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ECONOMY VACUUM OVEN

MODEL: 1400E

INSTALLATION AND INSTRUCTION MANUAL

Sheldon Manufacturing Inc. P.O. Box 627 Cornelius, Oregon 97113
EMAIL: tech@Shellab.com **INTERNET:** http://www.Shellab.com/~Shellab
1-800-322-4897 (503) 640-3000 FAX (503) 640-1366

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Rev 10/99
4861374

This unit is an economy vacuum 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.

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Section 1

RECEIVING AND INSPECTION

IMPORTANT: READ THIS INSTRUCTION MANUAL IMMEDIATELY.

Your satisfaction and safety require a complete understanding of this unit, including its proper function and operational characteristics. Be sure operators are familiar with these instructions 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 claims. 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 any, the carrier will arrange for official inspection to substantiate your claim.

1.3 **Return Shipment:** Save the shipping carton until you are sure the unit has been delivered in good condition. If for any reason you must return the unit, contact your customer service representative for authorization. Supply the complete data label information when requesting return authorization. Please see the manual cover for information 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. This unit is equipped with 2 shelves, 1 thermometer and a thermometer clip.

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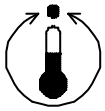
Section 2

GRAPHICS SYMBOLS

Your oven is provided with a display of graphic symbols to help in identifying the use and function of the available adjustable components.

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

2.2  Indicates **"AC Power On".**

2.3  Indicates **"Adjustable Temperature".**

2.4  Indicates **"Manual Adjustment".**

2.5  Indicates **"Heating".**

2.6  Indicates **"Earth Ground"**

2.7  Indicates **"Potential Shock Hazard"** behind partition

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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 power source must match the voltage, cycle, phase, and ampere requirements listed on the data plate. This unit is intended for 50/60 HZ application. Plug the cord into a grounded outlet. THE VOLTAGE OF THE OUTLET SHOULD NOT VARY MORE THAN 10% FROM THE DATAPLATE RATING. A separate circuit is recommended to preclude loss of product due to overloading or circuit failure. Note that the electrical supply to the unit must conform to all national and local electrical codes.

3.2 **Location:** When selecting a site for the unit, consider conditions that may affect performance, such as heat from radiators, 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 the unit and any walls or partitions that might obstruct free airflow.

3.3 **Lifting / Handling:** This unit is heavy and care should be taken to use appropriate lifting devices sufficiently rated for such loads. Please see section 10, for weight specifications. The unit should only be lifted from the bottom surface. 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 should be removed to prevent shifting and damage. The doors should be positively locked in the closed position during transport.

3.4 **Leveling:** The unit must sit level and solidly. The Model 1400E has four rubber feet that are already attached to the unit and are not adjustable; however, the counter top must be level for maximum working and safety conditions.

3.5 **Cleaning:** The oven has been cleaned at the factory, but not sterilized and should be disinfected prior to use. Remove all shelving if assembled and clean the

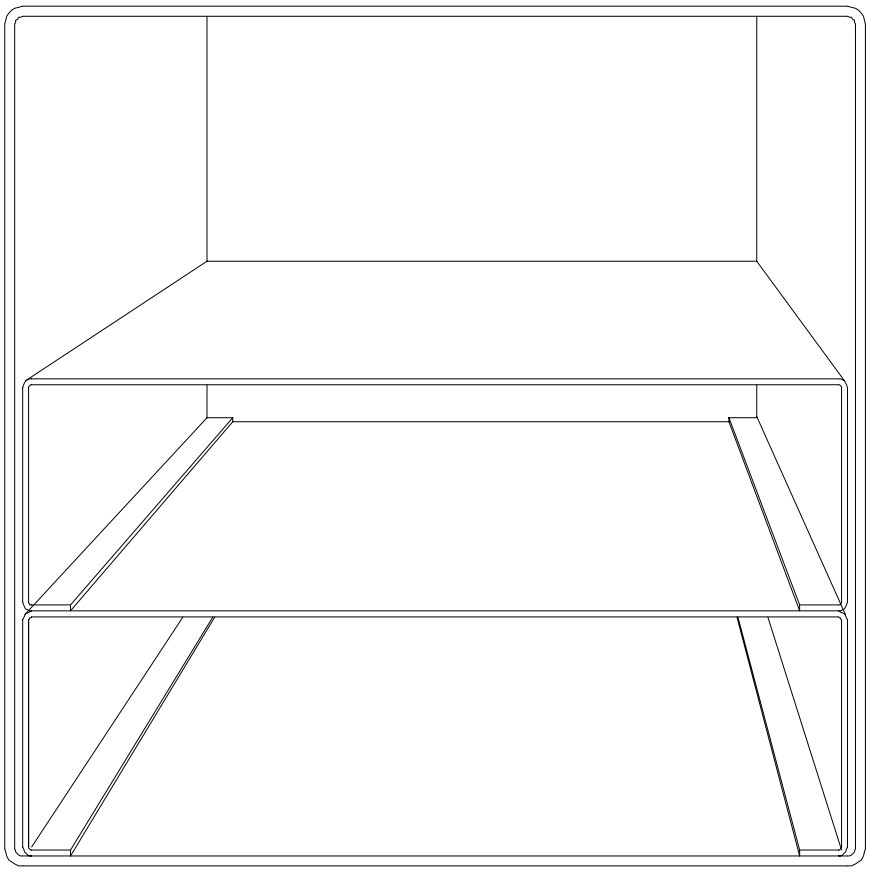
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chamber with a disinfectant that is appropriate for your application. DO NOT USE chlorine-based bleaches or abrasives as this will damage the interior. DO NOT USE spray cleaners that might leak through openings and cracks and get on electrical parts or that may contain solvents that will harm 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.

3.6 **Shelves:** See **Figure One** for proper orientation of shelves. **DO NOT** place items directly on the floor of the chamber.

FIGURE ONE



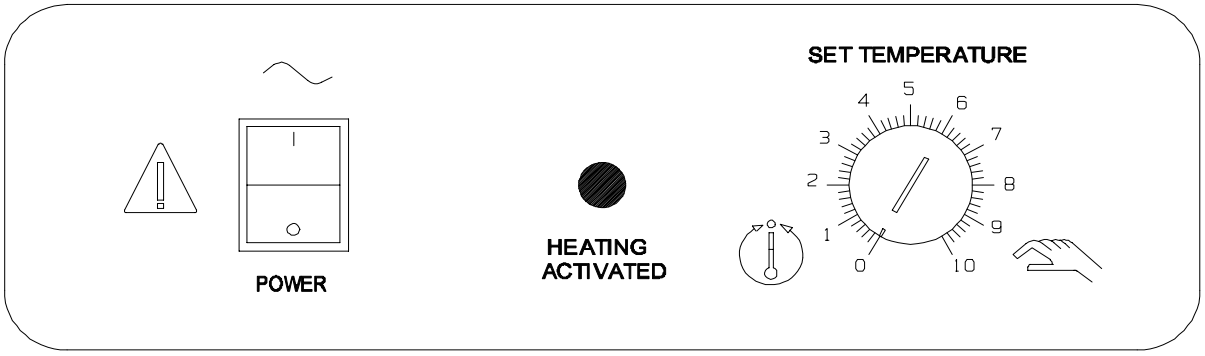
1400 SHELF PLACEMENT

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Section 4

CONTROL PANEL OVERVIEW

Figure 2



4500817M

4.1 **POWER:** The Main Power I/O (ON/OFF) switch controls all power to the oven. It must be in the I, or ON position before any systems are operational.

4.2 **HEATING Light:** This pilot lamp is on the when the temperature controller has activated the heating elements to reach and maintain set point.

4.3 **TEMPERATURE CONTROLLER:** The controller is marked SET TEMPERATURE and is equipped with an adjustment knob and a graduated dial. The graduated dial is marked with 10 major increments and 50 minor increments. These increments can be used as index points for setting and returning to set point temperatures.

4.4 **VACUUM:** This adjustment valve, located on the top of the unit, allows opening and closing of the plumbing to an external vacuum pump or system. Please note that either valve can be used to vacuum down the chamber and the remaining valve then acts as the vent.

4.5 **VENT:** This adjustment valve, located on the top of the unit, controls the vacuum release.

4.6 **VACUUM GAUGE:** This component, mounted on the top of the unit between the two valves, indicates the chamber operating pressure.

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Section 5

PRECAUTIONS

5.1 Do not place or use explosive, combustible, or flammable materials in the oven.

5.2 Do not use sealed containers in the oven chamber.

5.3 Do not cut or remove the ground prong from the power cord or use an ungrounded 2-prong adapter plug.

5.4 Disconnect the unit from the electrical power source before attempting to make any repairs or component replacements.

5.5 If a mercury thermometer is used and breakage should occur, all spilled mercury must be completely removed from the chamber.

5.6 **THIS IS NOT AN EXPLOSION PROOF OVEN. THIS OVEN IS NOT SUITABLE FOR USE IN CLASS I, II, OR III LOCATIONS, AS DEFINED BY THE NATIONAL ELECTRICAL CODE NFPA 70.**

5.7 This oven is not intended, nor can it be used, as a patient connected device.

5.8 **DURING OPERATION AT HIGH TEMPERATURES** the vacuum and vent valves will become hot to the touch and gloves should be worn while making any adjustments.

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Section 6

VACUUM OPERATION (See Figure 3 on the following page)

6.1 A pump with a pumping capacity four times greater than the chamber volume is advisable. The 1400E has a chamber volume of one (1) cubic foot, so a pump with a pumping capacity of four (4) cubic feet per minute is recommended. When working below 1mm, a diffusion type pump will be needed.

6.2 **IT IS IMPORTANT TO USE VACUUM TUBING FOR ALL THE VACUUM HOOKUPS. OTHER TYPES OF TUBING MAY COLLAPSE AND PREVENT COMPLETE EVACUATION.**

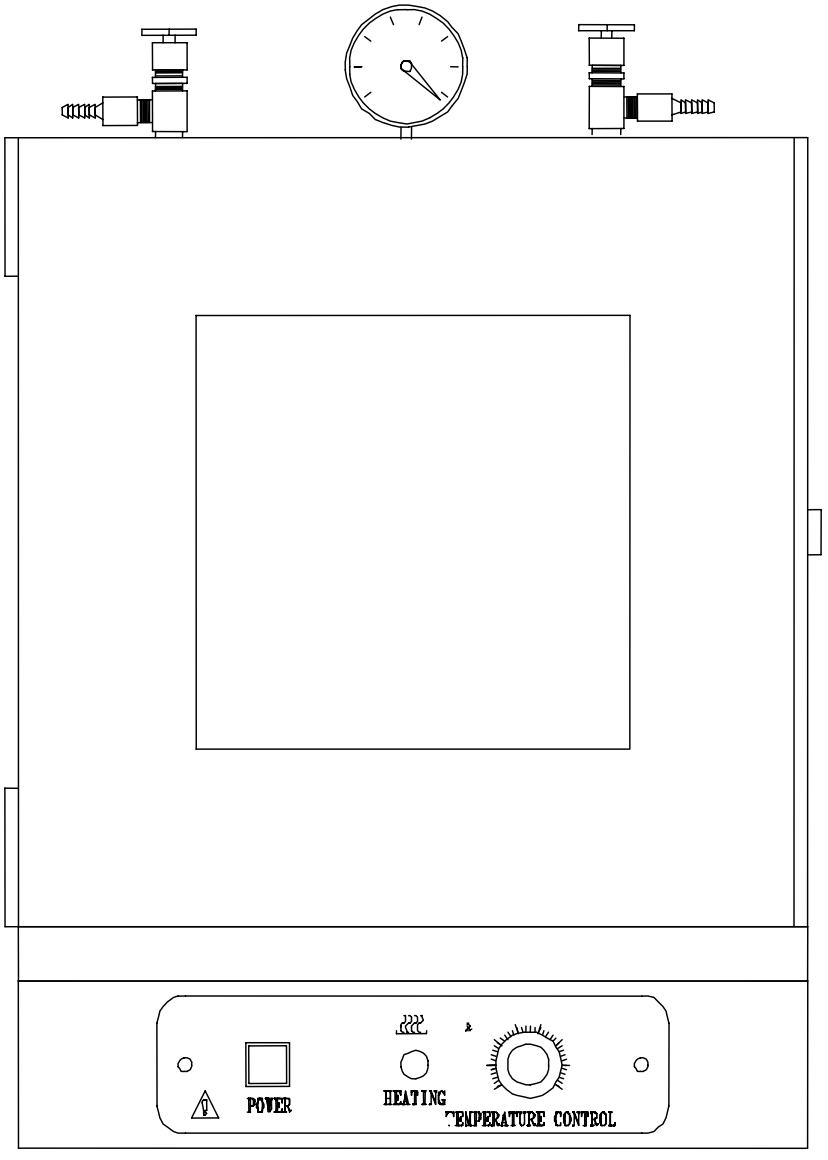
6.3 **To Apply Vacuum to the Chamber:** Attach the hose from the vacuum pump to the 1/4" hose barb of one of the valves. Close the other valve. Open the valve with the vacuum attached to it. Latch the door shut and start the vacuum pump. This action will hold the door shut and against the gasket until the pump creates a vacuum in the chamber. Once a good vacuum seal is accomplished, the door will hold itself shut and sealed until the chamber is returned to atmospheric pressure.

6.4 Watch the VACUUM GAUGE and when the required vacuum is obtained, close the valve that has the vacuum attached to it and turn the pump off. The VACUUM GAUGE is calibrated from zero to (-)30 inches of Hg (762mm of Hg) with zero representing atmospheric pressure. The oven can be evacuated to pressures as low as 10 microns.

6.5 **Vacuum Release:** To return the chamber to atmospheric pressure, open the vent valve very slowly (the one not connected to the vacuum), and allow the chamber to pressurize. The speed of pressurizing can be controlled by how much the valve is opened.

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FIGURE THREE



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Section 7

OPERATION

7.1 **Power Supply:** Connect the service cord to a grounded outlet and push the power switch to the ON position.

7.2 Place a reference thermometer inside the chamber where it can be easily viewed through the window, then vacuum down the chamber as described in Section 6.0.

7.3 **Setting Temperature:** The operating range for this oven is 40°C - 210°C. To set the Temperature Controller turn the control knob to the desired oven temperature, using the graduated dial as a reference guide. Allow at least one hour for the temperature to stabilize. Using the reference thermometer, verify the oven temperature, if it is not the correct value, turn the control knob up or down as needed. Allow the temperature to re-stabilize, and continue this process until the exact desired temperature is achieved.

NOTE: Slight vapor or smoke may occur in the initial heat-up. This is a normal occurrence when the oven is first brought up to temperature and protective coatings on the element heat up.

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Section 8

MAINTENANCE

Note: Prior to any maintenance or service on this unit, disconnect the service cord from the power supply.

8.1 **Cleaning:** Disinfect the oven interior on a regular basis. To prepare the oven for cleaning, remove the shelves and door gasket. The shelves and door gasket are autoclavable.

A. First clean removed parts and interior with soap and water. To decontaminate use a disinfectant that is suitable to your application. DO NOT use chlorine-based bleaches or abrasives, as this will damage the stainless steel surfaces.

B. When washing the gasket, handle carefully so as not to impair the positive seal.

8.2 If the oven is to be shut down for storage or transporting, remove shelves, be certain the chamber is dry, latch the door closed and disconnect the power cord.

8.3 There is no maintenance required on electrical components. If the oven fails to operate as specified, see Troubleshooting before calling for service.

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Section 9

TROUBLESHOOTING AND SERVICE

Always make a visual inspection of the oven and control console when troubleshooting. Look for loose or disconnected wires or tubing, which may be the source of the problem. The oven is designed so that no internal electrical servicing should be required under normal conditions. If electrical servicing is necessary, it should be performed by qualified service personnel.

TEMPERATURE	
Temperature too high	
	1/ controller failed on – call Customer Service 2/ wiring error – call Customer Service
Temperature too low	
	1/ unit not recovered from door opening 2/ unit not recovered from power failure or being turned off 3/ element failure – see if heating light is on; compare current draw to data plate 4/ controller failure – confirm with front panel light that controller is calling for heat 5/ if ambient room temperature is lower than range of unit – compare set points and ambient temperature to rated specifications in manual Unit Specifications 6/ wiring problem – check all functions and compare wiring to wiring schematic in manual - especially around any areas recently worked on 7/ loose connection – check shadow box for loose connections
Unit will not heat up at all	
	1/ verify that controller is asking for heat by looking for controller light – if pilot light is not on continuously during initial start up, there is a problem with the controller 2/check amperage – amperage should be virtually at maximum rated (data plate) amperage 3/ Units will need at least some vacuum in chamber to keep unit air tight - verify with vacuum gauge
MECHANICAL	
door not sealing	
	1/ check physical condition of gasket 2/ assure that gasket clamps are in original location 3/ adjust hinge blocks 4/ Confirm that unit has not been damaged and body is not out of square.

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Unit won't hold vacuum	
	1/ check door gasket for alignment and damage, wear or lack of compliance 2/ assure all vent and feed valves are closed tightly 3/ assure tight connections to pump

OTHER

Unit or wall fuse/circuit breaker is blown	
	1/ check wall power source 2/ compare current draw and compare to specs on data plate 3/ see what other loads are on the wall circuit
Unit will not turn on	
	1/ check wall power source 2/ check fuse/circuit breaker on unit or in wall 3/ see if unit is on, e.g., heater, and just controller is off 4/ check all wiring connections, esp. around the on/off switch
Unit is smoking – Out of box	
	This is not uncommon during initial operation. Put unit under vent and run at full power for one hour.
Contamination in chamber	
	1/ see cleaning procedure in operator's manual 2/ develop and follow standard operating procedure for specific application; include definition of cleaning technique and maintenance schedule

SERVICE: If this product should require service, contact your service representative. Should return of the product be necessary, a return authorization number must be obtained and the product shipped prepaid, to the proper service center. To insure prompt handling, the return authorization number should be placed on the outside of the package or container. Make sure a detailed explanation of the reason for return is enclosed with the unit. For information on where to contact customer service, please see the manual cover.

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Section 10

PARTS LIST

Description	115V	220V
Control Knob	X1000771	X1000771
Door Gasket, Silicone	100029	100029
Door Glass	700027	700027
Heating Element	200114	200114
I/O (ON/OFF)	X1000124	X1000124
Pilot Light	200020	200020
Power Cord	100014	101990
Temperature Controller	100026	100026
Thermometer	100030	100030
Vacuum / Vent Valve	8600500	8600500
Vacuum Gauge	3500501	3500501

Addition gaskets Available:

Hi-Temp, Silicone	3450508
Viton, Acids	110085
Buna-N, Solvents	100049

UNIT SPECIFICATIONS

	Shipping	Net
Weight	62 lbs.	50 lbs.

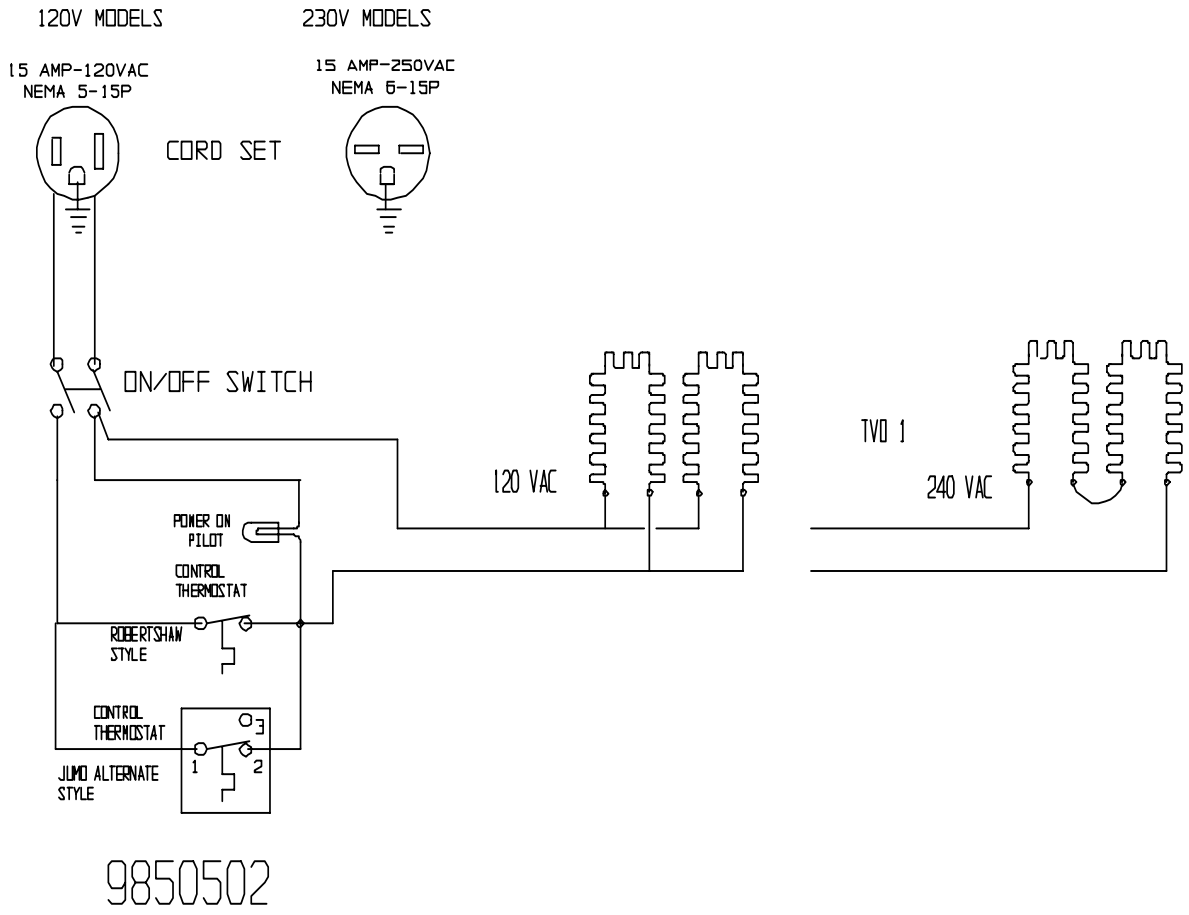
	Exterior WxDxH	Interior WxDxH
Dimensions	15.5 x 16.5 x 22”	9 x 12 x 9”

	Cubic Feet
Capacity	0.6

	Range	Uniformity	Rise Time
Temperature	40 to 210°C	±3.5°C @ 100°C ±5.0°C @ 200°C	30 min. to 100°C

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WIRE DIAGRAM



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