Nitrogen Generation Systems

Balston Nitrogen Generators

Balston offers both membrane and PSA technology. Balston Membrane Nitrogen Generators produce up to 99.5% pure, commercially sterile nitrogen at dewpoints to -58°F (-50°C) from a compressed air supply. All Membrane Nitrogen Generators include a 0.01 micron membrane filter which ensures the nitrogen is completely free of suspended impurities.

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

Product Features:

- **Membrane and PSA technologies available**
- **Lower cost...eliminates the need for expensive gas cylinders**
- **Eliminates unexpected shutdowns due to a bad or empty cylinder**
- **Hassle-free, easy to install and operate**
- **Compact, frees up valuable floor space**
- **Safe and reliable**

Aluminum Extrusion

Lead Free Soldering

Food Processing and Packaging

Chemical Tank Blanketing

Nitrogen Generation Systems

Membrane Nitrogen Generators

Balston
Membrane Nitrogen Generator

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

Complete package with prefilters, carbon filter, and membrane filter

Compact - frees up valuable floor space

Eliminates unexpected shutdowns due to a "bad" or empty cylinder

Hassle-free, easy to install, easy to operate

Safe and reliable

No electrical line required

Applications

Purging or testing of tanks and vessels	Analytical equipment purge
Solvent blanketing	Carburizing, hardening, sintering, annealing
Food processing and packaging	Packaging
Storage of perishables	Chemical transferring
Electronic component manufacture and storage	Sparging and mixing

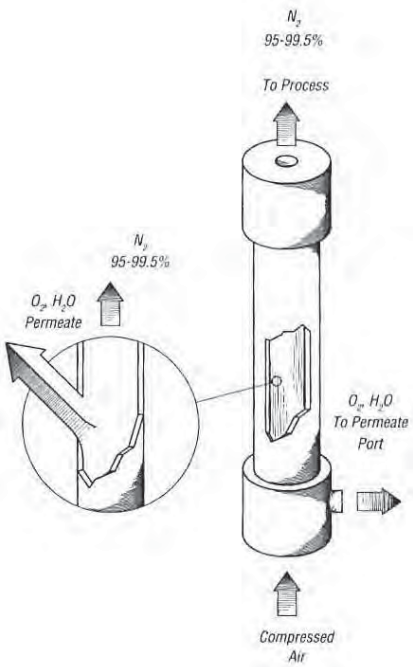
Advantages of Balston® Nitrogen Generators

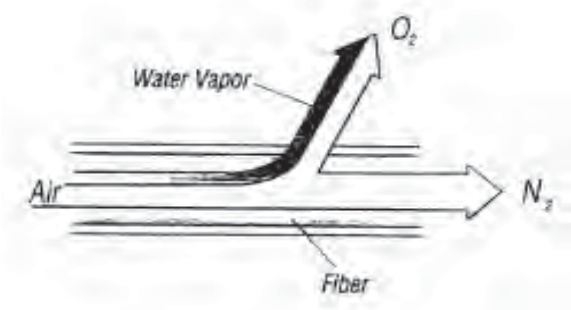
Balston Membrane Nitrogen Generators produce up to 99.5% pure, commercially sterile nitrogen at dewpoints to -58°F (-50°C) from a compressed air supply. All Membrane Nitrogen Generators include a 0.01 micron membrane filter which ensures the nitrogen is completely free of suspended impurities. For applications requiring monitoring and controlling, an oxygen monitor which offers LED readouts and remote alarm or chart recorder capabilities can be included. An audible alarm signals high or low oxygen concentrations (determined by the application). The oxygen monitor is supplied with alarm relay outputs which may be used to signal a remote alarm, open a backup supply or the process stream, or close the process flow.

HFX Series
High Flow Nitrogen
Membrane Generator

Nitrogen Generation Systems

Membrane Nitrogen Generators





While "fast gases" like oxygen, carbon dioxide, and water vapor quickly permeate the membrane, most of the nitrogen flows along the membrane fiber as a separate product stream.

Proven Technology

Balston Membrane Nitrogen Generators produce up to 99% pure, commercially sterile nitrogen at dewpoints to -58°F (-50°C) from a compressed air supply. All Membrane Nitrogen Generators include a 0.01 micron membrane filter which ensures the nitrogen is completely free of suspended impurities. For applications requiring monitoring and controlling, Parker Hannifin offers systems which include oxygen monitors.

Balston Nitrogen Generators are one of the most efficient membrane systems available with higher recovery rates and lower operating costs than many other membrane systems.

Balston Nitrogen Generators utilize proprietary membrane separation technology. The membrane divides the air into two streams: one is 95%-99% pure nitrogen, and the other is oxygen-rich with carbon dioxide and other trace gases.

The generator separates air into its component gases by passing inexpensive, conventional compressed air through bundles of individual hollow fiber, semi-permeable membranes. 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 to the center of the fibers at one end of the module and contacts the membrane as it flows through the fiber bores. While oxygen, water vapor and other trace gases permeate the membrane fiber and are discharged through a permeate port, the nitrogen is contained within the hollow fiber membrane, and flows through the outlet port of the module.

Water vapor also permeates through the membrane; therefore, the nitrogen product gas is very dry.

Nitrogen Generation Systems

Membrane Nitrogen Generators

Advantages

- Lower cost...eliminates the need for costly gas cylinders
- Complete package with prefilters, carbon filter, and membrane filter
- Compact - frees up valuable floor space
- Eliminates unexpected shutdowns due to a “bad” or empty cylinder
- Hassle-free, easy to install, easy to operate
- Safe and reliable
- No electrical line required(1)

Custom Systems Available

- Flow rates to 9200 SCFH
- Delivery pressures to customer’s specifications
- Skid mounted systems with compressor, receiving tank and controls are available

Savings and Convenience

The Balston Membrane Nitrogen Generators completely eliminate the inconvenience and the high costs of nitrogen Dewars and cylinders. There is no need to depend on outside vendors for nitrogen gas supplies. The hassles of changing dangerous, high pressure cylinders and interruption of gas supplies are completely eliminated. The Balston Systems offer long term cost stability by eliminating uncontrollable vendor price increases, contract negotiation, long term commitments and tank rentals. Once the Generator is installed, a continuous nitrogen supply of consistent purity is available within minutes from start-up.

The Balston Nitrogen Generators are complete systems ready to operate as delivered with carefully matched components engineered for easy installation, operation and long term reliability. The generators are free-standing and housed in an attractive cabinet. Standard features include: high efficiency coalescing prefilters with automatic drains, an activated carbon filter, and a 0.01micron membrane final filter. Installation consists of simply connecting a standard compressed air line to the inlet and connecting the outlet to a nitrogen line. The membrane systems offer the advantages of no moving parts and no electrical requirements.(1)

There is no complicated operating procedure to learn or labor intensive monitoring involved. Simply select the purity your process requires, set the flow and pressure, and within minutes high purity, dry nitrogen is available for use!

Once the system is operating, it requires little monitoring. The only maintenance involves changing the coalescing filter cartridges and activated carbon filter periodically. This is a simple ten minute procedure.

The Balston HFXO Series include an oxygen monitor which offers LED readouts and remote alarm or chart recorder capabilities. An audible alarm signals high or low oxygen concentrations (determined by the application). The oxygen monitor is supplied with alarm relay outputs which may be used to signal a remote alarm, open a backup supply or the process stream, or close the process flow.

Notes:
1 No electrical power required unless used with an accessory such as an oxygen monitor.

Nitrogen Generation Systems

Membrane Nitrogen Generators - HFX Series

Flow Rates (SCFH) @ 100 psig @ 68°F							Pressure Correction Factors (at Indicated Operating Pressure (PSIG)									
Model	**95**	**96**	**97**	**98**	**99**	**99.5**	**58**	**73**	**87**	**101**	**116**	**130**	**145**	**160**	**174**	**190**
HFX Series Nitrogen Generators																
HFX-1	40	33	26	16	11	---	.52	.65	.86	1	1.15	1.35	1.44	---	---	---
HFX-3	148	120	95	70	42	---	.54	.68	.85	1	1.14	1.3	1.43	---	---	---
HFX-5	279	229	176	131	76	---	.52	.65	.85	1	1.14	1.34	1.43	---	---	---
HFX-7	452	360	283	209	120	---	.53	.66	.86	1	1.14	1.32	1.43	---	---	---
HFX-9	752	600	452	330	201	---	.44	.65	.85	1	1.1	1.3	1.4	---	---	---
HFX-11	1201	992	780	572	248	---	.44	.65	.85	1	1.2	1.4	1.6	---	---	---

Principal Specifications - HFX Series Membrane Nitrogen Generators

Model Number	HFX-1, HFX0-1	HFX-3,HFX0-3	HFX-5, HFX0-5	HFX-7, HFX0-7, HFX-9, HFX0-9, HFX-11, HFX0-11
Atmospheric Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Particles > 0.01 micron	None	None	None	None
Suspended Liquids	None	None	None	None
Min/Max Operating Press.	60 psig/145 psig (1)	60 psig/145 psig (1)	60 psig/145 psig (1)	60 psig/145 psig (1)
Max. Press. Drop (at 95% N_2, 125 psig)	10 psig	10 psig	10 psig	10 psig
Recommended Ambient Operating Temperature	77°F (25°C)	77°F (25°C)	77°F (25°C)	77°F (25°C)
Min/Max Inlet Air Temp.	40°F/122°F (4°C/50°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)
Recommended Inlet Air Temperature	77°F (25°C)	77°F (25°C)	77°F (25°C)	77°F (25°C)
Inlet/Outlet Port Sizes	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT
Electrical Requirements	None (2)	None (2)	None (2)	None (2)
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)	75 lbs. (34 kg)	106 lbs. (114 kg)	250 lbs. (114 kg)

Notes:
1 Maximum operating pressure in Europe is 8 barg.

2 No electrical power required unless used with an electrical accessory, e.g., an oxygen analyzer.

Ordering Information - HFX Series Membrane Nitrogen Generators

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

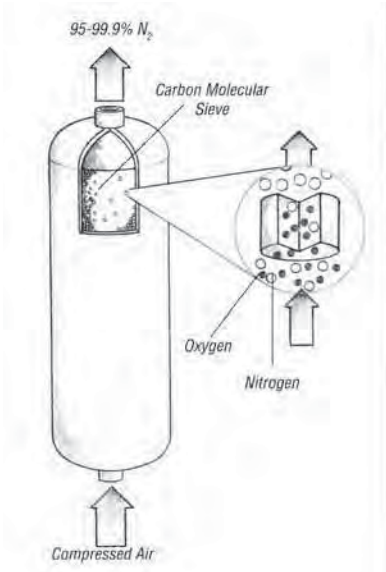
			Maintenance Kit Components				
Model	**Maintenance Kit**	**Maintenance Kit w/02 Monitor**	**Replacement Filter Cartridges 1st stage**	**Replacement Filter Cartridges 2nd stage**	**Replacement Filter Cartridges 3rd stage**	**Final Membrane Filter**	**Activated Carbon Filter**
HFX-1, HFX0-1 (w/O2 monitor)	MK75005	MK750050	100-12-DX	100-12-BX	---	9933-05-95	1/7825-08-000
HFX-3, HFX0-3 (w/O2 monitor)	MK7579C	MK75790C	100-12-DX	100-12-BX	---	GS-100-12-95	75620
HFX-5, HFX0-5 (w/O2 monitor)	MK7579C	MK75790C	100-12-DX	100-12-BX	---	GS-100-12-95	75620
HFX-7, HFX0-7 (w/O2 monitor)	MK7576	MK76760	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303
HFX-9, HFX0-9 (w/O2 monitor)	MK7576	MK75760	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303
HFX-11, HFX0-11 (w/O2 monitor)	MK7576	MK76760	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303

Nitrogen Generation Systems

PSA Nitrogen Generators

DB-1200-4000

DB-1900



Pressure swing adsorption gas separation process preferentially adsorbs oxygen over nitrogen using carbon molecular sieve (CMS).

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

Complete package with prefilters, final filters, and receiving tank

Compact - frees up valuable floor space

Eliminates unexpected shutdowns due to a "bad" or empty cylinder

Hassle-free, easy to install, easy to operate

Safe and reliable

Proven Technology

Balston Monobed and Dual Bed 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.

How the Technology Works

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.

Nitrogen Generation Systems

PSA Nitrogen Generators - Monobed Series

Applications

- Solder Reflow Ovens
- Food Processing and Packaging
- Electronic Component Storage and Manufacture
- Heat Treating
- Degassing Aluminum
- Plastic Extrusion and Molding
- Gas Assist
- Laser Cutting

Savings and Convenience

The Balston PSA Nitrogen Generators completely eliminate the inconvenience and the high costs of nitrogen Dewars, bulk nitrogen supplies, and cylinders. There is no need to depend on outside vendors for your nitrogen gas supplies. The hassles of changing dangerous, high pressure cylinders, and interruption of gas supplies are completely eliminated. The Balston PSA Nitrogen Generators offer long term cost stability eliminating uncontrollable vendor price increases, contract negotiations, long term commitments, and tank rentals. Once the Generator is installed, a continuous nitrogen supply of consistent purity is available within minutes from start-up.

DB5-10 Series PSA Nitrogen Generator

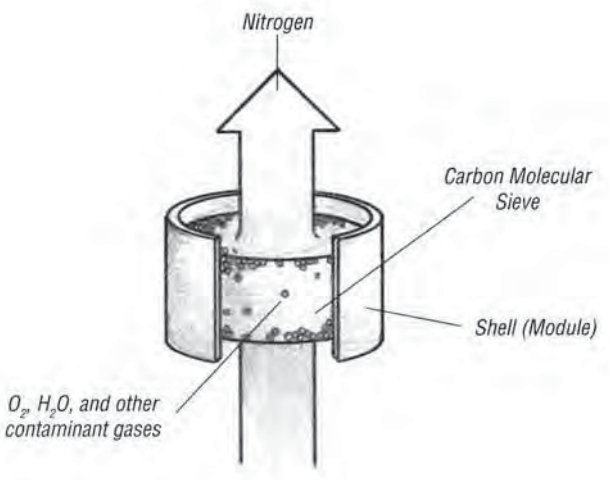
MB Series Nitrogen Generator

Easy to Operate and Maintain

Installation consists of simply connecting a standard compressed air line to the inlet and connecting the outlet to a nitrogen line. Plug the electrical cord into a wall outlet, and the unit is ready for trouble-free operation. This system is designed to operate 24 hours per day, 7 days per week.

Once the system is operating, it requires little monitoring. The only maintenance involves changing the coalescing prefilter cartridges and final sterile air filter periodically. The PSA towers do not require any maintenance.

An oxygen monitor to measure the oxygen concentration of the nitrogen stream is available as an option. An audible alarm signals high or low oxygen concentrations (determined by the application). The oxygen analyzer is supplied with alarm relay outputs which may by used to signal a remote alarm, open a backup supply or the process stream, or close the process flow for protection of downstream equipment or processes.



Nitrogen Generation Systems

PSA Nitrogen Generators - Monobed Series

Principal Specifications - Monobed Nitrogen Generators

Model Number	MB-1	MB-3	MB-5
Atmospheric Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes
Particles > 0.01 micron	None	None	None
Suspended Liquids	None	None	None
Recommended Inlet Pressure	110 psig (7.6 barg)	110 psig (7.6 barg)	110 psig (7.6 barg)
Max Inlet Pressure	140 psig (9.7 barg)	140 psig (9.7 barg)	140 psig (9.7 barg)
Max Outlet Pressure at Corresponding Purity (Based on nominal conditions & standard 60 gallon nitrogen tank)	80 psig @ 99.99 - 95%	80 psig @ 99.99 - 96.0% 75 psig @ 95.0%	80 psig @ 99.99-99.5% 75 psig @ 99.0% 70 psig @ 98.0-95.0%
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)
Inlet Port Size	1/2" NPT (female)	1/2" NPT (female)	1/2" NPT (female)
Outlet Port Size	1/2" NPT (female)	1/2" NPT (female)	1/2" NPT (female)
Electrical Requirements	120VAC/60 Hz., .18 kw	120VAC/60 Hz., .18 kw	120VAC/60 Hz., .18 kw
MB Dimensions Nitrogen Tank Dimensions (all units)	29 3/8"w x 24 1/2"d x 78"h (74cm x 62cm x 198cm) 26" dia x 54"h (58cm x 58cm x 130cm)		
Max. Shipping Wt. (all units)	460 lbs. (209 kg)		

Ordering Information - Monobed Nitrogen Generators

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

Model	**MB-1**	**MB-3**	**MB-5**
Balston Monobed without Oxygen Analyzer	MB-1	MB-3	MB-5
Balston Monobed with a Parker Oxygen Analyzer	MBO-1	MBO-3	MBO-5
Balston Monobed with a Teledyne 3300 PB Analyzer	MBOA-1	MBOA-3	MBOA-5
Balston Monobed with a Teledyne 3300 TB Analyzer	MBOB-1	MBOB-3	MBOB-5
Monobed Nitrogen Generator Replacement Parts	**Part Number**		
Prefilter (box of 5)	5/100-18-BX		
Final Filter (box of 5)	5/100-12-BX		
Final Sterile Air Filter (box of 10)	100-18-SA		
Replacement Oxygen Monitor Fuel Cells (Optional)			
Parker 72-730	72-695		
Teledyne 3300PB (High Purity Applications)	I22		
Teledyne 3300TB (High Purity Trace Applications)	B2C		
Maintenance Kits			
MKMB1	Maintenance Kit w/out 02 Sensor		
MKMBO1	Maintenance Kit w/02 Sensor (72695)		
MKMBOA1	Maintenance Kit W/02 Sensor (I22)		
MKMBOB1	Maintenance Kit W/02 Sensor (B2C)		

Nitrogen Purity Flow Chart - Monobed Nitrogen Generators

Flow Rate (SCFH)			
Purity (%N2)	**MB-1**	**MB-3**	**MB-5**
95	130	260	390
96	115	230	345
97	103	207	310
98	90	180	270
99	72	143	215
99.5	60	120	180
99.9	43	87	130
99.95	38	77	115
99.99	14	27	41

Notes
1 The 72-460 is an optional accessory which will maintain a constant pressure drop across the flow control valve, thereby providing a constant nitrogen purity.

Nitrogen Generation Systems

PSA Nitrogen Generators - Dual Bed Series

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

Model Number	DB-5, DB-10	DB-15, DB-20
Nominal Conditions		
Feed Pressure (minimum)	110 psig	110 psig
Temperature	80°F	80°F
Ambient Pressure	1 Atm.	1 Atm.
Compressed Air Specifications		
Maximum Pressure	140 PSIG	140 PSIG
Temperature Range	60°F - 105°F	60°F - 105°F
Dewpoint	40°F atmospheric dewpoint or better	40°F atmospheric dewpoint or better
Residual Oil Content	Trace	Trace
Particles	<.01 micron	<.01 micron
Atmospheric Dewpoint		
Atmospheric Dewpoint	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes
Particles > .1 micron	None	None
Suspended Liquids	None	None
Recommended Inlet Pressure (Min.)	110 psig (7.6 barg)	110 psig (7.6 barg)
Max Inlet Pressure	140 psig (9.7 barg)	140 psig (9.7 barg)
Max Outlet Pressure (Based on nominal conditions and standard 60 gallon nitrogen tank)	80psig	DB-15: 80 psig @ 95-99.99% Purity DB-20: 80 psig @ 98-99.99% Purity 75 psig @ 97% Purity 70 psig @ 95-96% Purity
Min. / Max. Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Ambient Conditions		
Temperature	45°F - 95°F	45°F - 95°F
Min/Max Ambient Temperature	40°F - 95°F	40°F - 95°F
Ambient Pressure	Atmospheric	Atmospheric
Air Quality	Clean air without contaminants	Clean air without contaminants
Dimensions, Weight and Connections		
Dimensions	28.5"L x 32.25"D x 78"H	28.5"L x 50"D x 78"H
Weight (with tank)	620 lbs (DB-5), 830 lbs (DB-10)	1240 lbs (DB-15), 1450 lbs (DB-20)
Inlet/Outlet	1/2" NPT/1/2" NPT	1" NPT/3/4" NPT
Electrical Requirement	120VAC/60Hz, 1.5 Amp	120VAC/60Hz, 1.5 Amp

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

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

Balston Dual Bed Nitrogen Generator with Oxygen Analyzer	DBO-5	DBO-10	DBO-15	DBO-20
Balston Dual Bed Nitrogen Generator without Oxygen Analyzer	DB-5	DB-10	DB-15	DB-20
Maintenance Kit for Nitrogen Generator with Oxygen Analyzer	MKDBO-5	MKDBO-5	MKDBO-15	MKDBO-15
Maintenance Kit for Nitrogen Generator without Oxygen Analzer	MKDB5	MKDB5	MKDB15	MKDB15
Oxygen Sensor	72695	72695	72695	72695

Performance Data - Nitrogen Flow (SCFH), for Models DB5 to DB-20

% Nitrogen	DB-5	DB-10	DB-15	DB-20
99.999	33	66	99	132
99.995	74	148	222	296
99.99	141	281	421	561
99.95	204	409	613	817
99.9	240	480	720	960
99.5	345	689	1034	1378
99	416	831	1247	1663
98	499	998	1496	1995
97	570	1140	1710	2280
96	630	1259	1889	2518
95	694	1387	2081	2774

Notes
1 Stand-by feature is unavailable for purities 99.995-99.999%

Nitrogen Generation Systems

PSA Nitrogen Generators - Dual Bed Series

Principal Specifications - Dual Bed Nitrogen Generators

Model	DB-1200	DB-1600	DB-1900
Atmospheric Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Particles > .1 micron	None	None	None
Suspended Liquids	None	None	None
Recommended Inlet Pressure	110 psig (7.6 barg)	110 psig (7.6 barg)	110 psig (7.6 barg)
Max Outlet Pressure	80 psig	80 psig	80 psig
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)
Inlet Port Size	1-1/2" NPT (female)	1-1/2" NPT (female)	2" NPT (female)
Outlet Port Size	1" NPT (female)	1" NPT (female)	1-1/2" NPT (female)
Electrical Requirements	120VAC/60 Hz	120VAC/60 Hz	120VAC/60 Hz
Dimensions	78"w x 48"d x 92"h (198cm x 122cm x 234cm)	78"w x 48"d x 92"h (198cm x 122cm x 234cm)	72"w x 54"d x 101"h (183cm x 137cm x 257cm)
Shipping Wt.	3,800 lbs. (1,724 kg)	3,800 lbs. (1,724 kg)	4300 lbs. (1,951 kg)

Model	DB-2500	DB-4000
Atmospheric Dewpoint	-58°F (-50°C)	-58°F (-50°C)
Particles > .1 micron	None	None
Suspended Liquids	None	None
Recommended Inlet Pressure	110 psig (7.6 barg)	110 psig (7.6 barg)
Max Outlet Pressure	80 psig	80 psig
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Inlet Port Size	2" NPT (female)	2" NPT (female)
Outlet Port Size	1-1/2" NPT (female)	1-1/2" NPT (female)
Electrical Requirements	120VAC/60 Hz	120VAC/60 Hz
Dimensions	72"w x 54"d x 125"h (183cm x 137cm x 318cm)	84"w x 72"d x 138"h (213cm x 183cm x 351cm)
Shipping Wt.	6500 lbs. (2948 kg)	7100 lbs. (3221 kg)

How To Order

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

Dual Bed Nitrogen Generator	DB-1200	DB-1600	DB-1900	DB-2500	DB-4000
Prefilter Cartridges, 1st Stage	200-35-DX	200-35-DX	200-80-DX	200-80-DX	200-80-DX
Prefilter Cartridges, 2nd Stage	200-35-BX	200-35-BX	200-80-BX	200-80-BX	200-80-BX
Additional Prefilter Cartridges	200-35-DX	200-35-DX	200-80-DX	200-80-DX	200-80-DX
Final Air Filter	100-18-DX	150-19-DX	150-19-DX	200-35-DX	200-35-DX
Oxygen Monitor					
Standard	72-730	72-730	72-730	72-730	72-730
High Purity (Optional)	3290	3290	3290	3290	3290

Flow Rate (SCFH)

Purity %N2	DB-1200	DB-1600	DB-1900	DB-2500	DB-4000
95	3300	4400	5220	6880	11010
96	3050	4066	4540	5984	9574
97	2800	3732	4430	5836	9330
98	2445	3250	3860	5088	8138
99	1995	2652	3150	4150	6640
99.5	1635	2178	2585	3402	5445
99.9	1077	1435	1703	2243	3590
99.95	951	1268	1505	1981	3170
99.99	630	840	997	1312	2100
99.995%	522	696	826	1088	1741
99.999%	186	248	295	389	622