



VACUUM OVEN

MODELS: 1410S, 1430S

INSTALLATION AND INSTRUCTION MANUAL

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These units are general purpose vacuum ovens 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. These units are not intended for hazardous or household locations or use.

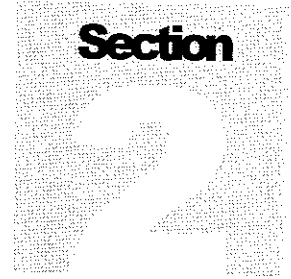
RECEIVING AND INSPECTION

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.


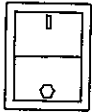








NOTE: This equipment must be used only for its intended application; any alterations or modifications will void your warranty.

- 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. Save the shipping crate until you are sure the unit has been delivered in good condition.
- 1.3 Return Shipment:** 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 reach customer service.
- 1.4 Accessories:** Remove wrapping materials from inside of chamber. Make certain that your accessory package is complete. Each unit is equipped with two (2) shelves and a thermometer. The 1430S comes with four (4) leveling feet.



GRAPHIC SYMBOLS

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

- 2.1  Indicates "AC Power On".
- 2.2  Indicates "I/O" (ON/OFF).
- 2.3  Indicates "Vacuum Gauge".
- 2.4  Indicates "Vent (Gas)".
- 2.5  Indicates "Vacuum".
- 2.6  Indicates "Adjustable Temperature".
- 2.7  Indicates "Manual Adjust".
- 2.8  Indicates "Heating".
- 2.9  Indicates "Consult Your Manual".
- 2.10  Indicates "Unit should be recycled" (Not disposed of in land-fill)

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.

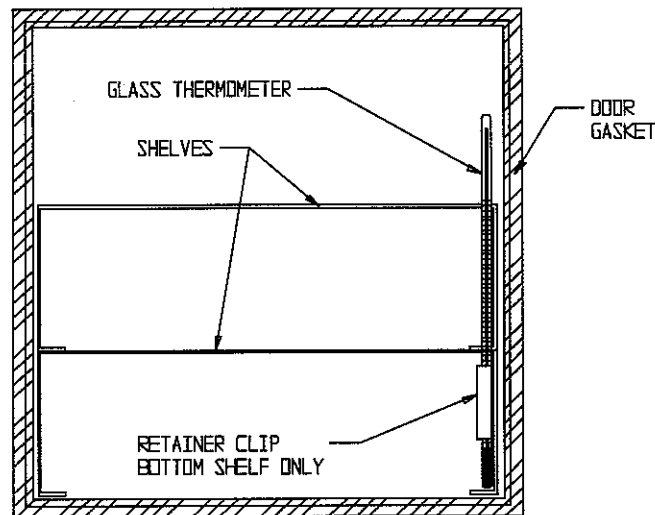
- 3.1 Power Source:** The power source must match the voltage, cycle, phase, and ampere requirements listed on the data plate. This unit is intended for 50/60 HZ application. Plug the cord into a grounded outlet. THE VOLTAGE OF THE OUTLET SHOULD NOT VARY MORE THAN 10% FROM THE DATAPLATE RATING. A separate 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 which 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 walls or partitions which might obstruct free airflow.
- 3.3 Lifting and Handling:** This unit is heavy and care should be taken to use appropriate lifting devices that are sufficiently rated for these loads. 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 1410S has four rubber feet that are already attached to the unit and are not adjustable. Leveling feet are supplied with Model 1430S and must be installed in the four holes in the bottom corners of the unit. With the unit standing upright, turn the leveling feet counterclockwise to raise the level of that corner. Adjust the leveling foot at each corner until the unit stands solid and level. If the unit must be moved, turn the leveling feet in all the way (clockwise) to prevent damage while moving.

3.5 Cleaning: The oven was cleaned at the factory, but not sterilized. It should be disinfected prior to use. Remove all shelving and clean the chamber with a disinfectant that is appropriate to your application. **DO NOT USE** chlorine-based bleaches or abrasives as they will damage 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 the coatings. A similar periodic cleaning is 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 within the specific chamber. **DO NOT** Place items directly on the floor of the chamber.

FIGURE 1



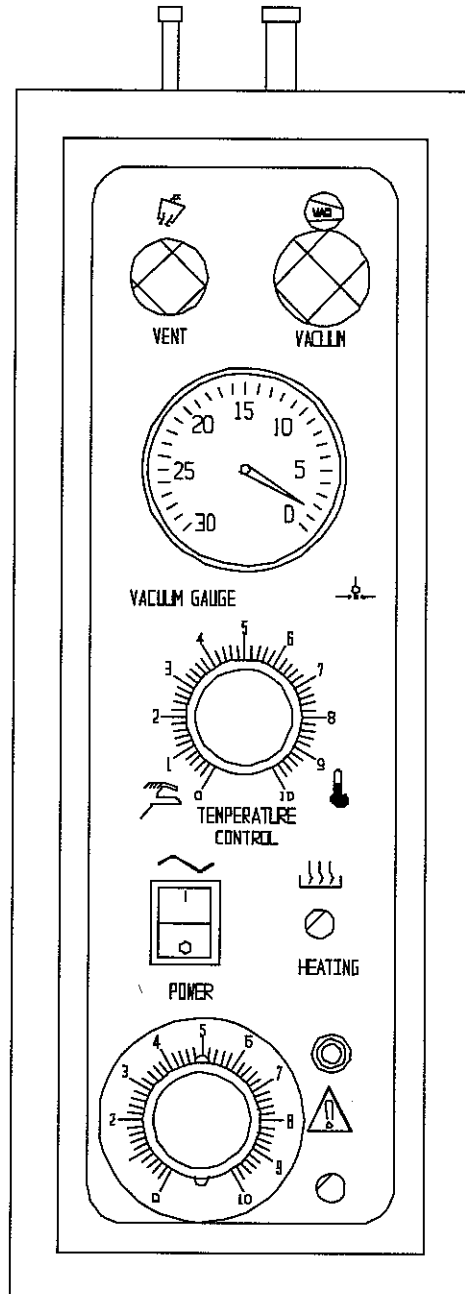
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CONTROL PANEL OVERVIEW (See Figure 2)

- 4.1 **POWER:** The main power I/O (ON/OFF) switch must be in the I/On position before any electrical systems are operational.
- 4.2 **HEATING LIGHT:** This pilot lamp is on when the temperature controller has activated the heating elements to reach and maintain set point.
- 4.3 **MAIN TEMPERATURE CONTROLLER:** Marked SET TEMPERATURE this is the manually adjustable temperature controller . Its dial is marked from 0 to 10 and is adjustable across this scale. A clockwise adjustment raises the temperature.
- 4.4 **VACUUM:** This adjustment valve, located on the right of the panel, allows opening and closing of the piping system to an external vacuum pump or system.
- 4.5 **VENT:** This adjustment valve, located on the left of the panel, controls the vacuum release to return the chamber to atmospheric pressure.
- 4.6 **VACUUM GAUGE:** This component indicates the chamber operating pressure in inches of mercury.
- 4.7 **SAFETY CONTROL:** The Safety is completely independent of the Main Controller. It guards against any failure of the Main Controller that would allow temperature to rise past set point. If temperature rises to the Safety set point the power relay and reset button are tripped and the unit is shut down.
- 4.8 **SAFETY ON PILOT LIGHT:** This light is located at the bottom right corner of the control panel. It lights when the Safety Control has turned off the circuit. It can only be turned off when the temperature in the chamber has dropped below the Safety Control set point and the reset button is depressed.
- 4.9 **RESET BUTTON:** This button is located at the bottom right corner of the control panel just above the Safety On Pilot light. It must be depressed to reset the Main Controller temperature when the chamber temperature has cooled below the Safety set point.
- 4.10 **CIRCUIT BREAKER / FUSE:** This control, mounted on the rear wall next to the power cord, provides protection for the units electrical circuitry against power fluctuations. The circuit breaker when tripped, must be reset by pushing in the extended button for the unit to continue operation. The fuse (on CE units in place

of the circuit breaker) when blown, must be replaced before the unit can continue operation.

FIGURE 2



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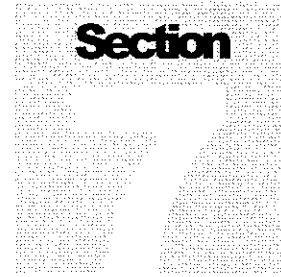
PRECAUTIONS

THIS IS NOT AN EXPLOSION PROOF OVEN.

- 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 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.

VACUUM OPERATION (See Figure 2)

- 6.1 **IT IS IMPORTANT TO USE VACUUM TUBING FOR ALL THE VACUUM HOOKUPS. OTHER TYPES OF TUBING MAY COLLAPSE AND PREVENT COMPLETE EVACUATION.**
- 6.2 A pump with a pumping capacity four times greater than the chamber volume is advisable. Example: A 1410S 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. See Unit Specifications for chamber capacities.
- 6.3 **Vacuum:** To apply vacuum to the chamber, attach the hose from the vacuum pump to the larger 3/8" hose connection on top of the oven. Close the VENT valve and open the VACUUM valve. Latch the door shut and start the vacuum pump. Be certain the vacuum valve is open and the VENT valve is closed. 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 VACUUM valve and turn the pump off. The VACUUM GAUGE is incremented 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 and allow the chamber to re-pressurize. The speed of pressurizing can be controlled by how much the valve is opened.



OPERATION

NOTE: Slight vapor or smoke may occur in the initial heat-up. This is the dissipation of protective coatings that have been applied to the oven elements.

- 7.1 Power Supply:** Connect the service cord to a grounded outlet and push the power switch to the I/ON position. If supplied with a detachable cordset, plug the female end into the inlet of the unit and the male plug into the supply. Assure that units requiring a fuse have a fuse installed. This fuse may be at the inlet or part of the cordset male plug.
- 7.2** Place a reference thermometer inside the chamber where it can be easily viewed through the window (**See Figure 1**). Turn the Safety Control to its maximum position, clockwise. Vacuum down the chamber as described in Section 6.0
- 7.3 Setting Main Temperature:** The temperature control dial is marked from 0-10. These scale numbers do not represent temperature but are to be used as a reference guide. The operating range is 40°C - 225°C. The dial should be used according to the operating range. To set the temperature control, turn the knob clockwise to the setting on the dial that is approximate to the operating temperature desired. The HEATING light will come on indicating that the oven is heating. Allow the unit to heat until the reference thermometer has reached the desired temperature. When the desired temperature has been reached, turn the control knob counterclockwise just until the HEATING light goes off. Allow the unit to stabilize for several hours. Re-adjust the control knob up or down as required until the desired temperature is obtained. Allow the unit to stabilize between each setting. Temperature stability is obtained when the HEATING light circulates on and off to maintain set point and the temperature value in the chamber remains consistent.
- 7.4 Setting Safety Control:** The Safety Control is graduated the same as the Main Temperature Control knob. When setting the Safety Control, wait until the chamber temperature has stabilized at the desired set point. After the desired stability has been obtained, gradually turn the Safety Control knob counterclockwise until the Safety Pilot light goes on and the reset button is tripped. Turn the Safety Control knob clockwise several minor divisions and push the Reset Button. If the Safety Pilot does not go off, adjust the Safety Control knob upscale a minor division at a time and retry the Reset Button until the Safety Pilot goes off. Repeat this step several times until you are sure the proper safety setting is obtained. Note that each time the Main Control set point is changed this procedure must be followed.

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 stainless steel surfaces.
 - B.** When washing the gasket, handle the gasket 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 and latch the door closed. Screw the leveling feet in on the 1430S. See Section 3.3 for transport procedures.
- 8.3** There is no maintenance required on the electrical components. If the oven fails to operate as specified, see Troubleshooting before calling for service.

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 trouble. 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 set too high-see Section 7.3
- 2/ controller failed on – call Customer Service
- 3/ wiring error – call Customer Service

Temperature too low

- 1/ high limit set too low – see section 7.4
- 2/ controller set too low – see section 7.3
- 3/ unit not recovered from door opening – wait for display to stop changing
- 4/ unit not recovered from power failure or being turned off
- 5/ element failure – see if heating light is on; compare current draw to data plate
- 6/ controller failure – confirm with front panel lights that controller is calling for heat
- 7/ high limit failure – confirm with front panel lights that safety is operating correctly
- 8/ wiring problem – check all functions and compare wiring to wiring schematic in manual - especially around any areas recently worked on
- 9/ loose connection – check shadow box for loose connections
- 10/ if ambient room temperature is lower than range of unit – compare set points and ambient temperature to rated specifications in manual Unit Specifications

Unit will not heat over a temperature that is below set point

- 1/ confirm that High Limit set point is set above the Main Temperature set point and that the reset switch has not been activated
- 3/ check connections to sensor

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/ is the Safety set high enough? – for diagnostics, should be fully clockwise with the pilot light never on
- 4/ has the fuse or circuit breaker blown?
- 6/Units will need at least some vacuum in chamber to keep unit air tight - verify with control panel vacuum gage

Indicated chamber temperature unstable

- 1/ ± 0.1 may be normal
- 2/ is ambient room temperature radically changing – either door opening or room airflow from heaters or air conditioning? – stabilize ambient conditions
- 3/ sensor miss-located, damaged or wires may be damaged - check mounts for control and Safety sensors, then trace wires or tubing between sensors and controls
- 4/ high limit set too low – be sure that Safety is more than 5 degrees over desired set point; check if Safety pilot is on continuously; turn controller knob completely clockwise to see if problem solved then follow instructions in section 7.4 for correct setting
- 5/ bad connections or faulty solid state relay – check connectors for mechanical soundness and look for corrosion around terminals or signs of arcing or other visible deterioration

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

MECHANICAL

Glass door not sealing

- 1/ check physical condition of gasket
- 2/ assure that gasket clamps are in original location

Outer door not sealing

- 1/ adjust hinge blocks
- 2/ Confirm that unit has not been damaged and body is not out of square.

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

unit will not turn on	<ol style="list-style-type: none"> 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 is smoking – Out of box	<ol style="list-style-type: none"> 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 5/ check if Safety light is on and Reset switch is extended. If so push Reset switch in and see if unit operates properly after that.
Contamination in chamber	<p>This is not uncommon during initial operation. Put unit under vent and run at full power for one hour.</p>
	<ol style="list-style-type: none"> 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 along with proper shipping instructions. 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.

PARTS LIST

Description	115V	220V
Circuit Breaker	1100505	1100505
Door Gasket, Standard Silicone 1410S	100029	100029
Door Gasket, Standard Silicone 1430S	100037	100037
Door Glass, 1410S	700027	700027
Door Glass, 1430S	110107	110107
Element Assembly, 1410S	9570728	9570728
Element Assembly, 1430S	9570739	9570739
EMI Filter, CE units only	NA	2800502
Fuse, CE units only	NA	103555
Heating Light	200021	200021
I/O (On/Off) Switch	X1000124	X1000124
Pilot Light, Safety On	200020	200020
Power Cord, European	1800500	1800500
Power Cord, USA	100014	101990
Temperature Control Knob	X1000771	X1000771
Temperature Controller	100026	100026
Thermometer	100030	100030
Vacuum Gauge	100031	100031
Vacuum Valve	700028	700028
Vent Valve	100032	100032

Additional Gaskets Sold:

	1410S	1430S
Hi – Temp Silicone	3450508	3450509
Viton Acids	110085	100578
Buna – N – Solvents	100049	100038

Unit Specifications

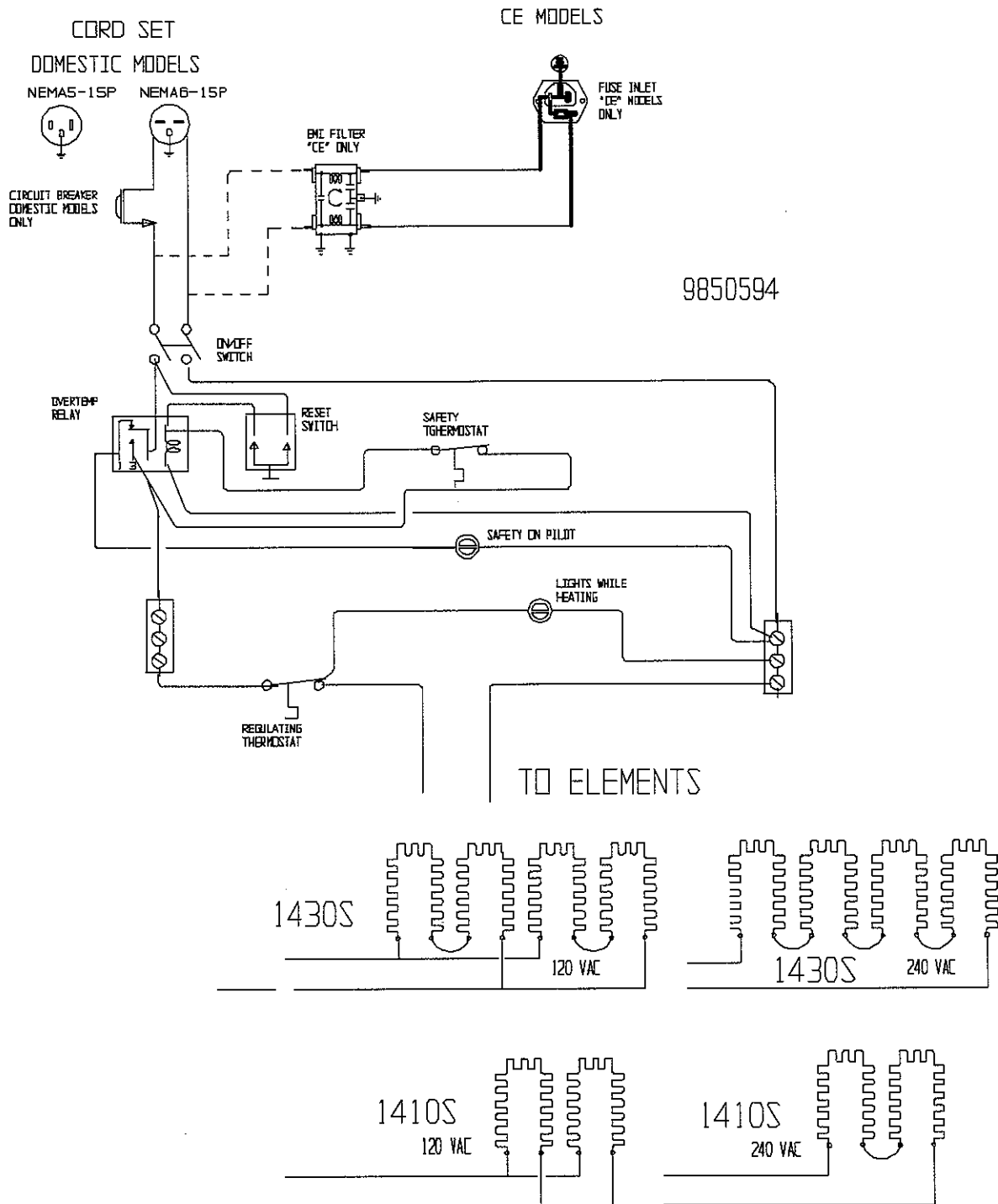
Weight	Shipping	Net
1410S	57 lbs.	55 lbs.
1430S	170 lbs.	115 lbs.

Dimensions	Exterior WxDxH	Interior WxDxH
1410S	20.5x17x16.3	9x12x9
1430S	23.8x26.3x20.3	12x20x12

Capacity	Cubic Feet
1410S	0.6
1430S	1.7

Temperature	Range	Uniformity	Sensitivity
1410S	Amb.+ 5° to 200°C	2.0 @ 100°	1.0°C
1430S	Amb. +5° to 200°C	3.0 @ 100°	1.0°C

Wire Diagram



SHELDON MANUFACTURING, INC.
LIMITED WARRANTY

Sheldon Manufacturing, Inc., ("Manufacturer") warrants for the original user of this product in the U.S.A. only that this product (parts only if outside of the U.S.A.) will be free from defects in material and workmanship for a period of two years from the date of delivery of this product to the original user (the "Warranty Period"). During the Warranty Period, Manufacturer, at its election and expense, will repair or replace the product or parts that are proven to Manufacturer's satisfaction to be defective, or, at Manufacturer's option, refund the price or credit (against the price of future purchases of the product) the price of any products that are proven to Manufacturer's satisfaction to be defective. This warranty does not include any labor charges if outside of the U.S.A. This warranty does not cover any damage due to accident, misuse, negligence, or abnormal use. Use of Manufacturer's product in a system that includes components not manufactured by Manufacturer is not covered by this warranty. This warranty is void in the event that repairs are made by anyone other than Manufacturer without prior authorization from Manufacturer. Any alteration or removal of the serial number on Manufacturer's products will void this warranty. **Under no circumstances will Manufacturer be liable for indirect, incidental, consequential, or special damages.** The terms of this warranty are governed by the laws of the state of Oregon without regards to the principles of conflicts of laws thereof. If any provision of this limited warranty is held to be unenforceable by any court of competent jurisdiction, the remainder of this limited warranty will remain in full force and effect.

This warranty is in lieu of and excludes all other warranties or obligations, either express or implied. Manufacturer expressly disclaims all implied warranties, including without limitation, the warranties of merchantability and fitness for a particular purpose.

.....
For fast and efficient support, please have the following information available anytime you request service:

Model _____

Serial No. _____

Part No. _____

Order From VWR
Call 800-932-5000

from anywhere in the U.S. and Canada

Sales & Inventory Locations:

Pacific Northwest Area

Anchorage, AK
Salt Lake City, UT
San Francisco, CA
Seattle, WA
Tualatin, OR

Southwest Area

Albuquerque, NM
Denver, CO
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fax: (908) 757-0313

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Catano, PR 00962
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fax: (787) 78804320

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