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1.0 Introduction

This manual provides information on installing and operating your High-Capacity Nitrogen Generator.

For more information, please visit https://www.terrauniversal.com/desiccators-dry-boxes/n2-generator-compressor.php.
2.0 Description

Terra Universal’s High-Capacity Nitrogen Generator provides a consistent flow of high-purity nitrogen gas without the expense and inconvenience associated with bottle systems.

As shown in the diagram below, compressed air enters the system through a 200-gallon tank. The air passes through two-stage coalescing filtration, followed by an activated carbon (adsorption) filter, and a fourth-stage coalescing filter. The pressure regulator caps the pressure at 180 PSI to protect the nitrogen separation membranes (max 189 PSIG).

The dual-membrane system generates high-purity nitrogen by extracting the other gaseous elements, exhausting them from the system. A flow-restricting valve positioned downstream of the membranes is preset at the factory to deliver the highest possible purity. Adjusting this valve will increase the fill rate of the nitrogen storage tank at the cost of purity (not recommended).

The smaller, 60-gallon tank stores the nitrogen gas under pressure. When the tank pressure reaches 150 PSI, a pressure switch triggers the solenoid valve next to the pressure regulator, stopping flow to the membrane system. After the tank pressure drops by 30 PSI (down to 120 PSI), the solenoid valve will reopen and begin refilling the nitrogen storage tank.

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**Figure 1. System Diagram**
An inline flow meter allows operators to measure and adjust the outlet flow of nitrogen gas. The nitrogen gas passes through one final coalescing filter before exiting the unit.

3.0 Installation

3.1 Site Preparation

A. Make sure that the unit will be placed on a level, stable surface, away from heat or chemicals that could damage it.

B. Ensure that a compressed air source (at least 200 PSI) and dedicated electrical circuit are located near the installation site.

3.2 Unpacking

Carefully remove the crating from around the unit and inspect for damage. If mounted to a pallet, leave the unit secured on the pallet until it reaches the installation site.

Be careful not to throw away any loose components or other important items with the packing material. Any damage should be reported according to the terms in the shipping agreement.

3.3 Installation

A. Locate the power cord and secure it prior to moving the unit.

B. Using a forklift or similar equipment, carefully maneuver the unit to the installation site and place the unit on the ground. Remove the wooden pallet (if applicable).

C. Close the shutoff valve between the fourth-stage coalescing filter and the pressure regulator (see Figure 2 on pg. 6).

D. Prior to connecting a new air compressor, follow the manufacturer’s instructions for breaking in the motor.

E. Regulate the compressed air source to 200 PSI.

F. Allow the air compressor to run with the outlet open for a few seconds to remove debris.

G. Shut off the compressed air source.

H. Use high-pressure tubing and fittings to connect the compressed air source to the inlet valve located on the side of the unit (see Figure 3 on pg. 6).
I. Open the inlet valve on the compressed air tank.

J. Connect the power cable to the electrical supply. Verify that the LED logo on the front of the unit is flashing.

K. Reopen the compressed air source to begin filling the compressed air tank. Leave the post-filter shutoff valve (from Figure 2) in the "closed" position.

L. Locate the condensate drain at the bottom of the compressed air tank. Direct the drain tubing to a suitable location for intermittent draining.
4.0 Operation

4.1 Initial Startup

A. Close the flow meter by turning the adjustment knob clockwise until it stops (see Figure 4).

B. Verify the pressure gauge on the compressed air tank reads at least 200 PSI.

C. Reopen the post-filter shutoff valve (refer back to Figure 2).

D. Set the pressure regulator to 180 PSI using the T-handle adjustment screw (see Figure 4).

E. Allow approximately 60 minutes for the nitrogen gas storage tank to fill. The system will automatically close the solenoid valve when the tank pressure reaches 150 PSI.

F. Extend a line from the nitrogen gas outlet to the outside of the building or a suitable exhaust area. Open the flow meter using the adjustment knob (see Figure 4) and allow time for the tank to release any residual air or contaminants.
G. After purging the tank, close the flow meter and allow the tank to refill. The LED logo will stop flashing and glow solid when the tank reaches 150 PSI, triggering the solenoid valve.

The High-Capacity Nitrogen Generator is now ready for use.

4.2 Adjusting the Flow of Nitrogen Gas

Open the main access door to the nitrogen generator and locate the flow meter (see Figure 5). Below the flow meter is an adjustment knob for changing the inlet flow.

To calculate the flow rate in SCFM, use the scale chart on the flow meter:

A. Note the pressure reading on the nitrogen storage tank.
B. Follow the corresponding vertical line (psig) on the flow meter scale until it intersects with the red horizontal bar.
C. Estimate the flow rate based on the closest diagonal curve to the intersection point.

4.3 Adjusting the Preset Valve for High-Flow Applications

The valve shown in Figure 6 is preconfigured at the factory to ensure nitrogen gas purity of at least 99%.

As a general rule, this valve should only be adjusted when the production of nitrogen gas cannot keep up with the demand at the flow meter.

If this situation arises, users can open the valve to increase the flow rate; however, this may have an impact on the purity of the nitrogen gas.

Any time that the preset valve is adjusted, users must measure the purity of the resulting nitrogen gas to ensure it meets the application requirements.
4.4 Adjusting the Pressure Switch on the Nitrogen Gas Storage Tank

The pressure switch on the nitrogen gas storage tank actuates the solenoid valve, halting nitrogen generation when the tank reaches 150 PSI (factory default). While the tank is filling with nitrogen gas, the LED logo on the front of the unit flashes. When the pressure switch shuts off the air supply, the LED logo glows solid.

Users can adjust the high-pressure set-point on the pressure switch to suit their application.

To adjust the pressure switch:

A. Disconnect the power supply.
B. Remove the cover from the pressure switch (see Figure 7).
C. Turn the adjustment nut clockwise to increase the set-point or counter-clockwise to decrease the set-point. One turn equals approximately 2.5 PSI
D. Reinstall the cover (hand-tighten only).
E. Reconnect the power supply.
F. Allow the nitrogen gas storage tank to fill and observe the pressure level on the gauge. Note the level at which the solenoid valve closes and the LED logo stops flashing.
G. Repeat the above procedure if further adjustments are needed.

Figure 7. Pressure Switch with Cover Removed
5.0 Maintenance

5.1 Cleaning

Clean surfaces with clean, lukewarm water with or without a mild, non-abrasive detergent. Always check material compatibility before selecting a cleaning agent. Avoid cleaning with a circular motion, which rubs dirt or grit into the surface.

5.2 Draining Condensate

The High-Capacity Nitrogen Generator includes an automatic drain that collects condensate and discharges it when a preset level is reached. The self-monitoring unit operates as long as the nitrogen generator is connected to power and does not cause any pressure-loss in the system.

5.3 Filter Replacement

Each coalescing filter uses a replaceable filter cartridge to remove oil and water vapors from the air. The color-coded differential pressure (DP) indicator shows filter saturation: green indicates a clean filter and red indicates a fully saturated filter. The small, vertical window near the bottom of the filter housing allows operators to see liquid collecting in the filter bowl. Liquid can be drained from the filter housing as-needed by loosening the bottom drain port.

To replace coalescing filter cartridges:
A. Shut off the compressed air supply and release any pressure remaining in the nitrogen generator system.
B. When all pressure gauges read 0 PSI and air movement can no longer be felt at the inlets/outlets, twist the lower half of the filter housing to release the filter bowl, exposing the filter element.
C. Unscrewing the used filter element and install the replacement cartridge.
D. Reinstall the filter bowl.

Please contact a Terra representative for replacement filter cartridges.
# 6.0 Specifications

### High-Capacity Nitrogen Generator

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical Requirements</strong></td>
<td>120V, 60Hz (220V, 50Hz, if applicable)</td>
</tr>
<tr>
<td><strong>Body Material</strong></td>
<td>Powder-coated steel</td>
</tr>
<tr>
<td><strong>Exterior Dimensions</strong></td>
<td>60” x 44” x</td>
</tr>
<tr>
<td><strong>Nitrogen Storage Tank</strong></td>
<td>60 gal</td>
</tr>
<tr>
<td><strong>Compressed Air Tank</strong></td>
<td>200 gal</td>
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### Two-Stage Coalescing Filtration

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency at 0.01 Micron (1st Stage)</td>
<td>93%</td>
</tr>
<tr>
<td>Efficiency at 0.01 Micron (2nd Stage)</td>
<td>99.99%</td>
</tr>
<tr>
<td><strong>Max Pressure</strong></td>
<td>250 PSIG</td>
</tr>
<tr>
<td><strong>Housing Material</strong></td>
<td>Anodized Aluminum</td>
</tr>
<tr>
<td><strong>Filter Type</strong></td>
<td>Replaceable Cartridge</td>
</tr>
</tbody>
</table>

Filter Materials:
Borosilicate glass microfibers with fluorocarbon resin binder. Resistant to water, all hydrocarbon and synthetic lubricants.

### Nitrogen Separation Membranes

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum Operating Pressure</strong></td>
<td>60 PSIG</td>
</tr>
<tr>
<td><strong>Max Operating Pressure</strong></td>
<td>189 PSIG</td>
</tr>
<tr>
<td><strong>Pre-Filter</strong></td>
<td>Activated carbon (hydrocarbon filtration)</td>
</tr>
<tr>
<td><strong>Nitrogen Purity</strong></td>
<td>99%+</td>
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</table>

### Single-Stage Coalescing Filters

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tr>
<td>Efficiency at 0.01 Micron</td>
<td>99.99%</td>
</tr>
<tr>
<td><strong>Max Pressure</strong></td>
<td>250 PSIG</td>
</tr>
<tr>
<td><strong>Max Temperature</strong></td>
<td>130°F (54°C)</td>
</tr>
<tr>
<td><strong>Housing Material</strong></td>
<td>Anodized Aluminum</td>
</tr>
<tr>
<td><strong>Filter Type</strong></td>
<td>Replaceable Cartridge</td>
</tr>
</tbody>
</table>

Filter Materials:
Borosilicate glass microfibers with fluorocarbon resin binder. Resistant to water, all hydrocarbon and synthetic lubricants.

### Flowmeter

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>Hedland H671A-050 (Badger Meter)</td>
</tr>
<tr>
<td><strong>Scale</strong></td>
<td>Multi-pressure flow, SCFM</td>
</tr>
<tr>
<td><strong>Flow Range</strong></td>
<td>5 – 50 SCFM (depending on PSIG)</td>
</tr>
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</table>

### Regulator

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
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<tbody>
<tr>
<td><strong>Max Operating Pressure</strong></td>
<td>250 PSI</td>
</tr>
<tr>
<td><strong>Max Flow</strong></td>
<td>350 SCFM</td>
</tr>
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</table>

### Condensate Drain

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>Kaeser ECO-DRAIN 31</td>
</tr>
</tbody>
</table>
7.0 Warranty

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

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

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

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

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

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

Thank you for ordering from Terra Universal!