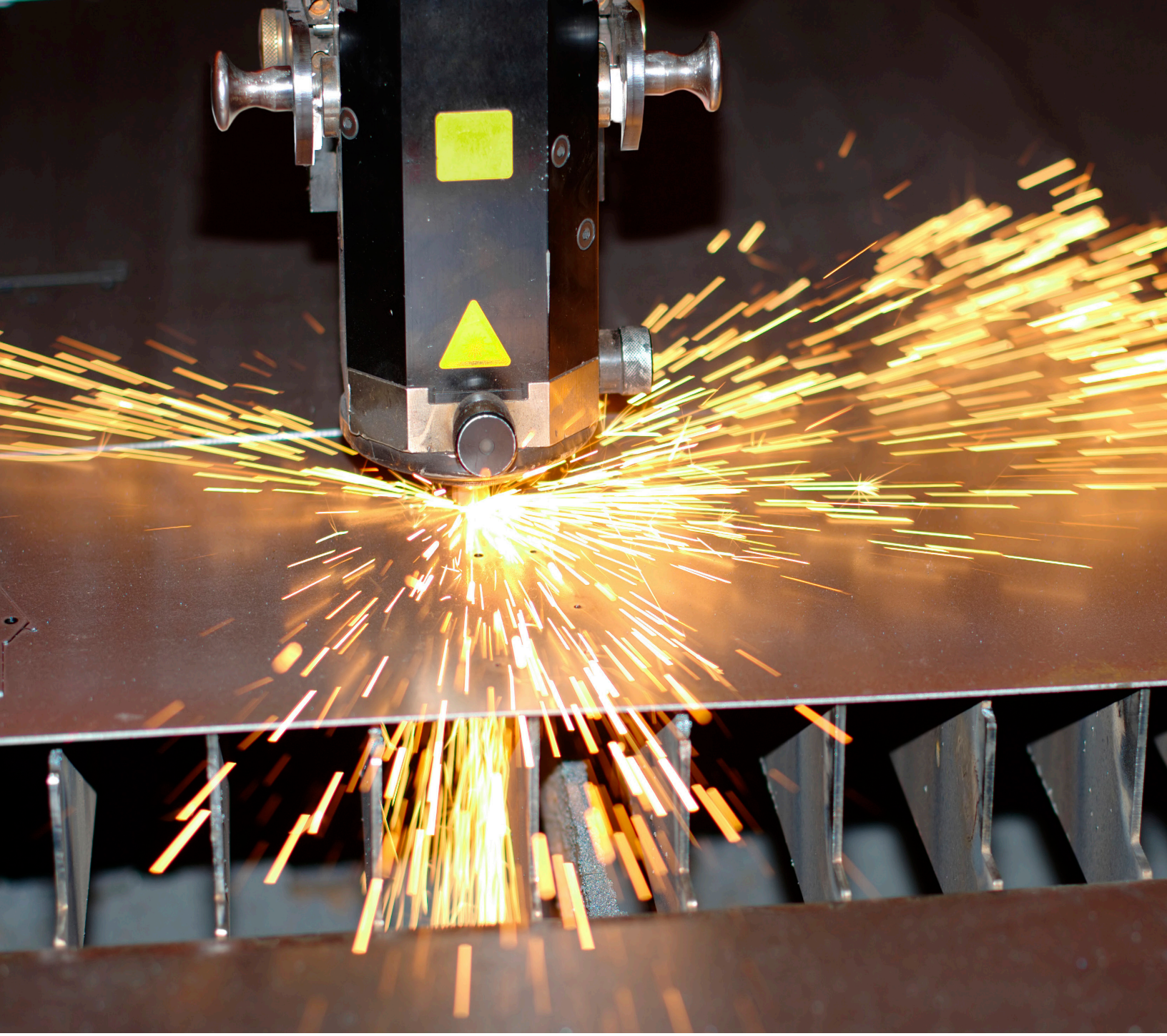

Nitrogen Generation Systems

Bulletin N2-R

Parker Balston

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Parker Hannifin Corporation

The Global Leader in Motion and Control Technologies

We engineer success of our customers around the world, drawing upon seven core motion and control technologies. These technologies enable virtually every machine and process to operate accurately, efficiently and dependably.

As the global leader in motion and control, we partner with our distributors to increase our customers' productivity and profitability by delivering an unmatchable breadth of engineered components and value-added services.

We continue to grow with our customers by creating application-focused products and system solutions. A key to our global expansion has been to follow our customers and establish operations, sales and service wherever they are needed. No single competitor matches Parker's global presence.

Corporate Headquarters in Cleveland, Ohio.

Parker's Motion and Control Technologies

Aerospace	Fluid Connectors
Automation	Hydraulics
Engineered Materials	Instrumentation
Filtration	

Legal Notifications

WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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Parker Balston

ENGINEERING YOUR SUCCESS.

The Benefits of Producing Nitrogen on Location

Nitrogen is commonly used in industry because it is dry and inert. Traditionally, nitrogen has been obtained through a delivered supply in the form of bulk liquid N2, dewars, and high pressure compressed gas cylinders. Relying on outside vendors can pose several challenges including long term purchase commitments, inflexible delivery schedules, uncontrollable vendor price increases, contract negotiations, tank rental fees, HAZMAT fees, and a long procurement process which could result in delays.

With regard to cylinders and dewars, the gas supply is interrupted when changeouts are necessary. It is common to run out of supply due to a late or missed delivery.

Product Features:

Membrane and PSA technologies available

Purities up to 99.999% (10ppm O2)

Lower cost...eliminates the need for expensive gas cylinders

Operate continuously with no unexpected shutdowns

Hassle-free, easy to install and operate

Compact, frees up valuable floor space

Safe and reliable

Provide stable long term N2 costs

Sustainable and good for the environment

Add extra work shifts without extra gas expense

Additionally, precautions must be taken when handling and storing high pressure compressed gas cylinders. A dangerous situation can be created if a cylinder is dropped and a valve is broken off, potentially causing the cylinder to become a projectile.

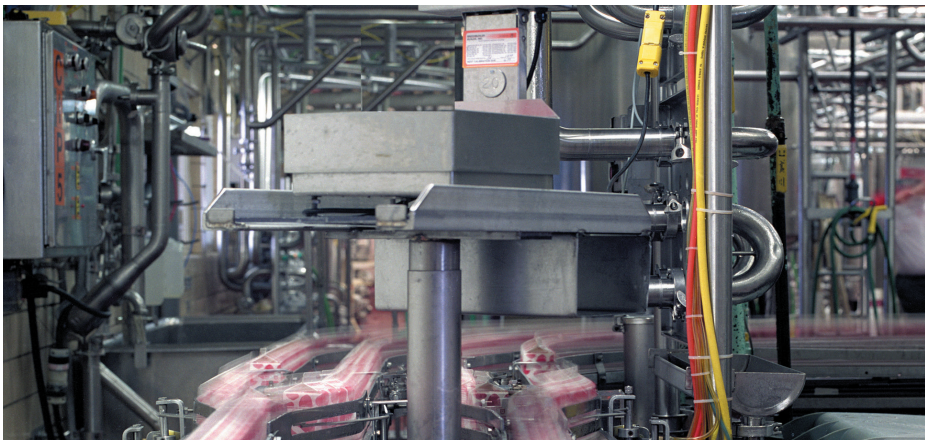
Parker Balston nitrogen generation systems continuously produce high purity nitrogen from compressed air and eliminate the inconvenience of a delivered nitrogen supply. A continuous supply of consistent purity is available within minutes of startup.

Installation is simple: pipe in compressed air and pipe out nitrogen. Just connect a standard compressed air line to the inlet of the generator, connect the outlet to your nitrogen line and the unit is ready for trouble free operation. The system is designed to operate 24 hours/day, 7 days/week.

Parker Balston nitrogen generators are free standing, housed in an attractive cabinet or skid mounted, depending on the application. Standard features include high efficiency coalescing prefilters with automatic drains, activated carbon adsorption (when required), nitrogen storage tank and a 0.01 micron final membrane filter.

Nitrogen generation in house and on demand is good for the environment and represents a sustainable approach to the supply of nitrogen. Gas industry sources indicate that an air separation plant uses 1976 kJ of electricity per kilogram of nitrogen at 99.9%. Generation of 99.9% nitrogen in house using a PSA system is 1420 kJ. That means up to 28% fewer greenhouse gases are created by the generation of electricity with a typical nitrogen generator. At a purity of 98%, the energy required for in house nitrogen drops to 796 kJ/kg. That means that in house generation creates 62% fewer greenhouse gases from electrical power at that purity. Request our white paper entitled "A Sustainable Approach to the Supply of Nitrogen" for a more complete discussion.

An oxygen monitor to measure the oxygen concentration of the nitrogen stream is available as an option (standard on Models DB-30, DB-40, DB-50, and DB-80). Parker offers a range of oxygen monitors to meet your application. See Page 15 for details.



Market Focus: Food and Beverage

Modified Atmosphere Packaging

The benefits of using nitrogen for packaging in the food & beverage industry are well known. Residual oxygen within a package promotes bacterial growth and oxidation, which can compromise product quality and shelf life. Using nitrogen minimizes the levels of oxygen present, preserving quality and significantly improving shelf life. A nitrogen generator, which separates nitrogen and oxygen from a compressed air supply, can often be the most effective way to supply this nitrogen.

The final stage sterile air filter is USDA/FSIS accepted for use in federally inspected meat and poultry plants and is in full compliance with FDA and GFSI requirements.

Wine Bottling

A nitrogen blanket, reducing the oxygen concentration to less than 0.5%, minimizes contact between oxygen and the wine surface during storage (both pre and post bottling). This will prevent the growth of bacteria and other microbes. Nitrogen can also be used to purge air from pipes and hoses prior to bottling and to ensure oxygen is not introduced during transport. Finally, sparging with nitrogen will remove any oxygen or CO2 introduced during handling helping to preserve wine integrity. A Parker nitrogen generator supplies a continuous stream of nitrogen to displace residual oxygen and fill the voids within the package, preserving taste and freshness and extending shelf life.

Other Applications

Coffee Packaging
Meat Packaging
Lettuce Packaging

Market Focus: Chemical Processing

Chemical Blanketing

Many industries use a wide variety of dangerous chemicals in the manufacture of products. Blanketing with an inert gas, such as nitrogen, is often used to ensure the chemical integrity and maximize safety. Nitrogen tank blanketing controls the oxygen concentration and humidity within the vessel, protecting the product from contamination, degradation, and chemical change. The reduced oxygen level minimizes the chance of explosion. A nitrogen blanket can also be used to balance tank volumes and prevent collapse during unloading.

Isocyanate Blanketing

Isocyanates are highly reactive acids that change physical properties when combined with oxygen and moisture, and are potential explosion hazards in the presence of oxygen. Minimizing the concentration of oxygen (below 5%) and water vapor in the void volume can eliminate these issues. A Parker nitrogen generator supplies a continuous stream of dry (-58° dewpoint) nitrogen, creating an inert headspace that ensures chemical integrity and decreases the fire hazard.

Other Applications

Edible Oils

De-ionized Water

High Pressure for Pipeline Services

Market Focus: Metal Processing

The use of nitrogen is widespread in the metal processing industry, including much of the support equipment such as lasers. Using nitrogen to minimize the contact with oxygen improves final product quality and minimizes rework.

Aluminum Extrusion

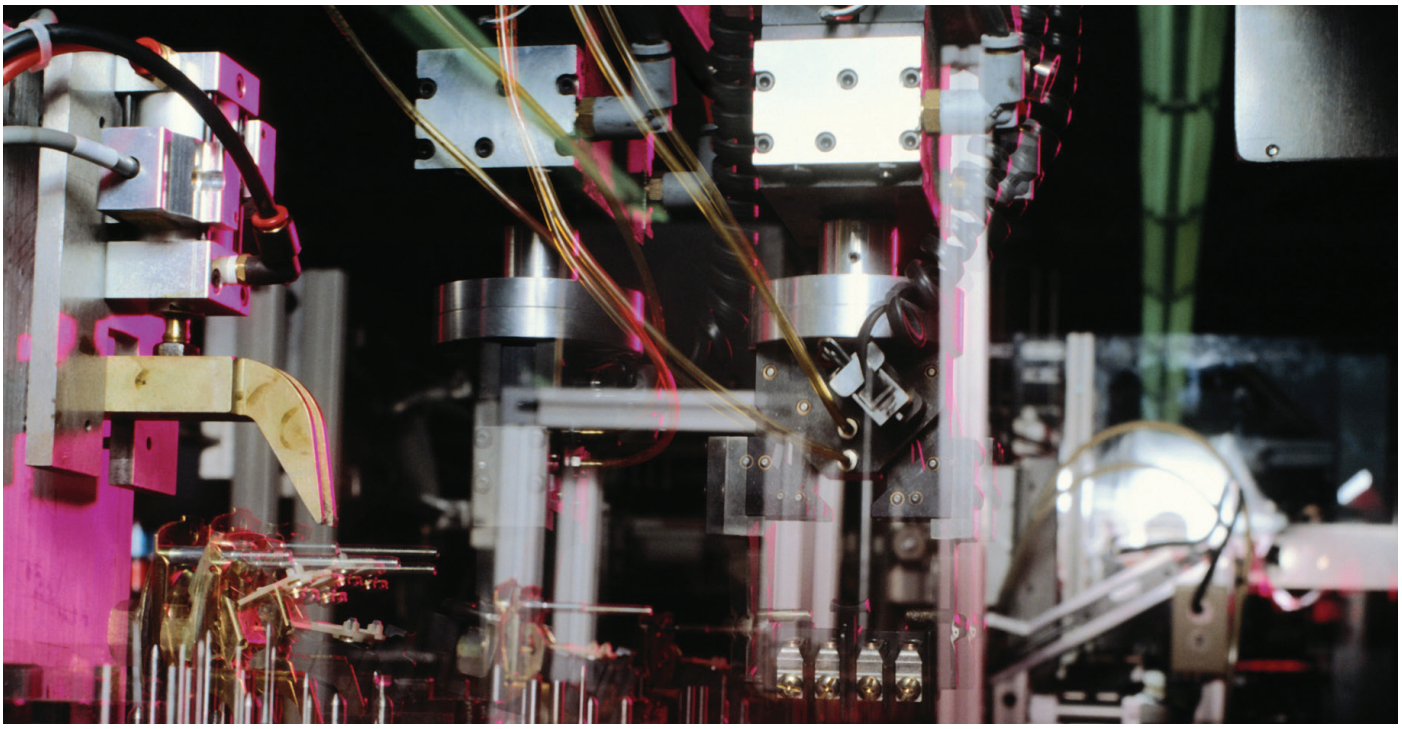
High temperatures often cause aluminum oxide to form on the surface of the dies, causing imperfections in the newly formed piece. This damage can cause increased tooling costs, higher maintenance costs and requirements, extended downtime and lost productivity. This damage can also leave the final part useless, due to weakness within the material or non-compliance to the original design specification. Using nitrogen to degas the aluminum during the extrusion process removes oxygen and assists die cooling, which improves consistency, yields less scrap, and produces high quality finished products. A Parker nitrogen generator is often the most cost efficient way to supply this continuous stream of nitrogen.

Other Applications

Aluminum Degassing

Laser Cutting

Selective Laser Sintering



Market Focus: Power Generation

Nitrogen is used throughout the energy cycle from production in oil and gas wells to transmission at power plant. The severe combustibility of the product often makes it a requirement, from gas lift in the production well to blanketing the seals on a natural gas compressor during electrical generation. The remoteness of many of these locations, coupled with the volumes required, typically make a nitrogen generator a great fit.

Boiler Layup

Boiler cycling (i.e. startup and shutdown) is more common in today's challenging business environment, primarily due to instability of natural gas prices and volatile energy demand. Proper layup of the Heat Recovery Steam Generator (HRSG) is critical. Problems associated with improper boiler layup include corrosion and pitting on both the gas & water sides of the HRSG, maintenance issues, startup delays and water chemistry delays. Nitrogen is an essential tool in helping to alleviate these issues and has become the preferred technology since it doesn't introduce foreign chemicals to the boiler. A Parker nitrogen generator improves operating costs, eliminates corrosion and pitting and ensures a quick, trouble free startup.

Other Applications

Blanket Boiler Feedwater

Transformer Blanketing

Membrane Nitrogen Generators

How Membrane Technology Works

Parker Balston nitrogen generators utilize proprietary membrane separation technology. The membrane separates compressed air into two streams: one is 95-99% pure nitrogen and the other is air enriched with oxygen, carbon dioxide, water and other gases.

The generator separates air into component gases by passing inexpensive compressed air through semi permeable membranes, consisting of bundles of individual hollow fibers. Each fiber has a perfectly circular cross section and a uniform bore through its center. Because the fibers are so small, a great many can be packed into a limited space, providing an extremely large membrane surface area that can produce a relatively high volume product stream.

Compressed air is introduced into the center of the fibers at one end of the module and contacts the membrane as it flows through the fiber bores. Oxygen, water vapor and other trace gases easily permeate the membrane fiber and are discharged through a permeate port while the nitrogen is contained within the membrane and flows through the outlet port. Since water vapor permeates through the membrane as well, the nitrogen gas stream is very dry, with dewpoints as low as -58°F/50°C.

Models HFX-7 through HFX-11

Product Features

Complete package with prefilters, carbon filter, and membrane filter

No electrical line required, safe for all Class 1 environments.

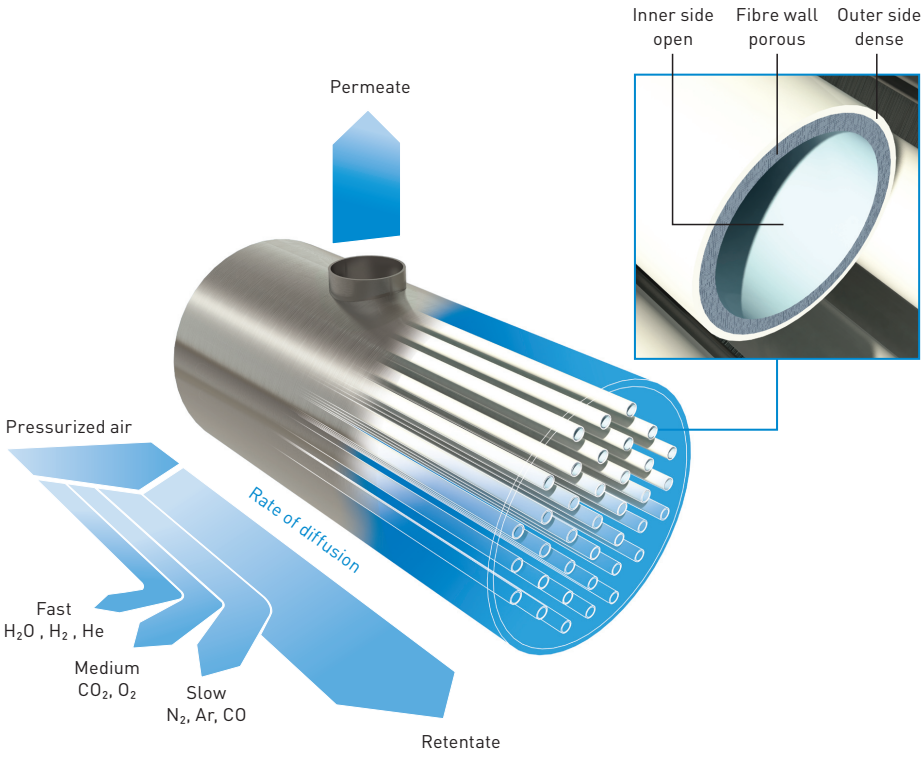
Produce 95 - 99% pure, commercially sterile nitrogen from a compressed air supply

Dewpoints to -58°F (-50°C)

All models include a 0.01 micron membrane filter

Models available with oxygen monitors

Final stage sterile filter is USDA accepted for use in federally inspected meat and poultry plants, in full compliance with FDA and GFSI requirements



Gas Separation Membrane

Membrane Nitrogen Generators

HFX Series

Flow Rates SCFH (Nm^3/hr) **@ 100 psig (7 barg) @ 68°F (20°C)***

Model	95	96	97	98	99
HFX-1	**40** (1.1)	**33** (0.9)	**26** (0.7)	**16** (0.5)	**11** (0.3)
HFX-3	**148** (4.2)	**120** (3.4)	**95** (2.7)	**70** (2.0)	**42** (1.2)
HFX-5	**279** (7.9)	**229** (6.5)	**176** (5.0)	**131** (3.7)	**76** (2.2)
HFX-7	**452** (13)	**360** (10)	**283** (8.0)	**209** (5.9)	**120** (3.4)
HFX-9	**752** (21)	**600** (17)	**452** (13)	**330** (9.3)	**201** (5.7)
HFX-11	**1201** (34)	**992** (28)	**780** (22)	**572** (16)	**248** (7.0)

Flow Correction Factors at Indicated Operating Pressure (PSIG)

58	73	87	101	116	130	145
.52	.65	.86	1	1.15	1.35	1.44
.54	.68	.85	1	1.14	1.3	1.43
.52	.65	.85	1	1.14	1.34	1.43
.53	.66	.86	1	1.14	1.32	1.43
.44	.65	.85	1	1.1	1.3	1.4
.44	.65	.85	1	1.2	1.4	1.6

* At 100 psig. Nitrogen generator purity is pressure, temperature, and flow dependent. Higher flow and purities can be accomplished at higher pressures.

Principal Specifications - HFX Series

Model Number	HFX-1	HFX-3, HFX0-3	HFX-5, HFX0-5	HFX-7, HFX0-7, HFX-9, HFX0-9, HFX-11, HFX0-11
Min/Max Operating Press.	60 psig/145 psig (4 barg/10 barg)[1]	60 psig/145 psig (4 barg/10 barg)[1]	60 psig/145 psig (4 barg/10 barg)[1]	60 psig/145 psig (4 barg/10 barg)[1]
Air Quality	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants
Max. Press. Drop (at 95% N_2, 125 psig)	10 psig (0.7 barg)	10 psig (0.7 barg)	10 psig (0.7 barg)	HFX-7. HFX0-7: 10 psig (0.7 barg) HFX-9, HFX0-9: 15 psig (1.03 barg) HFX-11, HFX0-11: 20 psig (1.4 barg)
Recommended Inlet/Ambient Operating Temperature	77°F (25°C)	77°F (25°C)	77°F (25°C)	77°F (25°C)
Temperature Range	40°F/110°F (4°C/43°C)	40°F/122°F (4°C/50°C)	40°F/122°F (4°C/50°C)	40°F/122°F (4°C/50°C)
Electrical Requirements	None[2]	None[2]	None[2]	None[2]
Inlet/Outlet Port Sizes	1/4" NPT	1/4" NPT	1/4" NPT	1/4" NPT
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Final Filtration Efficiency	99.9999+% at 0.01µm	99.9999+% at 0.01µm	99.9999+% at 0.01µm	99.9999+% at 0.01µm
Dimensions	12.8"w x 7.5"d x 16.3"h (32cm x 19.1cm x 41cm)	16"w x 16"d x 50"h (41cm x 25cm x 91cm)	16"w x 16"d x 50"h (41cm x 25cm x 91cm)	24"w x 20"d x 69"h (61cm x 51cm x 175cm)
Shipping Wt.	38 lbs (17.3 kg)	127 lbs (58 kg)	138 lbs (63 kg)	250 lbs (114 kg)

Notes:
1 Maximum operating pressure in Europe is 8 barg. 2 No electrical power required unless used with an oxygen analyzer @ 120VAC / 60Hz / 30 Watts.

Ordering Information - HFX Series

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Model	Maintenance Kit	Maintenance Kit w/02 Monitor	Maintenance Kit Components				
			Replacement Filter Cartridges 1st stage	Replacement Filter Cartridges 2nd stage	Replacement Filter Cartridges 3rd stage	Final Membrane Filter	Activated Carbon Filter
HFX-1	MK75005	N/A	100-12-DX	100-12-BX	---	9933-05-95	7700-L321
HFX-3, HFX0-3 (w/02 monitor)	MK7579C	MK75790C	100-12-DX	100-12-BX	---	GS-100-12-95	75620
HFX-5, HFX0-5 (w/02 monitor)	MK7579C	MK75790C	100-12-DX	100-12-BX	---	GS-100-12-95	75620
HFX-7, HFX0-7 (w/02 monitor)	MK7576	MK76760	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303
HFX-9, HFX0-9 (w/02 monitor)	MKHFX9	MKHFX09	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303
HFX-11, HFX0-11 (w/02 monitor)	MKHFX11	MKHFX011	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303

PSA Nitrogen Generators - Monobed

How PSA Technology Works

Balston Monobed Nitrogen Generators produce up to 99.99% pure, compressed nitrogen at dewpoints to -58°F (-50°C) from nearly any compressed air supply. The generators are designed to continually transform standard compressed air into nitrogen at safe, regulated pressures without operator attention.

Balston PSA Nitrogen Generators utilize a combination of filtration and pressure swing adsorption technologies. High efficiency prefiltration pretreats the compressed air to remove all contaminants down to 0.1 micron. Air entering the generator consists of 21% oxygen and 78% nitrogen. The gas separation process preferentially adsorbs oxygen over nitrogen using carbon molecular sieve (CMS). At high pressures the CMS has a greater affinity for oxygen, carbon dioxide, and water vapor than it does at low pressures. By raising and lowering the pressure within the CMS bed, all contaminants are captured and released, leaving the CMS unchanged. This process allows the nitrogen to pass through as a product gas at pressure. The depressurization phase of the CMS releases the absorbed oxygen and other contaminant gases to the atmosphere.

Product Features

Monobed design

Complete package with prefitration, and receiving tank

Safe and reliable

Produce 95 - 99.99% pure nitrogen

Dewpoints to -58°F (-50°C)

Final stage sterile filter is USDA accepted for use in federally inspected meat and poultry plants, in full compliance with FDA and GFSI requirements

PSA towers require no maintenance

Nitrogen Purity Flow Chart - Monobed Nitrogen Generators
Flow Rate, SCFH (Nm^3/hr)*

Purity (% N2)	MB-1	MB-3	MB-5
99.99	**37** (1.1)	**74** (2.1)	**112** (3.2)
99.95	**56** (1.6)	**110** (3.1)	**165** (4.7)
99.9	**76** (2.2)	**152** (4.3)	**228** (6.5)
99.5	**99** (2.8)	**197** (5.6)	**296** (8.4)
99	**109** (3.1)	**218** (6.2)	**327** (9.3)
98	**135** (3.8)	**270** (7.6)	**405** (11.5)
97	**154** (4.4)	**309** (8.7)	**463** (13.1)
96	**174** (4.9)	**349** (9.9)	**523** (14.8)
95	**194** (5.5)	**388** (11.0)	**583** (16.5)

* At 110 psig. Nitrogen generator purity is pressure, temperature, and flow dependent. Higher flow and purities can be accomplished at higher pressures.

PSA Nitrogen Generators

Monobed Nitrogen Generators

Principal Specifications

Model Number	MB-1	MB-3	MB-5
Recommended Inlet Pressure	110 psig (7.6 barg)	110 psig (7.6 barg)	110 psig (7.6 barg)
Min/Max Inlet Pressure	80/140 psig (5.5/9.7 barg) →		
Air Quality	Clean air without contaminants →		
Outlet Pressure at Corresponding Purity (Based on nominal conditions & standard 60 gallon, 110 psig (7.6 barg) N2 tank)	80 psig @ 99.99 - 95% 75 psig @ 95.0%	80 psig @ 99.99 - 96.0% 75 psig @ 95.0%	80 psig @ 99.99-99.5% 70 psig @ 99.0-95.0%
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Electrical Requirements	120VAC/60 Hz., 180W	120VAC/60 Hz., 180W	120VAC/60 Hz., 180W
Inlet/Outlet Port Size	1/2" NPT (female)	1/2" NPT (female)	1/2" NPT (female)
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes
Final Filtration Efficiency	99.9999+% at 0.01µm	99.9999+% at 0.01µm	9.9999+% at 0.01µm
Generator Cabinet Dimensions	29"W x 27"D x 77"H (74cm x 69cm x 196cm) →		
N2 Tank Size	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)
N2 Storage Tank Dimensions	24"D x 53"H (61cm x 135cm)	24"D x 53"H (61cm x 135cm)	24"D x 53"H (61cm x 135cm)
Shipping Weight	724 lbs. (328 kg)	766 lbs. (347 kg)	835 lbs. (379 kg)

Ordering Information

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Model	MB-1	MB-3	MB-5	Maintenance Kits*
Balston Monobed without Oxygen Analyzer	MB-1	MB-3	MB-5	MKMB1
Balston Monobed with the standard Oxygen Analyzer	MBO-1	MBO-3	MBO-5	MKMBO1
Balston Monobed with Advanced Instruments % Oxygen Analyzer	MBOC-1	MBOC-3	MBOC-5	MKMBOC1
Balston Monobed with Advanced Instruments Trace Oxygen Analyzer	MBOD-1	MBOD-3	MBOD-5	MKMBOD1

* Each kit contains two replacement prefilter and two final filter elements. Valve maintenance components are also included. Where needed, a replacement oxygen sensor is also included.
* Stand-by available on MB and MBO models. Add suffix -SB to model number.

PSA Nitrogen Generators - Dual Bed

Dual Bed Nitrogen Generation Systems

Product Features

Fully enclosed (steel) with casters

High efficiency coalescing and sterile air filters

Oxygen analyzer available

PLC controls

High oxygen alarms and dry contacts available

Stand by mode[1]

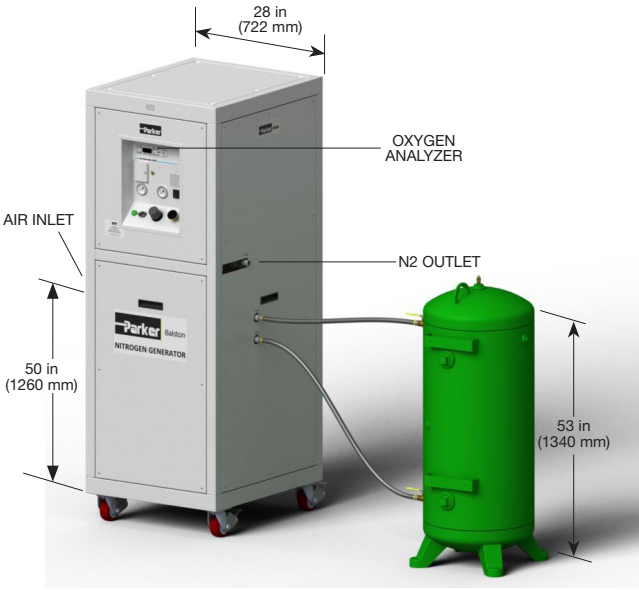
Purity easily adjusted between 95%-99.999% with flow control valve

Outlet pressure regulator

Vertical nitrogen storage tank

Energy efficient compared to delivered nitrogen

Final stage sterile filter is USDA accepted for use in federally inspected meat and poultry plants in full compliance with FDA and GFSI requirements. The filter achieves 6 log reduction of bacteria and microorganisms and 99.9999+ % contaminant removal



Models DB5 through DB-20

Nitrogen Flow SCFH (Nm^3/hr)[2]

% Nitrogen	DB-5	DB-10	DB-15	DB-20
99.999	**94** (2.6)	**189** (5.4)	**283** (8.0)	**377** (10.7)
99.995	**150** (4.2)	**300** (8.5)	**450** (12.7)	**600** (17.0)
99.99	**194** (5.5)	**388** (11.0)	**583** (16.5)	**777** (22.0)
99.95	**314** (8.9)	**629** (17.8)	**943** (26.7)	**1258** (35.6)
99.9	**365** (10.3)	**730** (20.7)	**1095** (31.0)	**1460** (41.3)
99.5	**512** (14.5)	**1024** (29.0)	**1536** (43.5)	**2048** (58.0)
99	**618** (17.5)	**1200** (34.0)	**1853** (52.5)	**2470** (70.0)
98	**770** (21.8)	**1541** (43.6) [3]	**2311** (65.4)	**3081** (87.2)
97	**892** (25.3)	**1783** (50.5) [3]	**2675** (75.75)	**3566** (101.0)
96	**983** (27.8)	**1966** (55.7) [3]	**2949** (83.5)	**3931** (111.3)
95	**1065** (30.2)	**2130** (60.3) [3]	**3195** (90.5)	**4260** (120.6)

Notes

1 Stand-by mode is not recommended for purities 99.995-99.999%

2 At 110 psig. Nitrogen generator purity is pressure, temperature, and flow dependent. Higher flow and purities can be accomplished at higher pressures.

3 DB-10EC Models only. For DB-10 Models consult the factory.

Expansion System Options

As standard products, our DB-5 and DB-15 models (including those with an Oxygen Analyzer) can be expanded to the flow capacity of a DB-10 and DB-20, respectively. The DB-5 and DB-10 Models can be incorporated into the cabinet of a DB-20 so that they can be expanded to the flow capacity of a DB-20. To get the larger cabinet, order either the DB-5-EC or the DB-10-EC for future expansion to a DB-20. The expansion is integrated into the cabinet so no extra floor space is needed. Expansion Kit P/N EXP-DB-01.

Expansion Capabilities

DB-5	DB-10	DB-15	DB-20
DB-5 →		-	-
-	DB-10	-	-
-	-	DB-15 →	
DB-5-EC →			
-	DB-10-EC →		

PSA Nitrogen Generators

Dual Bed Nitrogen Generation Systems

Principal Specifications - Models DB5, DB-10, DB-15, DB-20

Model Number	DB-5	DB-10	DB-15	DB-20
Recommended Inlet Pressure	110 psig (7.58 barg)	110 psig (7.58 barg)	110 psig (7.58 barg)	110 psig (7.58 barg)
Min/Max Inlet Pressure	80/140 psig (5.5/9.7 barg) →			
Air Quality	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants
Pressure Drop	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Electrical Requirements	120 VAC / 60Hz., 180 W	120 VAC / 60Hz.,180W	120 VAC / 60Hz., 180W	120 VAC / 60Hz., 180W
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Final Filtration Efficiency	99.99999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um
Generator Cabinet Dimensions	28.5"L x 34"D x 78"H 72 cm x 86 cm x 198 cm	28.5"L x 34"D x 78"H 72 cm x 131 cm x 198 cm	28.5"L x 51.5"D x 78"H 72 cm x 131 cm x 198 cm	28.5"L x 51.5"D x 78"H 72 cm x 86 cm x 198 cm
Inlet / Outlet Port Size	1/2" NPT / 1/2" NPT	1/2" NPT / 1/2" NPT	1" NPT / 3/4" NPT	1" NPT / 3/4" NPT
N2 Storage Tank Size	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)
N2 Storage Tank Dimensions	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm
Shipping Weight	1076 lbs (488 kg)	1076 lbs (488 kg)	1076 lbs (488 kg)	1076 lbs (488 kg)

Ordering Information - Models DB5, DB-10, DB-15, DB-20

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM EST

DB N2 Generator without O2 Analyzer	DB-5	DB-10	DB-15	DB-20
DB N2 Generator with Std O2 Analyzer	DBO-5	DBO-10	DBO-15	DBO-20
DB N2 Generator with Advanced O2 Analyzer	DBOC-5	DBOC-10	DBOC-15	DBOC-20
DB N2 Generator with Trace O2 Analyzer	DBOD-5	DBOD-10	DBOD-15	DBOD-20

Maintenance Kits - Models DB5, DB-10, DB-15, DB-20[4]

DB N2 Generator without O2 Analyzer	MKDB5	MKDB5	MKDB15SS1	MKDB15SS1
DB N2 Generator with Std O2 Analyzer	MKDBO5	MKDBO5	MKDBO15SS1	MKDBO15SS1
DB N2 Generator with Advanced O2 Analyzer	MKDBOC5	MKDBOC5	MKDBOC15SS1	MKDBOC15SS1
DB N2 Generator with Trace O2 Analyzer	MKDBOD5	MKDBOD5	MKDBOD15SS1	MKDBOD15SS1

4 Each kit contains two replacement prefilter and two final filter elements. Also included are valve maintenance components. Where needed, a replacement oxygen sensor is also included.

Product Features and Benefits

Save up to 90% of your gas costs by eliminating expensive gas cylinders, dewars and bulk nitrogen

Typical payback 6-12 months

Eliminate dangerous and problematic nitrogen cylinder transport, storage and change-out issues

Easy to install, operate, and maintain

Long term price stability

Complete control of entire flow & purity range

No costly service visits or new equipment if your process specifications change

Compact – frees up valuable floor space

Proven technology with numerous references available

Parker is the market leader with over 50,000 successful generator installations

PSA Nitrogen Generators - Twin Tower

Twin Tower Nitrogen Generators

Principal Specifications

	DB-30	DB-40	DB-50	DB-80
Recommended Inlet Pressure	110 psig (7.6 bar)	110 psig (7.6 bar)	110 psig (7.6 bar)	110 psig (7.6 bar)
Min/Max Inlet Pressure	80/140 psig (5.5/9.7 barg)	80/140 psig (5.5/9.7 barg)	80/140 psig (5.5/9.7 barg)	80/140 psig (5.5/9.7 barg)
Air Quality	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants
Pressure Drop	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Electrical Requirements	120VAC/60 Hz. 300W	120VAC/60 Hz. 300W	120VAC/60 Hz. 300W	120VAC/60 Hz. 300W
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Final Filtration Efficiency	99.9999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um
Inlet Port Size	1.5" NPT Female	2" NPT Female	2" NPT Female	2" NPT Female
Outlet Port Size	1" NPT Female	1.5" NPT Female	1.5" NPT Female	1.5" NPT Female
Generator Skid Dimensions	64"W x 64"D x 96"H (163cm x 163cm x 244cm)	64"W x 64"D x 96"H (163cm x 163cm x 244cm)	64"W x 64"D x 103"H (163cm x 163cm x 244cm)	64"W x 64"D x 127"H (163cm x 163cm x 244cm)
N2 Storage Tank Size	240 Gal. (908 L)	240 Gal. (908 L)	400 Gal. (1514 L)	660 Gal. (2498 L)
N2 Storage Tank Dimensions	30"D x 92"H (76 cm x 234 cm)	30"D x 92"H (76 cm x 234 cm)	36"D x 101 "H (91 cm x 257 cm)	42"D x 125"H (107 cm x 318 cm)
Shipping Weight	3718 lbs (1686 kg)	4018 lbs (1823 kg)	4635 lbs (2102 kg)	5780 lbs (2622 kg)

Ordering Information - Models DB30, DB-40, DB-50, DB-80[1]

For assistance, call 1-800-343-4048 8AM to 5PM EST

DB N2 Generator with Std O2 Analyzer	DB-30	DB-40	DB-50	DB-80
DB N2 Generator with Advanced O2 Analyzer	DBOC-30	DBOC-40	DBOC-50	DBOC-80
DB N2 Generator with Trace O2 Analyzer	DBOD-30	DBOD-40	DBOD-50	DBOD-80

Maintenance Kits - Models DB30, DB-40, DB-50, DB-80[2]

DN N2 Generator with Std O2 Analyzer	MKDB30-SS1	MKDB40-SS1	MKDB50-SS1	MKDB80-SS1
DB N2 Generator with Advanced O2 Analyzer	MKDBOC30-SS1	MKDBOC40-SS1	MKDBOC50-SS1	MKDBOC80-SS1
DB N2 Generator with Trace O2 Analyzer	MKDBOD30-SS1	MKDBOD40-SS1	MKDBOD50-SS1	MKDBOD80-SS1

Nitrogen Flow SCFH (Nm^3/Hr)[3]

% Nitrogen	DB-30	DB-40	DB-50	DB-80
99.999	**552** (14.5)	**656** (17.2)	**864** (22.7)	**1381** (36.3)
99.995	**715** (18.8)	**847** (22.3)	**1115** (29.3)	**1783** (46.9)
99.99	**1010** (26.6)	**1198** (31.5)	**1578** (41.5)	**2525** (66.4)
99.95	**1365** (35.9)	**1622** (42.6)	**2135** (56.1)	**3417** (89.8)
99.9	**1530** (40.2)	**1812** (47.6)	**2390** (62.8)	**3818** (100.4)
99.5	**2178** (57.3)	**2585** (68.0)	**3402** (89.4)	**5445** (143.1)
99	**2270** (59.7)	**2690** (70.7)	**3545** (93.2)	**5670** (149.1)
98	**2950** (77.5)	**3505** (92.1)	**4615** (121.3)	**7385** (194.1)
97	**3190** (83.9)	**3780** (99.4)	**4980** (130.9)	**7960** (209.3)
96	**3945** (103.7)	**4680** (123.0)	**6157** (161.9)	**9845** (258.8)
95	**4320** (113.6)	**5140** (135.10)	**6765** (177.8)	**10815** (284.3)

Notes

1 For CRN/CSA use suffix "-CRN" on these models.

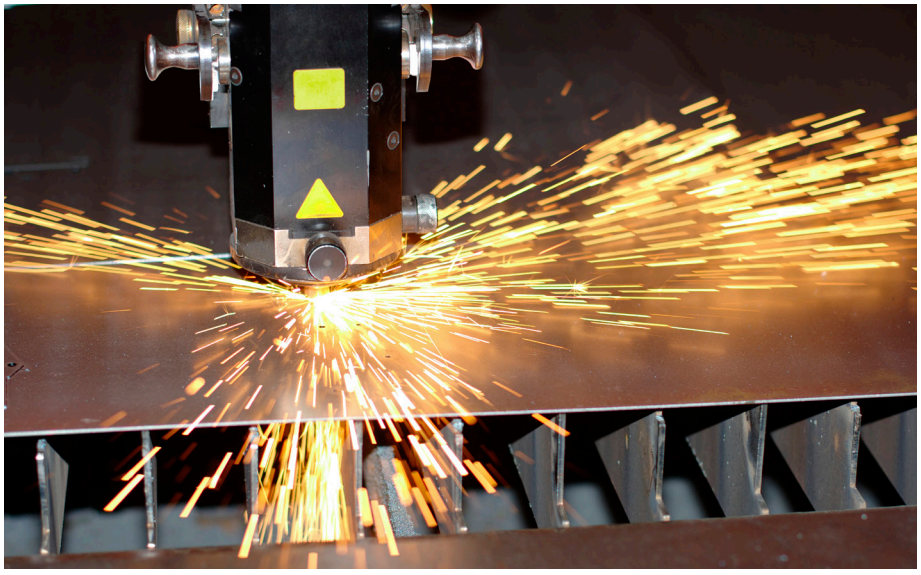
2 Each kit contains two replacement prefilter and two final filter elements. Valve maintenance components are also included. Where needed, a replacement oxygen sensor is also included.

3 At 110 psig nitrogen purity is pressure, temperature and flow dependent. Higher flow and purities can be achieved at higher pressures.

PSA Nitrogen Generators

Nitrogen for Laser Cutting

A large expense in owning an industrial laser cutting system is nitrogen gas. As lasers become more and more powerful and efficient, and as thicker materials are being cut, the expense of nitrogen mounts. In some cases, traditional bulk liquid nitrogen supplies cannot create enough high pressure gas to meet laser requirements. An investment in a Parker Nitrogen Generator for laser assist gas will pay for itself in little time. The nitrogen can also be used for beam purge. Impurities such as CO2 and water vapor can reduce the power and change the shape of the laser beam. Generating nitrogen on-site is also good for the environment as it eliminates deliveries of gas by traditional means.
The system consists of a nitrogen generator, high pressure booster and high pressure storage. A dedicated compressor is available. The system enters economy mode when the storage is full so there is no waste.



Benefits

Supply nitrogen at up to 500 psig, store nitrogen at up to 3000 psig

Produce gas on demand and never run out

Eliminate third party contracts and unreliable service

Utilizes proven PSA technology that has been developed over the past 30 years

No more rental costs, delivery fees or long term contracts

Fast return on investment

Nitrogen for 3D Printing

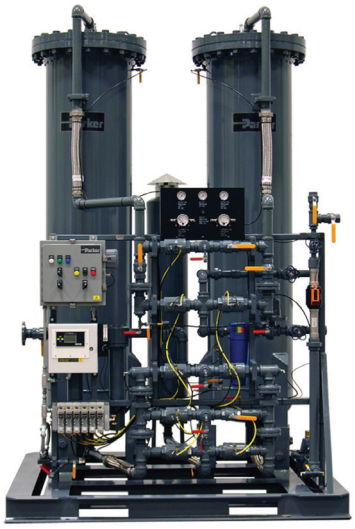
Selective laser sintering (SLS) commonly uses an inert nitrogen atmosphere to prevent oxidation and eliminate the potential of explosion in the sintering chamber. Tiny particles of plastic, ceramic or glass are fused together with a laser to form a 3D design. Parker has nitrogen systems to meet the needs for this application.

Dry Gas Seal Systems

A typical application is pressurizing dry gas seals on selected GAS compressor and turbine installations that need inert gas for lubricating and pressurizing dry seals designed to contain flammable, toxic, or hazardous process gasses from leaking into the atmosphere.

Model with Membrane Dryer for Gas Seals

Parker Custom Nitrogen Gas Generators



Parker's Nitrogen Systems are customizable - our team of engineers will work with you to meet your specific requirements.

Energy Efficient Control System

Traditional PSA systems operate under a fixed time cycle even when customer nitrogen demand is low. This is very wasteful since it requires compressors to produce large amounts of air to feed the PSA. The Energy Efficient Control System (EECS) utilizes the on board nitrogen flow meter to monitor customer demand of nitrogen. During periods of low demand, the time cycle will automatically extend which reduces the air requirement to the PSA when compared to a 60 second fixed time cycle. This ultimately results in an energy savings since the air compressor does not have to stay continuously loaded requiring less kilo-watts consumed by the compressor. As an added benefit, valve life can also be extended since the valves are switching less.

Differential Pressure Bed Monitoring

Differential pressure indicators are included to allow the user to monitor excessive differential pressures across the bed. This is important since high differential pressures can lead fluidization of the CMS inside the adsorption vessels.

L/D ratios

Beds are sized to maintain a specific length-to-diameter ratio. Proper L/D is critical to prevent feed gas channeling making the nitrogen separation process inefficient. Optimum L/D is calculated to minimize the channeling effect so maximum bed surface area is realized.

Valve Leak Check

Incorporated in the system is a Valve Leak Check step which allows the user to determine valve seat health without having to remove the valves from the process. Valve Leak Check can be performed and completed in less than 10 minutes.

PSA Standby

Separate from the EECS controls is a Standby feature. If nitrogen is no longer required for a period of time, the control system detects a no flow condition which will result in the PSA entering a sleep mode or Standby. This will shut the system down which will in turn time-out the air compressors so they are not continuing to run unnecessarily. This will also improve valve seat life since they are no longer cycling. Once the control system detects nitrogen flow the system automatically starts back up and seamlessly resumes nitrogen production.

Bed Design

Our PSA vessels can be reloaded, unlike some of our competitors. We utilize an ASME flanged on top of the dual bed design (Carbon Molecular Sieve). Some competitors use welded tops and non ASME.

Oxygen Analyzer Options

TS-02A Analyzer

The Balston TS-02A is a hand held nitrogen analyzer suitable for spot checking lines in your plant. Simply install shraeder valves at the point of testing. Resolution to 0.1% and accuracy +/- 1% of full scale. This option is best for spot checking purities of 99.5% or lower.

Standard % O2 Analyzer - O

The standard oxygen analyzer has a High/Low contact alarm and audible alarm. This option is best for nitrogen purities ≤ 99.9%. Includes High/Low dry contact Replacement Oxygen Sensor P/N 72695.

Advanced O2 Analyzer - OC

The advanced oxygen analyzer with advanced galvanic sensor is capable of oxygen analysis from 0.05% to 100%. The sensor has a 1 year expected life. Standard features include auto-ranging capability, two-stage alarms, system diagnostic functions, zero and span calibration. Two sets of digital outputs and a 4-20mA output are available. This option is best for nitrogen purities ≤99.95% Replacement Oxygen Sensor P/N GPR-11-60-4.

Trace O2 Analyzer - OD

The trace oxygen analyzer with advanced galvanic sensor is capable of oxygen analysis from 0-25%. The sensor has a 1 year expected life. Standard features include auto-ranging capability, two-stage alarms, system diagnostic functions, zero and span calibration. Two sets of digital alarm outputs and a 4-20mA output signal are available. This option is best for nitrogen purites >99.95% Replacement Oxygen Sensor P/N GPR-12-333.

TS-02A Analyzer

Standard % O2 Analyzer - O

Advanced O2 Analyzer - OC

Trace O2 Analyzer - OD

Ordering Information - O2 Analyzer Options

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Model Numbers	TS-02A Analyzer	Standard % O2 Analyzer	Advanced Analyzer	Trace O2 Analyzer
O2 Analyzer Manufacturer	Balston	Balston	Advanced Instruments	Advanced Instruments
Purity	Standard %	Standard %	Upgraded %	High Purity
Output	LCD Display	High/Low Contact Alarm	4-20 Milliamp	4-20 Milliamp
Most suitable for	Spot Checks ≤ 99.5%	Audible Warning ≤ 99.9%	99.5% - 99.99%	PPM Levels
Replacement Sensors	75695-L9001	72695	GPR-11-60-4	GPR-12-333

Ordering Information - Models with O2 Analyzer

	MBO-X	MBO-X-SB	DBO-X	DBO-X-EC	DB-30 thru 80
Standard % O2 Analyzer; best for purities ≤ 99.5%	MBO-1 thru MBO-5	MBO-1-SB thru MBO-5-SB	DBO-5 thru DBO-20	DBO-5-EC thru DBO-20-EC	DB-30 thru DB-80
Advanced O2 Analyzer; best for purities 99.5%-99.95%	MBOC-1 thru MBOC-5	MBOC-1-SB thru MBOC-5-SB	DBOC-5 thru DBOC-20	DBOC-5-EC thru DBOC-20-EC	DBOC-30 thru DBOC-80
Trace O2 Analyzer; best for purities >99.95%	MBOD-1 thru MBOD-5	MBOD-1-SB thru MBOD-5-SB	DBOD-5 thru DBOD-20	DBOD-5-EC thru DBOD-20-EC	DBOD-30 thru DBOD-80

WineMaker Series™ Nitrogen Generators

Creates a continuous supply of high purity nitrogen from compressed air

Generating your own nitrogen eliminates the hassles of supplied cylinders, dewars or bulk nitrogen. A nitrogen generator dispels any concerns about lines icing up, running low, or running out of nitrogen. Costly downtime, tank rental fees, Haz Mat fees, delivery fuel surcharges, price increases, evaporation concerns, and multi- year lease agreements will all be eliminated. Producing your own nitrogen eliminates reliance on outside vendors, allowing your winery to be more self sufficient. The WineMaker Series Nitrogen Generators typically have a 9-18 month payback, and an operating life of greater than 15 years.

Installation is simple: pipe in compressed air and pipe out nitrogen. Just connect a standard compressed air line to the inlet of the generator, connect the outlet to your nitrogen line and the unit is ready for trouble free operation. The system is designed to operate 24 hours/day, 7 days/week.

Expansion is done internally within the cabinet. The unit does not get any larger when expanded and there is no need to find more floor space. See bottom of page 10 for further information.

Wine Bottling

A nitrogen blanket reduces the oxygen concentration to less than 0.5% and minimizes contact between oxygen and the wine surface during storage (both pre and post bottling). This will prevent the growth of bacteria and other microbes. Nitrogen can also be used to purge air from pipes and hoses prior to bottling and to ensure oxygen is not introduced during transport. Finally, sparging with nitrogen will remove any oxygen or CO2 introduced during handling, helping to preserve wine integrity. A Parker nitrogen generator supplies a continuous stream of nitrogen to displace residual oxygen and fill the voids within the package, preserving taste and freshness and extending shelf life.

Product Features

Complete package with prefitration, and receiving tank

Digital Oxygen analyzer and Digital gas flow meter

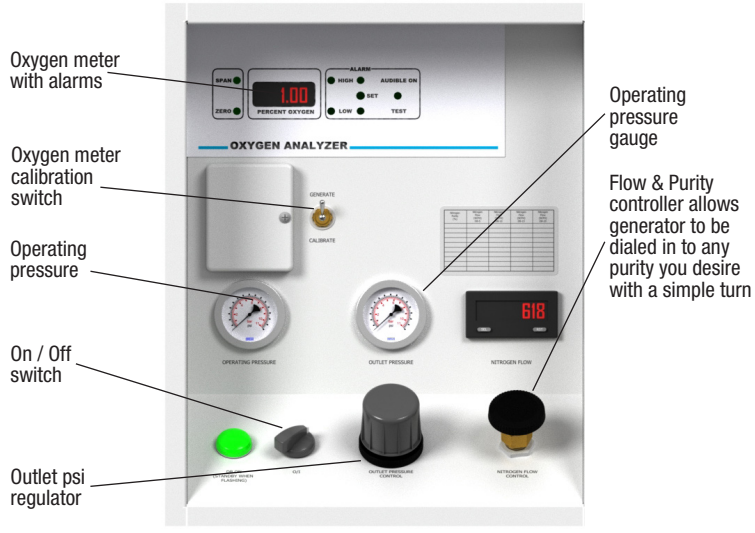
Plugs into 110 volt outlet

Portable and expandable

Lease to own options available

Services wineries producing from 5,000 to 1 million+ cases

Ensures minimal DO pickup



Principal Specifications and Ordering Information

Standard Package Includes:

- Fully enclosed cabinet with casters
- High efficiency coalescing and sterile air filters
- Oxygen analyzer available
- High oxygen alarms and dry contacts available
- PLC controls
- Stand by mode
- Purity easily adjusted between 99%-99.9%
- Outlet pressure regulator
- 60 gal. vertical nitrogen storage tank

Principal Specifications - Models DB-5-W, DB-10-W, DB-15-W, DB-20-W

Model Number	DB-5-W	DB-10-W	DB-15-W	DB-20-W
Recommended Inlet Pressure	110 psig (7.58 barg)	110 psig (7.58 barg)	110 psig (7.58 barg)	110 psig (7.58 barg)
Min/Max Inlet Pressure	80/140 psig (5.5/9.7 barg) →			
Air Quality	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants
Pressure Drop	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Electrical Requirements	120 VAC / 60Hz., 180 W	120 VAC / 60Hz.,180W	120 VAC / 60Hz., 180W	120 VAC / 60Hz., 180W
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Final Filtration Efficiency	99.99999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um
Generator Cabinet Dimensions	28.5"L x 34"D x 78"H 72 cm x 86 cm x 198 cm	28.5"L x 34"D x 78"H 72 cm x 131 cm x 198 cm	28.5"L x 51.5"D x 78"H 72 cm x 131 cm x 198 cm	28.5"L x 51.5"D x 78"H 72 cm x 86 cm x 198 cm
Inlet / Outlet	1/2" NPT / 1/2" NPT	1/2" NPT / 1/2" NPT	1" NPT / 3/4" NPT	1" NPT / 3/4" NPT
N2 Storage Tank Size	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)
N2 Storage Tank Dimensions	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm
Shipping Weight	1076 lbs (488 kg)	1076 lbs (488 kg)	1076 lbs (488 kg)	1076 lbs (488 kg)

Ordering Information - Models DB-5-W, DB-10-W, DB-15-W, DB-20-W*

Dual Bed N2 Generator w/o O2 Analyzer	DB-5-W	DB-10-W	DB-15-W	DB-20-W
Dual Bed N2 Generator with O2 Analyzer	DBO-5-W	DBO-10-W	DBO-15-W	DBO-20-W
Maint. Kit for N2 Generator w/o O2 Analyzer	MKDB5	MKDB5	MKDB15	MKDB15
Maint. Kit for N2 Generator with O2 Analyzer	MKDBO-5	MKDBO-5	MKDBO-15	MKDBO-15
Oxygen Sensor	72695	72695	72695	72695

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

* Each kit contains two replacement prefilter and two final filter elements. Also included are valve maintenance components. Where needed, a replacement oxygen sensor is also included.

Nitrogen Generator Flow (SCFH)** (Nm^3/Hr)

% Nitrogen	DB-5-W	DB-10-W	DB-15-W	DB-20-W
99.9	**365** (10.3)	**730** (20.7)	**1095** (31.0)	**1460** (41.3)
99.5	**512** (14.5)	**1024** (29.0)	**1536** (43.5)	**2048** (58.0)
99	**618** (17.5)	**1200** (34.0)	**1853** (52.5)	**2470** (70.0)

** At 110 psig. Nitrogen generator purity is pressure, temperature, and flow dependent. Higher flow and purities can be accomplished at higher pressures.

PRD Series
Non-Cycling Refrigerated Air Dryers

For use with Balston Nitrogen Generators

The importance of compressed air as a provider of energy for modern industrial processes is widely known. What is often overlooked however is the need to provide quality treatment for this air.

In fact, the air entering the system contains moisture which, when cooled, will turn into liquid water, causing extensive damage not only to the compressed air network, but also to the finished product.

These costly contamination problems can be avoided by installing a PRD Series non-cycling refrigerated dryer package complete with Parker Balston high efficiency filtration.

Parker's revolutionary 3-in-1 heat exchanger (PRD10 - PRD175) features a 3-in-1 aluminum design with integral air connections. All models include an air-to-air precooler, while the unique "slowflow" demister ensures perfect dewpoints whatever the operating conditions.

Compressed air purification equipment must deliver uncompromising performance and reliability while providing the right balance of air quality with the lowest cost of operation. Many manufacturers offer products for the filtration and purification of contaminated compressed air, which are often selected only upon their initial purchase cost, with little or no regard for the air quality they provide, the cost of operation throughout their life or their environmental impact. When purchasing purification equipment, delivered air quality, the overall cost of ownership and the equipment's environmental impact must always be considered.

Product Features

"Plug and Play" design for easy installation

Robust timed solenoid drain equals improved reliability (PRD15 - PRD175)

Unique 3-in-1 heat exchanger

Extremely compact footprint

Oversized demister separator resulting in excellent liquid removal over all operating conditions

Oversized condenser to operate in ambients to 122°F (50°C)

Fan cycling ensures stable operation

All models incorporate a dewpoint indicator

Low pressure differential across dryer (1.45 psi average)

ETL listed complete unit

Ideal for Nitrogen Generator Air Preparation

Technical Information

Product Selection

Dryer Model	Air Connections	Nominal Capacity (scfm)*	Dimensions ins (mm)			Weight		Primary Voltages
			H	W	D	lbs	kg	
PRD10	1/2" NPT-F	10	16.9 (430)	8.3 (210)	17.7 (450)	42	19	115V/1Ph/60Hz
PRD15	1/2" NPT-F	15	16.9 (430)	8.3 (210)	17.7 (450)	42	19	115V/1Ph/60Hz
PRD25	1/2" NPT-F	25	19.9 (505)	8.3 (210)	19.7 (500)	52	24	115V/1Ph/60Hz
PRD35	1/2" NPT-F	35	19.9 (505)	8.3 (210)	19.7 (500)	52	24	115V/1Ph/60Hz
PRD50	3/4" NPT-F	50	22.2 (565)	8.9 (225)	20.5 (520)	58	27	115V/1Ph/60Hz
PRD75	3/4" NPT-F	75	22.2 (565)	8.9 (225)	20.5 (520)	68	31	115V/1Ph/60Hz
PRD100	3/4" NPT-F	100	22.2 (565)	8.9 (225)	20.5 (520)	77	35	115V/1Ph/60Hz
PRD150	1 1/2" NPT-F	150	23.4 (604)	16.7 (425)	21.9 (555)	128	58	115V/1Ph/60Hz & 230V/1Ph/60Hz
PRD175	1 1/2" NPT-F	175	23.4 (604)	16.7 (425)	21.9 (555)	132	60	230V/1Ph/60Hz

Recommended Dryer, Air Surge Tank Model, and Pre-Filter for Nitrogen Generators

Nitrogen Generator	Recommended Dryer Model	Air Surge Tank Size (Gallons)*	Air Surge Tank Model	Recommended Pre-Filter Model*
MB-1	PRD10-A11516016FLU	60	72-060AST	2104N-1B1-DX
MB-3	PRD25-A11516016TXU	60	72-060AST	2104N-1B1-DX
MB-5	PRD25-A11516016TXU	60	72-060AST	2104N-1B1-DX
DB-5	PRD50-A11516016TXU	60	72-060AST	2206N-1B1-DX
DB-10	PRD75-A11516016TXU	120	72-120AST	2206N-1B1-DX
DB-15	PRD150-A11516016TX	120	72-120AST	2312N-1B1-DX
DB-20	PRD150-A23016016TX**	200	72-200AST	2312N-1B1-DX
DB-30	PRD150-A2301606TX**	240	72-240AST	2312N-1B1-DX
DB-40	PRD175-A23016016TX	240	72-240AST	2312N-1B1-DX
HFX-1	PRD10-A11516016FLU	n/r	N/A	2104N-1B1-DX
HFX-3	PRD10-A11516016-FLU	n/r	N/A	2104N-1B1-DX
HFX-5	PRD25-A11516016-TXU	n/r	N/A	2104N-1B1-DX
HFX-7	PRD35-A11516016TXU	n/r	N/A	2104N-1B1-DX
HFX-9	PRD50-A11516016-TXU	n/r	N/A	2206N-1B1-DX
HFX-11	PRD100-A11516016-TXU	n/r	N/A	2206N-1B1-DX

* An Air Surge Tank installed between the dryer and the nitrogen generator assures consistent air pretreatment.
**For 230 VAC

Technical Information

Technical Data

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Models	Max Ambient Temperature	Max Inlet Temperature	Min Ambient Temperature	Max Inlet Pressure	Refrigerant
PRD10 - PRD175	122°F (50°C)	149°F (65°C)	41°F (5°C)	232 psi g (16 bar g)	R134a

*Flow rates at the following climatic conditions - Ambient Temperature: 100°F (38°C), Inlet Temperature: 100°F (38°C), Inlet Pressure: 100 psi g (7 bar g).

**Parker Balston recommends Grade DX pre-filter.
**Parker Balston recommends Grade BX after-filter.

Note: Filters supplied loose, pre-filter supplied standard with DNC models.

Correction Factors for Models PRD10 - PRD175

To obtain dryer capacity at new conditions, multiply nominal capacity x C1 x C2 x C3.

Ambient Temperature (C1)	**°F**	60	70	80	90	100	110	120
	°C	16	21	27	32	38	43	49
	CF	1.34	1.26	1.17	1.09	1.00	0.91	0.82

Inlet Temperature (C2)	**°F**	90	100	110	120	140	149
	°C	32	38	43	49	60	65
	CF	1.24	1.00	0.81	0.67	0.45	0.43

Working Pressure (C3)	**psi g**	60	80	100	125	150	175	200	230
	bar g	4	6	7	9	10	12	14	16
	CFP	0.83	0.93	1.00	1.07	1.12	1.16	1.19	1.22

Notes:

1 Standard equipment includes:
-Models PRD10 - PRD175 have electromechanical control
-6' power cord (115V models) on Models PRD10 - PRD125 only
-On/Off switch
-R134a environmentally friendly refrigerant
-Power On light
-Built-in demister for high efficient removal of condensed liquid
-Removable cabinet for easy access to internal components
-Moisture dewpoint indicator
-Automatic condensate drain on Model PRD10
-Tmed solenoid condensate drain on Models PRD15 - PRD175

2 For reliable operation and to meet warranty conditions, a pre-filter must be installed

Offer of Sale

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13. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. Force Majeure. Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. Termination. Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appointments a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

20. Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act. Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

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