SHEL - LAB
HYBRIDIZATION OVEN

Model: 1004

INSTALLATION AND OPERATIONAL MANUAL

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Operation Manual

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This unit is an economy Hybridization oven for professional, industrial or educational use where the preparation or testing of materials is done at approximately atmospheric pressure and no flammable, volatile or combustible materials are being heated. This unit is not intended for hazardous or household locations or use.

Section 1

RECEIVING AND INSPECTION

Your satisfaction and safety require a complete understanding of this unit. Read the instructions thoroughly and be sure all operators are given adequate training before attempting to put the unit in service. NOTE: This equipment must be used only for its intended application; any alterations or modifications will VOID your warranty.

1.1 **Inspection:** The carrier, when accepting shipment, also accepts responsibility for safe delivery and is liable for loss or damage. On delivery, inspect for visible exterior damage, note and describe on the freight bill any damage found, and enter your claim on the form supplied by the carrier.

1.2 Inspect for concealed loss or damage on the unit itself, both interior and exterior. If necessary, the carrier will arrange for official inspection to substantiate your claim.

1.3 **Return Shipment:** Save the shipping carton until you are sure all is well. If for any reason you must return the unit, first contact your customer representative for authorization. Supply nameplate data, including model number and serial number. Please see the manual cover on where to contact Customer Service.

1.4 **Accessories:** Verify that all of the equipment indicated on the packing slip is included with the unit. Carefully check all packaging before discarding. Each unit is equipped with a rotisserie assembly (bottles not included), a brass locking pin, drip tray and cord set.

Section 2

GRAPHIC SYMBOLS

Your oven has been provided with a display of graphic symbols, which is designed to help in identifying the use and function of the available user adjustable components.

2.1  Indicates that you should consult your manual for further description or discussion of a control or user item.

2.2  Indicates **"AC Power ON"**.

2.3 °C Indicates **"Degrees Centigrade"**.

2.4  Indicates **"Temperature"**.

2.5  Indicates **"Protective Earthground"**.

2.6  Indicates **"Potential Shock Hazard"** behind this partition.

Section 3

INSTALLATION

Local city, county or other ordinances may govern the use of this equipment. If you have any questions about local requirements, please contact the appropriate local agency. Installation may be performed by the end user.

Under normal circumstances this unit is intended for use indoors, at room temperatures between 5° and 40°C, at no greater than 80% Relative Humidity (at 25°C) and with a supply voltage that does not vary by more than 10%. Customer service should be contacted for operating conditions outside of these limits.

3.1 Power Source: The electrical supply circuit to the oven must conform to all national and local electrical codes. Consult the unit's serial data plate for the voltage, cycle wattage and ampere requirements before making connection. VOLTAGE SHOULD NOT VARY MORE THAN 10% FROM THE SERIAL PLATE RATING. This unit is intended for 50/60 Hz application. A separate circuit is recommended to prevent possible loss of product due to overloading or failure of other equipment on the same circuit.

3.2 Location: When selecting a site for the oven, consider all conditions which may affect performance, such as extreme heat from steam radiators, stoves, ovens, autoclaves, etc. Avoid direct sun, fast-moving air currents, heating/cooling ducts, and high traffic areas. To ensure air circulation around the unit allow a minimum of 5cm between oven and any walls or partitions which might obstruct free airflow. The unit must sit level and solidly. It is equipped with non-adjustable rubber feet to raise it off the counter and prevent sliding. The work surface must be level to prevent sliding. The work surface must be level to provide optimum working conditions for the units.

3.3 Lifting / Handling: This unit may be heavy for some people and care should be taken to use appropriate lifting devices that are sufficiently rated for these loads. Units should only be lifted from their bottom surfaces. Doors, handles and knobs are not adequate for lifting or stabilization. The unit should be completely restrained from tipping during lifting or transport. All moving parts, such as shelves and trays should be removed and doors need to be positively locked in the closed position during transfer to prevent shifting and damage.

3.4 Cleaning: The oven interior was cleaned at the factory, but not sterilized. Remove all interior parts, if assembled and clean with a disinfectant that is appropriate to your application. DO NOT use chlorine-based bleaches or

abrasives as this will damage the stainless steel interior. DO NOT USE spray cleaners that might leak through cracks and openings and get on electrical parts or that may contain solvents that will harm the coatings. A thorough periodic cleaning is strongly recommended.

WARNING: Never clean the unit with alcohol or flammable cleaners with the unit connected to the electrical supply. Always disconnect the unit from the electrical service when cleaning and assure all volatile or flammable cleaners are evaporated and dry before reattaching the unit to the power supply.

Section 4

CONTROL PANEL OVERVIEW

4.1 **Power Switch:** The main power Green I/O (on/off) switch controls all power to the unit and must be in the I/ON position before any systems are operational including the carousel.

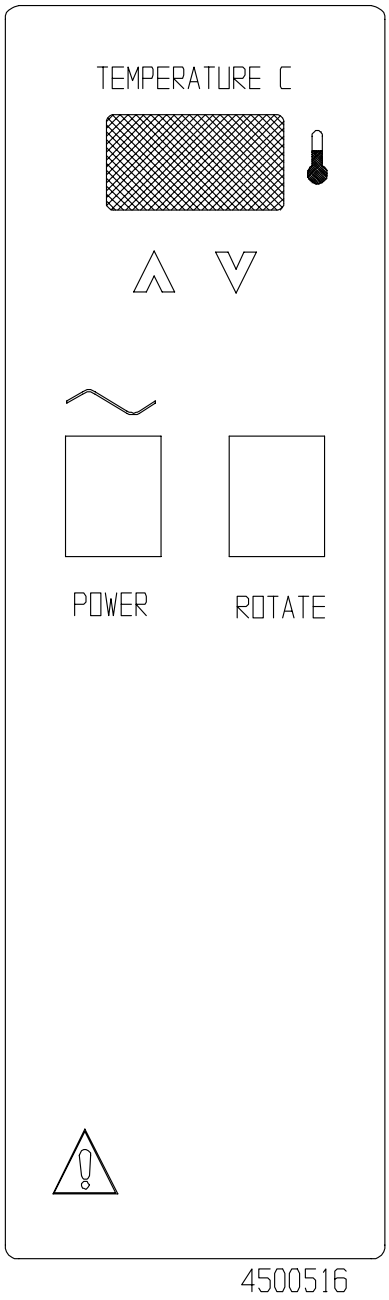
4.2 **Main Temperature Controller:** This control consists of the digital display and Up/Down arrow pads for inputting set point temperature and calibration. The unit must sit level and solidly. It is equipped with non-adjustable rubber feet to raise it off the counter and prevent sliding. The work surface must be level to provide optimum working conditions for the unit.

4.3 **Rotate Switch:** This I/O (On/Off) switch labeled ROTATE and controls the carousel.

4.4 **Fuse:** Located adjacent to the power cord, the fuse is an added measure of protection against power source variations. If blown, it can be replaced after the interruption has been cleared. This is on CE units only; not available in 110 volt configurations.

4.5 **Thermal Limit:** A factory set, non adjustable component of the element assembly. The Thermal Limit is independent of the Main Controller and prevents temperature runaway by shutting off power to the elements in the unlikely event that the Main Controller fails in the ON position. The thermal limit is activated at 113°C and will disengage at 107°C.

Figure One



Section 5

OPERATION

WARNING: Hybridization bottles can develop a pressure considerably different than ambient when the contents are heated or allowed to cool. DO NOT open bottles at different temperatures, hotter or colder, than when the bottles were filled and sealed. DO NOT take the bottles higher than 70°C without opening and retightening the lid to relieve pressure. Temperatures in excess of 70°C can cause breakage of hybridization bottles. DO not run this chamber at temperatures rises above 70°C when bottles are in use. If the chamber temperature rises above 70°C and bottles are in chamber, DO NOT OPEN THE OVEN DOOR. Turn the chamber power switch off and allow the chamber and bottles to cool below 70°C before opening the door.

5.1 Check power supply against unit serial plate. They must match.

5.2 Plug service cord into the grounded electrical outlet. Be certain the fuse is installed on 220V CE units.

5.3 **Set Main Temperature Controller:** Enter desired set point temperature. To enter set point mode on the controller, press either the Up or Down arrow pad one time. The digital display will start to blink, going from bright to dim. While blinking, the digital display is showing the set point. To change the set point, use the Up and Down arrow pads. If the arrow pads are not pressed for five (5) seconds, the display will stop blinking and will read the temperature in the chamber. Allow the oven at least 2 hours to stabilize.

5.4 **Calibration:** It is recommended that calibration is done once the unit is installed in its working environment and has been stabile at set point for several hours. Place a certified reference thermometer in the chamber where it is at or near the sample area. Allow the temperature to stabilize again until the thermometer reads a constant value for one hour. Compare the digital display with the reference thermometer. If there is an unacceptable difference, put the display into calibration mode by pressing both the Up and Down arrow pads at the same time until the two outside decimal points begin to blink. While blinking, the controller can be calibrated by pressing the Up or Down arrow pads until the display matches the reference thermometer. Allow the temperature to stabilize again, verify and recalibrate if necessary.

5.5 Activation of Carousel: Clip sample bottles into place; note that surfaces are hot. Turn the ROTATE switch to the On position. This activates the motor that sets the carousel in motion. The carousel will rotate at a fixed speed of seven (7) RPM (Rotations per Minute). CAUTION: DO NOT attempt to load or unload the carousel while in motion, personal injury can occur!

Section 6

MAINTENANCE

NOTE: Prior to any maintenance or services on this unit, disconnect power cord from supply.

6.1 **Cleaning:** Clean interior of the unit on a regular basis. Remove the rotisserie and sterilize the chamber with a disinfectant that is appropriate for your application. The rotisserie is autoclavable. When washing the interior, handle the door gasket carefully so as not to impair the positive seal. DO NOT USE chlorine based bleaches or abrasives as this will damage the stainless steel surfaces. DO NOT USE spray cleaners that might leak through openings and cracks and get on electrical parts or that may contain solvents that will harm coatings.

WARNING: Never clean the unit with alcohol or flammable cleaners with the unit connected to the power supply. Always disconnect the unit from the electrical service when cleaning and assure all volatile or flammable cleaners are evaporated and dry before reconnecting the unit to the power supply.

6.2 **Storage:** If the unit is to be turned off for any length of time, dry the chamber and drip tray thoroughly and leave at room temperature. Failure to do this may cause interior to become contaminated. No adjustment to controls should be required when restarting the unit. If the unit is shut down for transport, follow the above mentioned direction and disconnect the power supply. See Section 3.3 Lifting / Handling, for further instruction.

6.3 No maintenance is required for the electrical components. If the oven controls are not working as specified, please review the Troubleshooting section prior to calling for service.

Section 7

TROUBLESHOOTING

If the unit fails to operate as specified, review the following troubleshooting suggestions prior to calling customer service.

TEMPERATURE

Temperature too high	
	1/ controller set too high-see section 5.3 2/ controller failed on – call Customer Service 3/ wiring error – call Customer Service
Display reads "HI" or "400"+	
	probe is unplugged, is broken or wire to sensor is broken – trace wire from display to probe; move wire and watch display to see intermittent problems
Chamber temp goes way over set point and then settles to set point	
	For Hybridization units, ±1 may be normal; recalibrate to see if this eliminates the problem, see section 5.4
Temperature too low	
	1/ Internal non-adjustable high limit failure – call Customer Service 2/ controller set too low – see Section 5.3 3/ unit not recovered from door opening – wait for display to stop changing 4/ unit not recovered from power failure or being turned off, oven will need 2 hours to warm up and stabilize 5/ element failure – call Customer Service 6/ controller failure – call Customer Service 7/ wiring problem – check all functions and compare wiring to owners manual - especially around any areas recently worked on 8/ loose connection – check shadow box for loose connections.
Display reads "LO"	
	1/ sensor is plugged in backwards – reverse sensor wires to controller 2/ if ambient temperature is lower than range of unit – compare set points and ambient temperature to rated specifications in Section 8.0, Unit Specifications
Unit will not heat over a temperature that is below set point	
	1/ confirm that fan is moving and that amperage and voltage match data plate – check fan motor motion and feel for air movement in chamber 2/ confirm that set point is set high enough 3 / check connections to sensor

	4/ check calibration – using independent thermometer, follow instructions in section 5.4
Unit will not heat up at all	
	1/ verify that controller is asking for heat by looking for controller light. 2/ check amperage – amperage should be virtually at maximum rated (data plate) amperage 3/ do all controller functions work? 4/ has the fuse/circuit breaker blown?
Indicated chamber temperature unstable	
	1/ ±0.1 may be normal 2/ is fan working? –verify movement of cooling fan in back of chamber 3/ is ambient room temperature radically changing – either door opening or room airflow from heaters or air conditioning ? – stabilize ambient conditions 4/ sensor miss-located, damaged or wires may be damaged - check mounts for control, then trace wires between sensor and control 5/ calibration sensitivity – call Customer Service 6/ electrical noise – remove nearby sources of RFI including motors, arcing relays or radio transmitters 7/ bad connection on temperature sensor or faulty sensor – check connectors for continuity and mechanical soundness while watching display for erratic behavior; check sensor and wiring for mechanical damage
Will not maintain set point	
	1/ assure that set point is at least 5 degrees over ambient room temperature 2/ see if ambient room temperature is fluctuating
Display and reference thermometer don't match	
	1/ calibration error – see section 5.4 2/ temperature sensor failure – call Customer Service 3/ controller failure – evaluate if display lights are operating correctly 4/ allow at least two hours to stabilize 5/ verify that reference thermometer is certified
Can't adjust set points or calibration	
	1/ turn entire unit off and on to reset 2/ if repeatedly happens, call Customer Service
Calibrated at one temperature, but not at another	
	This can be a normal condition when operating temperature varies widely. For maximum accuracy, calibration should be done at or as close to the set point temperature.

Section 8

PARTS LIST

Description	115V	220V
Blower Motor	4880527	4880528
Element	2350503	120071
EMI Filter, CE Unit Only	NA	2800502
Fuse, CE unit Only	NA	3300515
Gear Motor	104210	104220
Main Power Switch	103351	103351
Power Cord, European	NA	X1000778
Power Cord, USA	100014	101990
Rotate Switch	X1000124	X1000124
Temperature Control	1750521	1750520
Thermal Limit, internal/non adjustable	1750513	1750513

UNIT SPECIFICATIONS

Weight	Shipping	Net
1004	55 lbs.	42 lbs.

Dimensions	Exterior WxDxH	Interior WxDxH
1004	21.75X16X14	12.5X9X10.5

Capacity	6 bottles - 300mm	12 bottles - 75mm

Temperature	Range	Uniformity	Sensitivity
1004	Amb. +5° to 70°C	± .5°C	.1°C

WIRE DIAGRAM