TERRA UNIVERSAL.COM
Critical Environment Solutions



Installation and Operating Guide *Document No. 1800-47*

Nitrogen Generator

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Installation and Operating Guide

Nitrogen Generator

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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 information on installing and operating your Terra Nitrogen Generator.

By studying this document carefully, you can be assured of a long, efficient service life from your system.

2.0 Description

Terra Universal's Nitrogen Generator is designed to provide reliable dry nitrogen without the expense and inconvenience associated with bottled systems. It uses efficient membrane separation technology to generate nitrogen from compressed air (see the chart below for typical system performance).

The system contains a gas pressure regulator and indicating gauge, a flowmeter, a 1-micron air-line coalescing prefilter, a 0.01-micron air-line coalescing filter, and the air separator membrane module. The prefilter removes all solids 1 micron and larger, along with water droplets and most oil aerosols. The coalescing filters remove solids 0.01 microns and larger and 99.999+% of oil aerosols, thereby protecting the membrane module from oil and other impurities in the incoming air-line and ensuring a long service life. Oil and moisture condensation from the prefilter and coalescing filters exits the system through a 1/4" slip-fit connector that can be directed to an in-house drain.



From left to right:
Cat. #2700-12B, #2700-11B, #2700-09B

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3.0 Set-Up and Operation

Before operation, carefully unpack and inspect the Nitrogen Generator. Any damage should be reported immediately to the shipping company.

WARNING

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

Connecting and Operating the System

1. With the pressure regulator (counter clockwise rotation) and flowmeter (clockwise rotation) completely closed, connect the Nitrogen Generator to an incoming compressed air line by means of the 3/8" (5/8" for Cat. #2700-09B) inlet slip fitting on the top panel. The compressed air fed into the Nitrogen Generator should be regulated externally between 100 and 200 psi (For maximum purity, choose the highest inlet pressure possible.)

2. Connect the nitrogen outlet by means of the other 3/8" (5/8" for Cat. No. #2700-09A) quick connect fittings on the top panel.

3. Open regulator (completely clockwise) and flowmeter (completely counterclockwise) to allow unrestricted flow at full line pressure. The outlet pressure will drop roughly 20-30% from the inlet pressure as the compressed air flows through the membrane. Flow and purity are determined by adjusting either the pressure regulator or flowmeter.

   If consistent outlet pressure is required, set the pressure regulator at the desired level and then adjust the flowmeter to achieve the desired flow at your selected pressure. The lower the outlet flow rate at any outlet pressure level, the higher the product purity. The higher the inlet pressure at any inlet flow rate, the higher the product purity.

NOTE

The light-up TUI logo serves as status indicator for inlet pressure. The LED emits a solid-color glow under normal conditions and flashes if it detects that the compressed air feed falls below the set-point (normally at 20 PSI). This light is 120VAC powered and included as a convenience.

Electricity is not required for the generator to extract nitrogen from compressed air.

Refer to flow tables on following pages for guidelines on typical purities achieved at varying pressures and temperatures. Conduct purity tests to determine the settings that meet your specifications.

Initial Calibration

The frequency at which to replace pre-filters will vary depending on your application and system set-up. To help determine the frequency for your system, check the pre-filter every three months until the color indicator on the pre-filter turns yellow, which signifies that it's time to replace it with a new pre-filter. Use the elapsed-time data from this procedure to set up a filter maintenance schedule that corresponds to your workflow. By doing this, the membrane filter will last indefinitely.

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4.0 Maintenance

The membrane module inside the Nitrogen Generator is designed to operate maintenance-free as long as the prefilter and coalescing filters effectively remove impurities (particularly oil vapor) from the feed air.

A slide indicator on these filters changes color (from green, to yellow, and then to red) when the filter element inside either unit needs to be replaced (see Figure 1). This indicator should be monitored monthly. Under continuous use at 100 PSI, filters will operate for approximately two years (20,000 hours).

Replacing Filter Elements

1. Open the front housing panel of the Nitrogen Generator to expose the filters (see Figure 1).

2. Rotate the self-locking bayonet head 1/8 turn counterclockwise to release it from the bowl (see Figure 2).

3. Pull the filter element to release it from the head. Remove the bottom filter element cap.

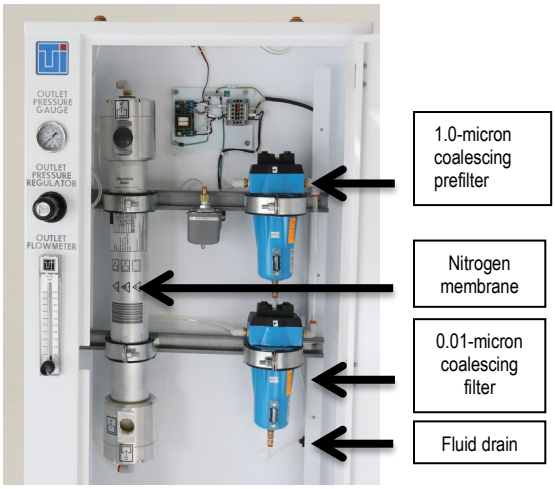


Figure 1: Filter Locations (Model shown: No. 2700-11B)

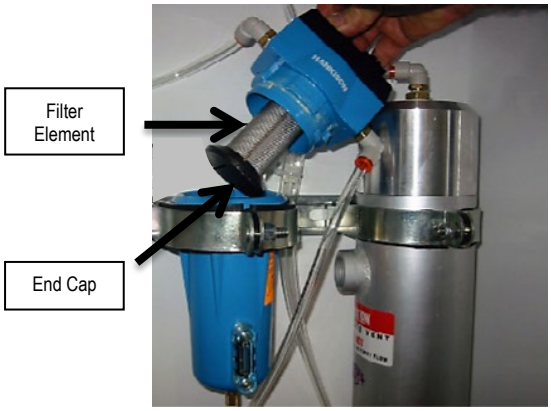


Figure 2: Removing Filter Head

4. Attach the bottom cap to the replacement filter element and push it into the filter head until it locks in place.

5. Rotate the filter head 1/8 turn clockwise to reattach it to the filter bowl. Close the front panel.

Replacement Filter Elements

	Cat. #
1-micron Prefilter	2700-15
0.01-micron Coalescing Filter	2700-16

Nitrogen Membrane

For Model 2700-09B	2700-36
For Model 2700-11B	2700-37
For Model 2700-12B	2700-38

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5.0 Specifications and Performance Data

2700-09B	24”W x 14”D x 68.25”H	157 lbs.	0 - 400 SCFH
2700-11B	24”W x 12”D x 49.25”H	96 lbs.	0 - 100 SCFH
2700-12B	20”W x 12”D x 35.25”H	58 lbs.	0 - 20 SCFH

* Includes polypropylene leveling feet; excludes other hardware.

Housing:	Powder-coated white CR steel cabinet with polyethylene leveling feet
Feed Air Pressure:	200 PSIG MAX
Feed Air Temperature:	40°F to 122°F
Nitrogen Outlet Flow:	See graphs on page 5.
Prefilter:	One-micron absolute filtration. Dual glass micro-fiber filter beds coalesce and remove water droplets. Remaining oil content: 1 ppm by weight. Includes slide indicator (to indicate need for filter change), liquid level indicator and internal drain. ISO 8573.1 Quality Class - Solids: Class 2, Oil Content: Class 4
Coalescing Filter:	Absolute filtration of 0.01µm particles; 99.999+% oil removal efficiency. Includes slide indicator (to indicate need for filter change), liquid level indicator and internal drain. ISO 8573.1 Quality Class - Solids: Class 1, Oil Content: Class 1
Membrane Module:	Semipermeable hollow fiber bundles.
Electrical:	Power not needed to generate nitrogen, but low-pressure indicator light requires 120VAC. User-supplied air compressor may require electricity.

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Nitrogen Flow Rate and Air Feed Required In SCFH

Operating conditions: 14.7 psi (1013 mbar) @ 20°C (68°F)

	Model #	2700-09B						2700-11B					2700-12B				
	Nitrogen Purity %	99.5	99	98	97	96	95	99	98	97	96	95	99	98	97	96	95
@ 58 psi	Nitrogen	82	128	221	304	385	466	47	79	108	137	170	5	10	14	18	22
	Air	692	809	950	1059	1151	1211	321	357	392	424	459	41	46	51	54	60
@ 73 psi	Nitrogen	120	189	325	449	569	689	59	99	136	171	213	7	12	17	22	28
	Air	1024	1194	1402	1568	1702	1790	403	449	487	530	576	51	57	63	68	75
@ 87 psi	Nitrogen	158	248	427	586	742	901	76	131	176	229	279	9	16	22	28	35
	Air	1338	1561	1833	2048	2225	2341	498	565	618	689	727	61	70	77	84	94
@ 102 psi	Nitrogen	185	291	501	689	872	1059	88	153	206	267	326	10	18	26	33	40
	Air	1575	1836	2158	2412	2617	2755	583	660	720	802	848	71	82	90	99	109
@ 116 psi	Nitrogen	222	350	600	826	1045	1271	101	175	235	305	374	12	21	29	37	46
	Air	1893	2204	2589	2892	3140	3305	664	752	823	915	968	82	93	103	113	125
@ 131 psi	Nitrogen	260	410	703	964	1222	1483	119	205	277	353	431	14	25	34	43	54
	Air	2207	2571	3019	3376	3673	3849	770	883	971	1059	1123	95	108	118	130	145
@ 145 psi	Nitrogen	297	466	802	1102	1395	1695	126	219	294	381	466	14	26	37	47	58
	Air	2521	2938	3450	3849	4202	4414	819	943	1028	1144	1211	102	117	129	141	156
@ 160 psi	Nitrogen	335	526	904	1240	1572	1907	142	246	334	431	526	15	29	41	52	65
	Air	2836	3305	3885	4334	4697	4944	978	1105	1204	1289	1420	122	136	150	162	174
@ 174 psi	Nitrogen	371	583	1003	1377	1745	2119	158	272	374	477	586	15	31	44	58	71
	Air	3154	3673	4308	4838	5227	5509	1088	1225	1349	1434	1586	127	147	164	178	193
@ 189 psi	Nitrogen	388	611	1052	1448	1833	2225	-	-	-	-	-	-	-	-	-	-
	Air	3309	3849	4520	5050	5509	5792	-	-	-	-	-	-	-	-	-	-

Notes:

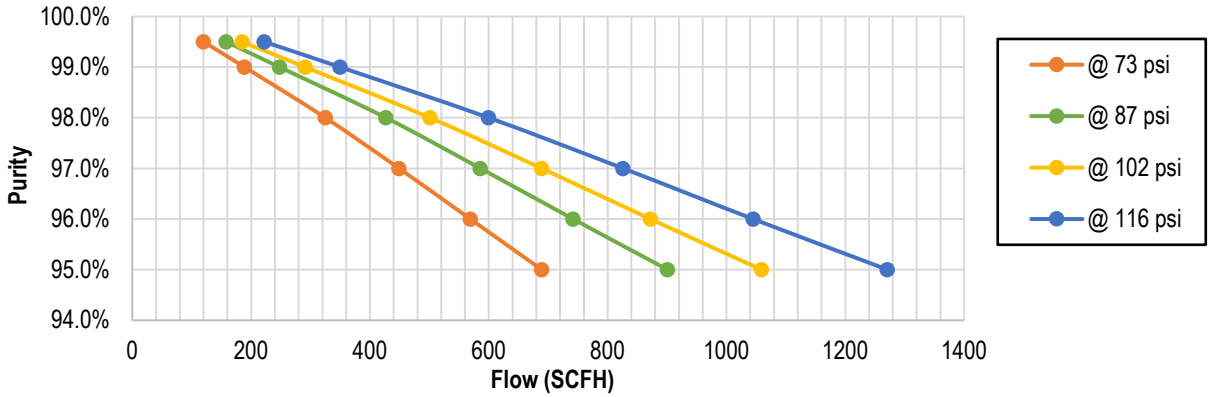
1. Terra's nitrogen generating membranes separate oxygen from pressurized air. The composition of the product is determined by measuring the residual oxygen content. The nitrogen content is calculated by subtracting the residual oxygen content from 100 %. Air is composed of nitrogen (78.1%), oxygen (20.9 %), Argon (0.9 %), CO2 (0.03 %), and some trace inert gases. Therefore it should be born in mind that the value that is normally called the nitrogen content actually is the inert gas content.

7.0 Operation with 3-5HP Oilless Air Compressors

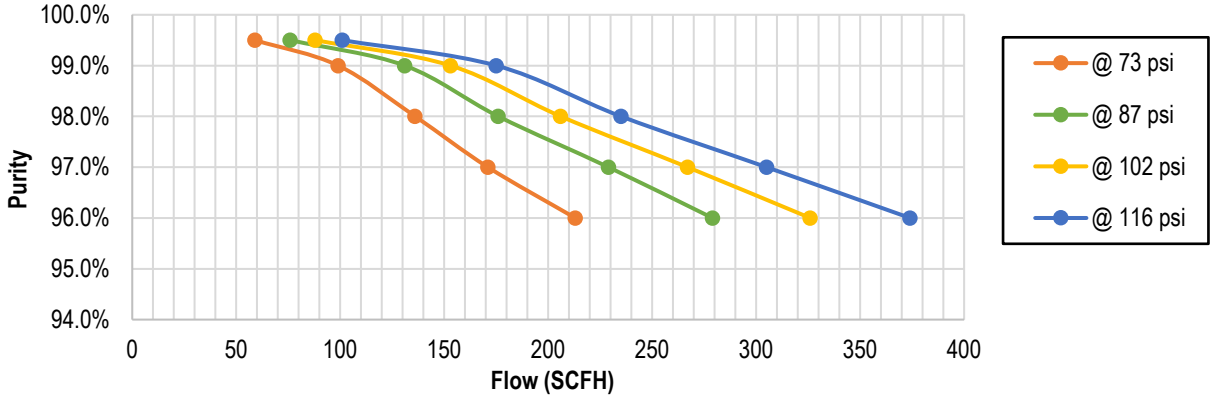
The efficiency of our nitrogen generators can be improved by installing an additional 30 gal. external tank to the 3HP air compressor units and an additional 60 gal. external tank to the 5HP units. The external tanks are mandatory in order to achieve the rated specs. Without an external tank, N2 generator will lose pressure much faster and reduce the nitrogen output. For instance, if the nitrogen generator is set to the minimum of 53 Psi output, the pressure will drop below 45 psi within 15-20 minutes of use and the compressor will not be able to keep up with the nitrogen generator output and will keep losing pressure.

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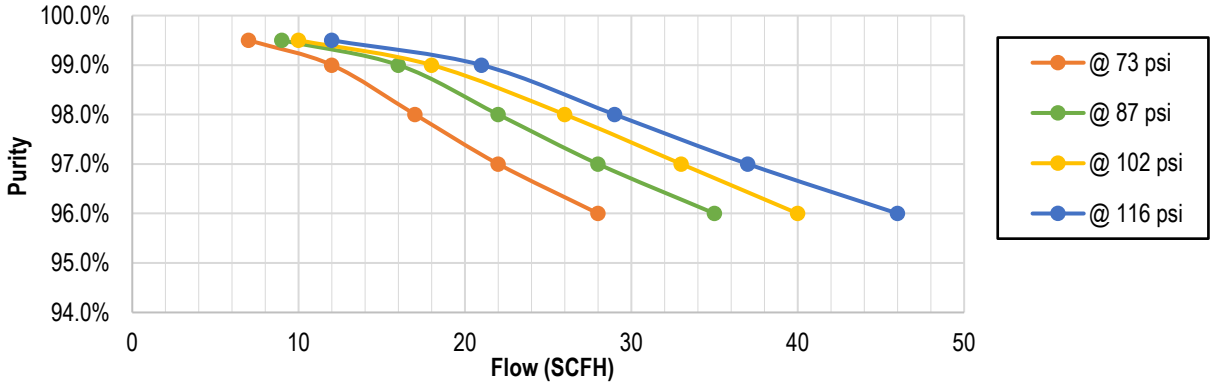
No. 2700-09B



No. 2700-11B



No. 2700-12B



Model	Dimensions*	Weight (uncrated)	Flowmeter Range

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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. This limited warranty covers parts and labor, but not transportation and insurance charges. Terra's sole responsibility is to repair or replace, at its option, any part of the product that proves defective or malfunctioning during this time limit. In some cases, components incorporated in Terra Universal products are covered by additional warranties from component manufacturers; obtain specific information from Terra sales representatives. Repairs may be completed by 3rd party service agents approved by Terra Universal. Terra Universal reserves the rights to limit this warranty based on a service agent's travel, working hours, the site's entry restrictions and unobstructed access to serviceable components of the product. This warranty is void if the equipment is abused or modified by the customer, is operated outside Terra's operating instructions or specifications, or is used in any application other than that for which it is specified. This warranty does not include routine maintenance or service procedures, shipping damage, nor damage from misuse, intentional or unintentional abuse, neglect, natural disasters, or acts of God.

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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!