

Series 210 Vacuum Glove Box

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Your Comprehensive
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1. Safety

Proprietary Notice

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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.

To reduce the risk of fire, electric shock, or injury to persons, observe the following:



CAUTION

- Use proper lifting and moving equipment when moving the vacuum glove box.
- Do not use the vacuum glovebox in a contaminated atmosphere or where metallic dust exists.
- Do not expose the vacuum glovebox to any heat sources.
- Do not use isopropyl alcohol, chlorine bleach, ammonia-based cleaners, abrasives, ammonia, or metal scouring pads.
 - Wipe with a soft damp cloth or a sponge soaked in water or diluted neutral detergent.
- Do not hit or collide the vacuum glovebox with other objects, especially sharp objects such as knives or screwdrivers.
- Acrylic vacuum gloveboxes cannot be autoclaved.

Critical Operation Conditions:



WARNING

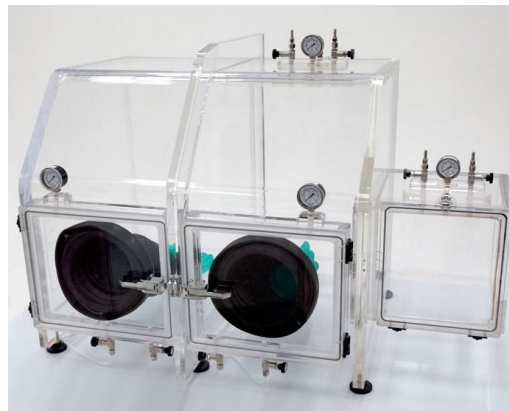
- Never install or use this unit in explosive atmospheres.
- Never install this unit near hazardous or flammable substances.
- Wear impact-resistant safety glasses at all times.
- Vacuum glovebox is designed for negative pressure. For applications that use positive pressure, make sure the glovebox has a pressure relief valve to prevent a rupture from over-pressurizing the glovebox.
- Place vacuum and purge connection valves in the correct open/closed positions.
 - Improper placement can cause severe damage to the chamber and control systems.
 - Ruptured gas lines or chamber implosion can harm personnel.
- The series 210 Glovebox is intended for vacuum cycling and process gas backfilling, which facilitates rapid removal of moisture and oxygen. Although designed to support intermittent vacuum service as low as 29.9", it may sustain damage to welds if exposed to continuous vacuum levels below 29"Hg.



2. General Information

This manual provides information on installing and operating your Terra Series 210 Vacuum Glove Box.

The Series 210 Glove Box supports vacuum and degassing operations. Vacuum cycling provides a fast, economical way to achieve extremely low moisture and oxygen levels inside the chamber. During each cycle, a vacuum pump connected to the glovebox removes the chamber environment, and with it moisture and oxygen. At the end of the vacuum cycle, the chamber is backfilled with a clean, dry process gas (commonly nitrogen or argon) to restore neutral pressure. This cycle can be repeated as many times as necessary to attain the desired low humidity, low oxygen conditions.



Shown without Purge Connection Kit

To sustain vacuum pressure, this Series 210 Glovebox is fabricated of 1.5"-thick acrylic and features support ribs to minimize wall deflection under vacuum. The chamber comes with a vacuum gauge and three metering valves on the top chamber panel: one for connection to a vacuum pump, one to interconnect the glove port chambers, and one to bleed the vacuum. Each glove port chamber includes its own vacuum gauge and dual valves, one to connect to the main chamber and one to bleed vacuum. Dual swing doors with latches isolate these chambers from the atmospheric pressure, allowing gloves to remain in place during vacuum processing.

To monitor and maintain vacuum conditions, an optional Purge Connection Kit includes the following connection ports:

- Two gas line fittings for connection to the sample chamber of Terra's Trace Oxygen Analyzer or other oxygen/humidity monitoring device (order separately)
- A "Gas In" port for connection of 0.25"-diameter tubing, which delivers purge gas to the chamber
- A "System Pressure" port that allows connection of a 0.25"-diameter gas line to Terra's Dual Purge System. This connection enables the Dual Purge System to monitor internal chamber pressure and activate a high-flow purge if necessary (refer to separate Operating Manual for "Plastic Glovebox: Dual Purge System," Doc. No. 1800-42.
- A Relief/Bleed Valve, which provides safe release of positive internal pressure during chamber purging.

See further information below on system installation. The following accessories are system options and must be ordered separately, normally at the time the chamber is ordered:

Vacuum Pump (No. 7906-56 or comparable)	Trace Oxygen Analyzer (No. 2005-97)
Vacuum Pump Connection Kit (No. 5400-24)	Purge Connection Kit (No. 3305-50; includes bleed valve)
Dual Purge System (Hi-Flow Model No. 1603-58)	Vacuum Control Module (No. 1681-75)

Vacuum Air Locks

These units can be mounted on either side of the chamber to provide a safe, practical way of moving materials into and out of the work area. Materials are loaded into the air lock by means of an external door. After the external door is closed, the chamber is typically exposed to vacuum cycles to remove ambient, moisture-laden air before the operator opens the internal door from inside the glove box to bring materials into the work area.

The Vacuum Air Lock is made of 1"-thick acrylic and supports vacuum pressure to 29.9" Hg.

Gloves

Terra provides a variety of glovebox gloves for use in this chamber, including nitrile, neoprene, hypalon and butyl materials. Gloves are typically installed prior to shipping. Refer to Appendix for instructions on mounting gloves.



3. Installation



WARNING

- To prevent dangerously low oxygen levels and risk of asphyxiation, nitrogen-purged systems should only be installed in a well-ventilated area.

Terra Glove Boxes are normally delivered with all specified components as a complete turnkey system. In this case, you need only make the required vacuum and power connections. Carefully uncrate the glove box and accessories and visually inspect for damage, both inside and out. Be sure not to throw away any important items with the packing material. Any damages should be reported according to the procedures outlined in the shipping agreement.

Make sure that your glove box is placed on a level, stable surface, away from heat or chemicals that could damage it.



CAUTION

- Do not clean acrylic with alcohol or other strong cleaning agents.
- Failure to place valves in correct on/off positions can severely damage system components, including Oxygen Analyzer and Dual Purge System.

Vacuum Connections (see photo on following page)

The glove ports of the Series 210 Vacuum Chamber are encased in their own vacuum chambers to accommodate the system's two operation modes.

During Vacuum Operation Mode, the doors on these chambers are closed to isolate them from external ("ambient") environment. Vacuum lines that connect these chambers to the main glovebox chamber are opened. In this configuration, gloves are not exposed to vacuum pressure and will not tear loose from the glove ports.

During Purge Operation Mode, these glove port chambers are isolated from the main glovebox. The lines connecting them to the main chamber are closed, and the doors are opened to allow the operator access to gloves.

Use a "T" fitting to interconnect vacuum lines from each of the two glove port chambers to the main chamber, using 0.25"-diameter polyethylene vacuum line.

Connect the hose barb vacuum connections at the top of the glovebox and antechamber to pump or vacuum controller (see illustration on following page).

Refer to separate Operation Manual (Doc. No. 1800-58) for installation of Terra's Vacuum Control Module. If the chamber will be backfilled with process gas, connect the Vacuum Pressure Release Fittings to an externally regulated gas source.

Purge Control Fittings (see photo on following page)

The optional Purge Control Fittings allow connection of the glovebox to Terra's Trace Oxygen Analyzer and Dual Purge System. This equipment allows continuous monitoring of oxygen or moisture levels and controls the purge of process gas (typically nitrogen or argon) used to maintain low oxygen and water vapor concentrations.

Use 0.25"-diameter polyurethane or similar tubing to connect this equipment (see separate Doc. No. 1800-42 for installation and operation of Dual Purge System).



Fig I: Vacuum Control Connections



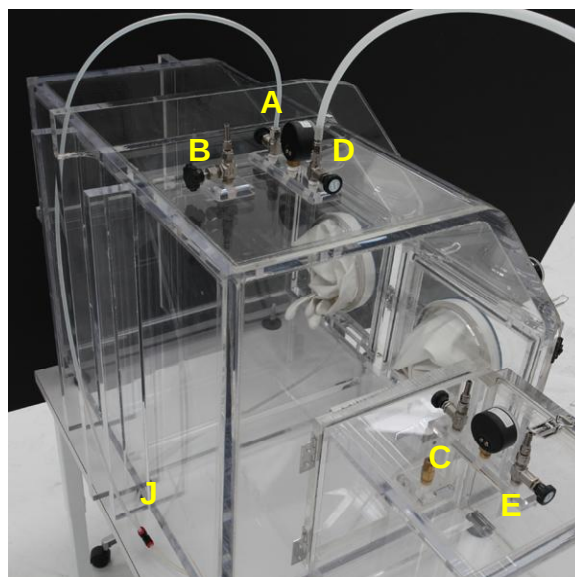
**F/G. Glove Port Chambers:
Interconnection Ports**

**H/I. Glove Port Chambers:
Pressure Release Valves**

**A. Glovebox/Glove Ports
Interconnection Port**

**B/C. Vacuum
Pressure Release
Valves**

**D/E. Vacuum Supply
Valves (to pump)**



**J. "T" Fitting branches to
Glove Port Chambers**

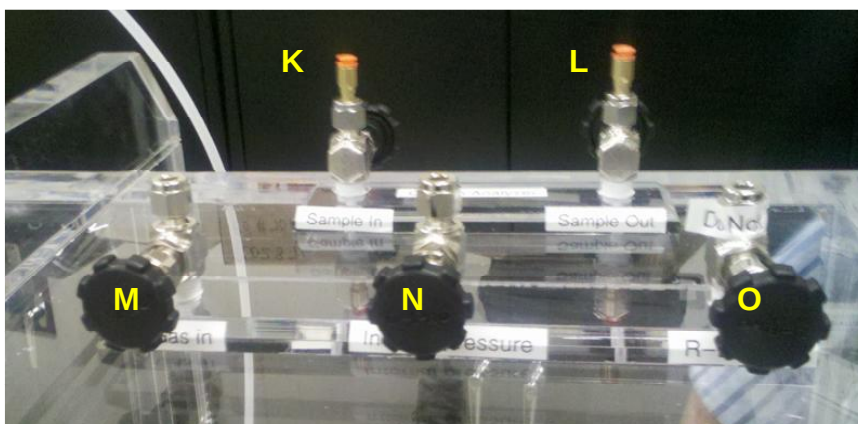
Fig. II: Purge Control Connections

**M. Gas In
(from Dual
Purge
System)**

**N. Internal
Pressure
(gas out to
Dual Purge
System)**

**K. Sample In
(from Trace Gas Analyzer)**

**L. Sample Out
(to Trace Gas Analyzer)**



**O. Purge
Relief Valve
(Do Not
Remove
Hex Fitting)**



4. Operation

Operation protocol depends on whether you are using the Series 210 Glovebox as a drying/degassing chamber, or whether you are creating an ultra-dry, anaerobic environment for processing sensitive materials.

4.1 Vacuum Operation Mode

For Drying, Degassing or Curing Materials

Parts are introduced into the chamber and exposed to one or numerous vacuum cycles. Following each vacuum drying cycle, the vacuum pressure is released by backfilling with air or process gas (typically nitrogen or argon) to restore atmospheric pressure and materials are removed from the chamber.

Vacuum Operation Mode requires that all chambers be interconnected, so that no vacuum pressure is applied to internal doors of the antechamber or to gloves when the vacuum pump is turned on.



- **During Vacuum Operation Mode, failure to open antechamber door can cause damage to door panel and hinges. Failure to interconnect glove port chambers and main glovebox chamber can result in damage to gloves and attachment hardware.**



- Do not form a vacuum when airtight containers are inside the unit.
- Use proper O-rings and nuts when attaching other equipment or additional valves for tight sealing.
- Cool high-temperature samples thoroughly before inserting into the chamber or ensure the samples are not in direct contact with the interior of the unit to avoid interior damage.
- Do not impact or drop the unit when a vacuum is formed inside.
- When forming or releasing a vacuum, turn the valve handle slowly to avoid rapid pressure change. If not, the stored samples can be damaged or dispersed.
- Do not let the body of the unit into direct contact with isopropyl alcohol, acetone, benzene, toluene, chloroform, cresol, sodium hydroxide, highly concentrated nitric or sulfuric acid, acetic acids, or strong chlorine-based solvents.
- When a vacuum is formed inside the unit, do not apply excessive force to the valves, the vacuum gauge, or any of their vicinities. Any damages caused by external forces can cause unit malfunction.



- **For applications that backfill the vacuum with nitrogen gas, take extra caution to avoid over-pressurization. Pressurized systems hold a great deal of energy. Over-pressurizing a chamber can cause adverse effects such as a rupture.**
- **Never turn off the vacuum pump while the vacuum valve is open! Contaminants – including oil, if the pump is oil lubricated – will be drawn into the chamber. Always close the metering valve before turning the pump on or off.**

To operate the system in Vacuum Operation Mode (see Figures I and II on previous page),

1. Place samples in the antechamber (if present), and then transfer them into the main glovebox chamber. If the glovebox includes an antechamber, use the glove ports to open the internal antechamber door and move samples inside the glovebox. Leave this internal antechamber door open when the sample is in place.
2. Close and latch the external access door.
3. If your system includes an antechamber, verify that the internal chamber door is open. Remove hands from gloves and securely close both external glove port doors, engaging two top and two bottom draw latches as well as the front latch of each door.
4. Verify that the chamber interconnection lines are securely connected, as described in Section 3.0 (Valves A, F & G).



Series 210 Vacuum Glove Box

5. OPEN the interconnect valve at the top of the glovebox chamber (A) and the interconnect valve below each of the glove port chambers (F and G).
6. CLOSE the vacuum bleed valves located at the top of the glovebox chamber (B), at the top of the antechamber (C), and below each of the glove port chambers (H and I). These valves include a hose barb fitting.
7. Verify that 0.25-inch diameter vacuum line is securely installed between the glovebox chamber (D) and the pump (or vacuum controller, if present).
8. CLOSE the vacuum valve on top of the antechamber (E).
9. Commence vacuum pump operation, monitoring the vacuum pressure reading displayed on the gauge mounted on top of the glovebox. Because all chambers are connected, this reading applies to pressure inside the main chamber, the glove port chambers, and the antechamber (if present). As long as chambers are connected, the system will not exert unsafe pressure on the internal antechamber door or the gloves. **See Document No. 1800-58 for connection and operation of Terra's Vacuum Control Module, which controls pump operation to achieve a target vacuum pressure and prevent pump damage during vacuum cycling.**
10. When the vacuum cycle is complete, open the vacuum release valve (B) located on the top of the glovebox chamber to backfill the chamber with air or process gas. For process gas backfilling, this valve is normally connected to an externally regulated nitrogen, argon, or other process gas source.

Note: Achieving maximum vacuum will vary depending on several factors, including pump capacity, chamber size, material thickness, and overall system configuration. These systems are not designed for instant vacuum and may require a significant amount of time to fully purge and reach maximum vacuum pressure. Please allow sufficient time for the system to reach the desired vacuum level before beginning operation.



4.2 Process Gas Purge Mode

For Processing Sensitive Samples in a Dry, Anaerobic Environment

For processing materials sensitive to moisture and/or oxygen, operation protocol typically requires two operating modes:

Vacuum Cycle Mode (described above) **establishes** the optimal dry, anaerobic environment inside the glovebox chamber and antechamber.

Process Gas Purge Mode **monitors and maintains** dry, anaerobic conditions as materials are transferred in and out of the glovebox via the vacuum antechamber and manipulated. Manipulation may involve weighing, packaging, mixing, or any number of other processes requiring human intervention via the chamber glove ports.

In such cases, parts are typically introduced into the vacuum antechamber, where they undergo one or more cycles of vacuum and process gas back fill to remove moisture and contaminants from the antechamber environment; then, parts are transferred into the main chamber.

To operate the system in Process Gas Purge Mode,

1. This mode generally requires vacuum cycling to remove moisture and oxygen from the glovebox and vacuum chamber. Follow procedures described above to establish a dry, anaerobic environment.
2. Following each vacuum cycle, you may need to meter the oxygen concentration or relative humidity level. To do so,
 - a. Stop vacuum operation by turning the pump off or isolating it from the chamber (using the Vacuum Control Module). CLOSE the vacuum supply valve (D).
 - b. Verify that the two valves on the antechamber (vacuum supply and vacuum pressure release lines, C and E) are CLOSED.
 - c. OPEN the Vacuum Pressure Release Valve (B) to backfill the chamber with process gas until it reaches neutral pressure.
 - d. OPEN the O₂/RH Sampling Ports (K and L) to allow monitoring of the internal environment by the Trace Oxygen Analyzer or other monitoring equipment.
 - e. Refer to separate instrument operating instructions to conduct monitoring operations.
 - f. If further vacuum cycling is required to remove moisture and oxygen, CLOSE O₂/RH Sampling Ports (K and L) to isolate monitoring equipment safely from vacuum pressure.



CAUTION

- Failure to isolate the Trace Oxygen Analyzer or other monitoring equipment from the vacuum chamber before applying vacuum will cause extensive damage and void equipment warranty.

3. When the target environmental conditions are achieved, stop vacuum operation and CLOSE vacuum supply valve (D) on the glovebox chamber.
4. Verify that the vacuum supply and vacuum pressure release valves (C and E) on the antechamber are CLOSED.
5. OPEN the Vacuum Pressure Release Valve (B) to backfill the chamber with process gas until it reaches neutral pressure. When neutral pressure is restored, CLOSE the Vacuum Pressure Release Valve (B).
6. OPEN the O₂/RH Sampling Ports (K and L) to allow monitoring of the internal environment by the Trace Oxygen Analyzer or other monitoring equipment.



7. OPEN the GAS IN and SYSTEM PRESSURE valves (M and N) to allow purge control by Terra's Dual Purge System (refer to separate operating instructions for Dual Purge System operation).
8. OPEN the purge gas relief valve (O).



CAUTION

- Do not remove the hex fitting on the Purge Gas Relief Valve. Doing so releases a pressure regulating mechanism necessary for its proper function.

The Trace Gas Analyzer will now monitor the oxygen concentration side the glovebox. When the concentration rises above set point level, it will signal the Dual Purge System to initiate a high-flow purge to displace air with process gas.

To transfer material in and out of the glovebox once target environmental conditions are achieved,

1. In most cases, material should be introduced into the vacuum antechamber, which should then undergo one or more vacuum cycles to remove moisture and oxygen that enter along with the material.

Prior to introducing material into the antechamber, verify that the internal antechamber door is CLOSED and that the two metering valves (C and E) on top of the chamber are CLOSED.

2. OPEN the external antechamber door, place material inside the antechamber, and CLOSE the external door.
3. OPEN the antechamber vacuum supply valve (E) to allow application of vacuum to the antechamber. For optimal results, maintain pump operation until vacuum pressure reaches 29.9" Hg.
4. Stop vacuum operation and CLOSE vacuum supply valve (E) on the antechamber.
5. Verify that the vacuum supply and vacuum pressure release valves (C and E) on the antechamber are CLOSED.
6. OPEN the Vacuum Pressure Release Valve (E) to backfill the chamber with process gas until it reaches neutral pressure. When neutral pressure is restored, CLOSE the Vacuum Pressure Release Valve (E).
7. If necessary, repeat this vacuum cycle.
8. CLOSE the vacuum supply and vacuum pressure release valves (C and E) on top of the antechamber.
9. Use glove ports to transfer material into the glovebox chamber. Carefully monitor oxygen and RH levels as material enters the glovebox chamber. If either climbs above target levels, additional purging or vacuum cycling may be necessary, depending on the amount of water or oxygen that must be removed and the speed with which a purging alone can attain target levels.
10. When manipulation of the material is complete, use glove ports to transfer material into the vacuum antechamber. CLOSE the internal antechamber door
11. Remove material from the antechamber by opening the external door.



5. Maintenance

Terra Universal's Series 210 Glovebox features no user-serviceable parts and requires no maintenance aside from periodic cleaning.

Mechanical Cleaning with Cloths or Wipers

When the chamber is used in a cleanroom environment, Terra recommends use of knitted polyester wipers or spun-lace, non-woven blends of cellulose and polyester manufactured and packaged specifically for cleanroom use. These products are manufactured under tightly controlled conditions that restrict the use of binders or chemical treatments that can outgas, and cleanroom packaging and strict lot control ensure optimal cleanliness.

Less critical environments (ISO 6 – 8 / Class 1000 – 100,000) generally tolerate more absorbent materials made of 100% cotton twill or cellulose.

Clean surfaces with clean, lukewarm water with or without a mild, non-abrasive detergent. In critical cleanroom applications, DI water may be required.

For thorough, repeatable results, avoid cleaning with a circular motion, which rubs dirt or grit into the surface. Using mild pressure, wipe in one direction, from top to bottom or side to side, in slightly overlapping strokes. Fold the wiper between strokes, and replace with a clean wiper often.

Vacuum Cleaning

If vacuum cleaning is permissible in your facility, Terra recommends vacuum cleaning both before and after the cleaning procedures described below. Use a portable or hand-held vacuum cleaner compatible with your facility, generally, a multi-filter cleaner that uses ULPA final filtration and incorporates cleanroom-compatible components: a stainless steel housing, non-shedding hoses, brushes, and other attachments, and non-marking wheels. Hand-held vacuum cleaners can be used to clean horizontal surfaces (see "Cleaning Accessories").

As in most cleaning procedures, begin vacuuming at the top of the chamber, using a soft brush attachment, and work your way down to the bottom. By using a hand-held vacuum with soft brush attachment, you can remove particles from chamber walls, corners and other surfaces.

Because the vacuum discharge generates turbulence that makes particle difficult to capture, keep the vacuum canister or discharge pointed away from the chamber.

- Do not use isopropyl alcohol, chlorine bleach, ammonia-based cleaners, abrasives, organic solvents, or metal scouring pads when cleaning. Use a soft cloth all the time.
- Regularly check the vacuum seal as well as the surface where the body and the base are in contact – make sure they are always clean and undamaged.
- Regularly check the valves, vacuum gauge, and their vicinities for any blockage or damage.
- If the unit is contaminated, wear chemical-resistant gloves before cleaning.



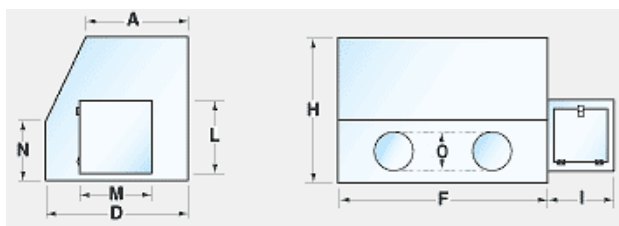
CAUTION



6. Specifications

Materials: 1.5"-thick acrylic construction with external support ribs
(2) all-304 stainless steel LiftLatches (main chamber and optional antechamber)
(2) chrome-plated metering valves (main chamber and antechamber) with hose barb fittings, for connection to 0.25"-diameter polyethylene vacuum line
(3) chrome-plated metering valves (main chamber) without hose barb fittings, for interconnection of main chamber and glove port chambers

Dimensions: See below



Inches	A in. (mm)	D in. (mm)	F in. (mm)	H in. (mm)	I in. (mm)	L in. (mm)	M in. (mm)	N in. (mm)	O in. (mm)
OD	16 (406)	29 (737)	32 (813)	29.5 (749)	12.75 (324)	12 (305)	11 (279)	17.33 (440)	8 (203)
ID	14.69 (373)	22.13 (562)	30.25 (768)	22.75 (578)	10.83 (275)	10.13 (257)	9.13 (232)	13.63 (346)	--

Related Manuals – Available for download from www.TerraUniversal.com:

- | | |
|--|---|
| - Vacuum Control Module
(Doc. No. 1800-58) | - Glove and Sleeve Installation
(Doc. No. 1800-43) |
| - Glovebox Dual Purge System (Included
in Doc. No. 1800-42) | |



7. 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. This limited warranty covers parts and labor, but not transportation and insurance charges. 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. Repairs may be completed by 3rd party service agents approved by Terra Universal. Terra Universal reserves the rights to limit this warranty based on a service agent's travel, working hours, the site's entry restrictions and unobstructed access to serviceable components of the product. 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, 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!*



8. Accessories

	Metering Valve Description: Dual valves allow purging of the chamber with nitrogen or other process gas before vacuum is applied. Applications: Permits safe, convenient application of vacuum to the chamber. Price: Contact your Terra Universal sales representative or visit www.TerraUniversal.com	5235-09
	Vacuum Gauge Description: Senses and indicates vacuums on 0-30" Hg scale Applications: Monitors vacuum pressure. Price: Contact your Terra Universal sales representative or visit www.TerraUniversal.com	5235-10
	Vacuum Control Module Description: This automatic Vacuum Control Module controls pump operation to maintain a preset vacuum level (to 800 torr) in a remote vacuum chamber or vacuum furnace. Applications: Automatically controls pump operation to maintain stable vacuum levels inside a vacuum chamber Price: Contact your Terra Universal sales representative or visit www.TerraUniversal.com	1681-75
	MicroVac Cleanroom Vacuum Cleaner Description: Four-stage filtration includes final ULPA filter for cleanroom compatibility. Includes mini-tool kit for cramped spaces. Applications: Cleanrooms and cleanroom enclosures Price: Contact your Terra Universal sales representative or visit www.TerraUniversal.com	5100-00



APPENDIX: Glove Installation

Normally, the glove is installed in the glove box prior to shipping. If for any reason you need to reinstall the assembly, follow these instructions:

1. Insert the glove and sleeve assembly into the glove box, allowing 2" of sleeve to extend beyond the front edge of the mounting flange.
2. Fold the outside edge of the sleeve over the flange, so that roughly 2" of the sleeve cuff is stretched along the outside perimeter of the flange.
3. The sleeve is held in place by a stainless steel clamp (TUI Cat. No. 1689-40). Position this clamp along the mounting flange so that about 1" of excess sleeve cuff protrudes on the inside edge of the flange (the edge closest to the front wall of the glove box). Carefully tighten the clamp just enough to hold the sleeve in place.



CAUTION

- Over-tightening the clamp could crack or warp the flange and damage the glove box.
4. Fold back the excess sleeve cuff toward the front edge of the flange to cover the clamp. Repeat procedure for the other glove and sleeve combination.