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Quick-Start Operation Guide 1800-42

Series 100 Polymer Glove Box



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Quick-Start Operating Guide

Series 100 Polymer Glove Box

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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:

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

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



This manual provides information on installing and operating your Terra Universal Polymer Glove Box.

Related Manuals – Available at TerraUniversal.com

- Glove and Sleeve Installation (Doc. No. 1800-43)
- Filtration/Recirculation Modules (Doc. No. 1800-06)

1.0 Introduction

This manual provides information on installing and operating your Terra Series 100 Polymer Glove Box with either the Glove Box Dual Purge System or with both the Glove Box Dual Purge System and NitroWatch. By studying it carefully, you can be assured of a long, efficient service life from your system.

Ordering information for any of the options can be found at TerraUniversal.com

CAUTION!!!:A Terra Automatic RB (Relief/Bleed) Valve is required on any glove box or air lock that incorporates the Glove Box Dual Purge System.

Carefully unpack the glove box and accessories. Wipe down with a particle-free cloth. Although your glove box may differ somewhat from the system shown in the image above, all standard Terra glove boxes are shipped with ports for connection to gas control equipment and the Automatic Relief/Bleed (RB) Valve.

CAUTION!!!:

- **Never use alcohol or other cleaning agent on acrylic or static-dissipative PVC surfaces.**
- **Do not expose glove boxes made of static-dissipative PVC to extreme heat or direct sunlight.**
- **Do not rest heavy objects on an unreinforced static-dissipative PVC glove box**
- **A stainless steel work surface is recommended on all polymer glove boxes to prevent scratching; this protection is particularly important with static-dissipative PVC.**

The glove box should be installed on a sturdy, level surface.

2.0 Equipment Description

Terra's Series 100 Glove Boxes provide a clean, low-humidity environment for a variety of critical assembly and inspection procedures. Their modular design allows for an assortment of options to suit your specific requirements. They are constructed of lightweight, transparent materials and feature all solvent-welded seams to ensure a tight seal that won't outgas. Neoprene gaskets on the side doors and back panel provide a safe, positive seal while allowing full access to the internal chamber to insert or remove materials or equipment. The side doors open inward to allow an operator to pass materials in and out of the glove box easily.

The Series 100 Glove Box maintains a positive-pressure for a clean, low humidity environment. It comes in five different materials and as a single or double model. Acrylic is suitable for general applications, but its static-generative properties and susceptibility to damage by a wide range of chemicals makes PVC (either dissipative or nondissipative) preferable in many cases. Polycarbonate is

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available for uses involving thermal stress. Polypropylene offers greater chemical resistance.

This glove box features two 1/8" pipe-tapped ports on the rear of the top surface, one for feeding in the purge gas and one for monitoring the internal cabinet pressure. These ports allow you to control the gas flow into the glove box.

Dual Purge System

Effective nitrogen control is provided by either the Glove Box Dual Purge System alone (for variable purge control), or the Glove Box Dual Purge System and NitroWatch (for automatic humidity control). These control systems greatly enhance the efficiency of the glove box by automatically regulating the nitrogen fed into the system.

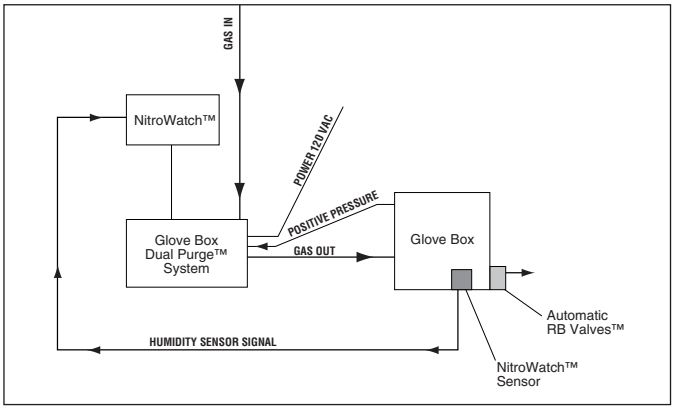
The Dual Purge System provides a continuous low-level purge to maintain a constant internal positive pressure that helps to block out contaminants and economize on nitrogen. The minute it senses a drop in this positive pressure (such as when an air lock is opened) it automatically initiates a temporary high-level flow that quickly flushes out any moisture or contaminants that might enter the chamber. When the selectable threshold pressure is reestablished, the system then reactivates the economical low-level purge.

The Dual Purge System incorporates a flowmeter and pressure regulator (to control the incoming flow of nitrogen) and an internal positive pressure gauge (to monitor the pressure inside the glove box), and a 1/2 Amp fuse (inside the housing). It also includes a built-in pressure alarm and an open chamber alarm, which provide audible and visible alarms when line pressure falls below a preset point or the chamber is open at some point, such as an air lock left open. An alarm silencer is included to mute the audible alarm if desired.

NitroWatch™

Add the NitroWatch™ to the system for completely automated humidity control. It provides a continuous readout of the internal humidity level and operates together with the Dual Purge System to automatically maintain any sub-ambient internal humidity level (down to 0%RH) you may require.

The Humidity Sensor, which senses the humidity level, is mounted inside the controlled environment. It employs a fast-response capacitive probe whose capacitance is proportional to the humidity level. The sensor is capable of measuring humidity over the entire humidity range, from 0 to 100% RH, with an accuracy of ± 3% RH at a temperature of 68 degrees F. The voltage output of the sensor is directly proportional to the humidity.



NitroWatch/Dual Purge/Glove Box System Functional Diagram

A 3-prong connector allows easy connection of the sensor to the Control Unit.

The Control Unit provides the indicators and controls necessary to set the desired humidity level and to measure the actual humidity level inside the chamber.

The rear panel of the NitroWatch features a 3-prong outlet for connection to the R/H sensor, and a telephone-jack outlet for connection to the Dual Purge System (the desiccator sensor switch port is not used in glove box applications). It draws power from the Dual Purge System and requires no separate power connection.

The Humidity Sensor senses the relative humidity level inside the chamber; the output signal is then compared to the set point level.

Whenever the internal humidity exceeds the value of this set point by more than 0.5% RH, the controller signals the Dual Purge System to initiate a high-flow nitrogen purge, which forces moisture-laden air out of the Automatic RB (Relief/Bleed) Valve. When the relative humidity falls to the proper level (within 0.5% of the set point), the high-flow purge is automatically shut down.

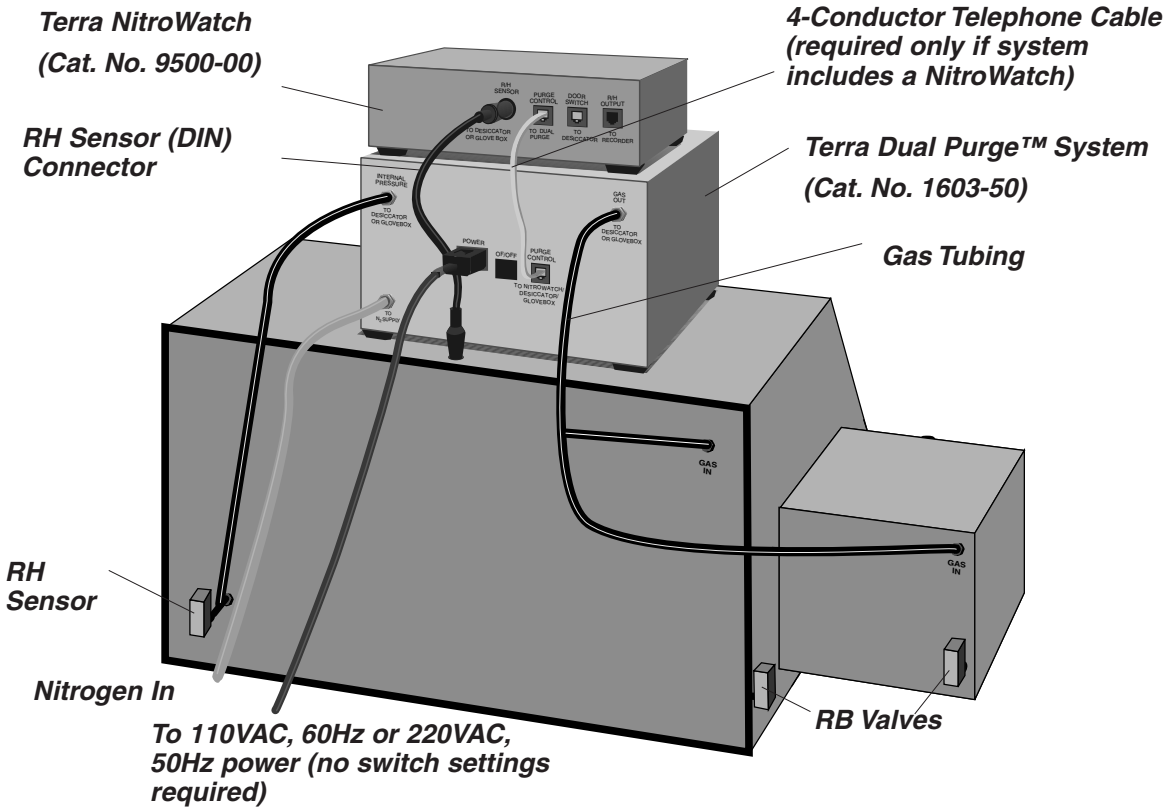
The NitroWatch thus ensures the optimal environment for stored materials and at the same time eliminates nitrogen waste. Keep in mind, however, that the lower your humidity level set point, the more nitrogen the system will consume (and the greater the internal positive pressure will be).

Refer to Terra Universal Catalog No. 105 for further information on nitrogen consumption.

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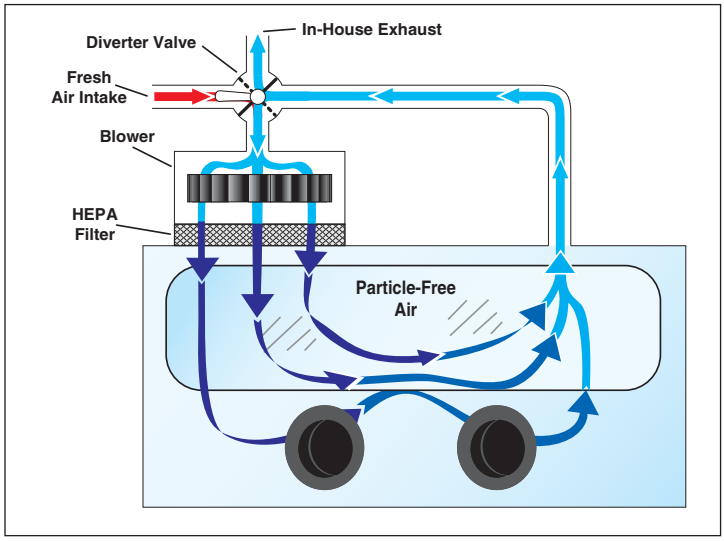


Series 100 Glove Box Options

Filtration

By selecting one of the filtration modules describe below, you can convert the Series 100 Glove Box into a recirculation/filtration chamber.These chambers include a versatile ventilation/exhaust system that provides continuous recirculation and filtration of the process gas.A diverter valve allows you to establish whatever ratio you wish of filtered gas to fresh gas, thereby meeting requirements for Type II biological enclosures.A variety of filters meet specific particle and biological requirements.

The **Closed-Loop Filtration Module** provides continuous recirculation to remove particulates, aerosols, spores, and other contaminants to ensure a clean process environment.This configuration includes a 460-CFM impeller blower, mounted in a plexiglass housing, that draws air into the glove box through an inlet HEPA filter (rated 99.99% efficient at 0.3 micron particles).A 4-position PVC diverter valve lets you determine the percentage of fresh make-up air entering the chamber, either 100% (no recirculation); 0% (complete recirculation); or 50% (half fresh, half recirculated).See Catalog No. 105 for additional information.



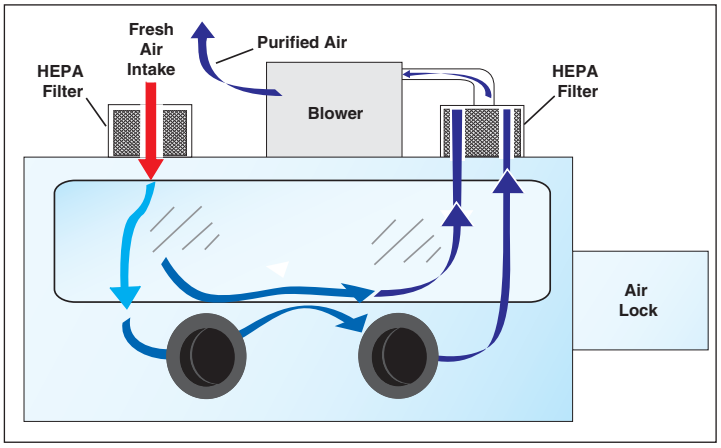
Closed-Loop Filtration Module for Continuous Recirculation

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The **Open-Loop Filtration Module** provides safe indoor exhausting, removing particulates, aerosols, spores, and other contaminants to ensure a clean process environment. This configuration includes a 460-CFM impeller blower, mounted in a plexiglass housing, that forces air into the glove box through an inlet HEPA filter (rated 99.99% efficient at 0.3 micron particles).A HEPA exhaust filter removes contaminants from the outflowing air to ensure that air exiting the system is safe for indoor release.Both filters are enclosed in a disposable plexiglass housing to ensure safe handling and disposal at replacement time.See Catalog No. 105 for additional information.



Open-Loop Filtration Module for Safe Indoor Exhausting

Glove Box Ports

The front panel of these glove boxes features 8" flanged arm ports that allow easy connection of Terra's Changeable Sleeve and Glove Combination, which feature flexible accordion sleeves and gloves made of natural latex for easy manipulation of objects inside the chamber.The convoluted sleeve sections promote air circulation around an operator's arm, resist collapsing due to pressure inside the chamber, and prevent blowback when a hand is removed.

Changeable Sleeve and Glove Combination

These accordion sleeves fit into the ports of Terra's glove boxes and atmospheric chambers for safe, easy handling of materials. They can be used with a variety of gloves, allowing you to change glove size or type without changing the sleeve itself. Supplied with one pair of tempered latex industrial gloves (select desired size).

Clamps included. See Terra's complete line of gloves at www.Terrauniversal.com.

Glove Port Covers

This optional feature allows you to seal the system and then remove gloves for cleaning or change-out—while maintaining the integrity of the internal glove box environment. The hinged port covers lie flat on the glove box floor when not in use.

Air Locks

Air Locks 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; an operator then opens an internal door inside the glove box to bring materials into the work area. Each air lock features its own gas inlet, system pressure, and an Automatic RB Valve port in case your application requires air lock purging. The Standard Air Lock can be used with the Series 100 or Series 200 Glove Boxes. The Pass-Thru and Universal Air Locks are for the Series 100 only. The Negative-Pressure Air Lock and Vacuum Antechamber are for the Series 200 only.

Ionizing Equipment

An optional ionizing bar and power supply can be used with the Series 100 Glove Box to neutralize the static charges in the work area.

3.0 Installation (see Appendix for instructions on attaching gloves)

For a Glove Box with a Flowmeter:

Make sure that the flowmeter is securely installed near the top of the cabinet. Flowmeters are generally mounted before shipping. To install a flowmeter yourself, use Terra's fitting kit no. 1600-56, which includes a brass male connector (positioned at the flowmeter inlet, directly behind the flow adjustment knob, for connection to the incoming gas line) and a hex nipple (which secures the flowmeter to the "Gas In" port through the glove box wall).

Set the flowmeter between 5 – 20 SCFH (depending on glove box size and purge requirements). Nitrogen line pressure should be regulated no higher than 70psi.

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Glove Box with Dual Purge System Only

1. Make sure that your glove box is placed on a level, stable surface, away from heat or chemicals that could damage it.
2. Using 1/4" tubing (not included), connect your in-house gas supply to the "Gas In" bulkhead on the rear panel of the Dual Purge System by loosening the Poly-Tite collar, inserting the tubing, and tightening the collar.
3. Use another length of 1/4" tubing to connect "Internal Pressure," on the rear panel on the Dual Purge, to the enclosure to be monitored.
4. Connect the "Gas Out" port of the Dual Purge System to the inlet of your glove box.
5. Connect the "Purge Control" ports of Dual Purge and NitroWatch systems with a 4-conductor sensor wire (terminated with easy-snap telephone jacks). If your application has no NitroWatch, leave this port open.
6. Plug the power cord to a grounded receptacle. The Dual Purge operates on 110VAC, 60Hz or 220VAC, 50/60Hz. No power switch settings are required.
7. **Zero Calibration:** Press and hold SET and UP buttons while power is turned ON.

   This activates a pressure sensor zero calibration routine before the setup mode is started. The display will indicate "CAL" before this calibration is performed. The zero value is set automatically and is not changeable via the pushbuttons.

   Remember to disconnect all air pressure from both pressure transducers before performing a zero calibration. Any pressure on the transducers while this routine is run will be subtracted from the readings during normal operation, resulting in likely continuous low-pressure alarms.
8. Initial Programming: Turn ON the Dual Purge System while depressing SET (the left button on the front control panel). Each time you release and then press and hold the SET button, you will advance through the following control functions. Use UP/DOWN to change default settings (shown in parentheses):

   Prg1 Purge Delay (minutes): No. of minutes that the high purge remains active after the internal pressure level is restored (default: 0).

   Prg2 Purge Delay (seconds): No. of seconds that the high purge remains active after the internal pressure level is restored (default: 60).

   door No. of seconds a door must remain open to activate OPEN DOOR alarm (defaults: 60). **Inactive in Glove Box applications**.

   beeP State of the BEEPER enable (default: ON).

   Glo Activates GLOVE BOX control mode – press UP to turn ON and proceed to glove box pressure setting; DOWN to turn OFF (default: ON).

   Press In GLOVE BOX mode, this setting lets you adjust the pressure (milli-inches WG) at which the high purge is activated (default: 0.2). **Note:** complete the "Zero Calibration" procedure above (Step 6) before completing this adjustment.

   DonE Settings are complete; press SET once more to begin operation.

   Make a mistake? No Problem! To reset the system, turn the system OFF while in setup mode and restart while holding the SET button.
9. Once programming is complete, turn the pressure regulator (the round knob on the right side of the Dual Purge control panel) until the pressure gauge reads between 30 and 40 psi (use more pressure for larger glove boxes with 4 arm ports). WARNING!!!: For safe operation, the incoming gas line must be regulated below 70psi.
10. The Dual Purge System includes a flowmeter, which provides a continuous low-level purge to maintain a constant positive pressure inside the cabinet. The flowmeter also ensures an uninterrupted nitrogen flow if power or system electronics ever fail.

    If continuous purging is desired, set the flowmeter so that the pressure gauge reads at least 0.1" WG when the system is in low purge state. This setting is recommended if you require a very low humidity set point (less than 10%RH) or if the air lock doors will be opened frequently. Continuous purging will tend to drive the humidity level very low.

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If continuous purging is not required, close the flowmeter. The Dual Purge System will initiate a purge only when an air lock door is opened, or when humidity level climbs above the set point (if your system includes a NitroWatch).

11. Operation Display Functions: After completing initial programming, press the specified button to view these operating conditions:

High Purge Bypass – Press and hold SET
In some applications (especially using fine powders in a glove box), you may wish to deactivate the high purge function, which could create turbulence. To do so, press DOWN while holding SET. To activate high purge, hold UP while holding SET.

Incoming Line Pressure – Press & hold UP (displays in PSI)

Internal Pressure – Press and hold DOWN (displays in milli-inches of WG)

Purge Timer – Press and hold UP and DOWN simultaneously to review the number of seconds the high-flow purge is active after a door is closed. To change this value, see "Programming," above.

Set-up with the Dual Purge System and NitroWatch®

Includes: Dual Purge System as described above, NitroWatch control unit, humidity sensor, and two 5' connecting lines (for connecting the control unit to the humidity sensor and to the Dual Purge System). Refer to illustration on page 3.

1. Carefully unpack the unit and check for any visible damage or missing parts.
2. Complete the Dual Purge System connections as described above. **Note:** The PURGE CONTROL connection allows the NitroWatch to draw power from and to control the Dual Purge System.
3. Connect the humidity sensor to the controller by plugging in the round DIN connector to the R/H SENSOR port on the rear panel.
4. Leave the DOOR SWITCH port on the NitroWatch open. This connection is used only in desiccator applications.
5. Turn the Dual Purge System ON by placing the power switch in the "up" position. The NitroWatch LED display should indicate some humidity level.

   NOTE: Allow about 5 minutes for the system to warm up after turning power "ON."
6. Initial NitroWatch Programming: After connecting the NitroWatch to the Dual Purge System, turn ON the Dual Purge System while holding down the NitroWatch SET button (the left button on the front control panel).

   Each time you release and then press and hold the SET button, you will advance through the following control functions. Use the UP/DOWN buttons to change default settings (shown in parentheses):

   Door Open Door Delay Alarm: No. of seconds a door must remain open to activate OPEN DOOR alarm (default: 60). This setting is inactive in Glove Box applications.

   rH Relative Humidity High Purge Delay Alarm: No. of seconds the RH level must remain above the set point to activate the alarm (default: 60).

   beeP Enables/Disables Beeper Alarm (default: ON).

   hU HUMEX operation selector – when in the OFF mode, the system operates as a NitroWatch (maintaining below-ambient humidity). In the ON mode, the system functions as a Humex2 (maintaining above-ambient humidity). Default: OFF.

   Add ADJUST parameter: Use this function to compensate for measured discrepancies between the NitroWatch %RH readout and that of an independent %RH calibrator. Press the UP/DOWN keys to adjust the scale up or down.

   Note: this adjustable offset value will wrap around if the maximum or minimum is exceeded. For example, if you try to set the adjust value above the maximum scale offset of 49.5, the value will wrap around to –50. Also, a side effect of using an offset value other than zero is that the R/H range will be reduced. For example, if the offset value is –10, then the maximum R/H value that can occur is 90 because the input value (100) will be added to the adjust value before the system uses it.

   AIr ALARM time selector, which allows you to specify the alarm scale determined above ("Door") in either minutes – LONG –or seconds – SHrt.

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LoG Displays the current Data Logging Time Interval, in minutes (default: 120)

Press SET again to advance to Normal Run Mode.

Make a mistake? No Problem! To reset the system, cut power to the NitroWatch by turning the Dual Purge System OFF while in setup mode and restart while holding the SET button.

7. Adjust Humidity Set Point: After completing initial programming, press the SET button to view the current % RH set point. Use the UP/DOWN keys to change this set point.

8. Beeper Silencing: Press any front panel button to silence the beeper during an alarm condition.

The NitroWatch will now activate high-flow purging whenever the %RH level inside the glove box exceeds the specified set point. Your system is ready for operation.

The NitroWatch may be placed on any surface near the sealed enclosure. A suggested location is on top of the chamber.

System Set-Up: Series 100 Glove Box (Filtration Module)
Terra glove boxes with filtration modules are shipped ready for installation. Simply connect the equipment to an appropriate power source and the glove box is ready for operation.

4.0 Operation

Operating the Dual Purge System

1. Operation Display Functions: After completing initial programming outlined above, press the specified button to view these operating conditions:

High Purge Bypass – Press and hold SET
In some applications (especially using fine powders in a glove box), you may wish to deactivate the high purge function, which could create turbulence. To do so, press DOWN while holding SET. To activate high purge, hold UP while holding SET.

Incoming Line Pressure – Press and hold UP — displays line pressure in PSI.

Turn the pressure regulator (the round knob on the right side of the Dual Purge control panel) until the pressure gauge reads 30 psi (for small enclosures) or 40 psi (for larger enclosures).

Internal Pressure – Press and hold DOWN — displays internal cabinet pressure in milli-inches of Water Gauge (WG).

The Dual Purge System includes a flowmeter, which provides a continuous low-level purge to maintain a constant positive pressure inside the cabinet. The flowmeter also ensures an uninterrupted nitrogen flow if power or system electronics ever fail.

If continuous purging is desired, set the flowmeter so that the pressure gauge reads at least 0.1" WG when the system is in low purge state. This setting is recommended if you require a very low humidity set point (less than 10%RH) or if access doors will be opened frequently. Continuous purging will tend to drive the humidity level very low.

If continuous purging is not required, close the flowmeter. The Dual Purge System will initiate a purge only when an access door is opened, or when humidity level climbs above the set point (if your system includes a NitroWatch).

Purge Timer – Press and hold UP and DOWN simultaneously to review the number of seconds the high-flow purge is active internal pressure is restored. To change this value, see “Initial Programming” above.

CAUTION!!!: Because the high-level purge fed into the system can lead to excessive internal pressure, you must equip a glove box with an Automatic RB Valve when you install a Dual Purge System.

Operating a Glove Box with the Dual Purge System and NitroWatch

1. **Adjust Humidity Set Point:** After completing initial programming outlined above, press the SET button to view the current % RH set point. Use the UP/DOWN keys to change this set point.

2. **Beeper Silencing:** Press any front panel button to silence the beeper during an alarm condition.

The NitroWatch will now activate high-flow purging whenever the %RH level inside the glove box exceeds the specified set point. Your system is ready for operation.

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CAUTION!!!: Because the high-level purge fed into the system can lead to excessive internal pressure, you must equip a glove box with at least two Automatic RB Valves when you install a Dual Purge System.

NOTE: If the Dual Purge System remains at high-level purge, or if it frequently fluctuates between high and low-level purge, you need to increase your flowmeter setting. Increase the flowmeter setting until the humidity level falls a few percent below your set point. At this flowmeter setting, the system will be able to maintain the desired humidity while on the low-level purge—and save nitrogen.

As you increase the flow, the internal positive pressure will also increase. You may safely increase this pressure as high as .3" WC as long as the chamber incorporates Automatic RB Valves, which automatically protect against the possibility of warping or rupturing.

Because the humidity sensor is exposed to moisture during shipping, the system must generally operate for a couple of days in a dry nitrogen environment before the sensor dries out and delivers completely accurate readings.

Applications with Large Materials

Generally, materials can be passed into the work area by means of the access doors, which are opened from inside the chamber.In some applications, however, you may need to remove the rear wall in order to get large objects inside the chamber.

In this case, simply remove the screws from the rear wall.When reattaching the wall, make sure not to apply too much torque, or the chamber wall could crack.

Applications with the Glove Box Filtration Module

The Glove Box Filtration Module System is shipped ready for installation. Simply connect the equipment to an appropriate power source and the glove box is ready for operation.

5.0 Maintenance

Terra's Glove Boxes require minimal maintenance. All materials are easy to clean with water or mild detergent and a dry, clean wipe. You should take care, however, not to damage heat-sensitive static-dissipative PVC, or to clean with harsh agents that could damage the dissipative surface.

All materials may be cleaned with clean, lukewarm water with or without a mild, non-abrasive detergent and a dry, clean non-abrasive wipe. Use only light pressure when cleaning. If the outside surface is exceptionally dirty or gritty, lightly swab the surface with a saturated cloth and allow the surfactants to drain away. Avoid rubbing dirt or grit into the surface. Turn the cloth often and replace with a clean cloth frequently. Dry the surface by blotting gently with a clean, dry cloth. Take care not to damage heat-sensitive static-dissipative PVC, or to clean with harsh agents that could damage the dissipative surface.

If you clean the inside of a glove box with water, you should dry the inside surface thoroughly and then purge the cabinet with nitrogen for several hours before reintroducing moisture-sensitive stored materials.

CAUTION!!!:

- **Do not clean plexiglass or static-dissipative products with alcohol or other strong cleaning agents.**
- **Do not expose static-dissipative PVC to extreme heat or direct sunlight.**
- **A Terra stainless steel shield is required on the bottom of each static-dissipative PVC glove box to prevent scratching.**

Special Care of Static-Dissipative PVC Plating

Although static-dissipative PVC has greater tensile strength than plexiglass, it is not as rigid, and so it tends to bow if not supported adequately. For this reason, you should not stack static-dissipative PVC enclosures or place heavy objects on top of them.

These enclosures should also be kept away from temperature extremes; avoid prolonged exposure to temperatures over 80 degrees Fahrenheit. Always avoid scratching the surfaces.

Replacing Filters

Filters need to be replaced when they become clogged. A significant reduction in airflow velocity or a noisy motor may indicate a filter change is required. The velocity of the outflow may be measured using an air velocity meter. If the air speed falls below acceptable limits required for your application, a filter change is required.

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To replace the filter for Closed-Loop Filtration Module:

1. Remove screws that secure filter housing in place.
2. Remove the housing and the used filter.
3. Insert replacement HEPA filter (Catalog No. 2100-30) and replace housing. Secure housing with screws.

To replace filters for Open-Loop Filtration Module:

1. Remove screws that secure the plexiglass filter housing.
2. Discard the disposable housing (with enclosed filter).
3. Replace with Replacement Filter Module (HEPA filter in plexiglass housing, Catalog No. 1684-84), and secure housing with screws.

Testing and Replacing Humidity Sensor

The NitroWatch humidity sensor requires no calibration. If a discrepancy is observed between the displayed %RH and that of an independent humidity calibrator, the humidity scale can be shifted accordingly (see NitroWatch Set-Up guidelines above). The sensor should be tested periodically and replaced as necessary (about every 5 years under normal use).

6.0 Troubleshooting

Terra Universal's Glove Boxes and Nitrogen Controls are designed to provide years of reliable, efficient service. If you should experience any problems that arise during operation of your system, refer to the appropriate troubleshooting procedure below. If the problem persists, or if you encounter any problems not described below, call Terra Universal for additional assistance.

PROBLEM: System won't turn on.

POSSIBLE SOLUTIONS:

1. Make sure that the power cord of the Dual Purge System is plugged into an appropriate outlet and that the telephone cable to the NitroWatch is properly connected.
2. Make sure that the power switch of the Dual Purge System is in the ON position.
3. Check the fuse of the Dual Purge System. The 1/2 amp fuse, mounted on the circuit board controller, is accessible once the stainless steel housing cover is removed.

PROBLEM: System stays in high purge at all times.

POSSIBLE SOLUTIONS:

1. Make sure that you have programmed the Dual Purge for Glove Box service, and that the internal pressure setting is between 0.2 and 0.7 inches water gauge.
2. If your system incorporates a NitroWatch and you require a very low humidity level, you may need to increase the flowmeter setting on the Dual Purge System to provide more than 0.1" WC internal pressure.

   You should increase the flowmeter setting until the system maintains a humidity level a few percent below the humidity set point without switching to the high-level purge. Remember, though, that the Dual Purge System should be able to maintain the humidity level you require with a low-level purge as long as access doors remain closed.
3. Check door seals of the air lock to make sure that there are no leaks.
4. If you are operating a large glove box and require a low humidity level, your system may need to operate on high purge much of the time to compensate for the hygroscopic characteristics of the plexiglass (or static-dissipative PVC) chamber walls. These materials absorb moisture from outside of the wall and pass it inside. The higher the difference between the external and internal humidity levels, the more nitrogen you will need in order to remove this moisture.

   Turn up the flowmeter setting until the Dual Purge maintains the desired humidity level on low purge.

PROBLEM: The system constantly switches between high and low purge.

POSSIBLE SOLUTIONS:

1. Make sure that all access doors are closed. Check door seals for leaks.
2. The flowmeter is set too low. Increase the flow and make sure you maintain at least 0.1" WC or more internal pressure. This is especially important if your system incorporates a NitroWatch and you have established a low humidity set point.

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You should increase the flowmeter setting until the Dual Purge System maintains a humidity level a few percent below the set point without switching to the high-level purge.

PROBLEM: The glove box is leaking.

POSSIBLE SOLUTIONS:

1. Check the condition of the gaskets. If any is cracked or peeling, call Terra for a replacement.

PROBLEM: Line pressure gauge does not display any pressure.

POSSIBLE SOLUTIONS:

1. Supply gas is down, or for some reason is not reading the Dual Purge System. Check your supply line for kinks or blockage.
2. If your gas system utilizes a filter, it may be clogged and need to be replaced.
3. Check the line pressure regulator to make sure it is not closed.

PROBLEM: The internal positive pressure gauge does not indicate a positive pressure.

POSSIBLE SOLUTIONS:

1. System may not be properly set up. Follow the operating procedures outlined in "Installation."
2. Check the doors for a possible leak.

PROBLEM: The NitroWatch delivers an obviously incorrect humidity reading.

POSSIBLE SOLUTION:

Check the NitroWatch sensor connection on the rear panel of the control module. If the connection to the sensor is good, and the unit still fails to deliver an accurate reading, contact Terra Universal.

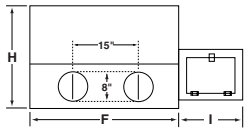
7.0 Specifications

Construction

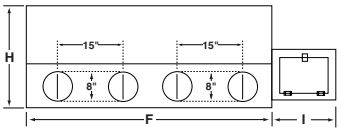
- 1/4" clear plexiglass (or optional material you've selected), with white translucent bottom.
- 8" x 8" door openings with gasketed doors on both sides of unit.
- 8" round arm ports with wide flanges for connecting glove assembly.
- Tapped 1/8" NPT inlet for connecting the Glove Box Dual Purge System and 1/8" NPT system pressure port.

Note: Stainless steel work surface is recommended on all polymer glove boxes to prevent scratching and is especially important with static-dissipative PVC.

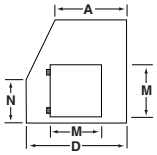
Series 100 Positive-Pressure Glove Box



Single Model (2 Arm Ports)



Twin Model (4 Arm Ports)



Type	A	D	F	H	I	M	N
Single	16 1/4	24	35	20 3/8	11 1/2	8	9
Twin	16 1/4	24	59	20 3/8	11 1/2	8	9

All dimensions in inches.

Dual Purge System

Overall Dimensions:	12"W x 11.25"D x 7"H
Weight:	16 lbs
Power Requirement:	120/220 VAC, 50/60 Hz, +10%/-15% 1/2 Amp. Universal power supply requires no power switch settings.
Flowmeter:	0–20 SCFH
Line Pressure Gauge:	0–60 psi
Open Door Alarm:	Factory set at 60 seconds (adjustable)
Inlet/outlet:	1/4" OD polyethylene tubing
Case Material:	Stainless steel

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Timer Adjustment:	Factory set at 60 seconds (adjustable)
Internal Positive Pressure:	0-0.5 inches of water
Fuse:	1/2 Amp

NitroWatch

Dimensions:	11"W x 6.5"D x 3"H
Power:	12 V/DC (from Dual Purge)
Sensor Dimensions:	1.5" x 0.75" x 4"
Case Material:	Stainless steel
Display:	3.5 digit LED display
Electrical Connections:	Screw terminals
Output:	0-5 V
Measuring Range:	0-100% RH
Accuracy (at 20° C):	± 3% RH
Resolution:	± .1% RH
Temp. Dependence:	± .04% RH/°C
Sensor Calibration:	None required, but scale offset routine allows display compensation.

Filtration Modules

Closed-Loop Filtration Module

Blower:	460-CFM impeller
Filter:	HEPA filter (rated 99.99% efficient @ 0.3 micron particles)

Open-Loop Filtration Module

Blower:	460-CFM squirrel-cage blower
Filters (inlet and exhaust):	HEPA filter (rated 99.99% efficient @ 0.3 µm particles)

8.0 Warranty

Products Manufactured by Terra: Terra Universal, Inc., warrants products which it manufactures to be free from defects for a period of 90 days for parts and labor. Terra's sole responsibility is to repair or replace, at its option, any part of the product which 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 which 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 which 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.

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

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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 30 days of receipt of the product or at the time the customer became aware or should have become aware of the failure. 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!

Appendix: Glove and Sleeve Combination Installation



Terra Universal's Glove and Sleeve Combination allows versatile access to equipment inside a stainless steel or plastic glove box. This assembly is designed for use with standard 8"-diameter TUI glove ports, which include a flange to allow glove connection.

Mounting the Glove and Sleeve Assembly to the Glove Box

Normally, the glove and sleeve combination 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!!!: Overtightening 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.

Mounting the Glove to the Sleeve

The two-piece design of this assembly permits you to replace the glove without removing the sleeve from the glove box. To replace the glove,

1. With the glove and sleeve combination installed inside the glove box, insert your hand fully into the assembly and then pull it from the glove box to turn the glove and sleeve inside out.
2. A steel retaining spring holds the glove and sleeve together in position on a retaining ring. Remove this spring.
3. Peel the cuff of the sleeve from the retaining ring to remove it (still attached to the glove).
4. To remove the glove, peel its cuff from the retaining ring.
5. To install a new glove, first turn it inside-out and then stretch the cuff from inside the ring over and around the outside edge.
6. Now place the ring (with the glove attached) inside the cuff of the sleeve and stretch the sleeve over the outside perimeter of the ring.
7. Reposition the steel retaining spring over the channel of the ring, and reinsert the sleeve and glove combination into the glove box. Repeat the procedure for the other hand.

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