



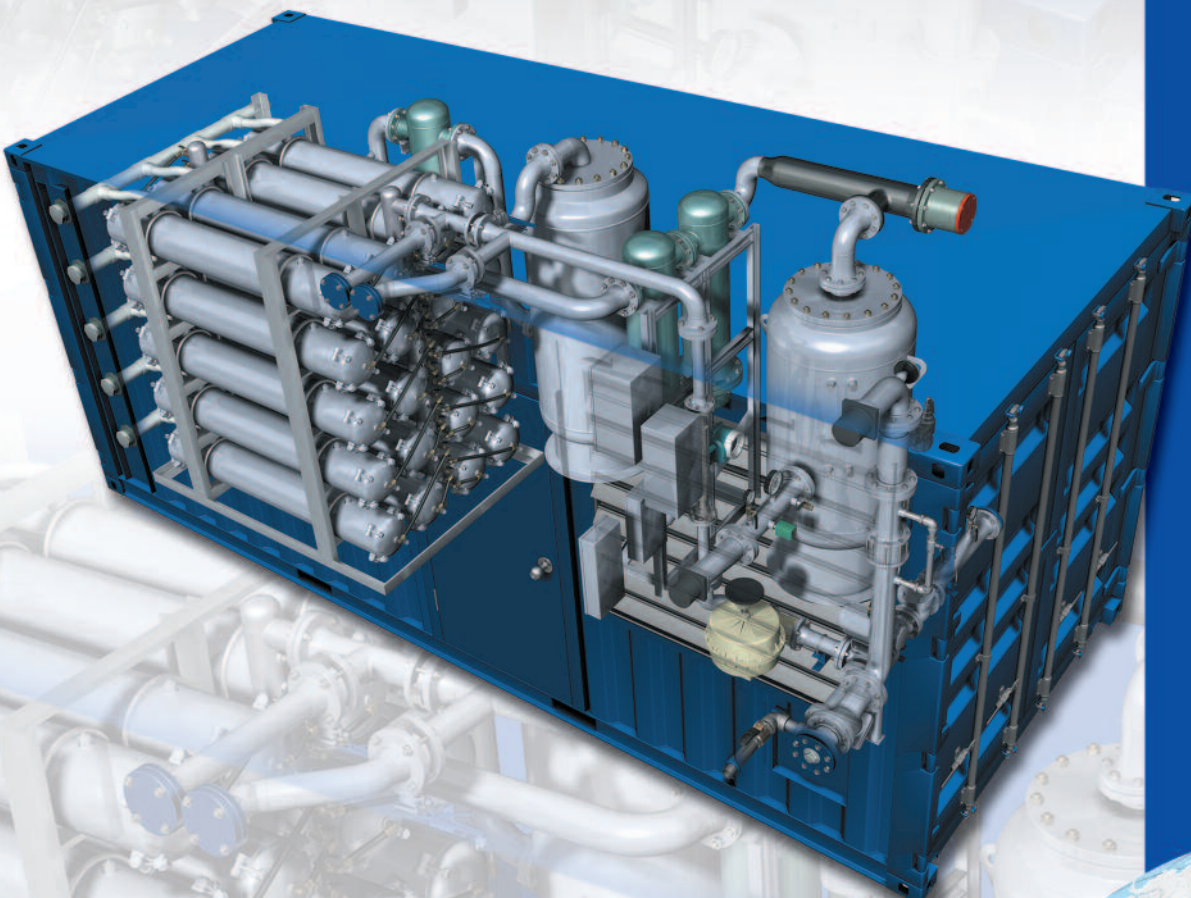
GENERON® NITROGEN PRODUCTION UNITS

*Nitrogen
On Demand*

*Highest
Efficiency*

*Highest
Purity*

*Lowest
Cost*



***From Concept To Completion,
We Provide Solutions!***



Generon® Membrane Technology

TECHNOLOGY

- Highest efficiency membranes on the market
- Long term commitment to R&D at our California module fabrication and research center
- Generon® has over 41 patents for its innovative polymer design
- Systems are designed by our experienced engineering team and assembled in our Houston manufacturing facility
- Generon® maintains a staff of engineers with extensive experience in system design and compression packaging to meet your individual needs



PERFORMANCE

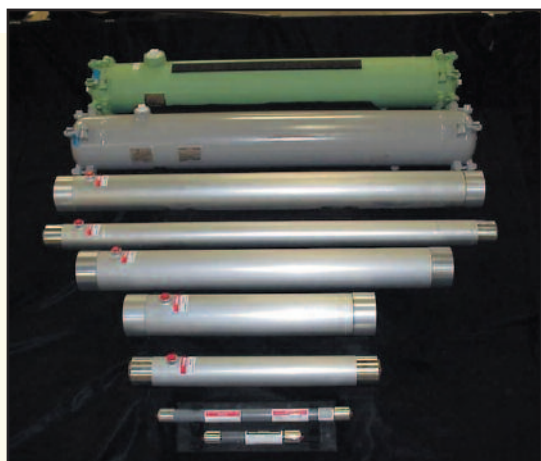
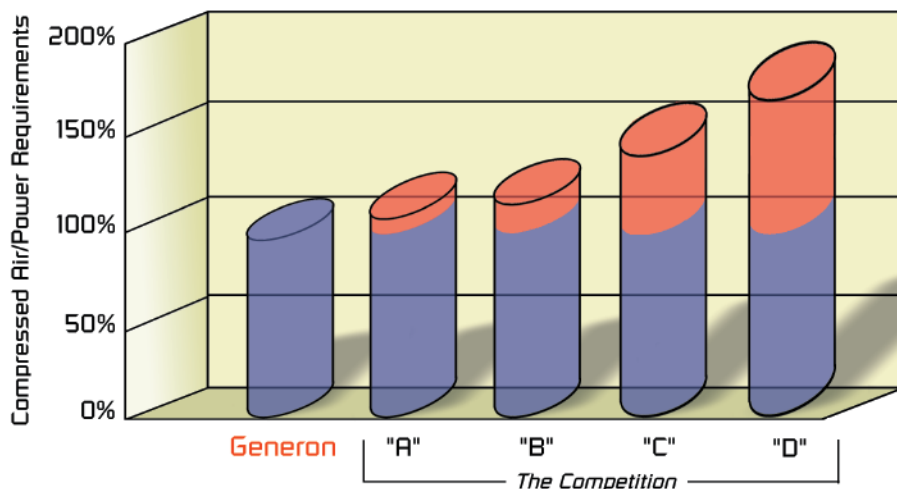
- Significant savings over bulk liquid or bottled Nitrogen
- Utilizes 12-90% less feed air than competitive systems
- Product durability assured through extensive product testing

Every membrane design must pass a 10,000 cycle pressure/temperature durability test simulating 10 years of operation

- Quality Manufacturing Operations

ISO 9001:2000 Certified

Power/Air Consumption Per Unit Of N2 Produced
(Product comparisons at 99% purity)



- ▲ Nitrogen purities to 99.9%
- ▲ Product Dew Points to -84°F (-64°C)
- ▲ Extensive product range for the smallest module producing 25 scfh (.7 Nm³/h) to large integrated system producing 187,000 scfh (4,915 Nm³/h)
- ▲ Product pressures available in two standards 200 psig / 14 barg and 330 psig / 23 barg
- ▲ System designed to 10,000 psig / 689 barg with post compression

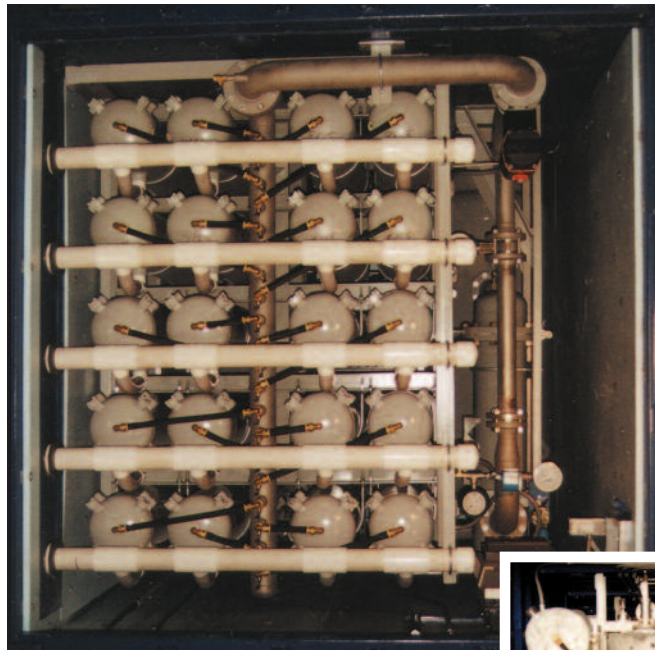
Generon® Nitrogen Production Units



- ▲ Generon® NPU series Portable Nitrogen Production Units provide a Nitrogen generating plant at your point of consumption.
- ▲ A Generon® NPU conditions the air and filters out Oxygen and water vapor by selective permeation of Oxygen and water vapor through the membrane fiber walls.
- ▲ Nitrogen flow and purity levels are adjustable to match your field application requirements.

STANDARD NPU FEATURES

- Produces continuous supply of gaseous Nitrogen
- Nitrogen flow rates up to 187,000 scfh (4,915 Nm³/h) or more
- Integral digital Oxygen analyzer controls and displays product purity
- Field tested and proven feed air pre-treatment system to ensure long system life
- Auto-vent discharges off-spec Nitrogen to protect your process
- ISO container design utilized for ease of transport by truck, ship or rail
- Product Nitrogen dew points to <-84°F (-64°C)
- Nitrogen purity automatically adjustable from 93-99.9%
- High accuracy air and Nitrogen flow-meters simplify monitoring
- Additional on-board after-coolers handle hot, saturated air
- Built in alarms notify user of off-line conditions
- Optional diesel driven heater protects NPU's during system shutdown; space heaters standard for arctic conditions
- Site conditions: designed for arctic or desert conditions





Generon® NPU Integrated Series



- ▲ Generon's engineering team located at its Houston headquarters, is well versed in custom designing integrated systems utilizing all the major suppliers of compression equipment.
- ▲ Generon's integrated NPU series can be equipped with both a feed air and Nitrogen booster compressor. The compressor equipment can be driven by electric or diesel-driven engines, at the customer's request.
- ▲ All systems come equipped with an interactive control system that can be linked to the customer's control and monitoring systems.
- ▲ Generon's engineering team will work closely with the leading compression equipment suppliers to ensure the optimal integration of the compression equipment meets the customer's exact requirements.
- ▲ Customized units to meet customer/area classification as requested.

Feed Air Compression

STANDARD VENDORS UTILIZED

- Atlas Copco
- Kaeser
- Sullair
- CompAir
- Others Upon Request

SYSTEM ATTRIBUTES

- Product Flows
51 - 331,500 scfh
1.4 - 8,715 Nm³/h
- Product Pressures
200-330 psig / 14 - 23 barg
- Operating Conditions
-40°F to 131°F (-40°C to 55°C)
- Power
3-2625 Hp

N2 Booster Compressor

STANDARD VENDORS UTILIZED

- Ariel
- GreenField
- Hurricane
- Knox Western
- Haskel
- Others Upon Request

SYSTEM ATTRIBUTES

- Product Flows
25 - 187,500 scfh
.7 - 4915 Nm³/h
- Product Pressures
500-5000 psig / 34-345 barg
- Operating Conditions
-40°F to 131°F (-40°C to 55°C)
- Power
260-1170 Hp

Model Designation	NPU 530	NPU 1050	NPU 1600	NPU 2100
N ₂ Output @ 95% N ₂ + Inerts	530 scfm / 14 Nm ³ /m	1050 scfm / 28 Nm ³ /m	1600 scfm / 42 Nm ³ /m	2100 scfm / 55Nm ³ /m
Maximum Working Pressure	200 psig / 14 barg	200 psig / 14 barg	200 psig / 14 barg	200 psig / 14 barg
N ₂ Dew Point (Atm)	< -84°F / < -64°C			
Dimensions (LxWxH) ft/m	10' x 8' x 8'6"/3 x 2.4 x 2.6	10' x 8' x 8'6"/3 x 2.4 x 2.6	10' x 8' x 8'6"/3 x 2.4 x 2.6	10' x 8' x 8'6"/3 x 2.4 x 2.6
Weight (lbs/kg)	12,500 lbs / 5,670 kg	15,000 lbs / 6,804 kg	24,500 lbs / 11,113 kg	28,000 lbs / 12,701 kg
Operating Temperature Range	-40°F / 131°F (-40°C / 55°C)			
Electrical Power	480V / 3Ph/60Hz Standard, customer to specify alternate power supply			
PLC Operator Terminal	Standard	Standard	Standard	Standard
Heater	Standard	Standard	Standard	Standard
Oxygen Analyzer	Standard	Standard	Standard	Standard
Air Cooler	Standard	Standard	Standard	Standard
Remote Telemetry	Optional	Optional	Optional	Optional
Electrical Generator	Optional	Optional	Optional	Optional
Heavy Duty Oilfield Base Skid	Optional	Optional	Optional	Optional

Model Designation	NPU 530	NPU 1050	NPU 1600	NPU 2100
N ₂ Output @ 95% N ₂ + Inerts	530 scfm/ 14 Nm ³ /m	1050 scfm/ 28 Nm ³ /m	1600 scfm/ 42 Nm ³ /m	2100 scfm/ 55 Nm ³ /m
Maximum Discharge Pressure	5000 psig/ 345 barg	5000 psig/ 345 barg	5000 psig/ 345 barg	5000 psig/ 345 barg
N ₂ Purity Range	93 - 99+%			
N ₂ Dew Point (Atm)	< -84°F / < -64°C			
Dimensions (LxWxH) ft/m	2 x (20 x 8 x 8.5)/ 2 x (6.2 x 2.5 x 2.6)	4 x (20 x 8 x 8.5)/ 4 x (6.2 x 2.5 x 2.6)	5 x (20 x 8 x 8.5)/ 5 x (6.2 x 2.5 x 2.6)	6 x (20 x 8 x 8.5)/ 6 x (6.2 x 2.5 x 2.6)
Weight (lbs/kg)	29,000 lbs / 13,154 kg	39,000 lbs / 17,690 kg	76,000 lbs / 34,473 kg	—
Required Utilities	Diesel Fuel and 24 VDC Power			
Feed Air Compressor	NPU 530	NPU 1050	NPU 1600	NPU 2100
Compressor Type	Oil-Lubricated, Air Cooled, Rotary Screw			
Rated Shaft Horsepower	525 Hp / 391 kW	1008 Hp / 752 kW	1575 Hp / 1175 kW	2100 Hp / 1566 kW
RPM Operating Range	1800-2100	1800-2100	1800-2100	1800-2100
Temperature Range	-40°F / 131°F (-40°C / 55°C)			
Prime Mover	Diesel Engine - Standard, other per customer requirement			
N ₂ Booster Compressor	NPU 530	NPU 1050	NPU 1600	NPU 2100
Compressor Type	Multi-stage, Air-cooled, Reciprocating			
Rated Shaft Horsepower	260 Hp / 194 kW	390 Hp / 291 kW	510 Hp / 381 kW	785 Hp / 587 kW
RPM Operating Range	1800-2100	1800-2100	1800-2100	1800-2100
Temperature Range	-40°F / 131°F (-40°C / 55°C)			
Prime Mover	Diesel Engine - Standard, other per customer requirement			
System Power	NPU 530	NPU 1050	NPU 1600	NPU 2100
Electrical System	Diesel Engine - Standard, other per customer requirement			
Starter	24 VDC			
Engine Heater	Glycol System			
Controls	Centralized Panel, PLC-based			
Skid Configuration	Heavy duty, Roll-off capability or standard ISO container			
Weather-Proof Enclosure	Optional, per customer specifications			

Model Designation	NPU 780	NPU 1560	NPU 2340	NPU 3100
N ₂ Output @ 95% N ₂ + Inerts	780 scfm / 20 Nm ³ /m	1560 scfm / 41 Nm ³ /m	2340 scfm / 61 Nm ³ /m	3100 scfm / 81 Nm ³ /m
Maximum Working Pressure	330 psig / 23 barg	330 psig / 23 barg	330 psig / 23 barg	330 psig / 23 barg
N ₂ Dew Point (Atm)	< -84°F / < -64°C			
Dimensions (LxWxH) ft/m	10' x 8' x 8'6"/3 x 2.4 x 2.6	10' x 8' x 8'6"/3 x 2.4 x 2.6	20' x 8' x 8'6"/3 x 2.4 x 2.6	20' x 8' x 8'6"/3 x 2.4 x 2.6
Weight (lbs/kg)	13,500 lbs / 6,125 kg	16,000 lbs / 7,258 kg	25,500 lbs / 11,567 kg	29,000 lbs / 13,154 kg
Operating Temperature Range	-40°F / 131°F (-40°C / 55°C)			
Electrical Power	480V / 3Ph/60Hz Standard, customer to specify alternate power supply			
PLC Operator Terminal	Standard	Standard	Standard	Standard
Heater	Standard	Standard	Standard	Standard
Oxygen Analyzer	Standard	Standard	Standard	Standard
Air Cooler	Standard	Standard	Standard	Standard
Remote Telemetry	Optional	Optional	Optional	Optional
Electrical Generator	Optional	Optional	Optional	Optional
Heavy Duty Oilfield Base Skid	Optional	Optional	Optional	Optional

Model Designation	NPU 780	NPU 1560	NPU 2340	NPU 3100
N ₂ Output @ 95% N ₂ + Inerts	780 scfm / 20 Nm ³ /m	1560 scfm / 41 Nm ³ /m	2340 scfm / 61 Nm ³ /m	3100 scfm / 81 Nm ³ /m
Maximum Discharge Pressure	5000 psig / 345 barg	5000 psig / 345 barg	5000 psig / 345 barg	5000 psig / 345 barg
N ₂ Purity Range	93 - 99+%			
N ₂ Dew Point (Atm)	< -84°F / < -64°C			
Dimensions (LxWxH) ft/m	3 x (20x8x8.5)/ 3 x (6.2x2.5x2.6)	5 x (20x8x8.5)/ 5 x (6.2x2.5x2.6)	7 x (20x8x8.5)/ 7 x (6.2x2.5x2.6)	8x(20x8x8.5)/ 8 x (6.2x2.5x2.6)
Weight (lbs/kg)	53,000 lbs / 24,040 kg	77,000 lbs / 34,927 kg	101,000 lbs / 45,813 kg	121,000 lbs / 54,885 kg
Required Utilities	Diesel Fuel and 24 VDC Power			
Feed Air Compressor	NPU 780	NPU 1560	NPU 2340	NPU 3100
Compressor Type	Oil-Lubricated, Air Cooled, Rotary Screw			
Rated Shaft Horsepower	900 Hp / 672 kW	1425 Hp / 1063 kW	2025 Hp / 1510 kW	2520 Hp / 1880 kW
RPM Operating Range	1800-2100	1800-2100	1800-2100	1800-2100
Temperature Range	-40°F / 131°F (-40°C / 55°C)			
Prime Mover	Diesel Engine - Standard, other per customer requirement			
N₂ Booster Compressor	NPU 780	NPU 1560	NPU 2340	NPU 3100
Compressor Type	Multi-stage, Air-cooled, Reciprocating			
Rated Shaft Horsepower	273 Hp / 204 kW	546 Hp / 407 kW	819 Hp / 611 kW	1092 Hp / 814 kW
RPM Operating Range	1800-2100	1800-2100	1800-2100	1800-2100
Temperature Range	-40°F / 131°F (-40°C / 55°C)			
Prime Mover	Diesel Engine - Standard, other per customer requirement			
System Power	NPU 780	NPU 1560	NPU 2340	NPU 3100
Electrical System	Diesel Engine - Standard, other per customer requirement			
Starter	24 VDC			
Engine Heater	Glycol System			
Controls	Centralized Panel, PLC-based			
Skid Configuration	Heavy duty, Roll-off capability or standard ISO container			
Weather-Proof Enclosure	Optional, per customer specifications			

IGS Generon® References, Standards and Track Record

Sampling of Customer Reference List

- | | | |
|-----------------|-------------------|-------------------------------|
| ▲ ADM | ▲ Chevron/Texaco | ▲ Mitsubishi Heavy Industries |
| ▲ Aker Kvaerner | ▲ Chiquita | ▲ Modec |
| ▲ Allied Signal | ▲ Conoco/Phillips | ▲ Nestle |
| ▲ AMEC | ▲ Daewoo | ▲ Odra Gas |
| ▲ Amerada Hess | ▲ Dome Petroleum | ▲ Oilvest |
| ▲ Aramco | ▲ Dow Chemical | ▲ Pemex |
| ▲ BASF | ▲ Global Santa Fe | ▲ Rexroth |
| ▲ Bayer | ▲ Halliburton | ▲ Sener Petrol |
| ▲ Bechtel | ▲ Hamworthy | ▲ Sinopec |
| ▲ Bilnam | ▲ Hibernia | ▲ Statoil |
| ▲ BJ Services | ▲ Hoek Loos | ▲ Shell |
| ▲ BOC | ▲ Hutchinson | ▲ Transocean |
| ▲ BP | ▲ KBR | ▲ Unitor |
| ▲ Burk Royalty | ▲ Linde | ▲ Weatherford |
| ▲ Celanese | ▲ Lubrizol | |

Industry Standards

- | | |
|-------------------|---------------------------|
| ▲ ASME | ▲ IEC/NEC |
| ▲ CE | ▲ NFPA RINA |
| ▲ ATEX/CENELEC | ▲ Class I Div 2 |
| ▲ DNV | ▲ Zone 2 |
| ▲ Lloyds Register | ▲ GOST |
| ▲ CSA | ▲ Class NK |
| ▲ Bureau Veritas | ▲ Germanischer Lloyd |
| ▲ ABS | ▲ NEMA/IP |
| ▲ Baseefa | ▲ Customer Specifications |

System History

- ▲ Over 22,000 Nitrogen/Dehydration Membranes Sold To Date
- Including:
 - 100+ NPU Systems
 - 500+ Engineered Systems
 - 189+ Cabinet Systems



❑ Innovative Gas Systems is a global technology company with operational centers in North America, Europe and Asia.

❑ Our products are world class with over 75 patents supporting our innovative technology in Nitrogen/Dehydration membranes, Nitrogen PSA and Oxygen PSA/VPSA.

❑ Please visit our website for a review of the complete list of products from IGS or contact one of our local sales associates directly.



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