMABLE LIQUIDS OR GASES**



<u>SPECIFICATIONS</u>	MODEL 21-250ER	MODEL 21-350ER	MODEL 31-250ER	MODEL 31-350ER	MODEL 51-550ER
INTERIOR DIMENSIONS INCHES W x H x D (CM) W x H x D	25.5x19.7x24 64x49.5x60	25.5x19.7x24 64x49.5x60	25.5x29.7x24 64x75.5x60	25.5x29.7x24 64x75.5x60	25.5x19.7x22.5 64x49.5x57
EXTERIOR DIMENSIONS INCHES W x H x D (CM) W x H x D	33x24x35.5 83x60x90	33x24x35.5 83x60x90	33x34x35.5 83x86x90	33x34x35.5 83x86x90	33x24x35.5 83x60x90
TEMPERATURE RANGE Ambient + 25F to	300°F/150°C	450°F/232°C	300°F/150°C	450°F/232°C	550°F/287°C
CONTROL STABILITY @ 100C @ 200C	+/- 0.2° C NA	+/- 0.3° C +/- 0.5° C	+/- 0.5° C +/- 0.5° C	+/- 0.5° C +/- 0.5° C	+/- 0.5° C +/- 0.5° C
STANDARD ELECTRICAL VOLTS/AMPS WATTS PLUG/NEMA	120/8.75* 1050 5-15P*	120/16* 1920 5-20P*	120/16* 1920 5-15P*	120/16* 1920 5-20P*	230/12.5 2850 6-20P
* Standard models voltage only, optional 230 voltage available. Check label on back of unit.					
WEIGHT SHIPPING STAND ALONE	185 165	185 165	225 200	225 200	195 170

Common Unit Construction

Exterior:	Powder Coated Steel	Interior:	Aluminized Steel (SS optional)
Insulation:	Fiberglass	Motor:	Sealed Ball Bearing
Thermo-control:	Hydraulic	Heater:	Resistive - Tubular Incoloy

**IMPORTANT**

Refers to an important note in the usage of the unit.

**WARNING**

Warns of a possible electrical shock

**WARNING**

Warns of a possible risk of fire

**CAUTION**

Cautions of HOT exterior surface during operation.

**WARNING**

Warns of possible injury or muscle strains, use assistance when moving or lifting.

Safety Precautions **Read Operating Instructions Thoroughly Prior to Operation****Read Operating Instructions thoroughly prior to operation and observe the following safety precautions:**

- Use only a grounded outlet that is rated for your model's electrical requirement.
- Do not modify the oven or factory control settings to operate the oven above the stated maximum operating temperature.
- Exterior surfaces on the Bench Oven models may become hot to the touch when operating at higher set temperatures.
- Do not leave the oven unattended during operation.
- Conduct periodic maintenance as required.

**WARNING:** Do not place volatile or combustible materials into Bench Ovens.**CAUTION:** This unit is not intended for use with any flammable liquids or vapors, or with chemicals that produce toxic gases.**Set-Up & Installation**

- Locate and place the oven on a suitable, clean, and solid surface.
- Maintain a minimum of 6 inches of air space between the rear electrical cover and any building or vertical surface.
- Do not cover or restrict air flow at the rear air intake ports, this will cause the motor to over-heat, shortening the motor's life and increase risk of fire.
- Heated exhaust air is expelled through the two small ports located just above rear electrical cover. (FIG. 2) Keep materials or building surfaces that may be susceptible to this heated exhaust air clear from rear area.
- Maintain a minimum 5 feet of unobstructed space above the oven to allow exhaust air to convect up and away from the air intake ports.
- Keep 3" of air space at the oven sides (3" from control panel cover).

For units with optional Exhaust Chamber Adapter, see page 5.

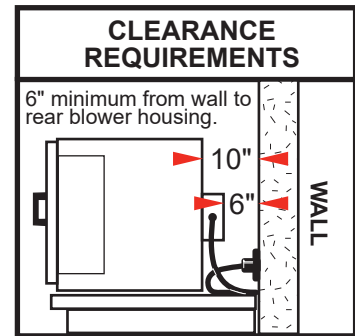


FIG. 1

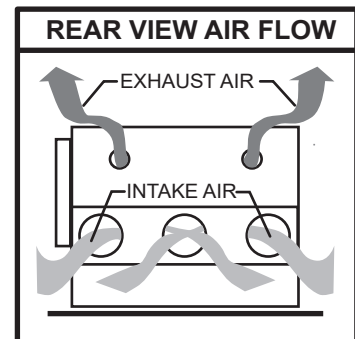


FIG. 2

Electrical

Plug the unit into a grounded outlet for your unit's rated voltage. Isolate each model to a separate, appropriately rated circuit or breaker.

Below are NEMA plug configurations that are supplied with the various Bench Series ovens. These configurations will also help to identify the ovens electrical rating or power requirements.

**See electrical label on the right rear side of electrical cover to verify your units power requirements.**

Shelf Installation and Use

Install adjustable shelf by first placing the shelf bracket rivets into the corresponding keyhole supports located on each inner side of the oven.

Orientate the bracket in the "down" or "L" position. This position guides the shelf in and out and protects the side wall from being scratched. The bracket may also be placed in the "up" or "┘" position if slightly more interior clearance is needed. Place the shelf on the brackets as shown. (FIG. 3)

- ⚠ Each shelf will support a distributed load of 100 lbs. maximum. Do not exceed a combined total of 300 lbs. within the oven at one time. Avoid placing articles on the oven floor. Instead, use a shelf at the lowest adjustable position.
- ⚠ Care should be taken when removing articles from the oven. Don't pull the shelf out when removing heavy loads. **The shelf is not secured and loads can tip and fall forward.**



FIG. 3

General Operation

All control parameters and other control variables have already been factory set for your model's temperature range and capacity to provide heating and performance characteristics for a broad range of applications. Your Bench Series ER oven is ready for operation.

NORMAL OPERATION

■ Turn the **power/recirc.** fan switch to the up position.

The blower will begin to circulate chamber air and the temperature controller will power ON.

■ Turn heater switch to the up position (heat).

Units heat elements will activate and begin heating. *If heater switch is not in the ON position the unit will not heat.*

■ Digital Controller Set-point Temperature.

The controller will begin its normal process to reach the factory default temperature set-point. The heat cycle indicator light on the controller will activate and cycle on and off with the heaters to reach and maintain the set temperature.

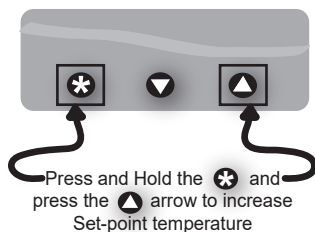
Typically, the oven will need to cycle at the set temperature for a minimum of 20 minutes before it will achieve equilibrium and becomes stable (see stability specs. on page 1).

ADJUSTING CONTROLLER'S SETPOINT TEMPERATURE

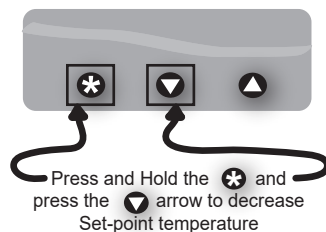
Upon start-up all Quincy Lab Bench Ovens will display the current chamber temperature (green LEDs) and begin the heating process to the factory default temperature set-point (orange LEDs) which varies depending on your oven's model.

To change the factory default set temperature simply do the following:

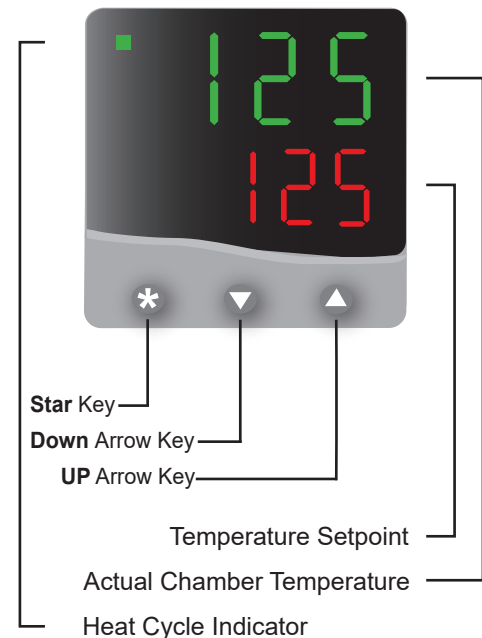
TO INCREASE TEMPERATURE SET POINT



TO DECREASE TEMPERATURE SET POINT



DIGITAL MICROPROCESSOR Temperature Controller



General Operation (continued)

Pressing the star key  alone verifies the control's temperature display units in degrees F or C (factory set at "°F" for Fahrenheit).

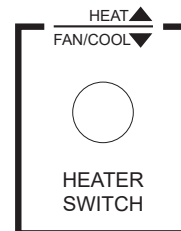
To change the display units to read in Centigrade, see the control's **Menu Level Functions** on page 6.

The temperature setting is maintained in the control whenever the power is turned off. When the oven is turned back on it will begin heating toward the temperature setting.

HEATER SWITCH

The heater switch in the off (down) or fan/cool position allows for convenient ambient air drying of articles or to more slowly & evenly cool heated articles without having to lower or change the temperature setting.

The heater switch in the off or cool position also allow the oven to cool before turning the fan off when using the oven at higher temperature settings. This helps to both cool the motor (prolonging its life) and remove any moisture-laden air before it condenses in the chamber, which will help prevent premature corrosion over time.



Chamber Loading and Oven Performance

When loading the oven place items in the oven in such way that air circulation within the oven is not impaired. Note the air flow from the top section view (FIG. 4). Heated air flows from back to front along the side walls, moves horizontally toward the chamber center and then back toward the recirculating blower.

Placing an article against the side walls or rear blower return vent opening will greatly affect unit performance i.e. chamber uniformity, run-up & recovery, maximum operating temperature, and energy use efficiency. Here are some guidelines that are critical to optimum oven performance and better/faster work-load processing.

OPTIMAL CHAMBER LOADING

- Leave a space between articles on a shelf.
- For best processing performance for a single item, adjust one shelf so that the article is centered in the oven.
- Avoid placing articles on the oven floor. Instead use a shelf at the lowest adjustable position.
- Do not place articles against the inner side walls or the slotted vents in rear air plenum. (This will obstruct air flow and degrade uniformity).
- Do not overload the unit with large or high-density loads. (This will show by non-uniform processing and/or long heat-through or processing times).

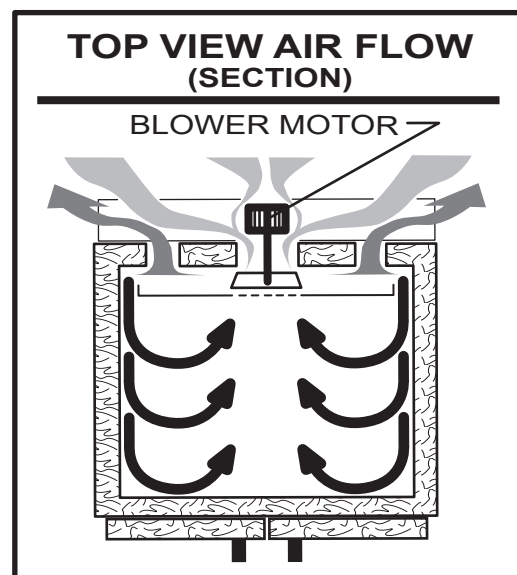





FIG. 4

Control Calibration to Match Independent Device

A controller calibration (offset) should only be performed in the event that the temperature displayed on the digital microprocessor does not match the oven's interior chamber temperature as measured at the center of the unit with an accurate independent device.

 **All of our units are calibrated at the factory using an N.I.S.T certified digital controller and probe which is placed at the center of the heating chamber as the calibration point.**

To perform a calibration you will need to access the "Zero" parameter on **LEVEL 3** (see page 6 for more on accessing controller levels)

Once on the "Zero" parameter on **LEVEL 3**, offset the difference on the controller to match you independent temperature device. Simply press and hold the  button on the controller and change the value using the  or  arrow key.

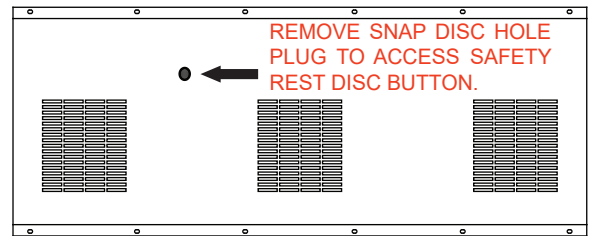
Safety Alarm Reset

THERMO SAFETY ALARM

The unit incorporates a thermo safety shut-off. In the event of electronic failure, an internal “snap disc” will cut off power to the unit until it is manually reset. To reset oven, unplug the unit, locate ‘SNAP DISC HOLE PLUG’ (FIG. 5) in the back of the unit. Remove plug and with a **NON- METEAL** rod press on the button to reset.

WARNING:

RISK OF ELECTRICAL SHOCK. DISCONNECT UNIT FROM POWER SOURCE BEFORE REMOVING COVER. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY OR DEATH.



UNITS REAR ELECTRICAL COVER

FIG. 5


Connecting to the Exhaust Chamber Adapter (Optional)

The optional exhaust chamber adapter is used to vent oven chamber fumes and heated moisture-laden air to a building's exterior for the purposes of minimizing excess heat, humidity or unpleasant but otherwise harmless fumes within an interior working environment.



The exhaust chamber system as a whole is not designed for use to remove harmful or flammable gases or vapors since the oven itself is not rated for use with such materials

It is recommended that the attached exhaust chamber and piping be checked once a year for any obstruction from dust, dirt, or material process "plaque" build-up from processing certain materials. Check with the manufacturer of the materials used in your process if heating the material may produce a bi-product or out gassing that may build up on the interior surface of the oven, exhaust chamber or piping and present a fire hazard over time.

 Contact an HVAC engineer for assistance with installation or questions regarding proper venting requirements in your specific building or location, and if any local or national fire or safety codes may apply for your application or process.

CONNECTING TO THE EXHAUST ADAPTER

- Connect the exhaust chamber adapter with standard 3" or 4" diameter single or double-wall steel or galvanized pipe.
- A minimum of 4 inches of clearance should be maintained between the connected pipe and any building surface or material. (FIG. 6)
- For best performance, run a short pipe horizontally (3 feet max.) directly through an exterior wall.

For vertical runs the exhaust pipe should not have more than one (1) 90 degree elbow, a maximum horizontal run of 3', and a maximum of 15' vertically. Exceeding these recommendations may cause improper ventilation.

Poor exhaust quality would be indicated by an excess of fumes and or vapor from around the door gasket versus what would normally be present if no exhaust venting was used.

Piping run lengths can be extended beyond recommended maximums where a connection to an existing ventilation or exhaust system provide a larger pipe diameter and/or a mechanically powered draft that provides a negative pressure at the point of connection. Mechanically powered vent systems work best to eliminate fumes and moisture vapors, but depending on vacuum strength at the point of connection, it may slightly reduce the oven's time-to-temperature and recovery performance.

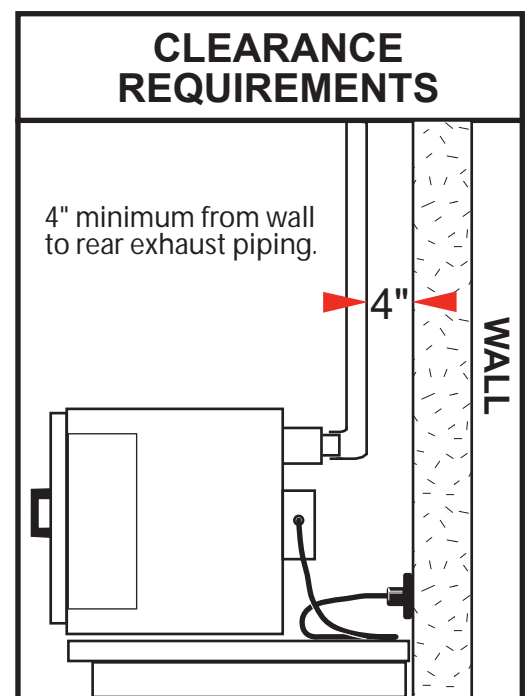


FIG. 6

Menu Level Functions

Access the menu levels for the following functions:

- Change control to read in C or F temperature units (**UNIT** in level 2).
- Change to whole degree or 1/10th degree display resolution (**DISP** in level 2).
- Run or Read temperature tracking /data (**CHEW** or **REARd** in level 3).
- Lock Temperature setting against inadvertent adjustment (**SPLd** in level 1).
- Calibrate control temperature to an external standard (**ZEERd** in level 3).
- Auto Tune PID performance parameters (**tUNE** in level 1).

FUNCTION PROMPT



FIG. 7

! All user-applicable functions and their menu locations are outlined in **red** in Menu Guide below

To access the menu levels:

Press and hold both arrow keys until the "tune" / "off" function prompt is displayed from within LEVEL 1. When in the function menu the LED display will alternate the function prompt with the current function setting when keys are released. See "menu entry point" in Menu Guide below.

To navigate within the menu:

Press the down arrow to move "Left" into menu LEVEL SELECTION (**LEVEL 1** level 1) (**FIG**). Use up and down arrow keys individually to move "right" or "left" within a level. Hold star key and up or down arrow keys to move "up" or "down" through levels 1, 2 and 3. (Note: you must be at **LEVEL 1** prompt to move up/down thru levels)

To change the function setting (or to read function data - if a read only function):

Once at the desired level function prompt, press and hold the star key and press the up or down arrow key to change a function setting or to read alternate function data. Release star key to set the function. Press and hold the up and down keys together to return to temperature display, or control will auto-return in 60 seconds.

Functions Menu Guide

LEVEL 3 (PRESS) * ↓

SP1d SP2d burn REUd REUL SPAN ZEERd CHEW REARd tECH UEr rSEt

RELAY OUTPUT TYPE SAFETY SETTINGS CONTROL CALIBRATION TEMPERATURE TRACKING

LEVEL 2 (PRESS) * ↓

SP1P hARnd PL1 PL2 SP2A SP2b DISP HISC LoSC INPt UNIt

MANUAL ADJUSTMENTS AUDIBLE/ALARM MODES RESOLUTION, RANGING, INPUT AND UNIT SELECTION

LEVEL 1 (PRESS) * ↓

tUNE bARnd Int.t dEr.t dARd CYC.t oFSt SPLd SEt.2 bnd.2 CYC.2

PID AND PERFORMANCE SETTINGS SP2 AUDIBLE / ALARM SETTINGS

LEVEL P (PRESS) * ↓

Prog run FAIL Stw SPru SEQ tYPE SPrr tSP hbU EoP

RAMP & SOAK PROGRAM SETTINGS

! **IMPORTANT NOTE**

The non-high-lighted control functions within the menu levels are factory set for the basic and **safe operation** of your model oven. Care should be taken when navigating or changing **user-applicable settings**, outlined in **red**, so as not to alter these factory settings. Factory settings for each function are listed within the parentheses "()" in each function tab above - use only as a trouble-shooting reference.

Press up & down arrow keys to scroll back-and-forth through level functions

Press star key & up or down arrow key to scroll through functions levels

Level "P" is the Ramp & Soak program level. See separate Ramp & Soak Programming Operating Manual





MENU ENTRY POINT


Temperature Tracking Feature

This feature monitors the stability of the control during any given length process. It will record and display the following:

- The total variation or spread between high and low temperature.
- The absolute or maximum high temperature
- The absolute or minimum low temperature

How to start the tracking feature

- Navigate on the controller to "CheK" prompt in menu level 3. (see page 6 for more accessing controller levels)
- Once on the "CheK" parameter hold the star key  and then the up arrow key  to select the **ON** option.
- Return to temperature display by pressing and holding both arrow keys simultaneously   until temperature is displayed or simply allow the control to auto-return in 60 seconds.
- The control will track the temperature variation until "CheK" is turned to **OFF**. Recorded readings are retained until next "CheK" ON.

 You can view readings at any time during or after tracking feature has been turned off. But de-powering the unit will reset "CheK" to OFF and "rEAd" to zero.

To view total temperature variation navigate to "rEAd" prompt in menu level 3. (see page 6 for more accessing controller levels)

EXAMPLE: The example below shows a typical temperature tracking reading in sequence from left to right .



Displays total variance (0.9°)



Press & Hold 
Then Press  Once
Displays High Variation



Press & Hold 
Then Press  Once
Displays Low Variation



Advance Control Operation

AUTO-TUNING performance parameters PID:



The control's PID performance parameters as well as other control variables are factory tuned for your model's temperature range and capacity to provide heating and performance characteristics for a broad range of applications. For certain applications, such as extra large or high density loads, it may be necessary to generate new PID parameters to improve oven performance.

To customize performance for a specific application, activate the auto-tune function. At the "tunE" prompt in the functions menu, change the function setting from "off" to "on". **NOTE:** To tune parameters more accurately for set temperatures below 250 degrees F, change the function setting to "At.SP" (at set point), instead of the "on" setting. Auto-tune will take between 5 and 45 minutes to complete. When completed it will return to normal operation automatically.

Start the tune function at the point in your application for which you desire better performance. For example; if you want better run-up performance once a load is placed, start the auto-tune function just after you've place the load. If you want the best stability after the load achieves temperature, start the auto-tune function after the load achieves temperature, etc.

PID vs "On - Off" Operation:

The temperature control has two primary modes, PID mode and On-Off mode. The control is factory set in PID mode. This mode is best for applications requiring excellent temperature stability, +/- 1 degree. On-Off mode can be used where faster run-up and recovery times for batch-style processing are desired and where a greater cyclical deviation from set point is not critical.

To place the control in On-Off mode, navigate [**level 1**] in the functions menu. Change the [**int.t**] and [**der.t**] function settings to [**oFF**] and the [**CyC.t**] to [**on.of**]. Return to the temperature display by pressing the up  &  down keys together for 3 seconds. The control will now operate in On-Off mode.

Maintenance / Control Calibration / Cleaning Procedures

The Bench Series Ovens are designed to be virtually maintenance free. But operational safety requires periodic cleaning and chamber temperature accuracy verification.

CONTROL CALIBRATION

Twice a year, check the actual oven chamber temperature against a known accurate temperature measurement device. Maintain temperature accuracy to your models specified specifications. (see Control Calibration on page 4.)

CLEANING PROCEDURE

Periodically check the rear air intake vents for dirt or dust build-up. Keep the intake & exit ports clear of obstruction and clean of dust and dirt. This will keep the motor from overheating and reduce risk of fire. It may be necessary to remove the rear electrical cover to clean or vacuum dirt and dust from in & around the motor. Unplug the oven before removing the rear cover. To clean exterior and interior surfaces, use a damp cloth or an all-purpose cleaner. Avoid commercially available oven cleaners.

Troubleshooting Tips / Parts & Equipment / Technical Support

PROBLEM	POSSIBLE CAUSE	WHAT TO DO BEFORE CALLING TECH. SUPPORT
Unit not turning ON when switch is in the ON position	1. No power going to the unit	1. Check if unit tripped a GCFI outlet or fuse. Try a different power outlet connection before moving to number 2 on this list.
	2. Triggered Thermal Safety Disc	2. Reset Thermal Safety disc in the back of the unit. (see PG 4 for more information)
	3. Disconnected / lose wires.	3. Check wire connections and make sure there are no lose or diconnected wires in the unit.
Unit's temperature varies by $\pm 15^{\circ}\text{F}$ or more	1. After setting a Temperature, it varies widely.	1. Check if motor is running continusly. If blower is working and unit still has a wild varying temperature in any direction, or the oven continous to heat and trips the Thermal Safety Disc, thermostat may need to be replaced. Contact Quincy Lab for further assistance.
Unit keeps tripping GFCI or fuse	1. Bad GCFI outlet	1. Check if unit tripped a GCFI outlet or fuse. Try a different power outlet connection before moving to number 2 on this list.
	2. Moisture on Heat Elements	2. Heating elements can retain some moisture if not used for a given period of time, or if used in a very humid enviroment. Allow the unit to heat up for some time to dry out the heat elements.
	3. Short in the unit / circuit overload	3. With the unit unplugged, check lose wires and wire terminal for possible short. Also, check the connections at the ovens' terminal block in the back for lose wires.

Common Replacement Components

Digital P.I.D Controller
PART # 701-6412
S.S Relay
PART # 701-6252

Door Ball Catch
PART # 301-2221
Blower Motor
PART # 301-2235 (115 VOLT)
PART # 301-2230 (230 VOLT)

For a complete list of replacement componets, part and additional equipment, visit us on the web at www.quincylab.com or contact your dealer for availability and pricing.

Common Additional Equipment

Additional Shelf
PART # 301-5000

Additional Shelf Rail
PART # 301-5001
PART # 301-5001S (STAINLESS STEEL)

Exhaust Chamber Adapter
PART # 301-2065

Floor Oven Stand
PART # 301-2060

Storage Cabinet
PART #301-2055

Technical Support

Contact Quincy Lab techincal support for further assistance or visit us on the web at www.quincylab.com

Email: information@quincylab.com
Voice: 800-482-4328
Fax: 773-622-2282

Quincy Lab, Inc.
1925 N. Leamington Ave.
Chicago, Illinois 60639

Limited Warranty



Quincy Lab, Inc. warrants to the original purchaser that this product will be free from defects in material and workmanship under normal use throughout the warranty period. The standard warranty period for this instrument is eighteen months from date of shipment. The instrument warranty is supplemented with a three year warranty on the heating element. Please refer to your invoice or shipping documents to determine the active warranty period. This warranty covers parts & labor (labor at factory only) and shipping cost for replacement parts.