

BAUER NPX™

High-Purity 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°F (-57°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 and prevention of chemical reactions: Since nitrogen is non-reactive, oxidation and other forms of corrosion can be minimized. Undesired chemical reactions in critical processes can also 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 N₂ 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% N₂ purity. PSA systems are therefore highly suitable for applications requiring >99.5% N₂ 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	For nitrogen purities from 99.9 to 99.999%	For nitrogen purities from 95.0-99.5%
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 PSA NITROGEN SYSTEMS

35 Years Of Nitrogen Generation Experience

WHY BUY NITROGEN WHEN YOU CAN MAKE YOUR OWN?

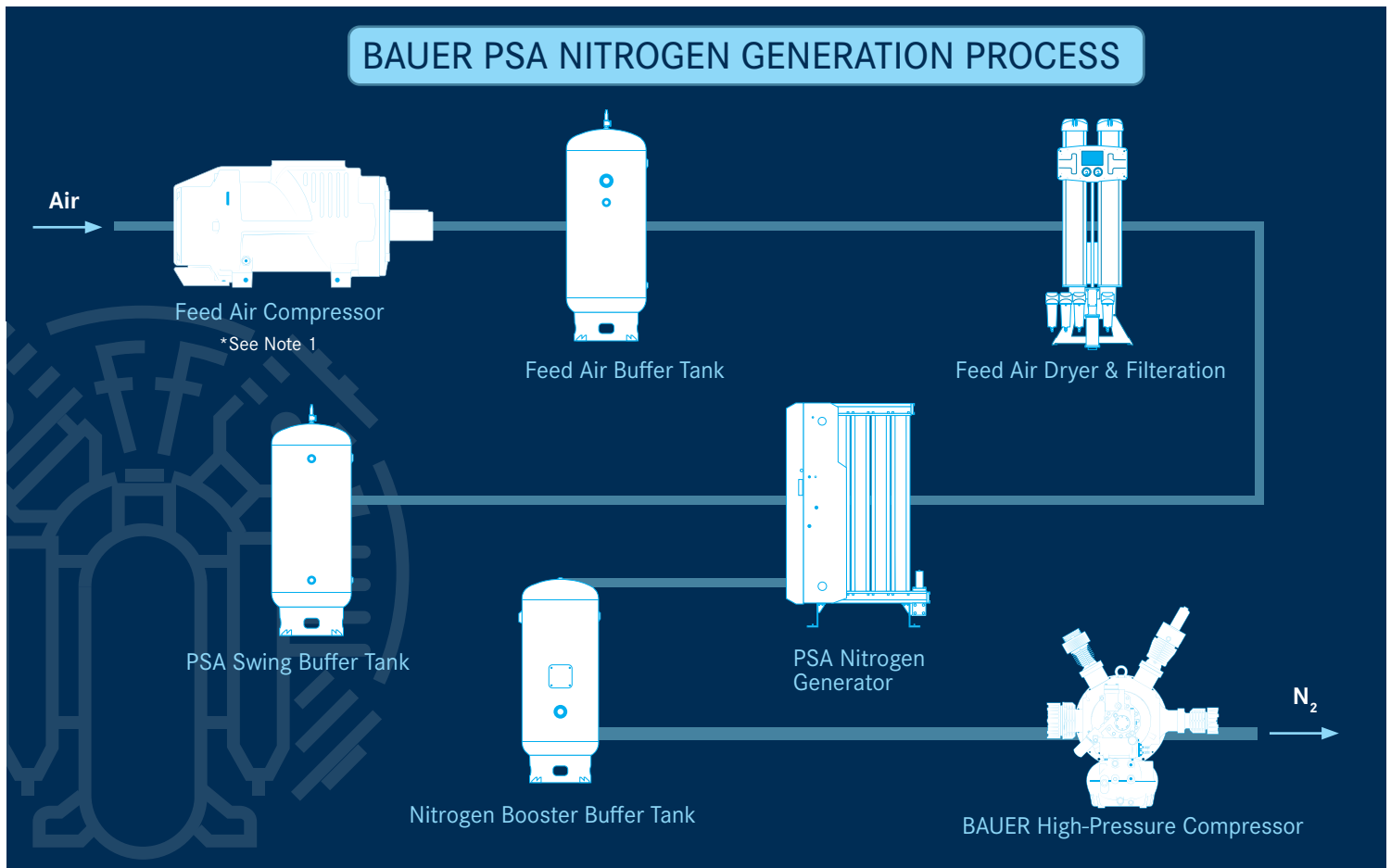
The BAUER Nitrogen Generators are self-contained, fully integrated, modular systems that eliminate the hazards involved with the handling of high-pressure cylinders, as well as the burden of the merchant-supplied nitrogen gas. BAUER PSA nitrogen generator systems are designed for the on-demand supply 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 PSA nitrogen systems are engineered to provide years of reliable performance. Critical performance values such as pressure, temperature and O₂ 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, Post-filtration, and desiccant dryers
- › Nitrogen generators
- › PSA swing buffer tanks
- › BAUER N-Series boosters compressor (optional)

Model	Nitrogen Purity	Nitrogen Flow From PSA*		Discharge Pressure From PSA		Required Feed Air Pressure		Required Feed Air Flow	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR
BAUER NPX NITROGEN SYSTEMS									
SYSTEM 1	99.5-99.999%	4.5 -19.6	7.6 -33.3	71-74	4.9-5.1	100	6.9	55.3-78.2	93.6-132.9
SYSTEM 2	99.5-99.999%	6.8-29.9	11.6-50.8	71-74	4.9-5.1	100	6.9	86.2-121	146.4-205.6
SYSTEM 3	99.5-99.999%	10.8-47.2	18.3-80.2	71-74	4.9-5.1	100	6.9	138.5-193.3	235.3-328.4
SYSTEM 4	99.5-99.999%	24.8-108.6	42.1-184.5	71-74	4.9-5.1	100	6.9	345.5-478	587-812.1

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



› **System 1 Shown:**
 NPX100-S1-99.5/99999 with optional
 BAUER N-Series booster compressor

- 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 N-Series Booster (optional)

BAUER NPX™ SYSTEM 1

Designed for High-Purity Nitrogen Flow
 Stationary On-Demand Nitrogen Generation System
4.5-19.6 SCFM @99.5 - 99.999% N₂

SYSTEM FOOTPRINT

Approx. DIMENSIONS L X W X H inches

› **System 1:** 136" x 90" x 96" (3454 mm x 2286 mm x 2438 mm). Approximate.

Model	Nitrogen Purity	Nitrogen Flow From PSA		Discharge Pressure From PSA		Required Feed Air Pressure		Required Feed Air Flow	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR
SYSTEM 1									
NPX100S1-995	99.5%	19.6	33.3	71	4.9	100	6.9	78.2	132.9
NPX100S1-999	99.9%	13.7	23.3	72	4.9	100	6.9	69.1	117.4
NPX100S1-9999	99.99%	8.6	14.6	74	5.1	100	6.9	62.5	106.2
NPX100S1-99999	99.999%	4.5	7.6	74	5.1	100	6.9	55.3	93.6

Performance based on the following: 95°F Ambient & 104°F Feed Air Temperatures
 Designed to meet ISO 8573 Cl. 1.2.1 quality Nitrogen Particle: < 100 P, Pressure Dew Point: ≤ -40°C, Oil: < 0.01 mg/m3



› **System 2 Shown:**
NPX100S2-99.5/99999 with optional
BAUER N-Series booster compressor

BAUER NPX™ SYSTEM 2

Designed for High-Purity Nitrogen Flow
Stationary On-Demand Nitrogen Generation System

6.8-29.9 SCFM @99.5 - 99.999% N₂

SYSTEM FOOTPRINT

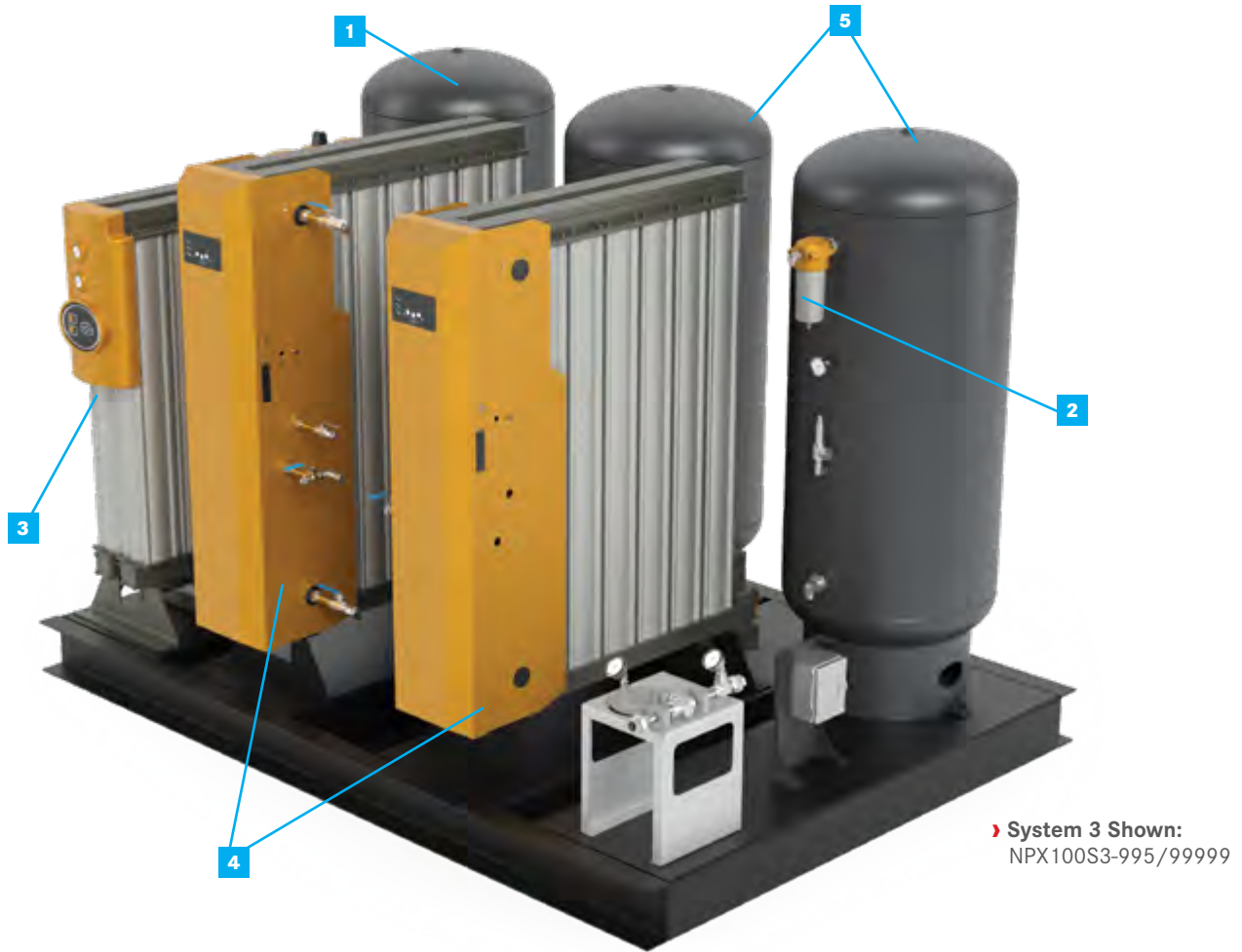
Approx. DIMENSIONS L X W X H inches

› **System 2:** 136" x 90" x 96" (3454 mm x 2286 mm x 2438 mm). Approximate.

- 1 Feed Air Buffer Tank
- 2 Pre filtration
- 3 Dryer
- 4 Post filtration
- 5 Nitrogen Generator
- 6 PSA Swing Buffer Tank
- 7 BAUER N-Series Booster (optional)

Model	Nitrogen Purity	Nitrogen Flow From PSA		Discharge Pressure From PSA		Required Feed Air Pressure		Required Feed Air Flow	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR
SYSTEM 2									
NPX 100S2-995	99.5%	29.9	50.8	71	4.9	100	6.9	121	205.6
NPX100S2-999	99.9%	20.9	35.5	72	4.9	100	6.9	106.4	180.8
NPX100S2-9999	99.99%	13	22.1	74	5.1	100	6.9	98.6	167.5
NPX100S2-99999	99.999%	6.8	11.6	74	5.1	100	6.9	86.2	146.4

Performance based on the following: 95°F Ambient & 104°F Feed Air Temperatures
Designed to meet ISO 8573 Cl. 1.2.1 quality Nitrogen Particle: < 100 P, Pressure Dew Point: ≤ -40°C, Oil: < 0.01 mg/m3



BAUER NPX™ SYSTEM 3

Designed for High-Purity Nitrogen Flow

Stationary On-Demand Nitrogen Generation System

10.8-47.2 SCFM @99.5 - 99.99% N₂

SYSTEM FOOTPRINT

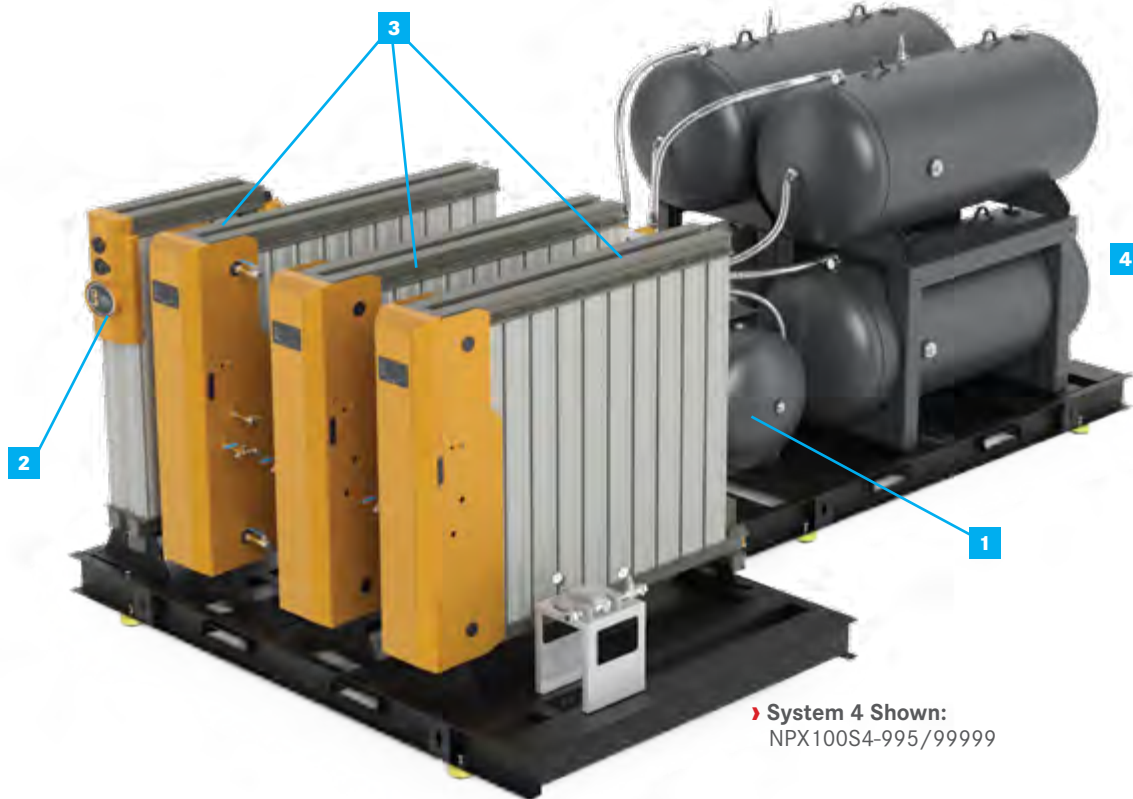
Approx. DIMENSIONS L X W X H inches

▶ **System 3:** 126 x 90 x 96 (3200 mm x 2286 mm x 2438 mm). Approximate.

- 1** Feed Air Buffer Tank
- 2** Water Separator
- 3** Dryer
- 4** Nitrogen Generator
- 5** PSA Swing Buffer Tank

Model	Nitrogen Purity	Nitrogen Flow From PSA		Discharge Pressure From PSA		Required Feed Air Pressure		Required Feed Air Flow	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR
SYSTEM 3									
NPX100S3-995	99.5%	47.2	80.2	71	4.9	100	6.9	193.3	328.4
NPX100S3-999	99.9%	33	56.1	72	4.9	100	6.9	171.6	291.5
NPX100S3-9999	99.99%	20.6	35	74	5.1	100	6.9	155.8	264.7
NPX100S3-99999	99.999%	10.8	18.3	74	5.1	100	6.9	138.5	235.3

Performance based on the following: Temperature : 98°F ambient temperature & 104°F feed air temperature
 Designed to meet ISO 8573 Cl. 1.2.1 quality nitrogen particle: < 100 P, Pressure Dew Point: ≤ -40°C, Oil: < 0.01 mg/m3



› System 4 Shown:
NPX100S4-995/99999

BAUER NPX™ SYSTEM 4

Designed for High-Purity Nitrogen Flow
Stationary On-Demand Nitrogen Generation System
24.8-108.6 SCFM @99.5 - 99.999% N₂

- 1** Feed Air Buffer Tank
- 2** Dryer
- 3** Nitrogen Generator
- 4** PSA Swing Buffer Tanks

SYSTEM FOOTPRINT

Approx. DIMENSIONS L X W X H inches

› System 4 (PSA): 126 x 90 x 85 (3200 mm x 2286 mm x 2159 mm). Approximate.

› System 4 (Tank): 126 x 90 x 97 (3200 mm x 2286 mm x 2464 mm). Approximate.

Model	Nitrogen Purity	Nitrogen Flow From PSA		Discharge Pressure From PSA		Required Feed Air Pressure		Required Feed Air Flow	
		SCFM	M3/HR	PSIG	BARG	PSIG	BARG	SCFM	M3/HR
SYSTEM 4									
NPX100S4-995	99.5%	108.6	184.5	71	4.9	100	6.9	478	812.1
NPX100S4-999	99.9%	76	129.1	72	4.9	100	6.9	429.4	729.5
NPX100S4-9999	99.99%	47.4	80.5	74	5.1	100	6.9	390	662.6
NPX100S4-99999	99.999%	24.8	42.1	74	5.1	100	6.9	345.5	587

Performance based on the following: Temperature : 98°F ambient temperature & 104°F feed air temperature
Designed to meet ISO 8573 Cl. 1.2.1 quality nitrogen particle: < 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



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

TRAINING



ON SITE/OFF SITE TRAINING



FACTORY TRAINED TECHS

BAUER COMPRESSORS INC. offers a variety of on site & off site Training Schools. Our on site classes are held at our BAUER Training Facility and are taught by the same people that help manufacture, test and service our products. From electrical systems to hands-on break downs, we cover all areas of compressor operation.

TRAINING TOPICS

Basic mechanical theory, control system theory (electric and pneumatic) along with troubleshooting for all BAUER systems.

Class schedule and course registration at:

www.BauerCustomerTraining.com



GLOBAL SERVICE

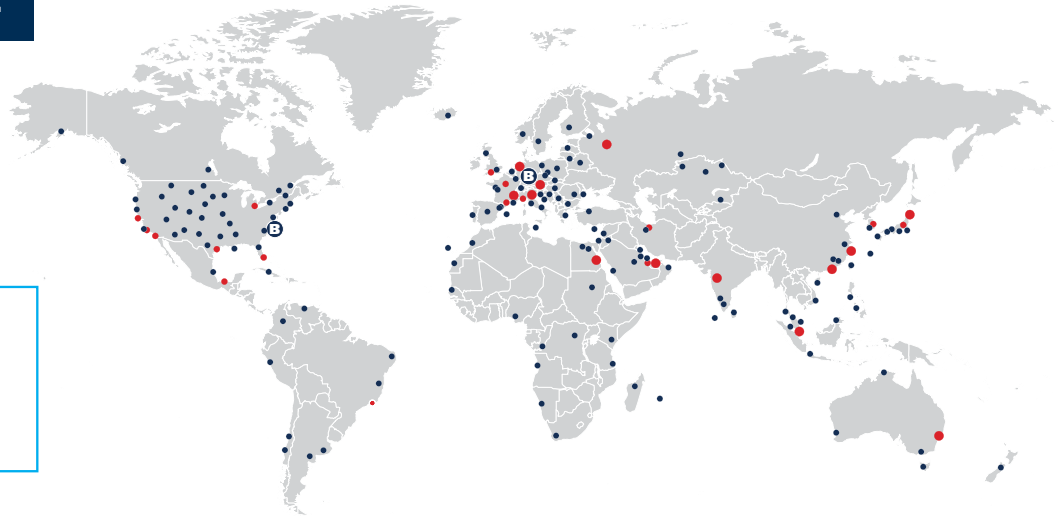


GLOBAL SERVICE REACH



FACTORY TRAINED TECHS

- B** BAUER Germany & BAUER Norfolk
- BAUER Branches
- BAUER Service Centers/Distributors



SERVICE AND SUPPORT

Our compressors are designed with you in mind. Easy to use manuals guide you through clear, mechanically accessible repairs. Our worldwide distribution network was developed to assist in after-sales support, along with product and maintenance parts assistance.

FROM THE SOURCE

BAUER COMPRESSORS INC., is certified with **ISO 9001:2015** quality processes providing you with confidence that cannot be duplicated by sub-standard after-market parts and service.

BAUER HELPDESK



24-7 PHONE TECH SUPPORT



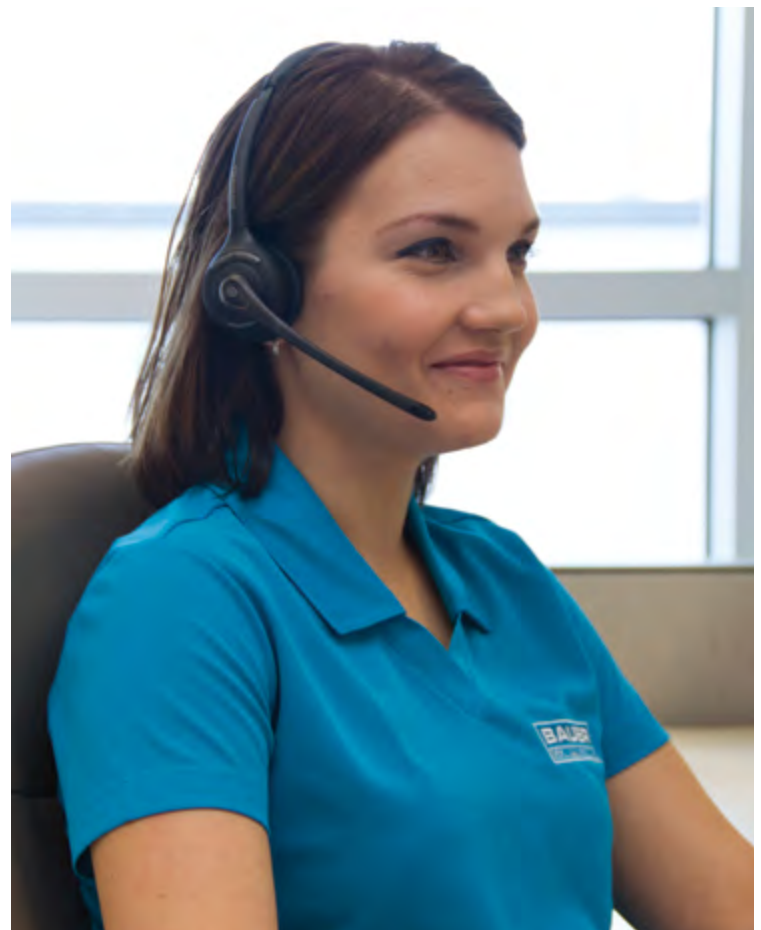
LIFECYCLE PERFORMANCE

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

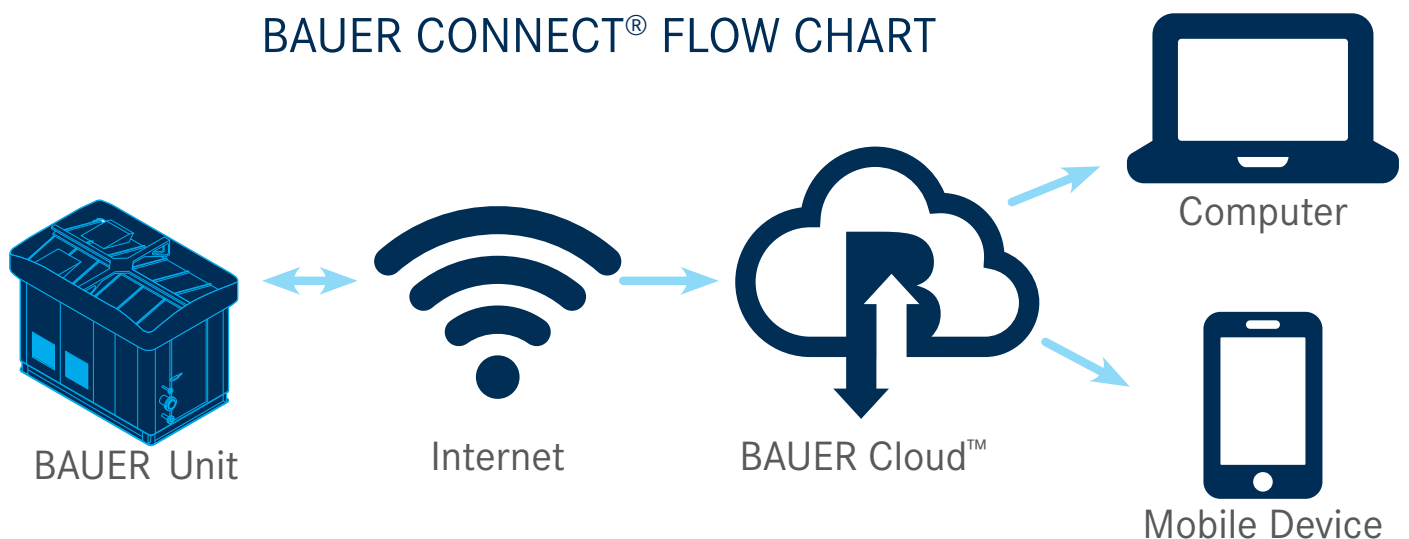




BAUER CONNECT® REMOTE TELEMETRY AND CONTROL VIA MOBILE APP

BAUER CONNECT® is an app and Internet-based IoT solution which allows BAUER customers to remotely control and monitor the performance of the entire BAUER system, through any wireless mobile device or computer; anytime, anywhere. Key Features: allow customers to increase efficiency and productivity, save time, do more with fewer resources, enjoy lower operational costs, and have total flexibility with a solution tailored specifically for the end-user. 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.

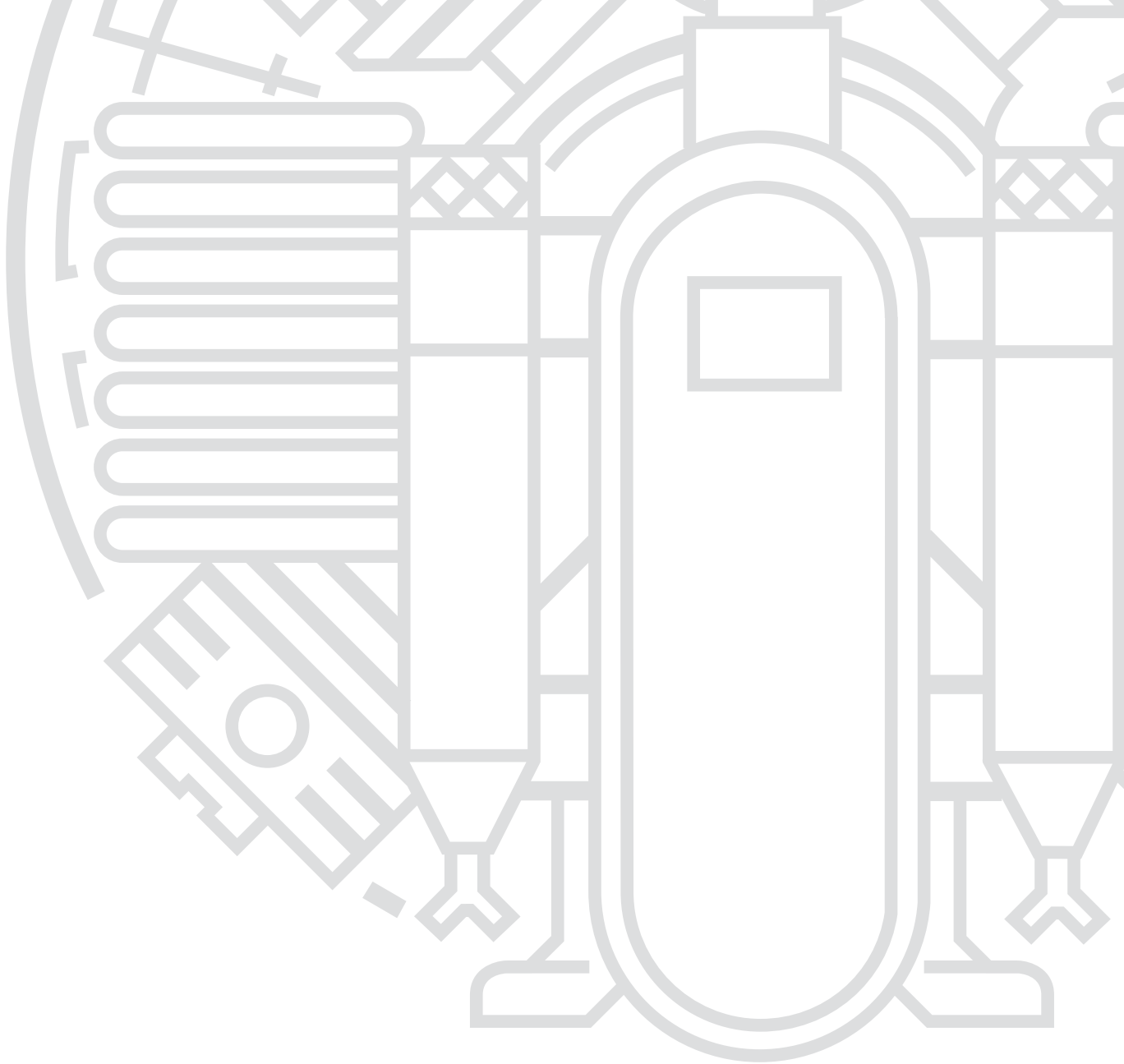
- › Quick reference of all of your units at your fingertips
- › Does not require password validation every time app is used
- › Beneficial tool, that allows for monitoring without the ability to control the unit(s)
- › Dashboards can be customized to specific customer needs

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.



To sign up and register go to Signup.Bauer-Connect.com



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