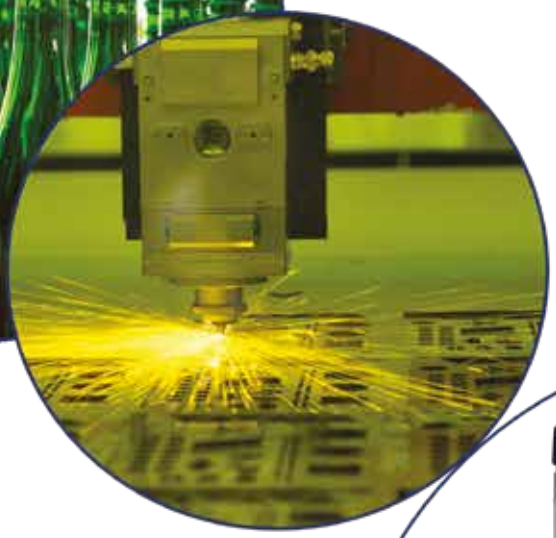
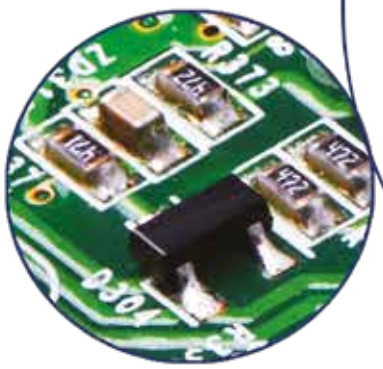
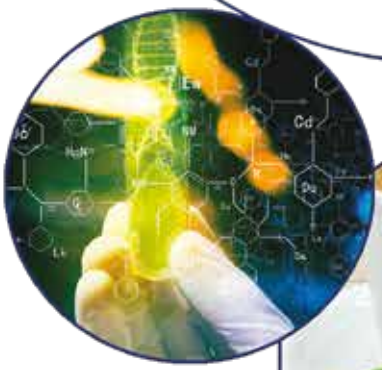
nano







ultra-high purity nitrogen generators

nitrogen purity: 95% to 99.999%

"We are so impressed with th of the nano GEN$_2$ *i4.0* nitro looking to add additional m

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.

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$_2$ i4.0 nitrogen generator can grow with your company.

e operation and performance ogen gas generators we are odules next year.”

nano GEN_2 *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

www.nano-purification.com

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_2 *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 is 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_2 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_2 gas continues to the buffer vessel and nano F^1 buffer vessel filter before returning to the GEN_2 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_2 outlet pressures and features an easy-to-operate touch screen graphical human-machine interface (HMI) which offers valuable information including:
  - power on/off
  - O_2 purity
  - inlet & outlet pressure
  - online column
  - service required
  - run hours

reliable high performance valves

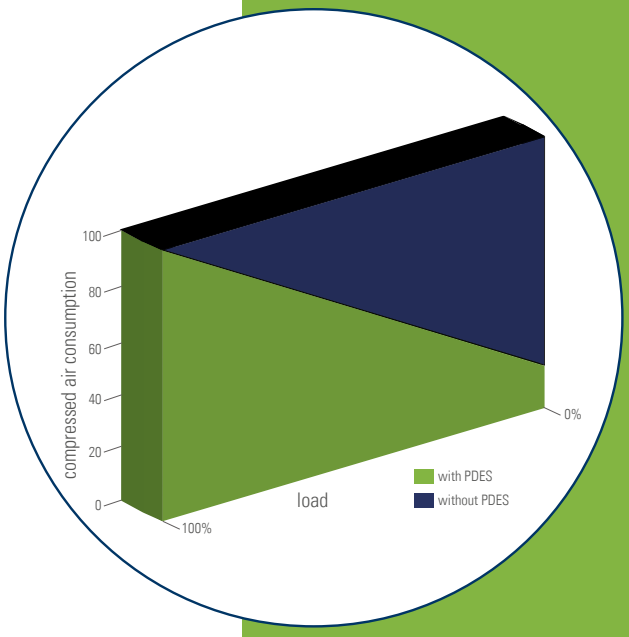
- inlet, outlet and exhaust are managed through unique integrated nano piston valves, which are designed for reliability, long service life and ease of maintenance
- incorporates adjustable equalization valves which smooth the column switch over, improve air/ N_2 ratios and extend CMS life

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

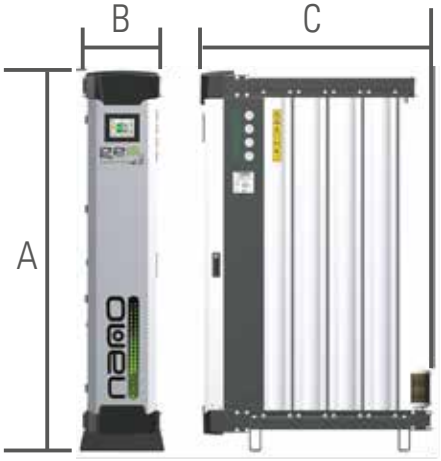


SPECIFICATIONS

generator model	rated outlet flow [1]	nitrogen purity* at the outlet (maximum oxygen content)												dimensions (mm)			approx. weight
		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	(kgs)
GEN2 i4.0-1110	Nm^3/h	0.9	1.7	2.0	2.5	3.0	3.6	5.2	5.8	7.3	8.3	9.5	10.3	1223	400	605	158
GEN2 i4.0-2110	Nm^3/h	1.8	3.4	4.0	5.0	6.0	7.2	10.4	11.6	14.5	16.7	19.0	20.6	1223	400	773	209
GEN2 i4.0-3110	Nm^3/h	2.7	5.1	6.0	7.5	9.0	10.8	15.6	17.3	21.8	25.0	28.5	30.9	1223	400	941	260
GEN2 i4.0-2130	Nm^3/h	5.1	7.2	8.9	10.0	11.4	13.2	18.9	21.0	26.4	30.3	34.5	37.5	1823	400	773	262
GEN2 i4.0-3130	Nm^3/h	7.7	10.8	12.6	15.0	17.1	19.8	28.4	31.5	39.6	45.5	51.8	56.3	1823	400	941	340
GEN2 i4.0-4130	Nm^3/h	10.2	14.4	16.8	20.0	22.8	26.4	37.8	42.0	52.8	60.6	69.0	75.0	1823	400	1109	418
GEN2 i4.0-6130	Nm^3/h	15.3	21.6	25.2	30.0	34.2	39.6	56.7	63.0	79.2	90.9	103.5	112.5	1823	400	1445	594
GEN2 i4.0-8130	Nm^3/h	20.4	28.8	33.6	40.0	45.6	52.8	75.6	84.0	105.6	121.2	138.0	150.0	1823	400	1781	730
GEN2 i4.0-10130	Nm^3/h	23.5	33.1	38.6	46.0	52.4	60.7	86.9	96.6	121.4	139.4	158.7	172.5	1823	400	2117	886
GEN2 i4.0-12130	Nm^3/h	27.2	38.4	44.9	53.3	60.9	70.5	100.9	112.1	141.0	161.8	184.2	200.3	1823	400	2453	1036

*nitrogen purity relative to oxygen content

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



GEN2 1110 to GEN2 12130

pressure correction factors [4]							
operating pressure (psig)	90	100	115	130	145	160	174
operating pressure (barg)	6	7	8	9	10	11	12
correction factor	0.88	1.00	1.10	1.20	1.30	1.40	1.50

temperature correction factors [5]										
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 sales@n-psi.co.uk
(2) for low purity applications only
(3) including oil vapor
(4) to be used as a rough guide only. All applications should be confirmed by nano. Contact nano for sizing assistance
(5) technical specifications subject to change without notice. Direct inquiries to sales@n-psi.co.uk.

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_2 *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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