

Modular Vacuum/Nitrogen Oven

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Your Comprehensive Equipment Source





Modular Vacuum/Nitrogen Oven

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Safety Notice

A thorough familiarity with all operating guidelines is essential to safe operation of the product. Failure to observe safety precautions could result in poor performance, damage to the system or other property, or serious bodily injury or death.

The following symbols are intended to call your attention to two levels of hazard involved in operation:



CAUTION

Cautions are used when failure to observe instructions could result in significant damage to equipment.



WARNING

Warnings are used when failure to observe instructions or precautions could result in injury or death.

The information presented here is subject to change without notice.

1.0 Introduction

This manual provides information on installing and operating your Modular Vacuum/Nitrogen Oven.

By studying this document carefully, you can be assured of a long, efficient service life from your system.

2.0 Description

The Modular Vacuum/Nitrogen Oven is designed for economical heating with an inert gas atmosphere or under vacuum. When used as a gas oven, the oven receives purging gas through holes in a manifold inside the heating chamber. When it is operated as a vacuum oven, this inlet manifold is valved off and the pumping port is connected to either a mechanical vacuum pump or other vacuum pumping system.

This oven is available in a double-door design; double doors allow easy pass-through procedures and are ideal for operations that involve a glove box. Each oven features a 0-30" vacuum gauge and separate gas inlet and outlet ports. Temperature control include an on/off switch, temperature gauge, and temperature controller. Dual metering valves allow fine adjustment of vacuum and bleed operations.





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3.0 Installation



WARNING: This oven operates at voltages high enough to cause death. Always break the primary circuits of the power supply when you need direct access to the electrical cabinet or wiring.

NOTE: If you ordered your oven as part of a Stainless Steel Controlled Atmosphere Chamber, it will be preinstalled and delivered as part of a complete turnkey system. If not, you will need to follow these instructions in order to set up your system. Refer to the separate operating manual of the "Stainless Steel Glove Box" for instructions on how to mount the oven to the atmospheric chamber.

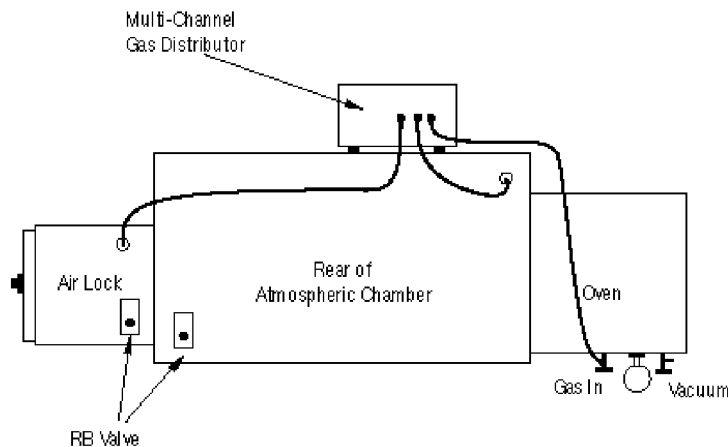
1. Carefully unpack the oven and inspect for any visible damage (report any damage according to the shipping agreement). Remove wrapped shelves from the inside of the chamber.
2. Inspect the door gasket to make sure it is in position to ensure a good seal.
3. To install the oven, connect a fused and grounded 120VAC power supply to the connection located on the rear of the oven (220VAC Models are also available).
4. If you are using this oven with Terra's Stainless Steel Glove box, make sure that the clamp that joins the two units is tight enough to ensure an air-tight seal. (For instructions on how to mount the oven, refer to the operating manual for the glove box).

NOTE: When mounted to the glove box, the oven requires no external support.

5. Connect a source of nitrogen or other inert gas to the gas inlet valve. A pressure regulator/flow-meter combination should be incorporated in this line. For this purpose, you can use a Terra Multi-Channel Gas Distributor or Glove Box Dual Purge System, which incorporate a pressure regulator and flow-meter. (See Figure 1).



CAUTION: High pressure and/or an unregulated gas source can cause damage to the flow-meter and/or gas lines. Under no circumstances should a high-pressure or unregulated gas source be connected.





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4.0 Operation

Gas Oven

1. Turn the power switch ON. The light besides the power switch will glow, indicating that power is being supplied to the unit. Set the thermostat control knob to position 10. The pilot light besides the thermostat knob will then glow, indicating that the unit is heating.

Note: When the oven is new and first heated, the insulation will become singed and you may notice some smoke and a burning odor. This condition normally persists for the first two or three hours of operation at high heat.

2. When the desired temperature is reached, re-adjust the control knob back until the pilot light goes out. The unit will then hold the set temperature.

Vacuum Oven

1. To apply vacuum to the chamber, attach a vacuum hose from a suitable pump to either hose connection on the oven. Close the unused valve and open the valve with hose connected. Start the pump and latch the door shut until a vacuum seal is established. (The application of a thin coating of vacuum silicon grease will facilitate the sealing process).
2. Carefully monitor the vacuum gauge. When the desired vacuum is attained, shut the vacuum valve and stop the pump. The other valve can be used to bleed air into the chamber as required.

Note: If oven does not heat properly, see Appendix for instructions on inspecting the thermocouple.

CAUTION:

- Never leave the oven under vacuum when it is not in use.
- Never operate the oven unless all service connections (such as gas lines) are established.
- Never turn the pump off while the vacuum valve is open since this will allow mechanical pump oil to be sucked up into the chamber.
- Never use silicon door gaskets when you use the oven evaporate solvent: orto heat high aniline-poin oils. Instead, select a rubber gasket (Cat. #9602-10) For operation hat involve acids, select the acid-resistant gasket (Cat. #96C2-11)

The interior finish and/or silicon rubber gasket may be damaged by the following substances:

Diesel Oil	Gasoline
JP-40i	Kerosene
Mil – 0-5606	Zylene
Hydraulic Fluids	Methyl Chloride
Butyl Acetate	Stoddard Solvent
Carbon Tetrachloride	Toluene
Ethylene Chloride	Aromatic Chlorinated Solvent



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5.0 Maintenance

This oven is designed to provide many years of efficient, reliable service as long as it is kept clean. If the inside of the chamber requires cleaning, it should be done with a clean cloth dampened with mild soapy water. The inside surface should then be thoroughly rinsed and dried.

Should stainless steel become discolored by iron rust, follow this easy procedure to remove all rust traces and restore the surface:

Prepare a solution of 20% nitric and 1 ½% hydro fluoric acid. Properly protect hands and use one in a well ventilated room. Swab the solution over the surface, allowing it to remain until all rust is loosened (usually, one to two minutes). Immediately flush surface with clean water until all acids are removed. Dry thoroughly.

If you prefer, you may use a 2% to 5% solution of warm oxalic acid. This, too, should be thoroughly removed with fresh water.

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CAUTION: Electrolysis can damage stainless steel. This can occur if an object is allowed to rest directly on the surface, trapping moisture that becomes oxygen-starved but is surrounded by water containing oxygen. The resulting electrolytic action will pit or erode the metal.

Gaskets should be checked periodically for hardening, shrinking, deterioration or other signs of wear. It is advisable to keep several gaskets available for use as replacements. Be sure to select the correct type of gasket for the work you are doing.

The oil level of the mechanical pump should be checked according to its separate manual.

See below for guidelines on servicing and replacing the oven thermocouple.

Spare Parts List

Cat. No.	Description
9602-04	Stainless Steel Shelf
9602-05	Stainless Steel Latch
9602-10	Rubber Gasket
9602-11	Acid-Resistant Gasket
9602-12	Heating Element
9602-06	Temperature



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6.0 Specifications

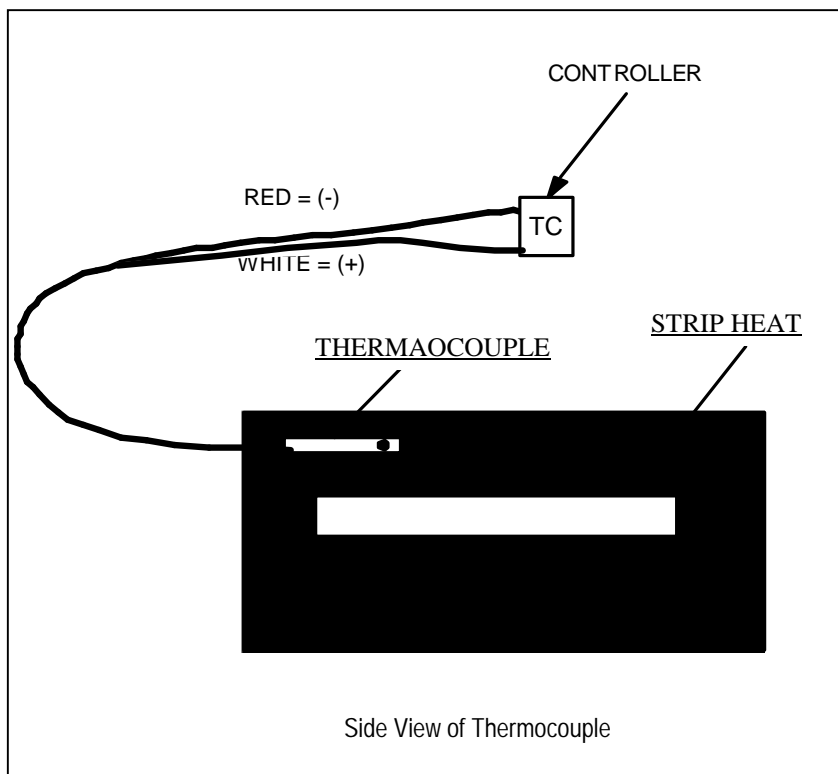
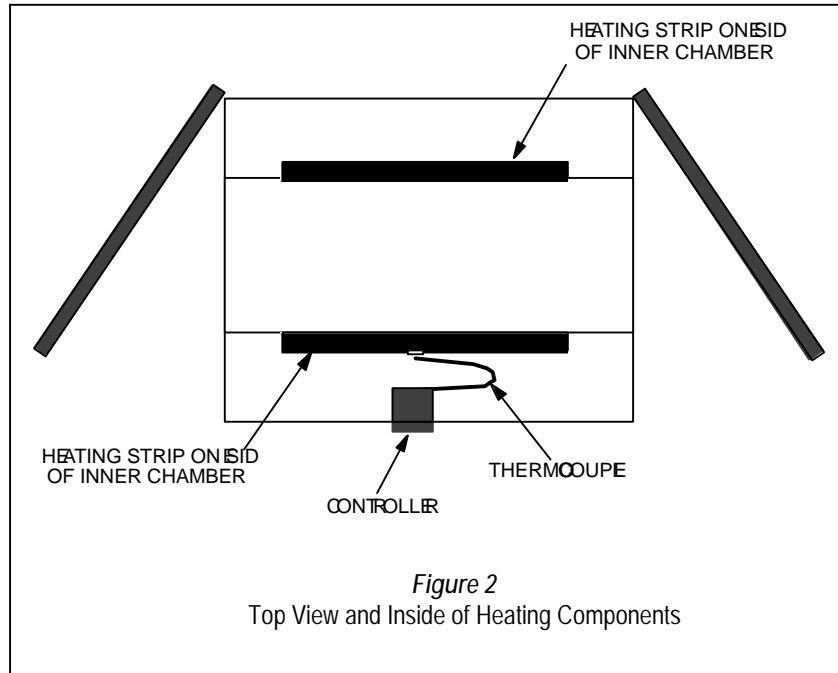


Figure 3



Modular Vacuum/Nitrogen Oven

Vacuum range:	Atmosphere to 10 microns, with adequate pump.
Vacuum gauge:	0-30"
Temperature range:	10°C to 149°C
Capacity:	0.48 cu. ft.
Inside dimensions:	8"W x 13"D x 8"H
Outside dimensions:	15"W x 13"D x 14"H
Power requirements:	120V AC, 60 Hz, 4.6 amps, 550 Watts.
Shipping weight:	54 lbs.
Leak rate:	0.2 liters/24 hours
Pumping rate:	33.4 liters per minute, free air capacity, with appropriate pump.

Appendix

Servicing/Replacing the Thermocouple

This thermocouple provides feedback to the temperature controller, allowing the oven to maintain a stable temperature setting.



WARNING: Before servicing the oven, be sure to disconnect system power

To service or replace the thermocouple,

1. Remove the top plate of the oven (by removing the six 10-32 screws that hold it in place)
2. Looking down on the internal components, you will see the thermo-couple bolted to the side of the chamber (adjacent to the temperature controller). Refer to Figure 2.

To check for loose or faulty wiring, trace the two wires from the thermo-couple to the controller. The red wire should be attached to the negative terminal, and the white wire to the positive terminal. The thermocouple itself should be securely attached to the side of the oven by a 10-32 nut. See Figure 3 on next page.

3. If the connections are correct but the oven still does not operate correctly, replace the thermocouple. Make sure that the wires are correctly attached to the controller, and that the thermocouple is securely mounted to the stud on the side of the oven
4. Replace the top cover of oven by reattaching the six 10-32



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7.0 Warranty

Products Manufactured by Terra: Terra Universal, Inc., warrants products that it manufactures to be free from defects for a period of 12 months for parts and 90 days for labor, commencing from the date of shipment. Terra's sole responsibility is to repair or replace, at its option, any part of the product that proves defective or malfunctioning during this time limit. In some cases, components incorporated in Terra Universal products are covered by additional warranties from component manufacturers; obtain specific information from Terra sales representatives. This warranty is void if the equipment is abused or modified by the customer, is operated outside Terra's operating instructions or specifications, or is used in any application other than that for which it is specified. This warranty does not include routine maintenance or service procedures, breakage of quartz baths after 60 days, shipping damage, nor damage from misuse, intentional or unintentional abuse, neglect, natural disasters, or acts of God.

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Generally, customers can improve the chance of collecting on a freight claim by following these procedures: 1) formally requesting that the carrier inspect the shipment immediately upon suspecting damage or shortage to verify condition; 2) notifying the carrier upon discovery of concealed damage and requesting an inspection within 15 days of receipt, both in person or phone and following up via mail; 3) keeping the shipment as intact as possible, including retaining original packaging materials and keeping the product as close to the original receiving location as possible; 4) holding salvage for disposition by the carrier.

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Warranty Returns: All warranty returns must be authorized in advance by Terra Universal and approved under an RMA. Unless approved in advance for good reason, all returns must be in original condition, including all manuals, and must be packaged in original packaging materials. All returned goods are to be shipped to Terra Universal, freight prepaid at customer's expense. See Terra's "Policy and Procedure for Returned Goods."

*Thank you for ordering from
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