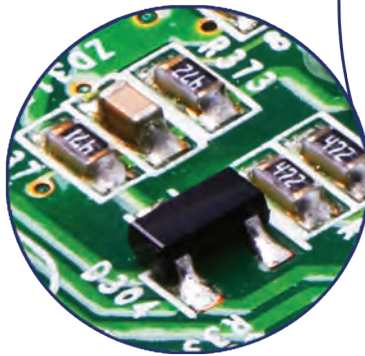
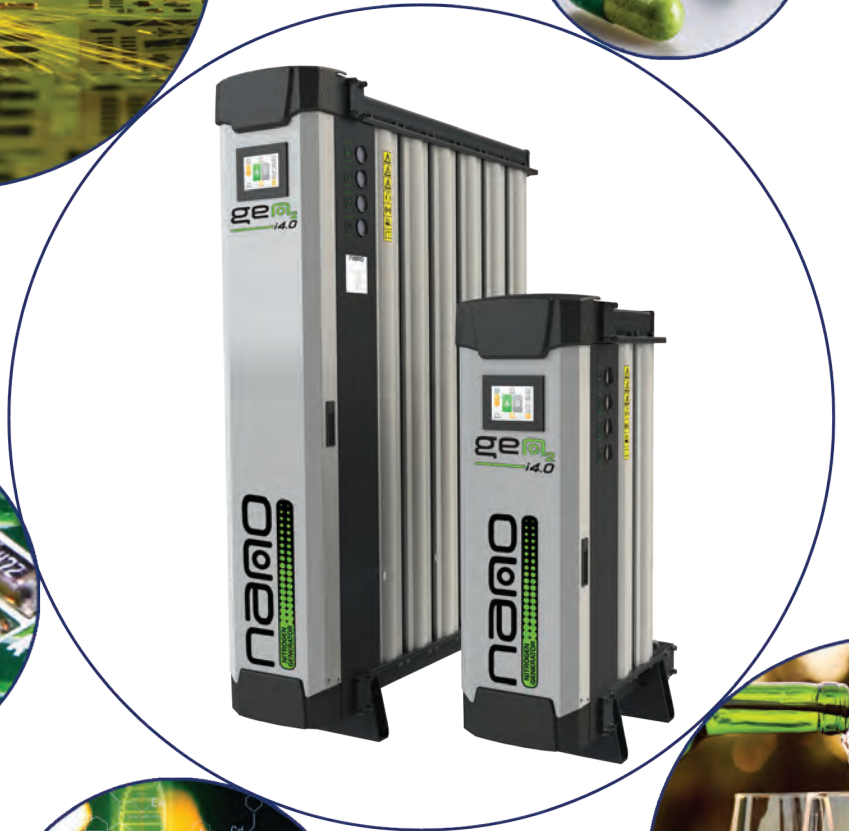
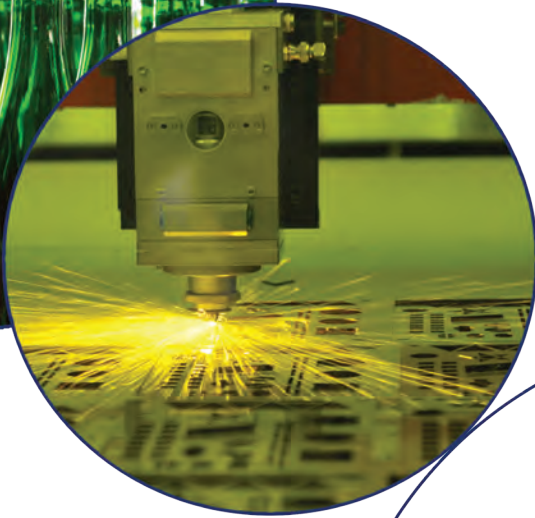


# nano



## ultra-high purity nitrogen generators

nitrogen purity: 95% to 99.999%

# “We are so impressed with the operation and performance of the nano GEN<sub>2</sub> i4.0 nitrogen gas generators we are looking to add additional modules next year.”

*major peanut & snack food packager - southeastern US*

Nitrogen is a dry, inert gas which is used in many commercial and industrial applications to improve quality or where oxygen may be harmful to the product or processes.

With traditional methods of gas supply such as liquid or bottled nitrogen, users are oftentimes responsible for hidden costs such as rental fees, refill and delivery surcharges, order processing charges as well as environmental fees.

Nitrogen generators begin with clean, dry compressed air to create a continuous supply of high purity nitrogen. Generating nitrogen in-house is a cost-effective and reliable alternative to the use of cylinder or liquid nitrogen across a wide range of applications.

## nano GEN<sub>2</sub> i4.0 nitrogen gas generators

- payback typically between 6 to 24 months
- easy installation with minimum cost and disruption
- user has complete control fulfilling nitrogen gas demand
- generate as little or as much nitrogen gas as needed at a fraction of delivered gas cost

### multi-bank design

The unique multi-bank design (GEN2 1110 to GEN2 12130) enables additional generators to be added in the future as demand increases and provides redundancy for ease of maintenance. Your GEN<sub>2</sub> i4.0 nitrogen generator can grow with your company.



## BENEFITS

### guaranteed performance

- 100% function and performance tested at our factory
- 2 YEAR WARRANTY

### rapid return on investment

- significant cost savings over cylinder or liquid supply provides a typical return on investment of less than 24 months
- ecomode energy savings control reduces energy consumption during periods of low demand



### fits any application

- maximum design operating pressure of 232 psig available

### design quality

- mass flow controller - ensures correct application pressure and flow
- integral oxygen analyzer - continuously measures and guarantees gas quality
- purity guarantee valve - automatically ensures gas meets desired specifications
- remote monitoring - enables connection to proprietary remote management and generator control systems

### easy to install

- the compact design allows installation in spaces too small for twin tower generator systems

### safe & reliable

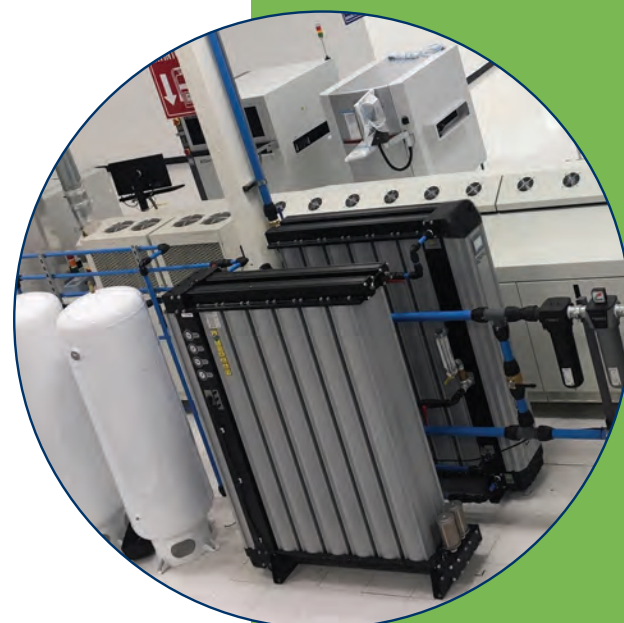
- eliminates the safety hazards of transporting and storing pressurized gas cylinders or liquid nitrogen

### easy to maintain

- innovative piston valves significantly reduce maintenance schedules and minimize downtime

### environmentally friendly

- reduces carbon footprint by eliminating gas delivery to your facility



## HOW IT WORKS

The technologically advanced nano GEN<sub>2</sub> i4.0 nitrogen generator operates on the Pressure Swing Adsorption (PSA) principle to produce a continuous uninterrupted stream of nitrogen gas from clean dry compressed air. Dual chamber extruded aluminum columns are filled with Carbon Molecular Sieve (CMS). Joined via an upper and lower manifold, the high density filled columns produce a dual bed system. After a preset time the control system automatically switches the beds. One bed is always online generating nitrogen while the other is being regenerated.

During regeneration, the oxygen that has been collected in the CMS stage and the moisture that has been collected in the optional integrated dryer stage are exhausted to atmosphere. A small portion of the outlet nitrogen gas is expanded into the bed to accelerate the regeneration process.



**A** clean compressed air enters the inlet into GEN<sub>2</sub> unit where the inlet valves direct the flow to either the left or right column sets

**B** after passing through the inlet valve, the compressed air enters one side of the manifold under the extruded columns

**C** the compressed air then flows up through the Carbon Molecular Sieve (CMS) beds where oxygen and other trace gases are preferentially adsorbed and allows the nitrogen to pass through

**D** the nitrogen gas then passes through the supporting bed layer with integrated filter into the outlet manifold before exiting through the outlet valves

**E** the N<sub>2</sub> gas continues to the buffer vessel and nano F<sup>1</sup> buffer vessel filter before returning to the GEN<sub>2</sub> unit for purity monitoring, flow & purity regulation

# FEATURES

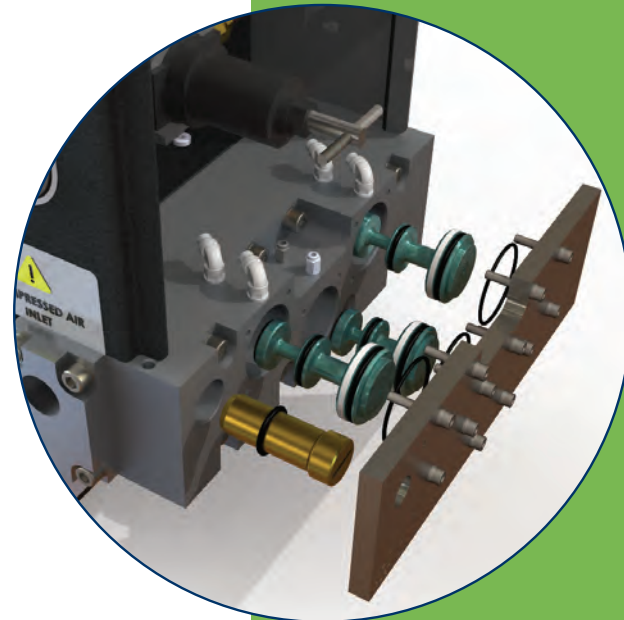
## PLC/HMI controlled operation **i4.0**

- operated by a reliable PLC control system with digital and optional analog outputs for remote monitoring and alarm capabilities
- provides the operator with continuous indication of column A, column B, Inlet air & N<sub>2</sub> outlet pressures and features an easy-to-operate touch screen graphical human-machine interface (HMI) which offers valuable information including:
  - power on/off
  - inlet & outlet pressure
  - service required
  - O<sub>2</sub> purity
  - online column
  - run hours



## reliable high performance valves

- inlet, outlet and exhaust are managed through unique integrated nano piston valves, which are designed for reliability, long service life and ease of maintenance
- incorporates adjustable equalization valves which smooth the column switch over, improve air/ N<sub>2</sub> ratios and extend CMS life

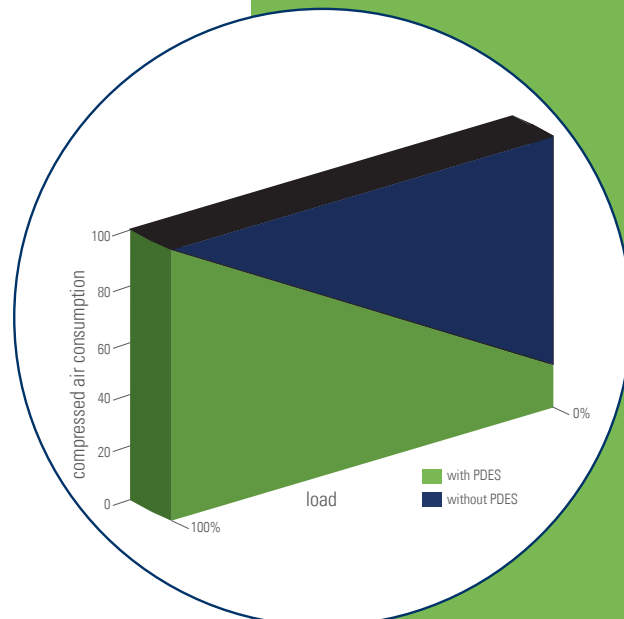


## communication

- standard communication protocols include modbus TCP communications via RJ45 ethernet port and 4-20 mA signal to monitor nitrogen purity
- an upgradable SD card records the performance of the generator and data that can be downloaded to any PC for analysis

## purity dependent energy saving (PDES)

- with the optional employment of 2 oxygen analyzers, the PDES option allows additional energy saving to be attained by keeping the purity within a narrow band of the required value
- achieved by elongating the adsorption cycle and consequently saving valuable compressed air and nitrogen consumed by the generator during column changeover



# SPECIFICATIONS

generator model	rated outlet flow <sup>(1)</sup>	nitrogen purity at the outlet (maximum oxygen content)*												dimensions (inches)			approx. weight (lbs)
		99.999% (10 ppm)	99.995% (50 ppm)	99.99% (100 ppm)	99.975% (250 ppm)	99.95% (500 ppm)	99.9% (0.10%)	99.5% (0.50%)	99% (1%)	98% (2%)	97% (3%)	96% (4%)	95% (5%)	A	B	C	
GEN2 i4.0-1110	scfh	32	60	71	88	106	127	184	205	258	293	335	364	48.15	15.7	23.82	214
GEN2 i4.0-2110	scfh	64	120	141	177	212	254	367	410	516	586	671	727	48.15	15.7	30.43	394
GEN2 i4.0-3110	scfh	95	180	212	265	318	381	551	614	773	879	1006	1091	48.15	15.7	37.05	575
GEN2 i4.0-2130	scfh	180	254	297	353	403	466	667	742	932	1070	1218	1324	71.77	15.7	30.43	548
GEN2 i4.0-3130	scfh	270	381	445	529	604	699	1001	1112	1398	1605	1828	1986	71.77	15.7	37.05	729
GEN2 i4.0-4130	scfh	360	509	593	706	805	932	1335	1483	1865	2140	2437	2649	71.77	15.7	43.66	967
GEN2 i4.0-6130	scfh	540	763	890	1058	1208	1398	2002	2225	2797	3210	3655	3973	71.77	15.7	56.89	1373
GEN2 i4.0-8130	scfh	720	1017	1187	1411	1610	1865	2670	2966	3729	4280	4873	5297	71.77	15.7	70.12	1739
GEN2 i4.0-10130	scfh	828	1170	1365	1623	1852	2144	3070	3411	4289	4922	5604	6092	71.77	15.7	83.34	1946
GEN2 i4.0-12130	scfh	962	1358	1584	1884	2150	2489	3564	3960	4979	5714	6506	7072	71.77	15.7	96.57	2447

\*without integrated dryer system

### specifications

design operating pressure range	87 - 174 psig (6 - 12 barg) <sup>(2)</sup>
design operating temperature range	41 - 122°F (5 - 50°C)
recommended operating temperature range	41 - 86°F (5 - 30°C)
maximum inlet particulate	0.1 micron
maximum inlet dew point	+38°F (3.3°C) PDP <sup>(3)</sup>
recommended inlet dew point	-40°F (-40°C) PDP
maximum inlet oil content	0.01 ppm <sup>(4)</sup>
supply voltage	100 - 240 VAC (50 or 60Hz)

### pressure correction factors<sup>(5)</sup>

operating pressure (psig)	90	100	115	130 - 174
operating pressure (barg)	6	7	8	9 - 12
correction factor	0.90	1.00	1.10	1.20

### temperature correction factors<sup>(5)</sup>

inlet temperature (°F)	41	50	59	68	77	86	95	104	113	122
inlet temperature (°C)	5	10	15	20	25	30	35	40	45	50
correction factor	0.8	0.9	0.94	1.00	1.00	0.98	0.95	0.90	0.85	0.72

(1) at 100 psig (7 barg) inlet pressure and 68 - 77°F (20 - 25°C) inlet temperature. For outlet flow at all other conditions refer to the correction factors above or contact support@n-psi.com

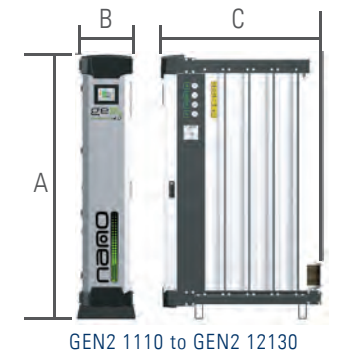
(2) 232 psig (16 barg) option available in USA. 210 psig (14.5 barg) option available in Canada. Consult factory

(3) for low purity applications only

(4) including oil vapor

(5) to be used as a rough guide only. All applications should be confirmed by nano. Contact nano for sizing assistance

(6) technical specifications subject to change without notice. Direct inquiries to support@n-psi.com or contact 704.897.2182



# EXPERIENCE. CUSTOMER. SERVICE.

Leading edge technology and hundreds of years of *experience*...nano-purification solutions, your world-class manufacturer of state-of-the-art compressed air and gas solutions to industry.

Our commitment at nano is to work alongside our *customers* and provide unique solutions with the highest quality products to solve your specific challenges.

A wealth of experience and leading edge products are only part of the equation. nano recognize that world-class customer *service* is the most important component to any successful business.



## DESIGN

Our experienced team of design engineers are always looking for new and unique technologies and products to bring you the highest level of performance and lowest overall operating cost.

## RESEARCH & DEVELOPMENT

Our R&D team endeavor to provide solutions that go beyond developing an existing product. They are continually researching new technologies which can provide unique advantages over competitive offerings.



## MANUFACTURE

The reliable and energy saving nano GEN<sub>2</sub> i4.0 range of nitrogen generators are manufactured in our state-of-the-art facility to the highest standards of build quality to ensure equipment reliability and high levels of performance.

## ENVIRONMENTALLY FRIENDLY

Through both product development and manufacturing, we strive to produce high quality products compliant to both local and global environmental legislation. Reduction of carbon footprint through energy saving products and use of environmentally friendly components are our commitment to you.



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charlotte, north carolina  
united states

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new bethlehem, pennsylvania  
united states

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