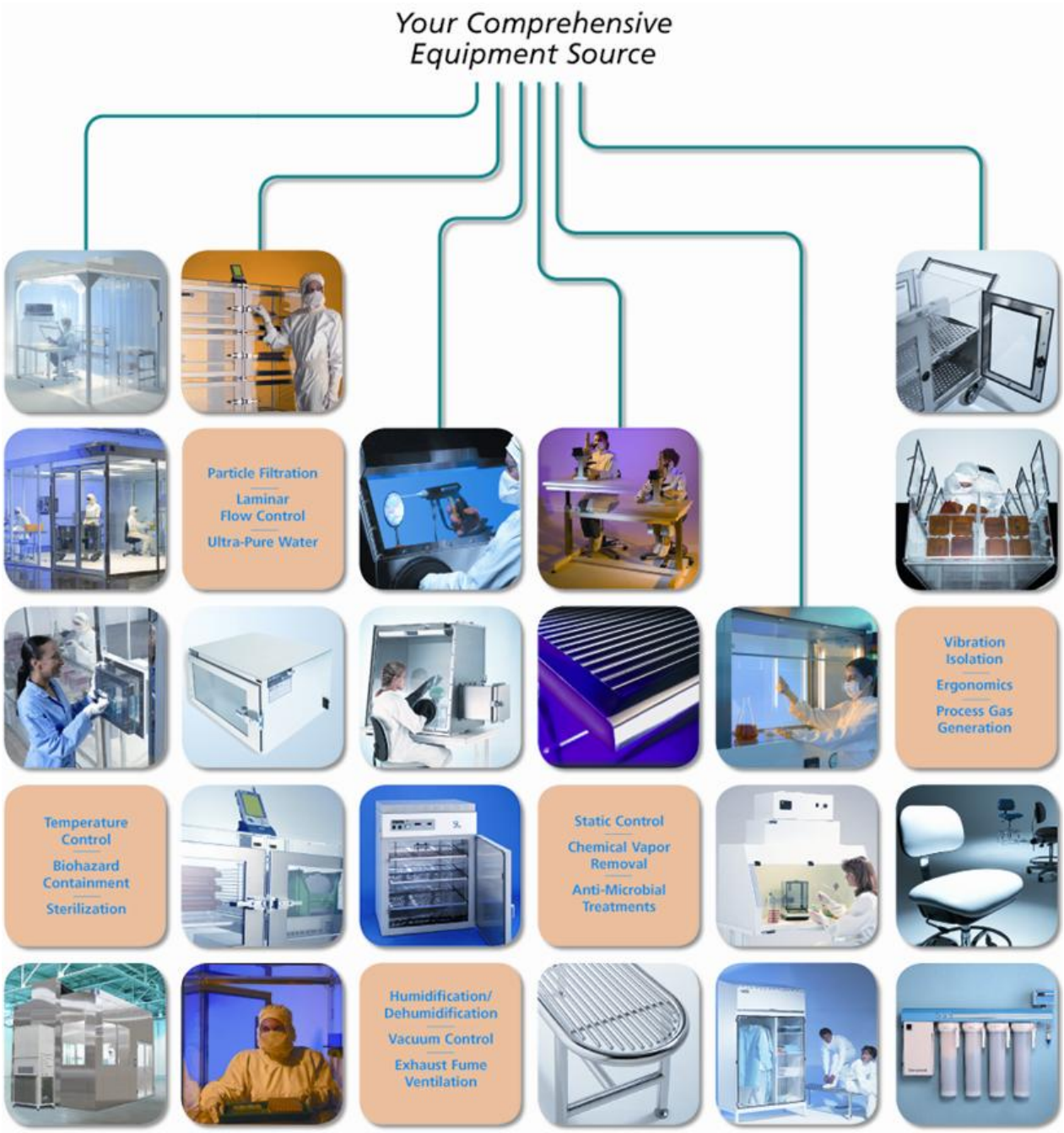
TERRA UNIVERSAL.COM
Critical Environment Solutions

Quick-Start Operating Guide ***Document No. 1800-11***

High-Performance Vacuum/Nitrogen



Quick-Start Operating Guide

Performance Vacuum/Nitrogen

Proprietary Notice

This manual pertains to proprietary devices manufactured by Terra Universal, Inc. Neither this document nor any portion of it may be reproduced in any way without prior written permission from Terra Universal.

Terra Universal makes no warranties applying to information contained in this manual or its suitability for any implied or inferred purpose. Terra Universal shall not be held liable for any errors this manual contains or for any damages that result from its use.

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 Terra High-Performance Pass-Through 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 High-Performance Pass-Through Vacuum/Nitrogen Oven is designed for heating with an inert gas atmosphere or under vacuum to a maximum continuous temperature of 300 degrees C (350 degrees C intermittently). When used as a gas oven, the oven receives purging gas through holes in a manifold extending longitudinally beneath the perforated hearthplate. 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.

The oven is heated by four externally mounted band heaters which provide a total of 3600 watts. Oven temperature is controlled and maintained by a time proportioning temperature controller. The pre-heated gas manifold will guarantee temperature uniformity during gas flow.

The rugged 1/2" thick double doors allow for easy pass-through operations and operate smoothly from both ends. Door flanges hold circulating water to speed up the cooling of the chamber during cycling operations; the oven can then remove the moisture completely prior to sealing operations.

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.

1. To install the oven, connect a fused and grounded power supply to the terminal block located behind the rear access panel. Consult the information plate mounted on the unit and the electrical schematic for power requirements and wiring details.

2. If you are using this oven with Terra's Stainless Steel Controlled Atmosphere Chamber, 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 stainless steel glove box.

CAUTION: When mounted to the glove box, the oven requires adequate support. Use one of Terra's specially designed stands or an equivalent support.

If you need to mount the oven to any other glove box, simply follow these procedures:

A. Remove the door and latch keeper.

B. Remove the spring-loaded bloc

C. Make a template of the circular end flange and cut a circular hole in the glove box, together with the through holes for the bolt circle.

D. Using “Silastic” or equivalent silicon sealer, form an air-tight seal between the flange and glove box. Mount the oven to the glove box, using 5/16" bolts with seal washers on the inside.

E. Replace the hinge and latch keeper, which should now bolt through the glove box material. Adjust the latch keeper to compensate for the thickness of the glove box

NOTE: It may be necessary to shim the hinge lugs on the door, depending on the thickness of the box material, in order for the spring-loaded hinge block to function.

3. Connect a water source to the water inlet coupling provided on the rear of the cabinet. Water should be supplied at normal pressures and at a minimum flow rate of 0.2 gallons per minute..

WARNING: Do not attempt to operate the oven without water, which is required to cool all of the “O” ring flanges. Water used to cool the system can reach scalding temperatures. Touching the system can result in serious burn.

4. Connect a drain line to the coupling provided. This drain should be free and open with little or no back pressure. If a valve is desired to control the water flow, it should be placed in the water inlet line. UNDER NO CIRCUMSTANCES SHOULD A VALVE BE PUT IN THE DRAIN LINE.

CAUTION: Back pressure in the drain can cause damage to the equipment and/or rupture the cooling lines.

5. Connect a source of nitrogen or other inert gas to the gas inlet valve located on the rear of the unit. This gas should be supplied at a flow rate of approximately 10 CFH and at a maximum pressure of 10 PSIG.

A pressure regulator/flowmeter 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 flowmeter.

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

6. For vacuum service, connect a vacuum pumping system to the pumping port located under the oven. The pumping system should incorporate a valve between the oven and the vacuum pump.

   NOTE: For optimal operation, Terra recommends the use of our air-cooled vacuum pump no. 7901-00.

4.0 Operation

As a Gas Oven: After connection of the properly regulated gas line, open the vent (gas inlet) and commence gas purging. The gas exhaust line incorporates a pressure relief valve for safe exhaust bleeding. Sufficient time should be allowed before heating to enable the oven to completely purge the air in the chamber. Keep in mind the flow rate of the gas source and the volume of the oven (3/4 cubic feet) in estimating how long this process will take.

Spare Parts List

Cat. #	Description	Quantity
5410-02	"O" Ring, 11.5" ID x 25" Section	3
5410-03	"O" Ring, 3" ID x .125" Section	1
5410-04	Thermocouple, Type "J", 20ga., 13" long	1
5410-05	Thermocouple, gland, #SP-152A-2	1
5410-06	Heating element, 975 watts	2
5410-07	Heating element, 825 watts	2

Make sure that the vent is closed before heating begins.

As a Vacuum Oven: After the vacuum pumping system is connected to the pumping port beneath the oven, close the vent (gas inlet) and commence pump operation. Once the oven has been evacuated to the desired level (as indicated on the circular vacuum gauge), you are ready to begin heating

When the desired cycle is concluded make sure that the pumping system is turned off (or the vacuum line valved off) before opening the vent (gas inlet) valve.

Heating is controlled by a controller mounted on the oven's front panel. Refer to separate controller instructions for operating guidelines

CAUTION:

1. The oven chamber should not be vented to the atmosphere if its temperature is above 100 degrees C. If the oven interior that is exposed is above this temperature, oxidation of the chamber wall may occur

2. Never operate the oven unless all service connections (gas lines, water) are established.

3. Never operate the oven unless all service connections (gas lines, water) are established.

4. 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.

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 acetone or alcohol. A general visual inspection of thermocouples and work support should be made after each use.

6.0 Specifications

Temperature range:	Up to 300°C continuous, 350°C intermittent.
Degree of vacuum:	Up to 10–6 Torr and higher; helium mass spectrometer tigh.
Heat-up time:	25 minutes under vacuum, 35 minutes with atmospheric flow.
Size of work zone:	11.5" dia. by 14" long
Exterior cover:	Mild steel, blue hammertone enamel.
Insulation:	2" of high temperature insulation–plus polished aluminum reflector
External connections:	Vacuum port–standard 1.125"–diameter port ISO-KF-40 Quick.

Clamp and blanking plate (3.81 cm diameter).

Water inlet–.25" FPT.
Water drain–.25" FPT.
Gas inlet–.25" FPT. (valved)
Gas outlet–.25" FPT. (valved)

Power requirements:	120VAC, 50–60Hz, 3.6 kw or 220VAC, 50-60Hz, 3.6 kw.
Water requirements:	.25 gpm, .25" FPT.
Gas flow:	Built-in provision.
External dimensions:	19.5"W x 17.75"D x 28.75"H.
Instrumentation:	0–30" Rough Vacuum dial gauge, .125" NPT coupling for thermocouple vacuum gauge

Connection on pumping port neck. Time proportioning temperature controller.

Door swing (out):	13.5".
Net weight:	150 lbs.
Shipping weight:	200 lbs.

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.

Products Manufactured by Others: Terra Universal, Inc., warrants that, to the best of its ability, Terra's representations of products that are manufactured by others reflect the manufacturer's representations, subject to change without notice. Sole warranty for these products is the original manufacturer's warranty that is passed forward to the purchaser and constitutes the customer's sole remedy for these products. Detailed warranties for distributed products are available through Terra sales representatives.

Freight Shortage or Damage: Upon receipt of any equipment from Terra Universal, Inc., customer shall immediately unpack and inspect for damage or shortage. The customer shall not accept a damaged package or a short shipment until the carrier makes a "damage or shortage" notation on both the carrier's and customer's copy of the freight bill or delivery receipt. Service title passes when the shipment is loaded, so customer is responsible for filing and collecting a freight claim. Any replacement products must be ordered and paid for separately. For Terra's "Policy and Procedures for Returning Goods," see Terra's Internet site: www.TerraUniversal.com.

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.

All Claims: Terra Universal expressly disclaims all other warranties, expressed or implied or implied by statute, including the warranties of merchantability or fitness for intended use. Terra Universal is not responsible for consequential or incidental damages arising out of the purchase or use of the products supplied by Terra Universal. Terra Universal is not liable for damage to facilities, other equipment, products, property or personnel of others, or of their agents, suppliers, or affiliated parties, which is caused or alleged to have been caused by products supplied by Terra Universal. In any event or series of events, Terra Universal's total liability for any and all damages whatsoever is limited to the lesser of the actual damages or the original invoice cost of the items alleged to have caused the damage. The customer's sole and exclusive remedy for any cause of action whatsoever is repair or replacement of the non-conforming products or refund of the actual purchase price, at the sole option of Terra Universal. All claims must be made in writing within 90 days of the date the product was shipped. Any claims not made within this time limit shall be deemed waived by the customer. Terra Universal is not responsible for any additional costs of repair caused by poor packaging or in-shipment damage during return.

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
Terra Universal!