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Quick-Start Operation Guide 1800-40

Desiccator Dry Storage Systems

(Including Dual Purge™ & NitroWatch® Controllers)



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Quick-Start Operating Guide

Desiccator Dry Storage Systems

(Including Dual Purge™ & NitroWatch® Controllers)

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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 Desiccator Dry Storage System.



1.0 Equipment Description

This section provides background information on Terra Universal's desiccators and gas controls. If you wish to proceed to installation and operating guidelines, see page 2.

Desiccators, Faraccators

Terra Universal offers several lines of desiccator cabinets:

Adjust-A-Shelf™ Desiccators are outfitted with chrome-plated racks that allow you to adjust the height of additional removable shelves every half inch.

Tape-and-Reel Desiccators™ feature racks that securely hold a variety of embossed carrier reels up to 1.25" thick and 14" in diameter.

Kiticcators™ are designed for optimal access and storage density of tote boxes (kitting trays).

Faraccators™ employ the Faraccator concept to shield static-sensitive components against the danger of ESD (electrostatic discharge).

Security Faraccators™ operate much like our standard Faraccators, but they add an outer locking security shell to protect stored parts against unauthorized access.

Double Agent Desiccators™ house an eight-door, electrically grounded Adjust-A-Shelf Desiccator (see above) in a high-security safe.

Each of these cabinets employs a similar nitrogen-flow design: clean, dry nitrogen is fed into a plenum chamber for uniform distribution in all chambers. Nitrogen displaces heavier moisture-laden air, which is purged through automatic relief/bleed (RB) valves.

Dual Purge System

The Dual Purge System provides variable gas purging to protect your stored materials. It provides a low-level purge just adequate to block out moisture and contaminants while the desiccator doors are closed. When an access door is opened, it automatically initiates a high-level purge adequate to minimize backfill. An adjustable time delay maintains the high-level purge for a set time after the door is closed, guaranteeing that any air or contaminants that do enter the cabinet are quickly flushed out through the Automatic RB Valve—before moisture can penetrate materials stored inside. Once contaminants have been removed, the economical low-level purge is restored.

The Dual Purge System is designed for enclosures that feature several access doors (as most desiccators do). It relies on a sensor switch (installed beneath each door) to activate the high- and low-level purges.

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CAUTION!!!: ***The Dual Purge System should be used only with desiccators that feature a plenum chamber.***

Each unit features a system line pressure gauge and regulator, internal positive pressure gauge, a 2-amp fuse (located inside the housing), a flowmeter, and all necessary gas line connections.

In addition, each unit features warning lights. One automatically flashes if a door is left open more than 60 seconds (user adjustable). This feature helps save nitrogen and reduce risk of contamination. The other flashes if the inlet line pressure falls below 35 psi. This alarm alerts the user of a problem with the supply line.

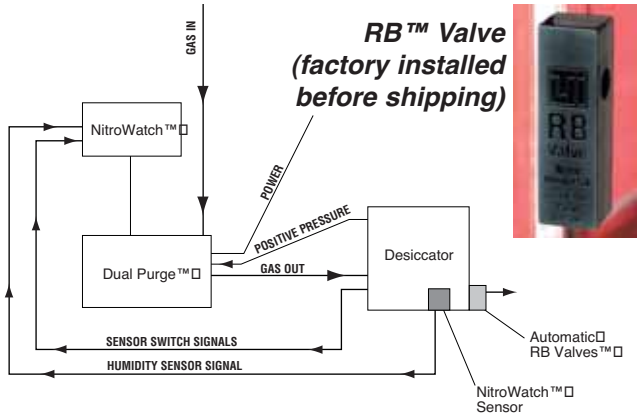
For automatic control of the relative humidity level within an enclosure, you may interface Terra's NitroWatch to the Dual Purge System.

WARNING!!!: ***Because variable inflow of nitrogen requires variable pressure relief, the use of an Automatic RB (Relief/Bleed) Valve (Cat. No. 1600-60B) is mandatory with the Dual Purge System. Failure to incorporate an Automatic RB Valve could lead to cabinet damage!***

NitroWatch

The NitroWatch senses and displays the relative humidity level (from ambient to 0%) inside a desiccator within 2% RH accuracy. It operates in tandem with the Dual Purge System and Automatic RB Valve to precisely and automatically control the flow of nitrogen into the desiccator and maintain a preset humidity level, no matter how operating conditions may change. It thus compensates for factors you may not have time to worry about, such as how often parts are accessed, the size and condition of the desiccator, variations in ambient humidity, and long periods without operator supervision.

The NitroWatch consists of two basic components: a humidity sensor and an indicator/controller unit.



NitroWatch/Dual Purge System Functional Diagram

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 ± 2% RH at a temperature of 68 degrees F. The voltage output of the sensor is directly proportional to the humidity.

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.

Improved Desiccator Efficiency with the NitroPlex™

Terra's NitroPlex Desiccators feature a separate % RH monitor/control modules in each chamber to allow true multiplexed humidity control in large cabinets. Refer to separate Quick-Start (No. 1800-38) for operating instructions.

2.0 Set-Up

Before installation and operation, carefully unpack the desiccator and accessories and check for signs of damage or missing parts. Wipe down with a particle-free cloth.

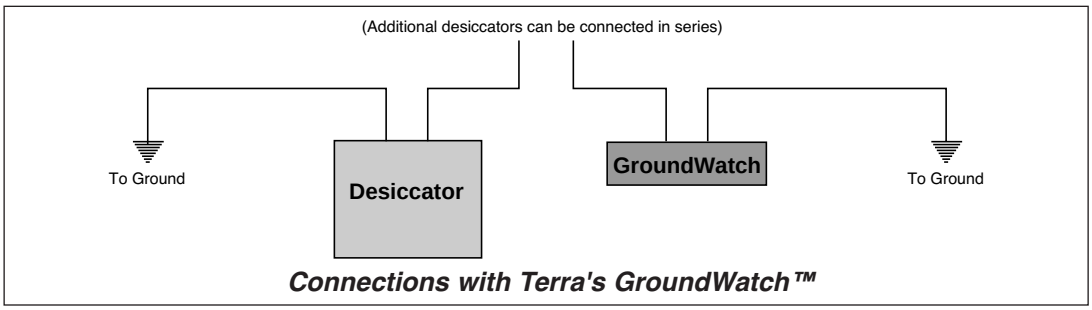
CAUTION!!!: ***Never use alcohol or other cleaning agent on acrylic surfaces.***

Desiccator installation requires a supply of clean, dry air or nitrogen (less than 5 ppm(v) H_2O) and ¼" polyethylene tubing. The Dual Purge universal power supply operates on 110VAC, 60Hz or 220VAC, 50Hz with no required switch settings.

All grounded cabinets feature grounding terminals in the upper-right corner of the cabinet. For standard grounding, simply connect the black connector to your in-house ground.

If your system incorporates Terra's GroundWatch™, which provides audible and visible alarms when ground contact is broken, simply connect one of these terminals to the corresponding terminal on the rear panel of the GroundWatch unit, and the other to ground.

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Connections with Terra's GroundWatch™

Door Alignment

All cabinets are checked prior to packaging to ensure proper door alignment. However, they can come out of alignment during shipping due to the inherent flexibility of plastic.

Doors feature sensor magnets that must be aligned with the associated sensor on the desiccator door. If these magnets are misaligned, the Dual Purge system may not function properly, and door seals may not seat properly, allowing nitrogen leakage.

On a properly aligned, level cabinet, all door latches are engaged directly in the center of the corresponding catch (see photos). To re-align a cabinet,

1. Open all doors.
2. Make sure that the bottom of the cabinet is level. Use the leveling feet of the stand or shims to level the bottom of the support stand.
3. Starting at the bottom of the cabinet and working up, close each door. Make sure that each latch engages the center of the corresponding catch.



Door Latch Too High



Door Latch Too Low



Door Latch Correctly Centered

Make gas connections as indicated in the illustrations on the following pages (for operation with either a flowmeter, a Dual Purge System, or a Dual Purge and NitroWatch system).

CAUTION!!!: Installation of at least one Terra Automatic RB Valve (Cat. #1600-60B) is required to protect against permanent damage to seals and doors. Normally, the RB Valve is factory installed to the front chamber lip by two 4/40 machine screws.

For optimal efficiency of gas delivery and for reduced %RH recovery times, Terra recommends factory installation of one RB valve in each desiccator chamber.

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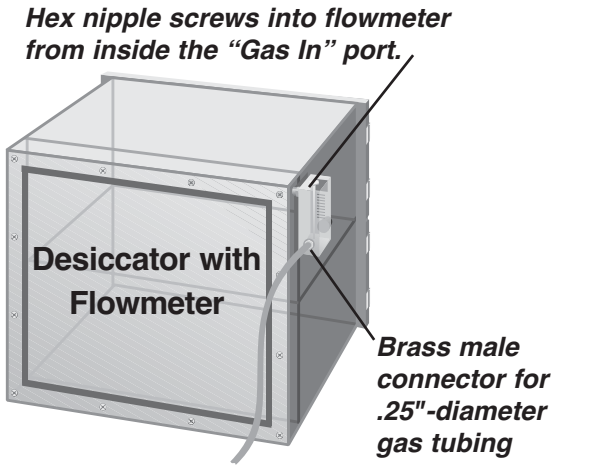
3.0 Operation

3.1 Operating the desiccator with a flowmeter only

Set the flowmeter to between 5 and 20 SCFH (depending on desiccator size and moisture requirements).

Flowmeter Installation

Attach flowmeter to hex nipple inserted from inside the cabinet wall through the "Gas In" port. Brass male connector attaches to the threaded female fitting behind the flow knob to allow connection of .25"-diameter polyethylene tubing.



Note on Flowmeter Operation:

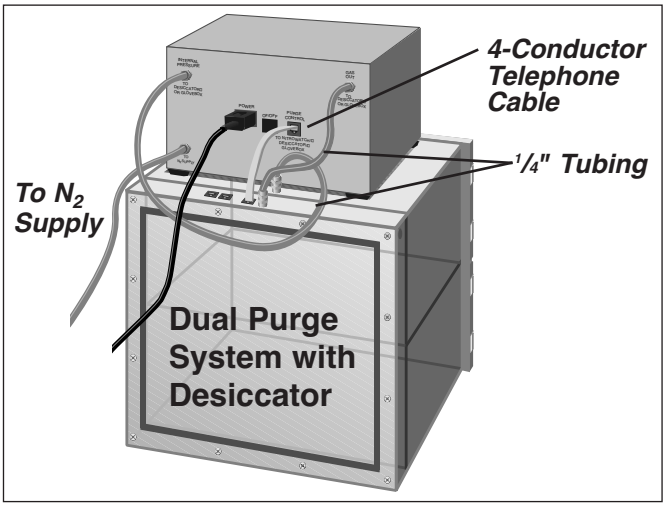
Because a flowmeter provides a constant flow rate, it is not ideal for use in large desiccators with doors that are frequently opened.

Left on a very low setting, the flowmeter will maintain a constant positive pressure that halts the influx of moisture through small cracks or through plastic walls (which are hygroscopic). However, this low flow rate will not block the influx of moisture or contaminants when a door is opened, nor will it quickly remove moisture once it enters the cabinet.

At a high flow rate, the system will remove moisture more effectively and block its influx when a door is opened, but the system will also consume an unnecessarily high amount of nitrogen at other times, and overpressures could in time damage seals or distort doors.

For these reasons, Terra recommends the Dual Purge system for more efficient nitrogen control, and the NitroWatch system for automatic %RH set point control.

3.2 Operating the Desiccator with the Dual Purge System



1. **Zero Calibration:** This routine is run before shipping to ensure that the pressure sensor that activates the Low Pressure Alarm is properly calibrated. You need to run the routine only if the Low Pressure Alarm is activated even though the Dual Purge is connected to an nitrogen supply with at least 5 psi of pressure.

   To perform the zero calibration routine, disconnect the incoming gas supply line. (Any pressure on the internal pressure transducers while this routing is run will be subtracted form the reading during normal operation, resulting in incorrect low-pressure alarms.)

   Press and hold SET and UP buttons while turning on system power. The display will indicate "CAL" and then automatically set the zero value.

2. **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):

   Prg 1 Purge Delay (minutes): No. of minutes high purge remains active after door is closed (default: 0)

   Prg 2 Purge Delay (seconds): No. of seconds that the high purge remains active after door is closed (default: 60)

   door No. of seconds a door must remain open to activate OPEN DOOR alarm (default: 60)

   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: OFF)

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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). See "zero calibration" above.

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.

3. **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 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 bench-top desiccators) or 40 psi (for larger standing desiccators). Note that regulator knob is cross-threaded: rotate clockwise to open the valve and increase pressure, or counterclockwise to close the valve and reduce pressure. For safe operation, pressure should be externally regulated below 70 psi.

Internal Pressure — Press and hold DOWN (displays internal cabinet pressure in milli-inches of 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, open the flowmeter to 5 – 10 SCFH (depending on chamber size). This is recommended if you require a very low humidity set point (less than 10%RH) or is doors are frequently opened. Continuous purging will tend to drive the %RH level very low.

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

Note: On systems with very large plastic access doors, a continuous purge can cause temporary door deflection and gas leakage. This condition does not indicate a permanent leak and generally does not damage the cabinet. When pressure is removed, doors return to their natural position and re-establish an effective seal. This deflection does, however, result in nitrogen waste and indicates the need to reduce the flowmeter setting.

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 "Initial Programming" above.

"Hi" Indicator — indicates that the Dual Purge System is in high-purge mode (you will see at least one bar to the right of this display, which indicates an internal positive pressure).

Flashing "Lo Pres" — indicates the absence of incoming line pressure. Check the line for proper connection, and check the nitrogen source to ensure to ensure incoming flow.

3.3 Desiccator with Dual Purge™ System and NitroWatch™

Includes: Dual Purge System as described above, NitroWatch control unit, humidity sensor, and three 5' connecting lines (for connecting the control unit to the humidity sensor, the desiccator sensor switches, and the Dual Purge System).

1. ***Dual Purge™* Set-Up:** Complete the unpacking and set-up instructions for the Dual Purge™ System (see sections 2.0 and 3.2 above).
2. ***NitroWatch™* Set-Up:** Make the electrical and gas connections indicated on the illustration (NOTE: The NitroWatch draws its power from the Dual Purge System and will not operate unless the Dual Purge System is plugged in and turned ON.)
3. **Initial Programming:** Turn ON the Dual Purge System while holding down the SET button on the NitroWatch control panel (the left button on the front control panel).

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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):

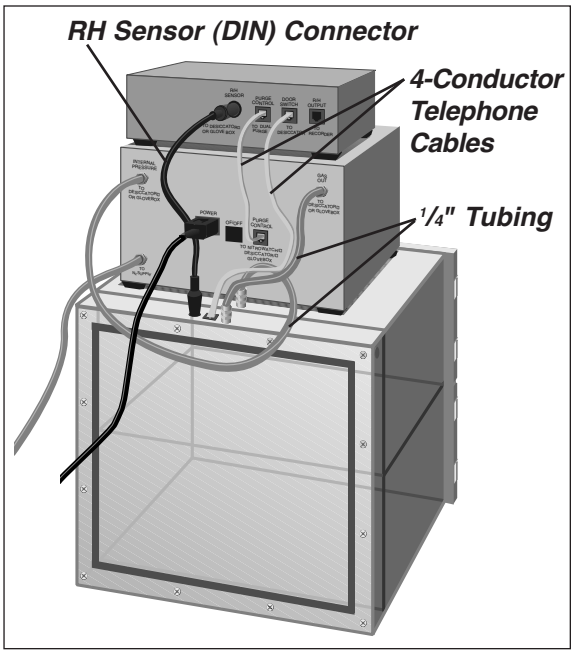
Door Open Door Delay Alarm: No. of seconds a door must remain open to activate OPEN DOOR alarm (default: 60)

rH Relative Humidity High Purge Delay Alarm: No. of seconds the RH level must remain above the set point toactivate 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 operates with Terra's 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. (Default: 0)



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 maxi um 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.

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

Press SET again to advance to Normal Run Mode.

Make a mistake? No Problem! To reset the system, turn the NitroWatch OFF while in setup mode and restart while holding the SET button.

4. **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.

5. **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 desiccator exceeds the specified set point. Your desiccator is ready for operation.

CAUTION!!!: ***Installation of at least one Terra Automatic RB Valve (Cat. #1600-60B) is required to protect against permanent damage to seals and doors. Normally, the RB Valve is installed prior to shipping.***

For optimal efficiency of gas delivery and reduced %RH recovery times, Terra recommends factory installation of one RB valve in each desiccator chamber.

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.

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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 explosion.

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.

4.0 Maintenance

Both acrylic and static-dissipative PVC desiccators can be periodically cleaned with clean, lukewarm water and a clean nonabrasive cloth. If desired, a mild, non-abrasive detergent may also be used. Use only light pressure when cleaning.

If the outside of the acrylic is exceptionally dirty or gritty, rinse the surface first by lightly swabbing a saturated cloth over the surface and allowing 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 acrylic by blotting gently with a clean, dry cloth.

If you clean the inside of a desiccator 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 acrylic 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 desiccator chamber 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 desiccators or place heavy objects on top of them.

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

Replacing Desiccator Doors

Under normal operating conditions, TUI desiccators should operate for years without warping of doors, particularly when doors are equipped with stainless steel frames. Even if some warping should occur, the Dual Purge System and NitroWatch will ensure that the desiccator maintains a positive internal pressure.

If your desiccator should experience warping, you should first attempt to determine the cause. Does your system incorporate an Automatic RB Valve? Is the pressure of incoming nitrogen set too high?

Call Terra Universal for any required replacement doors (we will need the model number, which is printed on a label affixed to the lower right side of every standard TUI desiccator). To replace a door, simply remove the screws that hold the door in place and reinstall the new door. The back panel is similarly secured by a number of screws; make sure that you do not overtighten these, or the plexiglass will crack!

After replacing gaskets you may need to realign the desiccator doors; refer to “System Set-Up.”

Testing and Replacing Humidity Sensor

If a discrepancy is observed between the displayed %RH and that of an independent humidity calibrator, the humidity scale can be compensated accordingly (see “Set-Up” instruction on page 2).

The NitroWatch humidity sensor requires no calibration. The sensor should be tested periodically and replaced as necessary (about every 5 years under normal use).

5.0 Troubleshooting

Terra Universal's desiccators are designed to provide years of reliable, efficient service. If you should experience any problems that arise during operation of your desiccator with the Dual Purge System and NitroWatch, 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.

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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 two telephone cables to the NitroWatch and desiccator are 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 the doors are properly closed and that the sensor switches are making contact. (See alignment procedure on pg. 3.)
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 desiccator to make sure that there are no leaks. (See alignment procedure on pg. 3.)
4. If you are operating a large desiccator 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) desiccator walls. These materials absorb moisture from outside of the desiccator 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. Yet if you operate on high-flow purge most of the time, you consume large amounts of nitrogen and run the risk of pressure build-ups.

   To compensate for this condition, select the NitroPlex Module. This unit increases desiccator efficiency by monitoring the humidity levels in each desiccator chamber independently and directing a high-level purge only to the chamber(s) where it is required.

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

POSSIBLE SOLUTIONS:

1. Make sure that all access doors are closed and that all sensor switches are making contact. 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 our system incorporates a NitroWatch and you have established a low humidity set point. 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 desiccator is leaking.

POSSIBLE SOLUTIONS:

1. Check the condition of the gasket on the desiccator. If it is cracked or peeling, call Terra for a replacement.
2. Check door alignment ("Set-Up"). Leaks may develop if doors are out of alignment, a condition that's easy to remedy.

PROBLEM: Line pressure gauge does not display any pressure, or displays the "Low Pressure" alarm at all times.

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.
4. Run the "Zero Calibration" routine described in section 3.2

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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.

6.0 Specifications

Refer to Terra Catalog No. 105 for dimensions, weights and capacities of all our desiccator lines.

Desiccators, Faraccators

CAUTION!!!:

- **Do not clean acrylic or static-dissipative products with alcohol or other strong cleaning agents. USE ONLY clean, lukewarm water (or a mild detergent) and a clean, nonabrasive wipe.**
- **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 desiccator chamber to prevent scratching.**

Plexiglass Desiccators and Faraccators

The plexiglass used in Terra desiccators is more rigid than acetates or vinyls, and is much more resistant than glass to thermal shock. The tensile strength of this material is 10,000 PSI at room temperature; however, when continuously loaded, imposed loading should not be allowed to exceed 750 PSI. Although this plexiglass can withstand temperatures between –30 and 190 degrees Fahrenheit, it is recommended that temperatures not exceed 160 degrees Fahrenheit for continuous service.

Exposure to direct sunlight may cause the material to warp and distort. Therefore, any plexiglass desiccator should be kept out of direct sunlight.

The self-ignition temperature is 830 degrees Fahrenheit (443 degrees Celsius) measured in accordance with ASTM D–1929. The products of combustion, when sufficient air is present, are water and carbon dioxide. However, as with many other common combustible materials, when sufficient air is not present during combustion, toxic carbon monoxide will be produced.

Static-Dissipative PVC Desiccators and Faraccators

Static-dissipative PVC features surface resistance between 106 and 108 ohms/square—much less than that of other treated plastics. Tests show that when 10KV is applied to the surface, electrostatic potential remains less than 15V, and static decay time is less than 1 second. And because this plating offers such effective static dissipation, it will not attract dust or other contaminating particles that could damage sensitive microelectronic components.

In a test conducted in accordance with Mil-B-81705B, the plating was conditioned for 24 hours at a relative humidity of 12% and a temperature of 70 degrees F. The sample exceeded the 2.0 second static decay requirement to zero as specified; in fact, it had a decay time of 0.01 seconds for each measurement taken! It had a surface resistivity of 1.7 x 107 ohms per square on one side and 2.8 x 107 on the other.

This plating is also durable. It features superb resistance to UV radiation; tests have indicated no loss of static protection after 500 hours of continuous exposure to a fadeometer. In temperature tests, it maintained its dissipative properties after 100 cycles of temperature fluctuations from –5°C to 60°C. It is also completely noncombustible.

The plating also offers all of the chemical-resistance of standard PVC plating. It remains unaffected by a wide range of chemical solutions.

Gaskets

Terra desiccators use one-piece neoprene gaskets and are mechanically attached to door frames without the use of adhesives or other materials that could outgas.

Dual Purge System

Overall Dimensions:	12"W x 11 1/4"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 switch settings.
Flowmeter:	0–20 SCFH
Line Pressure Gauge:	0–60 psi

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Open Door Alarm:	Factory set at 60 seconds (adjustable)
Inlet/outlet:	1/4" OD polyethylene tubing
Case Material:	Stainless steel; chrome-plated or stainless steel internal fittings
Timer Adjustment:	Factory set at 60 seconds (adjustable 0 - 8 minutes)
Internal Positive Pressure:	0-0.4 inches of water
Fuse:	1/2 Amp

NitroWatch

Dimensions:	11"W x 6 1/2"D x 3"H
Power:	12 V/DC (from Dual Purge)
Sensor Dimensions:	1 1/2" x 3/4" x 4"
Case Material:	Stainless steel
Display:	3 1/2 digit LED display
Electrical Connections:	Screw terminals
Output:	0-5 V
Measuring Range:	0-100% RH
Accuracy (at 20° C):	± 2% RH
Display Resolution:	± .1% RH
Temp. Dependence:	± .04% RH/°C
Sensor Calibration:	None required, but scale offset routine allows display compensation. Capacitive sensor pick-up should be tested and replaced as necessary (about every 5 years under normal use).

Automatic RB™ (Relief/Bleed) Valve

Dimensions:	7/16"W x 7/16"D x 1 1/2"H
Material:	Styrene-acrylonitrile (SAN) resin

7.0 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.

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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."

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