

# BAUER NPX™

High-Purity, High-Pressure PSA Nitrogen Systems







# PURELY THE RIGHT CHOICE

HIGH-PURITY NITROGEN IS OFTEN USED IN THE GAS ASSIST PLASTICS INJECTION MOLDING PROCESS

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# NITROGEN



## PROPERTIES OF NITROGEN

- › Nitrogen is an inert gas that is abundant in nature. The air we breathe consists of 78% nitrogen.
- › Two of the great properties of nitrogen are that it is inert and typically dry.
- › What makes nitrogen practically inert is the triple atomic bond of the  $N_2$  diatom, which is one of the strongest atomic bonds observed in nature. Significant energies are needed in order to break this bond.
- › Nitrogen is extremely dry with a gaseous dew point of  $-70^{\circ}\text{F}$  ( $-57^{\circ}\text{C}$ ).

## USES OF NITROGEN

Because of its inert nature as well as extremely dry characteristics, nitrogen is used extensively in various industrial, oil & gas, aerospace and military applications.

### SOME OF THE MOST COMMON USES OF NITROGEN:



- › Drying of vessels and pipes.



- › Fire and explosion prevention: When oxygen-rich air is replaced with nitrogen in vessels and critical spaces, ignition is suppressed. This prevents the possibility of fires and explosions.



- › Corrosion protection: Since Nitrogen is non-reactive, oxidation and other forms of corrosion can be minimized. Prevention of chemical reactions: Because nitrogen is non-reactive, undesired chemical reactions in critical processes can be prevented.



- › Gas Injection Technology: A low pressure process where nitrogen gas is used to create hollow sections in an injection molded part.

## GENERATING NITROGEN: PSA & MEMBRANE METHODS

Most of the nitrogen used in industrial applications is generated by separating the nitrogen from the oxygen present in ambient air. The two most common separation technologies for nitrogen are membrane and pressure swing adsorption (PSA). The benefit of these technologies is that nitrogen can be produced anywhere at any time.

### › PSA METHOD OF NITROGEN GENERATION (FOR NITROGEN PURITIES FROM 99.9-99.999%)

Pressure swing adsorption (PSA) is a technology used to separate some gas species from a mixture of gases under pressure according to the species' molecular characteristics and affinity for an adsorbent material. It operates at near-ambient temperatures and differs significantly from cryogenic distillation techniques of gas separation. Specific adsorbent materials are used as a trap, preferentially adsorbing the target gas species at high pressure. The process then swings to low pressure to desorb the adsorbed material.



## › MEMBRANE METHOD OF NITROGEN GENERATION (FOR NITROGEN PURITIES FROM 95.0-99.5%)

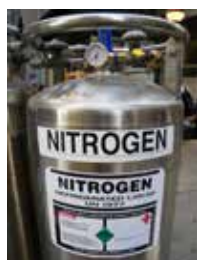
Incoming air is separated inside the membrane using tens of thousands of hollow fibers, each of which is sized to capture  $N_2$  molecules. The remaining components (mostly water vapor and oxygen) that make up ambient air are vented away from the membrane inlet before the nitrogen is delivered to the membrane outlet.

Membrane generation systems usually require less space than PSA generation systems, but are limited to 99.5%  $N_2$  purity. PSA systems are therefore highly suitable for applications requiring >99.5%  $N_2$  purity with the ability to provide Nitrogen purities up to 99.999%.

	PSA	MEMBRANE
Reliability	High cyclical rate (every 60 - 90 seconds) switching valves contribute a somewhat higher maintenance cost, but higher purities than membranes.	Very few moving parts provides a high level of reliability.
Purity	<b>For nitrogen purities from 99.9 to 99.999%</b>	<b>For nitrogen purities from 95.0-99.5%</b>
Flow	Changing flow patterns will vary product purity requiring buffer tank to blend product. Systems operate best under steady flow conditions.	System is not adversely affected by flow swings or overdrawing. Easy to vary flowrate.
Noise	Pressure releases occur every 60 to 90 seconds from the adsorber beds	Membranes are much quieter. No pressure releases or cycling.
Flexibility	PSA has a fixed product rate.	System capacity can be changed readily through the addition or removal of membrane bundles. Nitrogen purity can be adjusted by adjusting flow and temperature valves.
Air Feed Stock	Requires cleaner & dryer compressed air to avoid contamination of carbon molecular sieve	Membranes require four levels of prefiltration. No dryer needed if inlet filtration is maintained properly.
Economics	At lower purities the unit cost of nitrogen is higher than for membranes. At low flow rates (<1000 scfm) unit cost can be much higher. Higher capital costs.	More economical than PSA especially at lower purities.
Operation	On-off requirements effect PSA's more drastically than membranes. Cyclical operation works the air compressor much harder as the system loads and unloads the adsorption beds. Sensitivity to moisture requires a separate inlet air dryer or activated alumina adsorbant.	Membranes can cycle off and on more easily. Steady state flow is easier on the compressor and allows it to 'turndown during reduced flow requirements for energy savings.

## TYPES OF NITROGEN AND LOGISTICS

The two common forms of industrial nitrogen are nitrogen gas and liquid nitrogen. Liquid nitrogen can be vaporized to convert it into gaseous state. For industrial applications there are three ways in which nitrogen gas is supplied:



### › LIQUID NITROGEN

Nitrogen in liquid form purchased from a merchant gas supplier. The advantage of nitrogen in liquid form is that large volumes of nitrogen can be shipped and stored onsite. The disadvantage is that the end-user is dependent on a vulnerable supply chain. Furthermore, liquid nitrogen is stored in cryogenic vessels which are expensive, bulky and subject to leaks, thus creating waste. Cryogenic nitrogen suppliers typically require a long term contract at a locked-in rate which means that it is more expensive than other forms of nitrogen.



### › COMPRESSED NITROGEN GAS CYLINDERS:

Nitrogen can be purchased in compressed gas form. This requires the use of heavy, high-pressure cylinders which can be hazardous. The use of high-pressure nitrogen cylinders is limited to small applications because of the limited storage capacity of the bottles. Furthermore, not the entire volume of the bottles can be used thus the end-user pays for gas which is not being used. Users of nitrogen cylinders are subject to the same supply chain interruption risks as users of cryogenic nitrogen.



### › LOCALLY ON-DEMAND GENERATED NITROGEN:

Generating nitrogen onsite. This is the preferred method for end-users who are in remote locations or who cannot afford any interruption in their nitrogen supply. Generating nitrogen onsite, on-demand is simple and is explained in the following sections.

# OVERVIEW OF BAUER NITROGEN SYSTEMS

## 35 Years Of Nitrogen Generation Experience

### WHY BUY NITROGEN WHEN YOU CAN MAKE YOUR OWN?

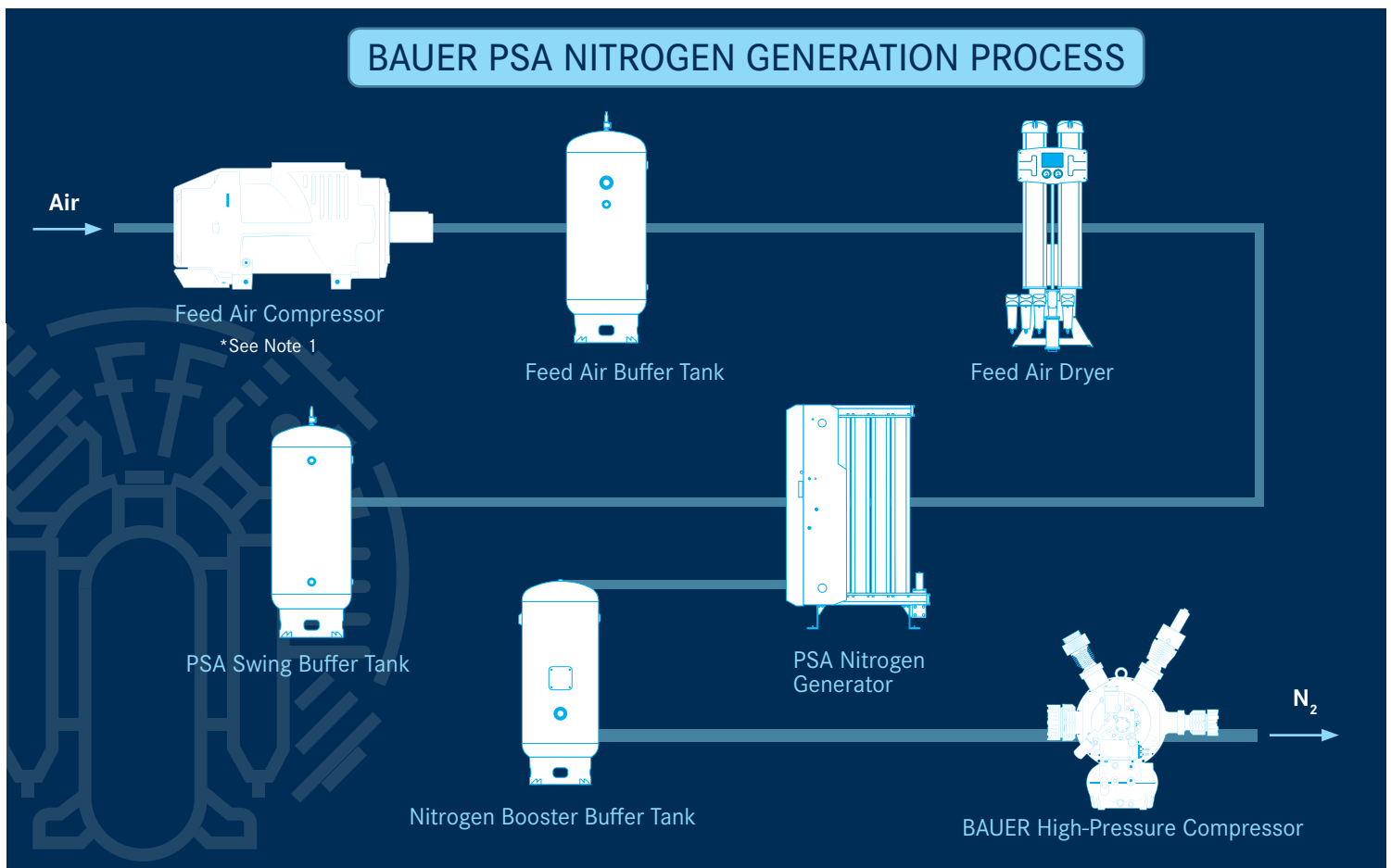
The BAUER Nitrogen Generators are self-contained, fully integrated, modular systems that eliminate the hazards involved with the handling of high-pressure cylinders, as well as the burden of the merchant, supplied nitrogen gas. BAUER PSA nitrogen generator systems are designed for the on-demand supply of nitrogen gas at purities up to 99.999%.

Generating nitrogen to meet customer required purity and quality is a critical process. BAUER PSA nitrogen generation systems require exact control of feed-air-flow, pressure, temperature, and quality (oil content, moisture content and particulate content), which BAUER provides in its systems.

All BAUER nitrogen systems are engineered to provide years of reliable performance. Critical performance values such as pressure, temperature and O<sub>2</sub> content are electronically monitored after each critical process step in order to assure optimal long-term total system performance. Bauer NPX nitrogen systems adapt automatically to changing environmental conditions, as well as, changes in PSA systems as they age.

### BAUER GUARANTEES SYSTEM PERFORMANCE OVER TIME

- › Process performance monitoring after each critical step to assure nitrogen quality and purity
- › Adaptive system that automatically adjusts to various ambient conditions, as well as, PSA aging
- › Remote telemetry to provide real-time feedback of system performance



\*Note 1 PSA Feed Air System can be provided by Customer or by BAUER.



## BAUER PSA BASED NITROGEN SYSTEMS FOR A WIDE VARIETY OF APPLICATIONS

BAUER produces a complete product line of PSA-based nitrogen systems suitable for a wide variety of applications including:

- › Chemical Plants (blanketing)
- › Electronics (waver soldering)
- › Food & Beverage (MAP)
- › Plastic Injection Molding (Gas Injection Technology)
- › Oil & Gas Refineries (blanketing)
- › Structural Foam Molding

For these applications, BAUER PSA nitrogen generating systems are configured to include:

- › Feed air system (optional)
- › Feed air buffer tanks
- › Pre-filtration & desiccant dryers
- › Nitrogen generators
- › PSA swing buffer tanks
- › BAUER Verticus Boosters

Model	Nitrogen Purity	Nitrogen Flow From Booster*		Discharge Pressure From Booster		Required Feed Air Pressure		Required Feed Air Flow		Booster Motor Size	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR	HP	KW
BAUER NPX NITROGEN SYSTEMS											
SYSTEM 1	99.5 - 99.999%	4.5 -10.5	7.6 -17.8	5000	345	160	11	52.2-68.0	88.7 -115.6	5-7.5	3.7 -5.5
SYSTEM 2	99.5 - 99.999%	6.7-23.5	11.4-40	5000	345	205	14.1	85.1-109	144.7-185.3	7.5-15	5.5-11
SYSTEM 3	99.5 - 99.999%	10.6-38.3	18-65.2	5000	345	189	13	141-180	239.7-306	7.5-15	5.5-11
SYSTEM 4	99.5 - 99.999%	24.1-94.3	40-160	5000	345	189	13	344-435	585.3-739.5	15-60	11-45
SYSTEM 5	99.99- 99.999%	55.2-80.9	93-137.5	5000	345	189	13	689-694	1171-1179	50-60	37-45

\*Note 1 Nitrogen flow is dependent on desired nitrogen purity.

# BAUER NPX™ SYSTEM 1

Designed for High-Purity, High-Pressure Nitrogen Flow

Stationary On-Demand Nitrogen Generation System for High Pressure Applications up to 5000 PSIG

4.5-10 SCFM @99.5 - 99.999% N<sub>2</sub>



System 1 Shown:  
NPX6-30-995 to  
NPX6-30-99999

## SYSTEM FOOTPRINT

Approx. DIMENSIONS L X W X H inches

System 1: 126 x 90 x 96

System 1 Approx Weight: 5,774 lbs

- 1 Feed Air Buffer Tank
- 2 Water Separator
- 3 Pre filltration
- 4 Dryer
- 5 Post filtration
- 6 Nitrogen Generator
- 7 PSA Swing Buffer Tank
- 8 BAUER Verticus Booster

Model	Nitrogen Purity	Nitrogen Flow From Booster		Discharge Pressure From Booster		Required Feed Air Pressure		Required Feed Air Flow		Booster Motor Size	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR	HP	KW
SYSTEM 1											
NPX6-30-995	99.5%	10.5	17.8	5000	345	160	11	68.0	115.6	7.5	5.5
NPX6-30-999	99.9%	10.5	17.8	5000	345	160	11	61.6	104.7	7.5	5.5
NPX6-30-9999	99.99%	7.3	12.5	5000	345	160	11	55.2	93.8	7.5	5.5
NPX6-30-99999	99.999%	4.5	7.6	5000	345	160	11	52.2	88.7	5	3.7

Systems utilize BAUER’s Verticus 12.2 boosters  
Performance based on the following: Temperature : 100°F / 37.8°C, Elevation: Sea Level, Relative Humidity 70%, Performance: ISO 1217  
Designed to meet ISO 8573 Cl. 1.2.1 quality NitrogenParticle: < 100 P, Pressure Dew Point: ≤ -40°C, Oil: < 0.01 mg/m3

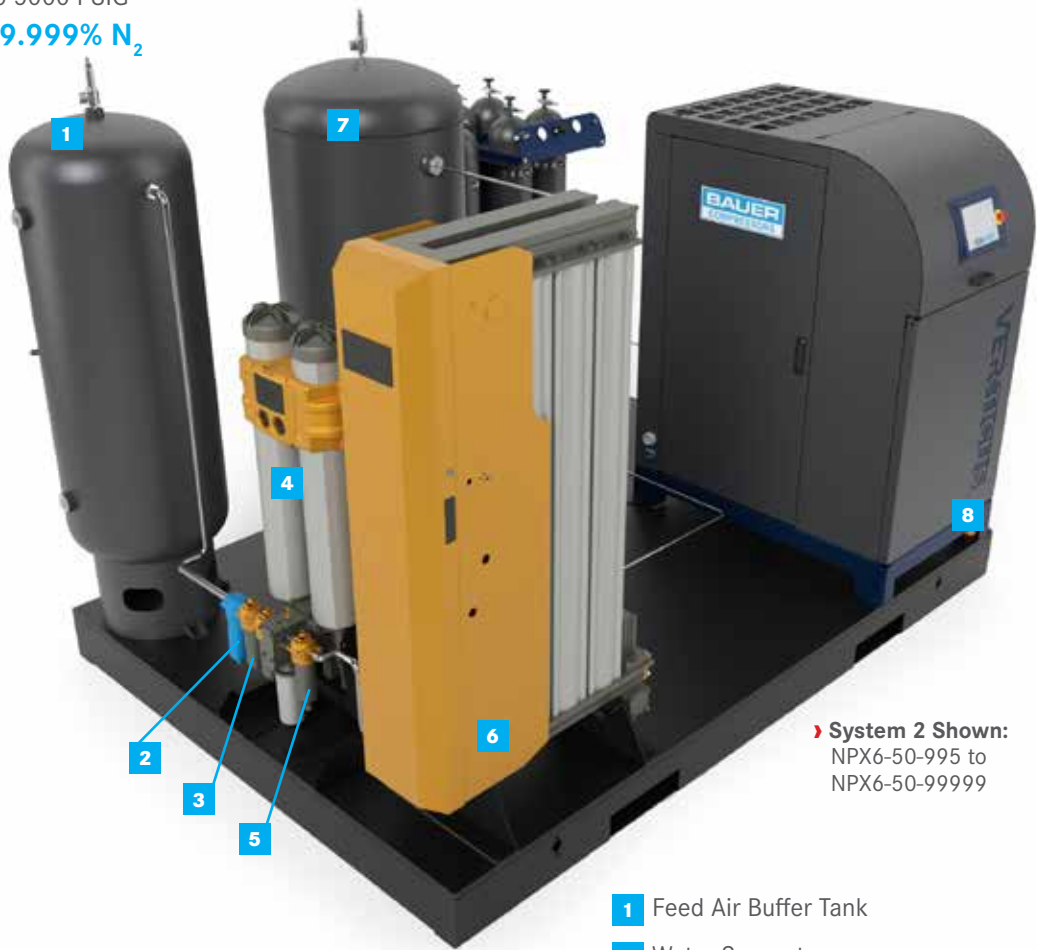


## BAUER NPX™ SYSTEM 2

Designed for High-Purity, High-Pressure Nitrogen Flow

Stationary On-Demand Nitrogen Generation System for High Pressure Applications up to 5000 PSIG

6.7-23.5 SCFM @99.5 - 99.999% N<sub>2</sub>



System 2 Shown:  
NPX6-50-995 to  
NPX6-50-99999

### SYSTEM FOOTPRINT

Approx. DIMENSIONS L X W X H inches

System 2: 126 x 90 x 96

System 2 Approx Weight: 6,160 lbs

- 1 Feed Air Buffer Tank
- 2 Water Separator
- 3 Pre filtration
- 4 Dryer
- 5 Post filtration
- 6 Nitrogen Generator
- 7 PSA Swing Buffer Tank
- 8 BAUER Verticus Booster

Model	Nitrogen Purity	Nitrogen Flow From Booster		Discharge Pressure From Booster		Required Feed Air Pressure		Required Feed Air Flow		Booster Motor Size	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR	HP	KW
SYSTEM 2											
NPX6-50-995	99.5%	23.5	40.0	5000	345	205	14.1	109.0	185.3	15	11
NPX6-50-999	99.9%	17.4	29.6	5000	345	205	14.1	96.0	163.2	10	7.5
NPX6-50-9999	99.99%	10.9	18.5	5000	345	205	14.1	87.0	147.9	7.5	5.5
NPX6-50-99999	99.999%	6.7	11.4	5000	345	205	14.1	85.1	144.7	7.5	5.5

Systems utilize BAUER's Verticus 12.2 & 15.3 boosters  
Performance based on the following: Temperature : 100°F / 37.8°C, Elevation: Sea Level, Relative Humidity 70%, Performance: ISO 1217  
Designed to meet ISO 8573 Cl. 1.2.1 quality NitrogenParticle: < 100 P, Pressure Dew Point: ≤ -40°C, Oil: < 0.01 mg/m3

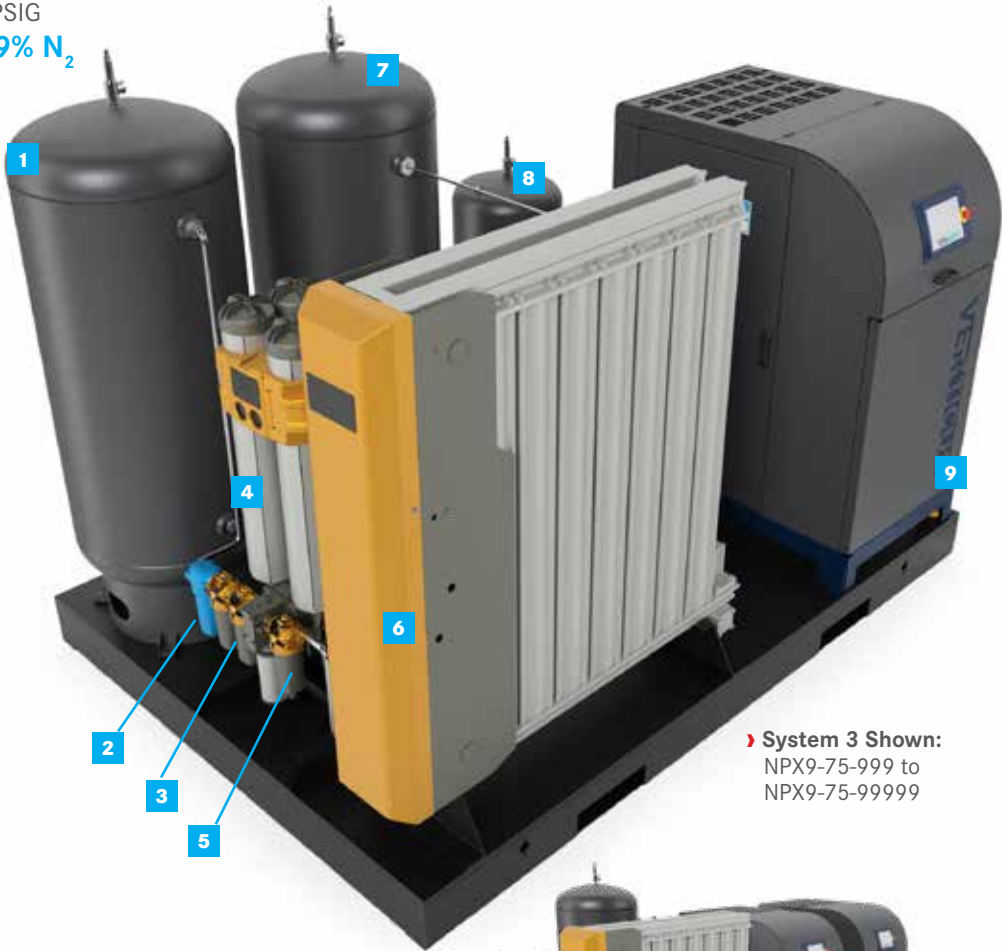
BAUER NPX™ SYSTEM 3

Designed for High-Purity, High-Pressure Nitrogen Flow

Stationary On-Demand Nitrogen Generation System for  
High Pressure Applications up to 5000 PSIG

10.6-38.3 SCFM @99.5 - 99.999% N<sub>2</sub>

- 1
- Feed Air Buffer Tank
- 2
- Water Separator
- 3
- Pre filtration
- 4
- Dryer
- 5
- Post filtration
- 6
- Nitrogen Generator
- 7
- PSA Swing Buffer Tank
- 8
- Nitrogen Booster Buffer Tank
- 9
- BAUER Verticus Booster



System 3 Shown:  
NPX9-75-999 to  
NPX9-75-99999

SYSTEM FOOTPRINT

Approx. DIMENSIONS L X W X H inches

System 3: 126 x 90 x 96

System 3 Approx Weight: 10,285 lbs

Approx. DIMENSIONS L X W X H inches

System 3 Duplex Booster Skid: 162 x 90 x 96

System 3 Duplex Booster Skid Approx Weight: 9,051 lbs



Duplex System 3 Shown:  
NPX9-75-995

Model	Nitrogen Purity	Nitrogen Flow From Booster		Discharge Pressure From Booster		Required Feed Air Pressure		Required Feed Air Flow		Booster Motor Size	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR	HP	KW
SYSTEM 3											
NPX9-75-995*	99.5%	38.3	65.2	5000	345	189	13	180.0	306.0	15	11
NPX9-75-999	99.9%	25.7	43.7	5000	345	189	13	162.0	275.4	15	11
NPX9-75-9999	99.99%	17.4	29.6	5000	345	189	13	145.0	246.5	15	11
NPX9-75-99999	99.999%	10.6	18.0	5000	345	189	13	141.0	239.7	7.5	5.5

\* Requires duplex booster skid  
Systems utilize BAUER's Verticus 12.2 & 15.3 boosters  
Performance based on the following: Temperature : 100°F / 37.8°C, Elevation: Sea Level, Relative Humidity 70%, Performance: ISO 1217  
Designed to meet ISO 8573 Cl. 1.2.1 quality NitrogenParticle: < 100 P, Pressure Dew Point: ≤ -40°C, Oil: < 0.01 mg/m3

BAUER NPX™ SYSTEM 4

Designed for High-Purity, High-Pressure Nitrogen Flow

Stationary On-Demand Nitrogen Generation System for  
High Pressure Applications up to 5000 PSIG

24.1-94.2 SCFM @99.5 - 99.999% N<sub>2</sub>

- 1 Feed Air Buffer Tank
- 2 Dryer
- 3 Nitrogen Generator
- 4 PSA Swing Buffer Tank
- 5 BAUER Nitrogen Booster
- 6 High-Pressure Storage
- 7 Nitrogen Booster Buffer Tank



SYSTEM FOOTPRINT

Approx. DIMENSIONS L X W X H inches

- › System 4: 162 x 90 x 117.5
- › System 4 Duplex Booster: 126 x 90 x 93.5
- › System 4 Booster Model: 23.10/23.12
- › Booster: 138 x 57 x 83.5
- › System 4 Verticus: 68 x 33 x 70

- System 4 Approx Weight:
- › Duplex 15.3 Booster Skid: 3,557 lb
- › C23 Booster Skid: 6,474 lb
- › 99.5 to 99999 (PSA Skid): 4,500 lb

Model	Nitrogen Purity	Nitrogen Flow From Booster		Discharge Pressure From Booster		Required Feed Air Pressure		Required Feed Air Flow		Booster Motor Size	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR	HP	KW
SYSTEM 4											
NPX28-200-995	99.5%	94.2	160.1	5000	345	189	13	435.0	739.0	60	45
NPX28-200-999	99.9%	74.1	125.9	5000	345	189	13	393.0	667.7	50	37
NPX28-200-9999*	99.99%	40.4	68.6	5000	345	189	13	347.0	589.5	15	11
NPX28-200-99999	99.999%	24.1	40.9	5000	345	189	13	344.3	584.9	15	11

\* Requires duplex booster skid

Systems utilize BAUER's Verticus 15.3 boosters & GIB23.10 & 23.12 boosters.

Performance based on the following: Temperature : 100°F / 37.8°C, Elevation: Sea Level, Relative Humidity 70%, Performance: ISO 1217

Designed to meet ISO 8573 Cl. 1.2.1 quality NitrogenParticle: < 100 P, Pressure Dew Point: ≤ -40°C, Oil: < 0.01 mg/m3



BAUER NPX™ SYSTEM 5

Designed for High-Purity, High-Pressure Nitrogen Flow

Stationary On-Demand Nitrogen Generation System for  
High Pressure Applications up to 5000 PSIG

80.9 SCFM @99.99% N<sub>2</sub>

50.2 SCFM @99.999% N<sub>2</sub>



- 1 Feed Air Buffer Tank
- 2 Water Separator
- 3 Dryer
- 4 Nitrogen Generator
- 5 PSA Swing Buffer Tank
- 6 BAUER Booster
- 7 High-Pressure Storage (optional)

System 5 Shown:

NPX42-250-9999

NPX42-250-99999

SYSTEM FOOTPRINT

Approx. DIMENSIONS L X W X H inches

System 5: 162 x 90 x 96 (x 2 skids)

System 5 Booster: 138 x 57 x 83.5

System 5 Approx Weight:

2 x PSA Skid: 9,000 lbs (total)

C23 Booster Skid: 6,474 lbs

Model	Nitrogen Purity	Nitrogen Flow From Booster		Discharge Pressure From Booster		Required Feed Air Pressure		Required Feed Air Flow		Booster Motor Size	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR	HP	KW
SYSTEM 5											
Duplex NPX28-200-9999	99.99%	80.9	137.5	5000	345	189	13	694.0	1179.1	60	45
Duplex NPX28-200-99999	99.999%	55.2	93.9	5000	345	189	13	689.0	1170.6	50	37

\* Requires duplex booster skid

Systems utilize BAUER's GIB23.10.

Performance based on the following: Temperature : 100°F / 37.8°C, Elevation: Sea Level, Relative Humidity 70%, Performance: ISO 1217

Designed to meet ISO 8573 Cl. 1.2.1 quality NitrogenParticle: < 100 P, Pressure Dew Point: ≤ -40°C, Oil: < 0.01 mg/m3

## PARTS



OEM PARTS WARRANTY



RAPID DELIVERY

### QUALITY AND RELIABILITY

Our factory-original replacement parts assures you that when maintenance or repair is performed, you are restoring the unit to its original specifications and performance.

1. Purification
2. Gaskets and Seals
3. Lubricants
4. Fill Hose and Assemblies
5. Valves
6. Air Intake Filters
7. All 10,000+ Parts



7 **PLUS, OVER 10,000  
OEM PARTS**

### COMPATIBILITY

We configure our designs with interchangeability and our end user in mind. You can count on parts being available for all BAUER models.

**PartsSales@BauerComp.com or 1-(844)-500-5822**

## BAUER HELPDESK



24-7 PHONE TECH SUPPORT



LIFECYCLE PERFORMANCE

### MECHANICAL & ELECTRICAL

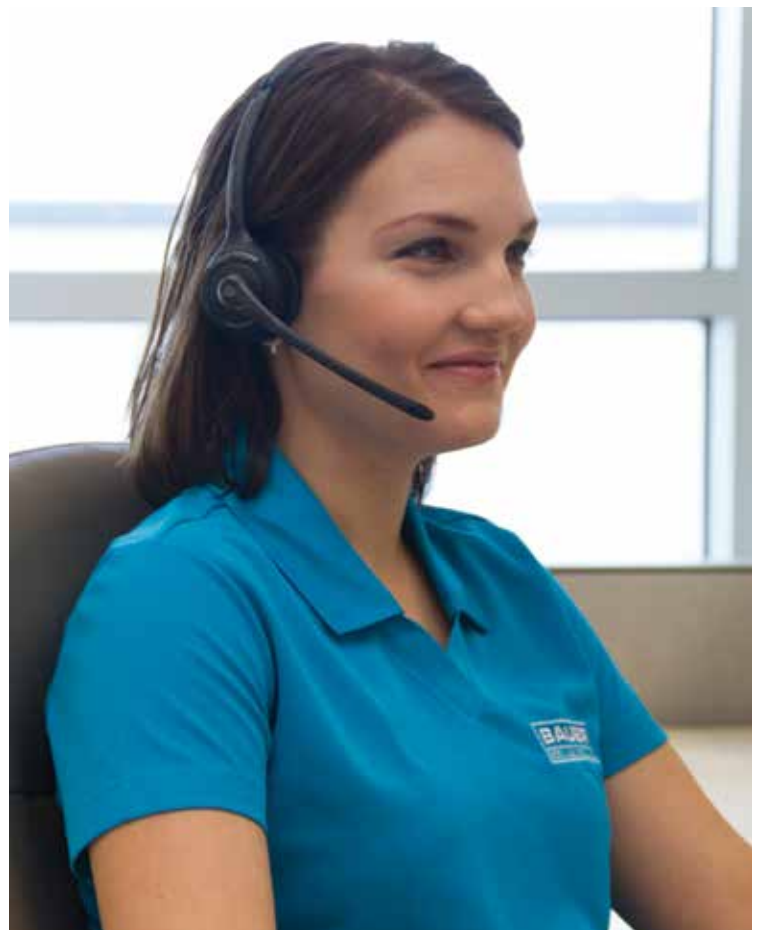
Total customer satisfaction is our top priority. BAUER provides 24-7 phone tech and **troubleshooting** support at our BAUER Helpdesk. Our support continues throughout our warranty period and beyond.

»»» For BAUER Helpdesk please email:

**CustomerService@BauerComp.com**

or call at:

**1-(844)-500-5822**

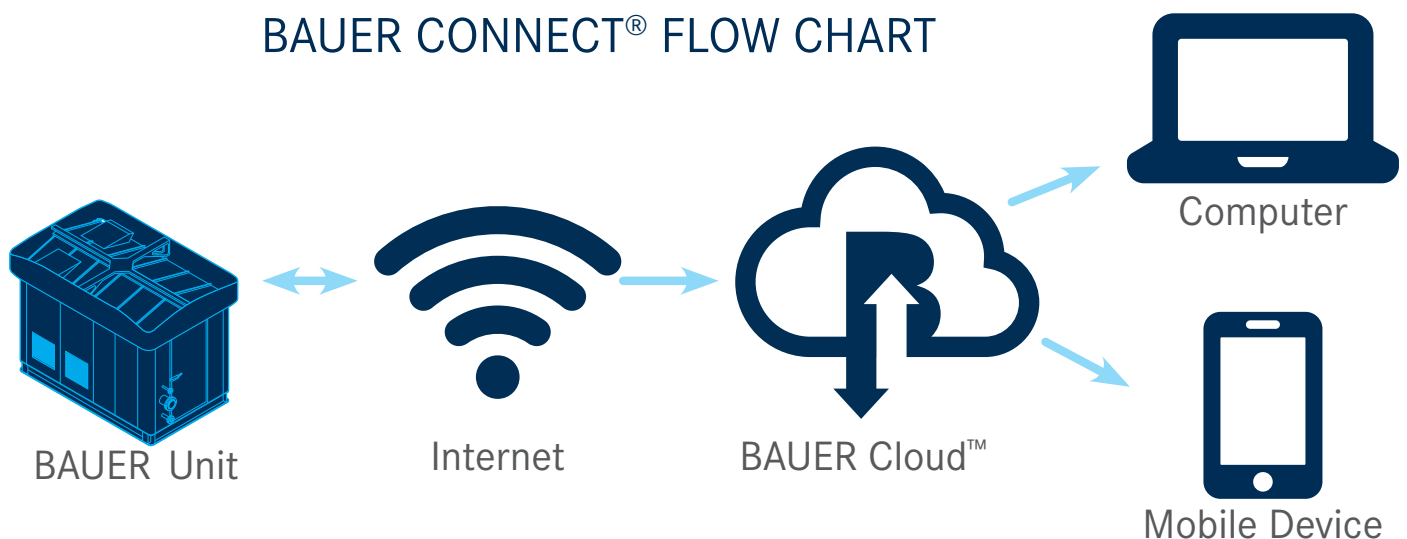




## BAUER CONNECT® REMOTE TELEMETRY AND CONTROL VIA MOBILE APP

BAUER CONNECT® is an App-based IoT solution that allows BAUER customers to remotely monitor the performance as well as control the entire BAUER system through any wireless mobile device or computer anywhere, anytime. The key features of this IoT solution, allow customers to increase efficiency and productivity, save time, do more with fewer resources, have lower operational costs and have total flexibility with a solution tailored specifically for them. BAUER CONNECT® – Connection that matters

### BAUER CONNECT® FLOW CHART







## BAUER REMOTE HMI

The BAUER Remote HMI function allows factory-trained technical personnel to remotely control the BAUER system via the BAUER CONNECT® App with the same functionality as if one were standing in front of the actual unit.

- › Live connection and control of all units no matter the location(s)
- › Save time and money with remote monitoring
- › Secure log-ins - Only approved team members can access and control your compressor system



## BAUER REPORTS

The BAUER Reports feature is a function that generates custom reports tailored to the specific needs of the customer. Customers can have access to historical data via a multitude of standard and customized reports.



## NOTIFICATIONS

The BAUER CONNECT® Mobile App will send push notifications if certain critical parameters of the BAUER system fall outside of normal operating range or if triggered by a system alert. This assures that essential personnel is notified immediately, thus allowing for pro-active intervention in a situation that could potentially be detrimental to the BAUER system as well as the customer's operation.



## MOBILE DASHBOARDS

BAUER CONNECT® App will also display a real-time graphical display of the entire system (SCADA view). The Mobile Dashboard feature provides information such as compressor system status, error log, critical pressures and temperatures, and volume of air dispensed in storage information, etc.

- › Quick reference of all of your units at your fingertips
- › Does not require password validation every time app is used
- › Beneficial tool, that allows for monitoring without the ability to control the unit(s)
- › Dashboards can be customized to specific customer needs



## BAUER PREDICTIVE ANALYTICS

This feature of BAUER CONNECT® provides a new pro-active dimension to perpetually maintaining customers' compressor systems at peak conditions with minimum downtime. BAUER's predictive analytics algorithm uses artificial intelligence to analyze the collected system information on the BAUER Cloud to predict upcoming maintenance requirements and preventative actions to avoid unplanned shutdowns.



Available on



To sign up and register go to [SignUp.Bauer-Connect.com](https://SignUp.Bauer-Connect.com)



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Subject to technical changes