



## VACUUM OVENS

MODEL: 1470, 1480, & 1490

02/11  
4861644

### INSTALLATION AND OPERATIONAL MANUAL

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This unit is a special purpose 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 or placed near or on top of unit. This unit is not intended for hazardous or household locations or use.



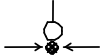








# RECEIVING AND INSPECTION

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 crate 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 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. The 1470 have two deep shelves and one shallow shelf. The 1480 has two deep shelves, one shallow shelf and four adjustable feet. The 1490 has three adjustable shelves and four adjustable 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 " <b>AC Power</b> ".  |
| 2.2  |    | Indicates " <b>I/On and O/Off</b> ".  |
| 2.3  |    | Indicates " <b>Vacuum Gauge</b> ".  |
| 2.4  |   | Indicates " <b>Vent (Gas)</b> ".  |
| 2.5  |  | Indicates " <b>Vacuum</b> ".  |
| 2.6  |  | Indicates " <b>Temperature</b> ".   |
| 2.7  |  | Indicates " <b>Over-temperature safety</b> ".                               |
| 2.8  |  | Indicates " <b>Degrees Centigrade</b> ".                                    |
| 2.9  |  | Indicates " <b>Heating</b> ".   |
| 2.10 |  | Indicates " <b>Consult Your Manual For Further Instructions</b> ".          |
| 2.11 |  | Indicates " <b>Unit should be recycled</b> " (Not disposed of in land-fill) |

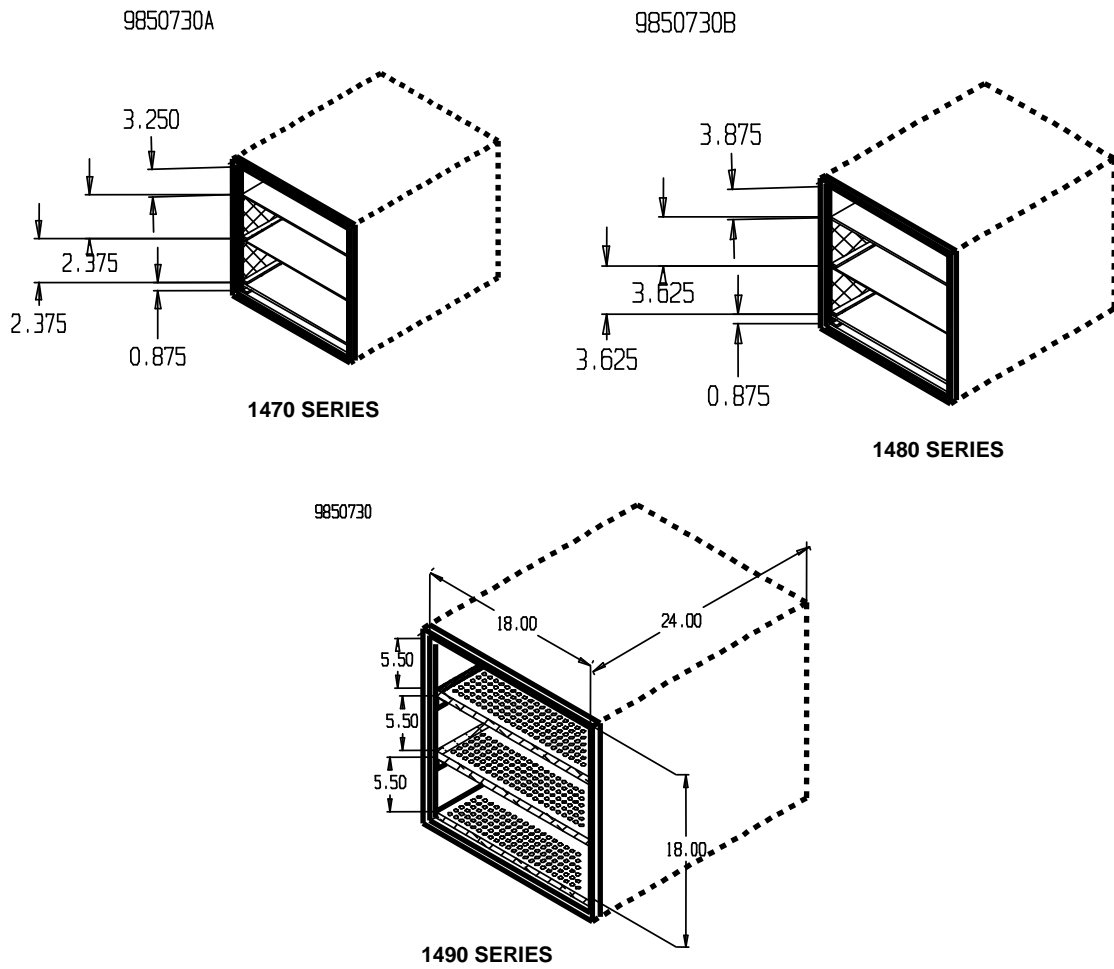
# INSTALLATION

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.

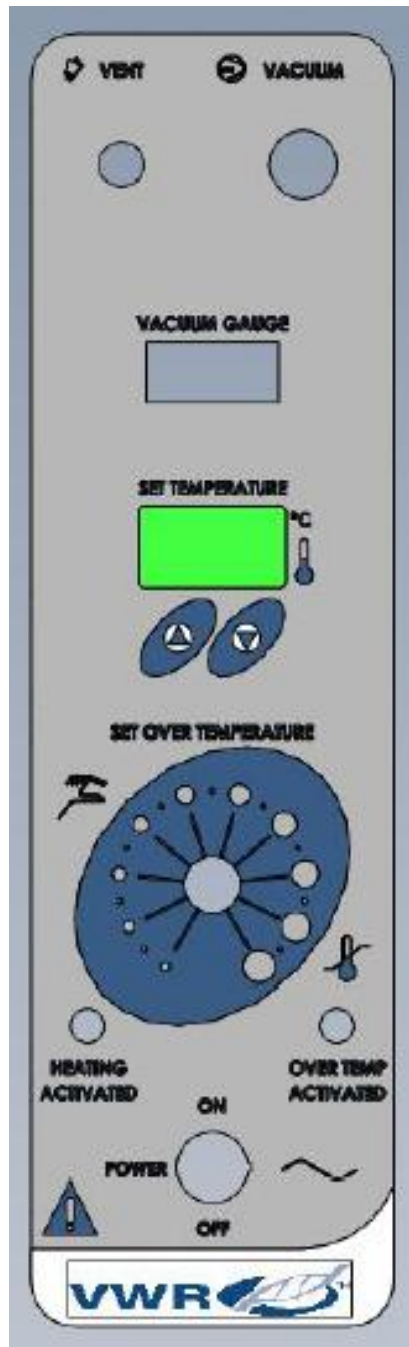
Under normal circumstances this unit is intended for use indoors, at room temperatures between 5° and 40°C, at no greater than 80% Relative Humidity (at 25°C) and with a supply voltage that does not vary by more than 10%. Customer service should be contacted for operating conditions outside of these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

- 3.1 Power Source:** The electrical supply circuit to the oven must conform to all national and local electrical codes. Consult the oven'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 30 cm between any walls or partitions and the unit which might obstruct free airflow.
- 3.3 Lifting / Handling:** These units are heavy 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 Leveling:** The unit must sit level and solidly. The Model 1470 has rubber feet that are already attached to the unit and are not adjustable. Leveling feet are supplied with Models 1480 and 1490, and must be installed in the four holes in the bottom corners of the unit. With the unit standing upright, turn the leveling foot 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 interior was cleaned at the factory, but not sterilized. Remove shelves and shelf clips and clean with a disinfectant that is appropriate for 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.
- 3.5 Shelves:** **See Figure 1** for proper orientation of shelves within the individual model chambers. **DO NOT** place items directly on the floor of the chamber.

**FIGURE 1**  
**Shelf Placement for 1470, 1480, 1490 Series**



## CONTROL PANEL OVERVIEW



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

**4.2 Main Temperature Control:** This control is marked °C and consists of the digital display and UP/DOWN arrow pads for inputting set point temperatures and calibration.

**4.3 Heating:** This indicator is ON when the Temperature Control has activated the heating elements to reach and maintain set point.

**4.4 Circuit Breaker / Fuse:** This control, mounted on the rear wall next to the power cord, provides protection for the unit's 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.

**4.5 Vacuum Gauge:** This component indicates the chamber operating pressure in inches of mercury.

**4.6 Vacuum:** This adjustment valve allows opening and closing of the piping system to an external vacuum pump or system.

**4.7 Vent:** This adjustment valve controls the vacuum release to return the chamber to atmospheric pressure.

**4.8 Over Temperature Safety Control (OTP):**

Located front left of the control panel, this is a hydraulic thermostat that is wired between the Main Temperature Controller and the heating element and functions as an override control. If at any time the Main Temperature Control fails in the ON position and the temperature in the chamber rises above its set point, the OTP is activated and maintains temperature at its own set point.

# PRECAUTIONS

**NOTE: THIS IS NOT AN EXPOLOSION PROOF OVEN.**

- 5.1** The bottom surface of the chamber should not be used as a work surface.
- 5.2** Do not place or use explosive, combustible, or flammable materials in the oven.
- 5.3** Do not use sealed containers in the oven chamber.
- 5.4** Do not cut or remove the ground prong from the power cord or use a 2-prong adapter plug.
- 5.5** Disconnect the unit from electrical power source before attempting to make any repairs or component replacements.
- 5.6** If a mercury thermometer is used and breakage should occur, all spilled mercury must be completely removed from the chamber.
- 5.7** This oven **IS NOT** suitable for use in Class I, II, or III locations as defined by the National Electrical Code NFPA 70.
- 5.8** This oven is not intended, nor can it be used, as a patient, connected device.



## VACUUM OPERATION

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

**6.2** A pump with a pumping capacity four times greater than the chamber volume is recommended. For example, 1470 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 a 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 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.

A KF-25 Flange is provided at the back of the unit. This access can be used to plumb the chamber to a larger, faster roughing pump or as a conduit for other service applications. Any use of this flange requires the end user to assure the attachment is vacuum tight.

**6.5** These ovens are not intended for use as pressure chambers. Pressure above atmospheric will blow by the door gasket and not allow build up of pressure.

**6.6 Vacuum Release:** To return the chamber to atmospheric pressure, open the VENT valve slowly and allow the chamber to re-pressurize. The speed or re-pressurizing can be controlled by how much the valve is opened.

**6.7 Vacuum Gauge:** To zero the gauge, simultaneously press the UP and DOWN keys on the gauge until "000" is displayed.

## OPERATION

**NOTE:** Slight vapor or smoke may occur in the initial heat-up. This is the dissipation of protective coatings that have been added 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 cord set, plug the female end into the inlet of the unit and the male plug into the supply. Assure that the units requiring a fuse have a fuse installed. This fuse may be at the inlet or part of the cord set male plug.
- 7.2** Place a certified reference thermometer inside the chamber where it can be easily viewed through a window. Vacuum down the chamber as described in Section 6.0.
- 7.3 Set Main Temperature Control:** To enter the desired set point temperature press either the Up or Down arrow pad one time. The digital display will start to blink from bright to dim. While blinking, the digital display can be changed by pushing the Up or Down arrow pads until the desired set point is obtained. If no arrow pads are pressed within five (5) seconds, the display will return to the indicating mode. During normal operation the set point can be checked by using this procedure and making no adjustments during the blinking mode. Allow several hours for the temperature to stabilize.
- 7.4 Calibrating the Main Temperature: Calibrating the Main Temperature:** It is recommended that calibration is done once the unit is installed in its working environment. The unit should be stable at set point for several hours and under vacuum. Compare the reading of the reference thermometer with the digital display. If there is an unacceptable difference, put the display into calibrate mode by pressing both the UP and DOWN buttons at the same time until the decimal points start to blink. While blinking, the display can be changed to match the reference thermometer by pushing the UP or DOWN buttons until the display reads the correct value. If no buttons are pushed for five (5) seconds the display will revert back to reading the temperature in the chamber. Allow for the oven temperature to stabilize again and recalibrate if necessary.
- 7.5 Setting the Over-Temperature Control:** After the Main Temperatures are set and adjusted, the Overtemperature Safety Control needs to be set. Do this by turning the OTP Control Knob counterclockwise until the Overtemperature Light comes on (this will blink in sequence with Heating Activated Light). Next, slowly turn the knob clockwise until the light goes off, then turn the knob another 8 degrees approximately. This should set the Overtemperature 1 degree above the Main Temperature set point.

# 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 for your application. DO NOT use chlorine based bleaches or abrasives as this 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 thorough, periodic cleaning is strongly recommended.
- B.** When washing the gasket, handle carefully so as not to impair the positive seal.

**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.

**8.2** If the oven is to be shut down for storage or transporting, clean and described above. Remove shelves and latch the door closed. Screw the leveling feet in on the 1480 / 1490.

**8.3** There is no maintenance required on the Temperature Controller or Temperature Probe. If the oven fails to maintain temperature, see Troubleshooting before calling for service.

# TROUBLESHOOTING

**FOR PERSONAL SAFETY, ALWAYS DISCONNECT THE POWER BEFORE SERVICING.**

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

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 spikes over set point and then settles to set point

recalibrate – see section 7.4

Temperature too low

- 1/ controller set too low – see section 7.3
- 2/ unit not recovered from door opening – wait for display to stop changing
- 3/ unit not recovered from power failure or being turned off
- 4/ element failure – see if heating light is on; compare current draw to data plate
- 5/ controller failure – confirm with front panel light that controller is calling for heat
- 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

Display reads "LO"

- 1/ sensor is plugged in backwards – reverse sensor wires to controller
- 2/ 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/ check connections to sensor
- 2/ check calibration – using independent thermometer, follow instructions in section 7.4

Unit will not heat up at all

- 1/ verify that controller is asking for heat by looking for heating 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/ do all controller functions work? 4/ has the fuse or circuit breaker blown? 5/Units will need at least some vacuum in chamber to keep unit air tight - verify with control panel vacuum gage
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Indicated chamber temperature unstable

	1/ $\pm 0.1$ 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 then trace wires or tubing between sensors and controls 4/ calibration sensitivity – call Customer Service 5/ electrical noise – remove nearby sources of RFI including motors, arcing relays or radio transmitters 6/ 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
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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
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Display and Reference thermometer don't match

	1/ calibration error – see section 7.4 2/ temperature sensor failure – evaluate if pilot light is operating correctly 3/ controller failure – evaluate if pilot light is operating correctly 4/ allow at least two hours to stabilize 5/ verify that reference thermometer is certified
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Can't adjust set points or calibration

	1/ turn entire unit off and on to reset 2/ if repeatedly happens, call Customer Service
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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 as close to the set point temperature as possible.
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## 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.
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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
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## OTHER

Controller on at all times-"locked-up"

	1/ turn unit off and on to reset 2/ if cannot change any condition on the front panel, call Customer Service
--	---

front panel displays are all off

	1/ check connections to the temperature display control board and assure that all are tight and in the correct orientation. 2/ Check for wire damage.
--	--

unit or wall fuse/circuit breaker is blown

unit will not turn on	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	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
Contamination in chamber	This is not uncommon during initial operation. Put unit under vent and run at full power for one hour.  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. If 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 – 115V

Description	1470	1480	1490
Door Gasket, Standard Silicone	3450706	3450707	3450719
Door Glass	3550542	3550540	3550586
Element	9570739	9570728	9570815 ( sides) 9570816 (top/bottom)
Feet	2700513	2700512	2700512
Pilot Light (Red)	4650553	4650553	4650553
Pilot Light (Green)	4650554	4650554	4650554
Power Cord	1800516	1800516	1800516
Power Switch	7850532	7850532	7850532
Sensor Clip	5080536	5080536	5080536
Solid State Relay	7030527	7030527	7030527
Temperature Control	1750604	1750606	1750608
Temperature Sensor	6600520	6600520	6600520
Vacuum Gauge	7850555	7850555	7850555
Vacuum Gauge Power Supply	6750507	6750507	6750507
Vacuum Valve	8600571	8600571	8600571
Vent Valve	8600566	8600566	8600566

# PARTS LIST – 220V

Description	1470	1480	1490
Door Gasket, Standard Silicone	3450502	3450503	3450504
Door Glass	3550542	3550540	3550586
Element	9570739	9570728	9570815 ( sides) 9570816 (top/bottom)
Feet	2700513	2700512	2700512
Pilot Light (Red)	4650553	4650553	4650553
Pilot Light (Green)	4650554	4650554	4650554
Power Cord, Euro	1800500	1800500	1800500
Power Cord, USA	1800537	1800537	1800537
Power Switch	7850532	7850532	7850532
Sensor Clip	5080536	5080536	5080536
Solid State Relay	7030527	7030527	7030527
Temperature Control	1750605	1750607	1750609
Temperature Sensor	6600520	6600520	6600520
Vacuum Gauge	7850555	7850555	7850555
Vacuum Gauge Power Supply	6750507	6750507	6750507
Vacuum Valve	8600571	8600571	8600571
Vent Valve	8600566	8600566	8600566

## Additional Gaskets Sold:

	1470	1480	1490
Hi – Temp Silicone	3450508	3450509	3450510
Buna – N -Solvents	3450712	3450708	3450724



# UNIT SPECIFICATIONS

Weight	Shipping	Net
1470	67 lbs.	55 lbs.
1480	240 lbs.	115 lbs.
1490	315 lbs.	275 lbs.

Dimensions	Exterior WxDxH (in.)	Interior WxDxH (in.)
1470	20.5x17x16.3	9x12x9
1480	25.5x25x21	12x20x12
1490	30.5x28.5x25.5	18x24x18

Capacity	Cubic Feet
1470	0.6
1480	1.7
1490	4.5

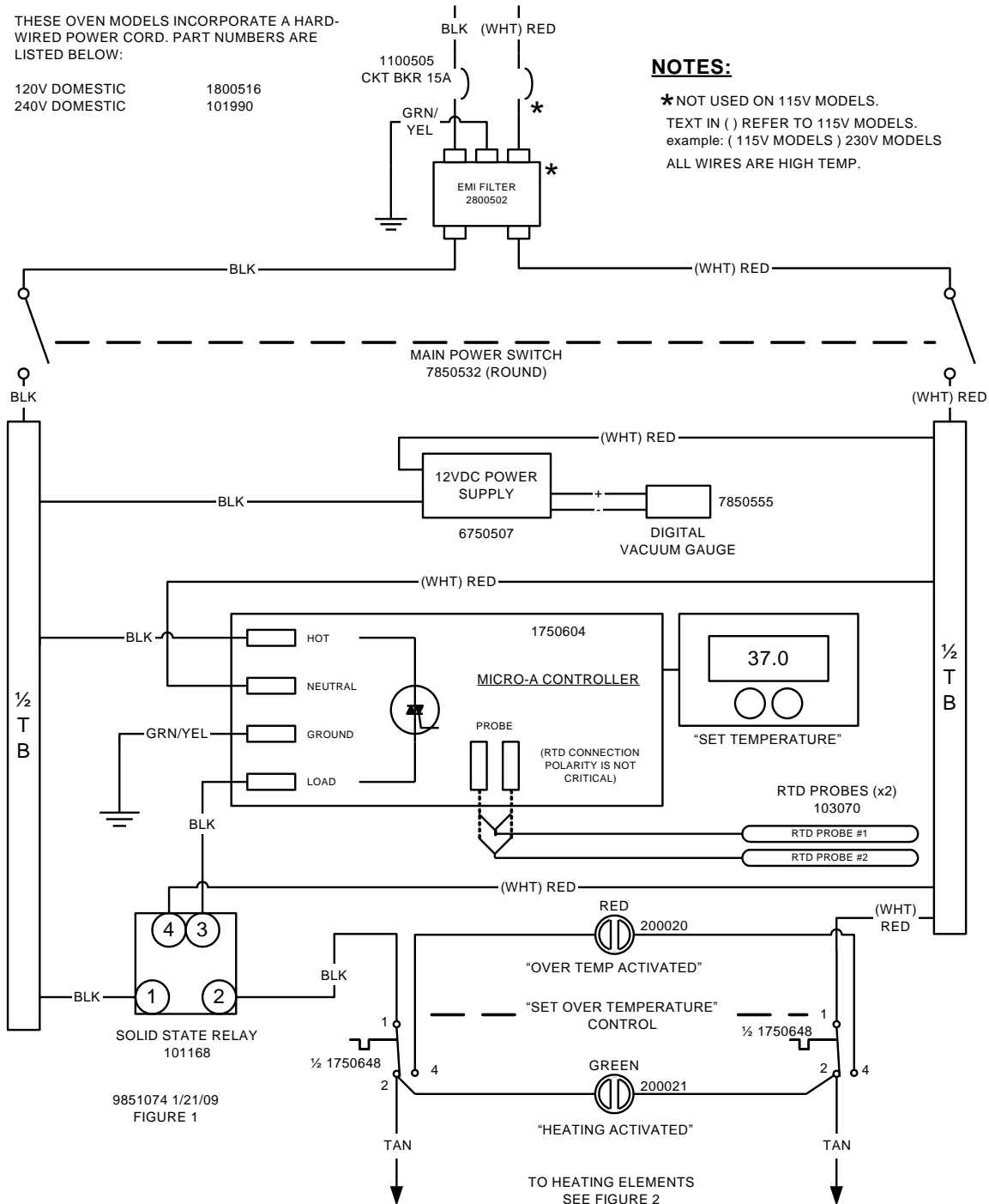
Temperature	Range	Uniformity	Sensitivity
1470	Amb. +10° to 240°C	±3.5° @ 100°C	1.0°C
1480	Amb. +10° to 240°C	±3.5° @ 100°C	1.0°C
1490	Amb. +10° to 240°C	±3.5° @ 100°C	1.0°C

# WIRE DIAGRAM

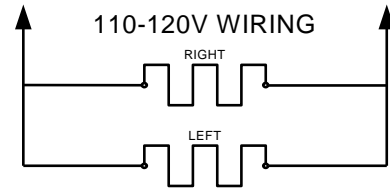
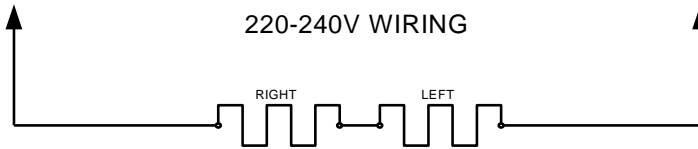
THESE OVEN MODELS INCORPORATE A HARD-WIRED POWER CORD. PART NUMBERS ARE LISTED BELOW:

120V DOMESTIC  
240V DOMESTIC

1800516  
101990



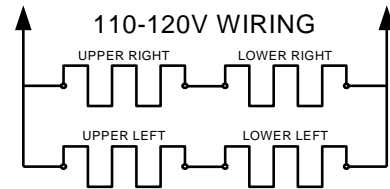
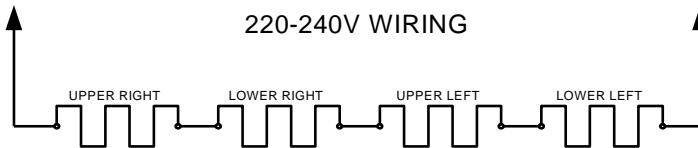
### MODEL 1470 (0.6 cu ft)



#### ELEMENT STATS

ASSEMBLY P/N: 9570739 x2 (1 LEFT & 1 RIGHT)  
 COIL RESISTANCE COLD: 35.7 $\Omega$  ea. COIL P/N: 2350509  
 DESIGN WATTAGE: 375W ea. DESIGN VOLTAGE: 120V ea.

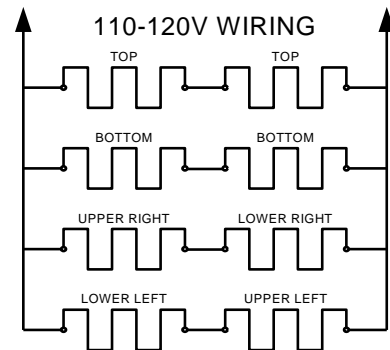
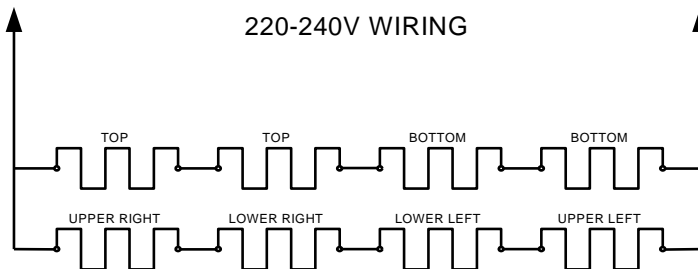
### MODEL 1480 (1.6 cu ft)



#### ELEMENT STATS

ASSEMBLY P/N: 9570739 x4 (2 LEFT & 2 RIGHT)  
 COIL RESISTANCE COLD: 13.4 $\Omega$  ea. COIL P/N: 2350509  
 DESIGN WATTAGE: 250W ea. DESIGN VOLTAGE: 60V ea.

### MODEL 1490 (4.5 cu ft)



#### ELEMENT STATS

ASSEMBLY P/N: 9570855 x4 (2 TOP & 2 BOTTOM)  
 COIL RESISTANCE COLD: 27.0 $\Omega$  ea. COIL P/N: 2350511  
 DESIGN WATTAGE: 250 W ea. DESIGN VOLTAGE: 60V ea.

ASSEMBLY P/N: 9570856 x (2 RIGHT SIDE & 1 LEFT SIDE BOTTOM)  
 COIL RESISTANCE COLD: 13.5 $\Omega$  ea. COIL P/N: 2350511  
 DESIGN WATTAGE: 125 W ea. DESIGN VOLTAGE: 60V ea.

ASSEMBLY P/N: 9570913 x1 (RIGHT SIDE TOP)  
 SAME SPECIFICATIONS AS 9570856 BUT HAS A MOUNTING STUD FOR THE PROBE.

**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  
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Phoenix, AZ  
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#### Midwest Area

Chicago, IL  
Detroit, MI  
Indianapolis, IN  
Minneapolis, MN  
St. Louis, MO

#### Gulf Area

Austin, TX  
Dallas, TX  
Houston, TX  
Lake Charles, LA

#### Northeast Area

Boston, MA  
Cincinnati, OH  
Cleveland, OH  
Pittsburgh, PA  
Rochester, NY

#### Mid-Atlantic Area

Baltimore, MD  
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#### Southeast Area

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