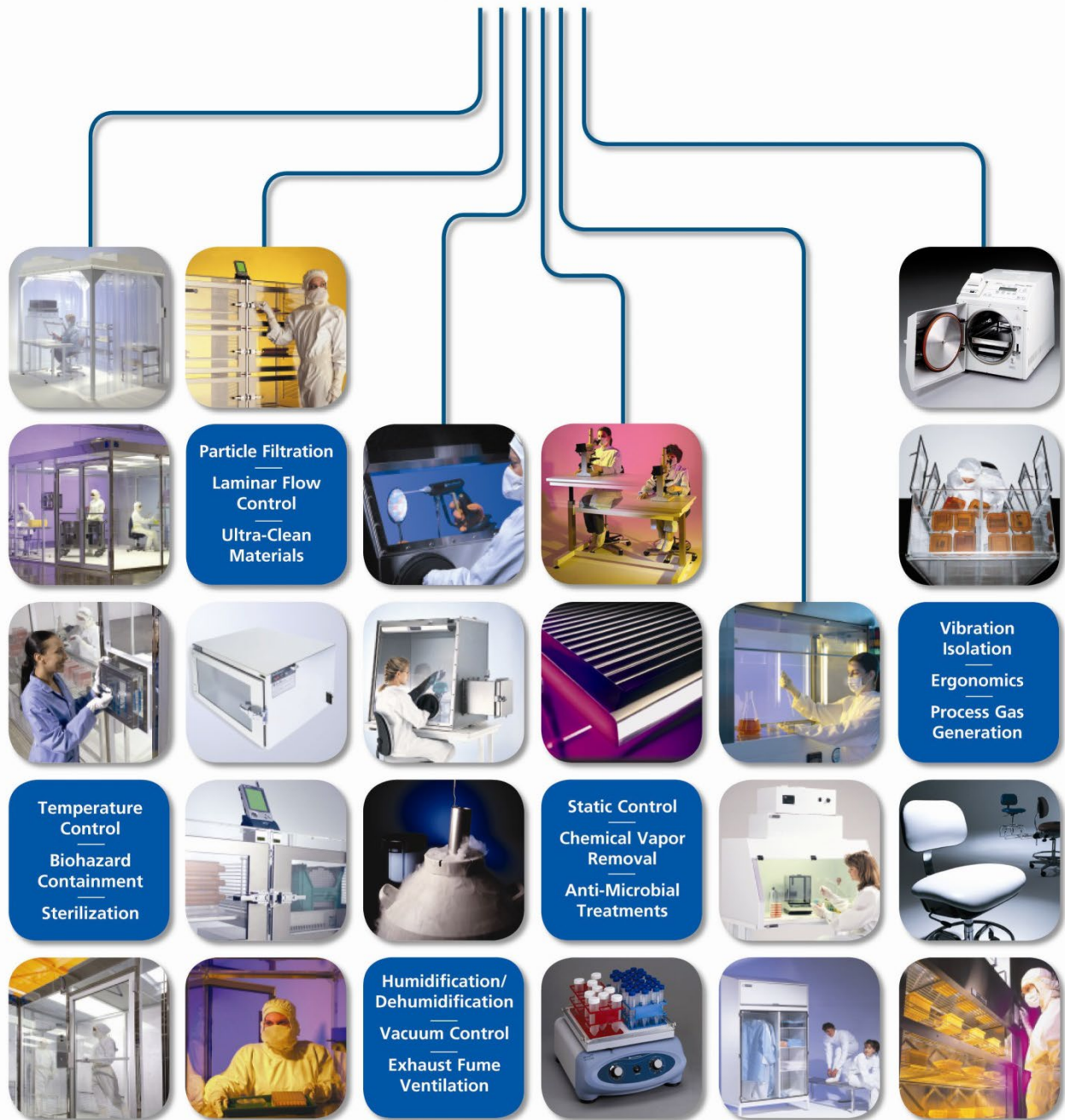


Smart® Desiccator

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Your Comprehensive Equipment Source





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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:

The information presented here is subject to change without notice.



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.

1.0 Introduction

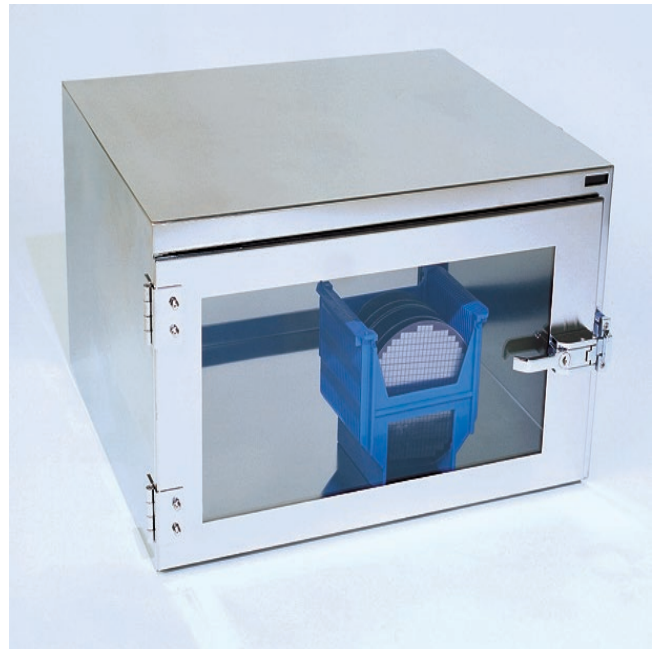
This manual provides installation and operating instructions that pertain to both the plastic and stainless steel Smart® Desiccator.

2.0 Description

The Smart® Desiccator extends shelf lives of stored materials by automatically maintaining the internal humidity level you select.

It maintains dry storage conditions by controlling the flow of dry purge gas, generally nitrogen, into the cabinet. A space-saving LED display continuously monitors the %RH (relative humidity) inside the chamber. After you enter a humidity set point, the Smart® Desiccator turns the flow of nitrogen on and off to maintain the set point without wasting nitrogen.

This smart control system cuts nitrogen costs up to 78% when compared to flow meter gas delivery systems. Terra's Automatic RB (Relief/Bleed) Valve relieves system overpressures that could damage door seals.





3.0 Set-Up and Operation



CAUTION

Do not position the desiccator so that the power supply connections are inaccessible. The power supply serves as the main disconnect for the system.



WARNING

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

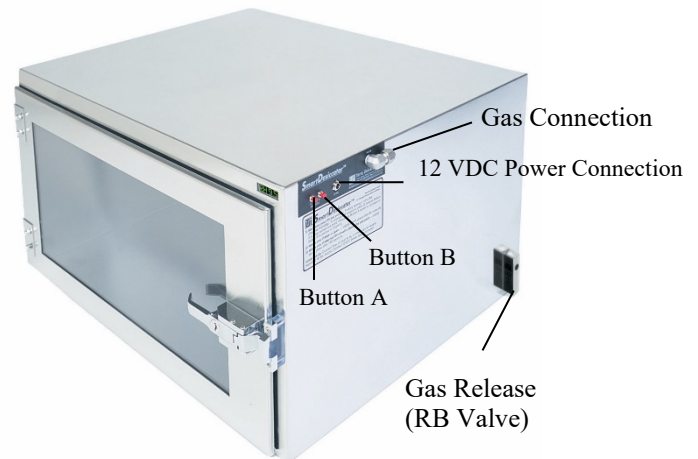
Follow these steps to prepare your Smart® Desiccator for operation using the factory-set parameters summarized below. To change any of these values, refer to Section 4.0: Changing Set-Up Mode Parameters.

Relative Humidity Offset: allows the user to offset the relative humidity readings to match %RH values displayed by a test instrument. This is effectively a calibration procedure.

High Relative Humidity Alarm (default = 60 seconds): allows the user to change the time delay between when the measured relative humidity level climbs above the set point value and when the “RH High” alarm is displayed.

Identification Parameter (default = 0): not used with the Smart® Desiccator.

Purge-Off Delay (default = 5 seconds): allows the user to change the delay between the time when the system regains the humidity set point and the high-flow purge is de-activated. This delay ensures that ample purge is provided to remove moisture and contaminants from the chamber. The longer the delay, the more nitrogen is consumed each time a humidity fluctuation triggers the high-flow purge.



1. Connect a ¼" nitrogen gas (or other process gas) supply line externally regulated at 10 – 20 PSI. See photo for fitting location. Higher pressure may result in periodic pressure release at the door seal. This gas release is normal and necessary to prevent overpressure to the cabinet. It does NOT indicate defective or failed seals. Once gas is released, the door seal returns to its original position.
2. Connect the 12VDC power supply to a standard 110VAC/60Hz power outlet and then connect it to the power input on the Smart® Desiccator (next to the nitrogen gas connection).
3. **RH Set Point (Factory Setting: 10% RH)** – The RH set point is established during normal run mode. With the power ON, press and release Button A to view current set point. Then press Button A again to increase the set point, or Button B to decrease it.



After a four-second delay, during which time no buttons are pressed, the unit will store the new set point and return to normal operation, displaying the current RH level.

Recommended Minimum Settings: Although the RH level can be specified anywhere between 0 and 99.5% RH, the practical set point range is from room ambient (highest setting) down to the RH of the supply gas (lowest setting).

Because the unit is accurate to $\pm 2\%$ RH, your set point should be at least 2% above zero (recommended minimum setting is 4%). Otherwise, the system could attempt to attain a negative reading and remain on high purge mode all the time.

4.0 Changing Set-Up Mode Parameters

Refer to the descriptions above for each of the set-up mode parameters. Before proceeding, make sure that the Smart® Desiccator is connected to a $\frac{1}{4}$ " nitrogen gas (or other process gas) supply line externally regulated at 10 – 20 PSI.

A. Relative Humidity Offset

1. To change parameter settings, you must first enter the Set up Mode. To do so, disconnect the 12VDC plug from the side of the unit.
2. While pressing and holding both red buttons (labeled "A" and "B"), reconnect the 12VDC plug to the power.
3. Release the "A" button only. The LED will show "RH" to indicate the Relative Humidity Offset Parameter.
4. Release the "B" button. The display should read the factory value (see below table). Press the "A" button to increase this value. The settable range is -10 to +10. When the upper range limit is reached, displayed values will cycle to the lower range limit.

Humidity Module Part#	Default Value
1911-30B	0%
1911-30C	+2%

B. RH Hi Alarm (Default = 180 seconds)

1. To advance to the Open Door parameter, press and hold the "B" button. The display should read "RH".
2. Release the "B" button. The display should indicate "180", the factory setting in seconds. Press the "A" button to increase this value. The settable range is from 0 – 255; when the value reaches 255 it will cycle to "0" and continue climbing. Release when the desired alarm delay appears

C. Identification Parameter (default = 0)

1. Press and hold the "B" button again to view the Identification Parameter, which is not used with Smart® Desiccators.

D. Purge-Off Delay (default = 30 seconds)

1. To advance to the Purge-Off Delay parameter, press and hold the "B" button. The display should read "purgG".



2. Release the “B” button. The display should indicate “30”, the factory setting in seconds. Press the “A” button to increase this value. The settable range is from 0 – 255; when the value reaches 255 it will cycle to 0 and continue climbing. Release when the desired alarm delay appears.
3. Press and hold the “B” button. The display will show “done” to indicate the end of the parameter set up mode.
4. Release the “B” button to return to Operation Mode. The display will read the current measured relative humidity level inside the chamber. The values that have been established will be stored and reloaded each time the Smart® Desiccator is powered up.

5.0 Desiccator Service and Maintenance



WARNING

Do not attempt to disassemble any of the modules. Contact Terra for assistance.



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.

Both acrylic and static-dissipative PVC desiccators should 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 the desiccator with water, you should dry the inside surface thoroughly and then purge the cabinet with nitrogen for several hours before reintroducing moisture-sensitive materials.

The desiccator is rated for operation in an environment with temperatures between 32°F (0°C) and 104°F (40°C) and a relative humidity of up to 92%.

Special Care of Static-Dissipative PVC Plating

Although static-dissipative PVC has greater tensile strength than acrylic, 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.

Stainless Steel Desiccators

Stainless steel should always be cleaned with alcohol (or similar cleaning agent) and a damp cloth.



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.

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 over-tighten these, or the desiccator walls 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" instructions on page 2).

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

6.0 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 Smart® Desiccator, 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 Smart® System is plugged into a working outlet and all low-voltage wires are properly connected in each chamber. If the problem persists, call Terra Universal.



PROBLEM: The digital display is flashing “rH high”.

EXPLANATION: The chamber has been in high-flow nitrogen purge mode for an extended period of time (Factory Default Alarm Setting: 180 Seconds). The alarm will deactivate when the chamber reaches the programmed set point.

POSSIBLE SOLUTIONS:

1. Make sure that the doors are properly closed.
2. If the relative humidity levels are not falling, you may need to increase the flow from the nitrogen gas supply (not to exceed 80 psi) or use nitrogen of a higher purity.
3. Check the door seals of the desiccator to make sure that there are no visible gaps. The flexible gaskets are designed to allow a small amount of leakage in order to maintain a positive pressure environment.

PROBLEM: The digital display is flashing “open door”.

EXPLANATION: The chamber door has been open for an extended period of time (Factory Default Alarm Setting: 60 Seconds).

POSSIBLE SOLUTIONS:

1. Make sure that all chamber doors are closed.

PROBLEM: The desiccator is leaking excessively.

POSSIBLE SOLUTIONS:

1. Check the condition of the gasket on the desiccator. If the gasket is cracked or peeling, call Terra Universal for a replacement.
2. Check door alignment. Leaks may develop if doors are out of alignment.



PROBLEM: The humidity module delivers an obviously incorrect humidity reading.

POSSIBLE SOLUTIONS:

1. Check the low-voltage connection on the rear of the humidity module. If the connection to the sensor is good, and the unit still fails to deliver an accurate reading, contact Terra Universal.
2. The fan inside the humidity controller is a key part of the system and must be running to ensure accurate RH readings. The system will not provide correct readouts if the fan is not running.

7.0 Specifications



NOTE

Refer to the original order form for the exact specifications/configuration of your desiccator.

Automatic RB (Relief/Bleed) Valve

Operating Temperature:

Dimensions: 0.5"W x 0.5"D x 1.5"H

Material: Styrene-acrylonitrile (SAN) resin

Smart Relative Humidity (RH) Module

Operating Temperature:

Dimensions: 1.75"W x 5.5"D x 1.5"H

Case Material: 304 Stainless steel

Power Requirements: 120/240 VAC, 50/60Hz

Gas Inlet: 1/4" OD polyethylene tubing



8.0 Warranty

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

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

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

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

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

Thank You for ordering from
Terra Universal!