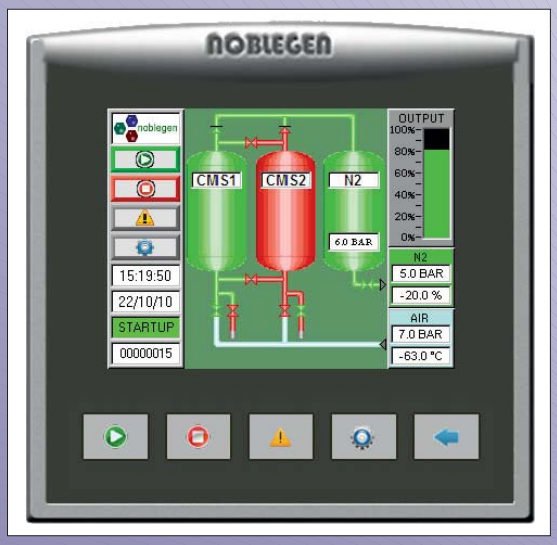
MAXIMUS+

Industrial Nitrogen Generator

PDS Energy Saving

Trend Graphs



HMI Touch Screen

ATEX Versions

Noblegen Gas Generators
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PSA Systems

A Description of PSA Technology

This system is made up of two beds of Carbon Molecular Sieve (CMS).

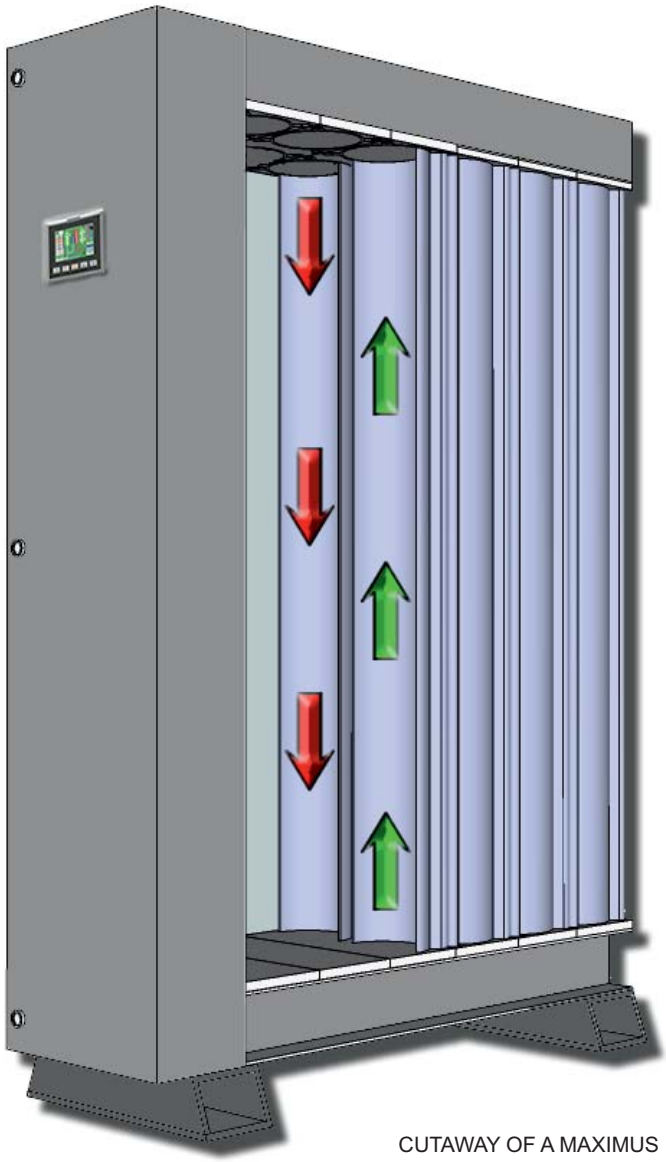
Pre-treated compressed air enters the bottom of the first “on-line” bed and passes across the CMS.

Oxygen and other trace gases are preferentially adsorbed by the CMS allowing Nitrogen to pass through.

After a pre-set time when the on-line bed is nearly saturated with adsorbed gases, the system automatically switches the bed to regenerative mode whilst the second, previously regenerated bed, comes on-line and takes over the separation process.

The saturated bed is regenerated by rapidly reducing the pressure inside the CMS chamber so allowing the captured gases to escape to atmosphere.

This continuous 'swing’ in pressure between the adsorption and regeneration modes gives the technology its name.



CUTAWAY OF A MAXIMUS MNG112

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Touch Screen Control

HMI Touchscreen : Dual Vessel PSA Display

The touchscreen displays the PSA process in real-time, this allows the user to see a visual readout of the generators performance.

The screen features:

- Full user control
- Alarms, with help menu
- Auto start / stop, for efficiency
- 30 Day trend graph for QA reporting

The generators have the option to be programmed to allow a automatic start and stop functions, utilising an internal calendar and real-time clock.

This allows the unit to be online during working hours and offline when not required.
This gives a electrical power saving of upto 50% compared to standard 24hr running

The generators have an internal trend graph to record a rolling 30 days of statisical information which can provide the user with valuable information for their records of:

- Output Flow
- Output Pressure
- Inlet Air Dewpoint *
- Outlet Oxygen Concentration *

(* features are optional extra on laboratory product)

Touch screen control, with real time readings

Trend Graphs, display upto last 30days production

PDS Energy Managment

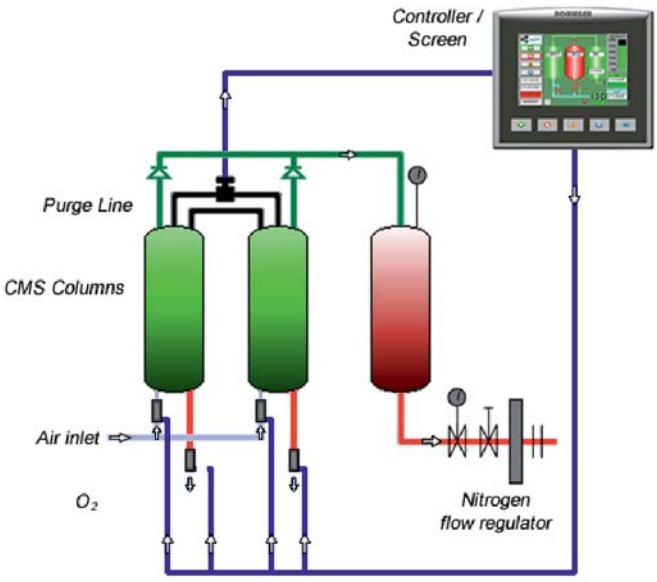
PDS EXPLAINED

With fixed time cycles the compressed air and energy required to drive the nitrogen generator is fairly constant regardless of the outlet flow, and performance is based around the generator output being at 100%.
In reality the generator output is rarely operating at full capacity, often with some over capacity built in to the sizing along with periods of reduced flow. Perhaps during shift work, overnight or over weekends and holidays where the flow is greatly reduced.
Where fixed time cycles are used generators are set up for maximum efficiency at 100% output.
Reduced output flow from a PSA Nitrogen generator controlled with fixed time cycles results in a higher purity of gas, which is not required and wastes energy from running compressors, dryers and the generator itself.
PDS is a more scientific and energy efficient approach to PSA control, by measuring the purity swing at the top of the CMS column to determine the generation and re-generation cycle.
This means that no 2 cycles are the same and the valves switch according to the conditions to maintain a constant purity of nitrogen gas regardless of output flow.

PDS BENEFITS

By monitoring the purity at the top of the CMS column a PLC program can determine what the average output purity will be and switches the valves accordingly.
The main benefits are:-

- Longer switching times, reduced parts wear and servicing.
- Less air required and improved Air:N2 ratios.
- Reduced energy from compressor, dryer and generator.
- High purity gas is no longer vented to atmosphere and wasted.
- Self regulating on ambient temperature changes.
- Longer purge time resulting in air saving.
- A specially selected oxygen sensor and sample valve allow the oxygen reading of each column to be measured and controlled using our HMI touch-screen PLC.



As the output flow decreases, the purity in the column improves and the PSA cycle automatically extends to regulate the output oxygen levels to the desired purity rather than maintaining a very high purity which wastes energy.

"Purity Dependant Switching (PDS) has been developed by Wirac Automation for its Noblegen range of Industrial Nitrogen Gas Generators"

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SO WHAT DOES IT MEAN

AIR:N_2 Ratio

Model	10 ppm	50 ppm	100 ppm	250 ppm	500 ppm	0.1%	0.5%	1.0%	2.0%	3.0%	4.0%	5.0%
104-112	10.8	8.0	5.9	4.9	3.6	3.4	2.8	2.6	2.4	2.2	2.1	2.0
116	10.8	8.5	6.2	5.1	3.6	3.4	2.8	2.6	2.4	2.2	2.1	2.0
120	10.8	8.8	6.4	5.3	3.6	3.4	2.8	2.6	2.4	2.2	2.1	2.0
PDS	9.5	7.7	5.6	4.6	3.2	3.0	2.5	2.3	2.1	1.9	1.85	1.8

The new AIR:N_2 ratios shown above are based on 100% output flow @ 20-25°c ambient air temperature in PDS Energy Management mode.

THE SAVINGS EXPLAINED

The table shows the typical energy savings though using PDS technology.
AIR:N_2 ratios decrease but the fact the generator output is dropping using the same amount of carbon molecular sieve must be considered, this has been accounted for in the table.
Where generators operate at 70-90% capacity is where the largest savings in air and energy can be made.
Savings are made through the following:-

As the nitrogen demand decreases, cycle times increase and the AIR:N2 reduces, so a variable speed drive compressor output and energy consumption will reduce.

As generation and re-generation cycles change in PDS mode the solenoid valve operations are less frequent and the overall power consumption of the generator reduces.

With less solenoid valve operations, gives longer maintenance intervals, longer life and lower running costs.

When using a desiccant dryer prior to the generator in DDS (dew-point dependant switching) mode, the lower air demand from the generator will save dryer purge air and thus reducing compressor power.

As the cycles extend more purge gas is saved in the other column, removing the need for equalisation at very low flows

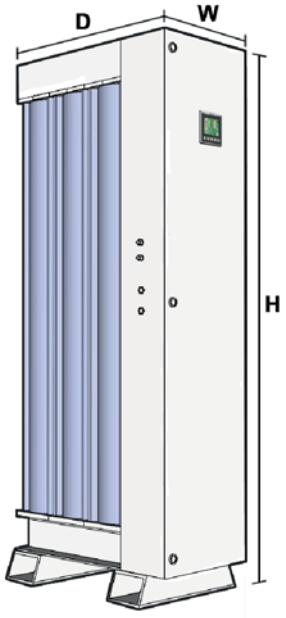
N_2 Demand	Energy Saving %	Air:N_2 Ratio Change %
100%	12%	-12%
90%	33%	-23%
80%	40%	-20%
70%	45%	-15%
60%	51%	-11%
50%	58%	-8%
40%	64%	-4%
30%	72%	-2%
20%	76%	-4%
10%	83%	-7%

Performance Data

Model	Nitrogen Outlet Flowrate - Nm^3/hr vs Oxygen Concentration											
	10ppm	50ppm	100ppm	250ppm	500ppm	0.10%	0.5%	1.0%	2.0%	3.0%	4.0%	5.0%
MNG104	2.0	3.8	5.5	7.1	8.6	9.0	14.1	17.8	22.0	25.8	29.0	32.2
MNG106	3.0	5.8	8.5	10.7	13.0	13.5	21.2	26.6	32.8	38.7	43.5	48.3
MNG108	4.0	7.8	11.0	14.3	17.3	18.0	28.3	35.5	43.8	51.6	58.0	64.4
MNG110	5.0	9.6	14.0	17.8	21.6	22.5	35.5	44.4	54.7	64.5	72.5	80.4
MNG112	6.0	11.5	16.5	21.4	26.0	26.8	42.4	53.5	65.7	77.4	87.1	96.5
MNG116	8.0	14.5	21.0	27.1	32.8	34.0	53.7	67.5	83.2	98.1	110.3	122.3
MNG120	10.0	17.5	25.3	32.8	39.7	41.2	65.0	81.7	100.7	118.7	133.5	148.0

Weights and Dimensions

Model	Height mm (ins)	Width mm (ins)	Depth mm (ins)	Weight kg
MNG104	1870 (74)	595 (23)	650 (25)	230
MNG106	1870 (74)	595 (23)	780 (30)	350
MNG108	1870 (74)	595 (23)	910 (35)	445
MNG110	1870 (74)	595 (23)	1040 (41)	538
MNG112	1870 (74)	595 (23)	1170 (46)	632
MNG116	1870 (74)	595 (23)	1480 (58)	820
MNG120	1870 (74)	595 (23)	1740 (68)	955



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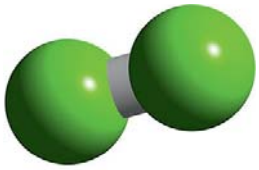
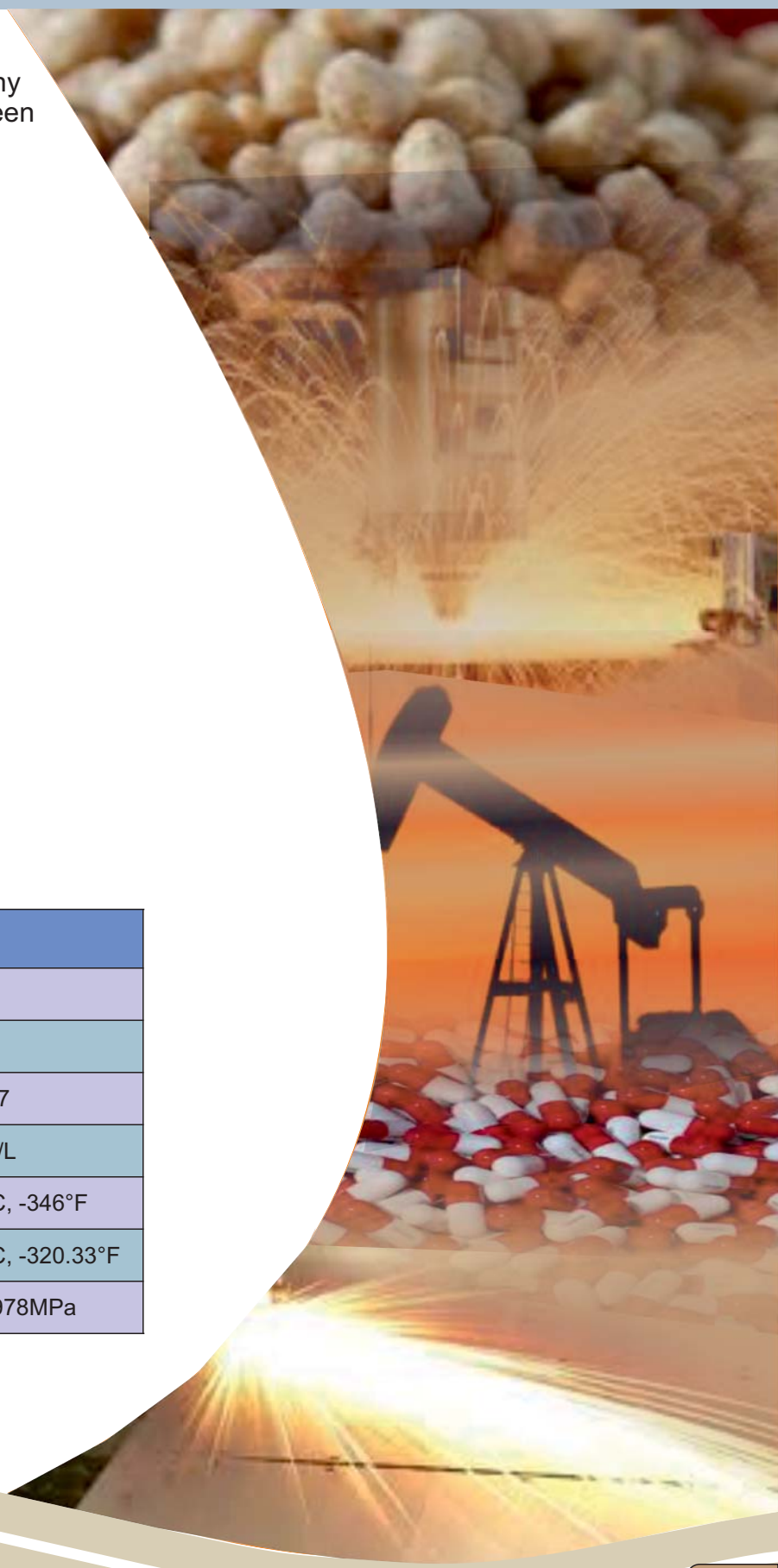
Applications

Nitrogen is a colourless, odourless, tasteless and mostly inert (unreactive) gas used in many varied industries, our Generators are have been successfully installed in a wide range of applications.

Examples uses of Nitrogen,

- Food Packaging
- Wine and Brewing
- Oil and Gas
- Laser Cutting
- Pharmaceutical and Laboratory
- Injection Moulding
- Electronic Assembly





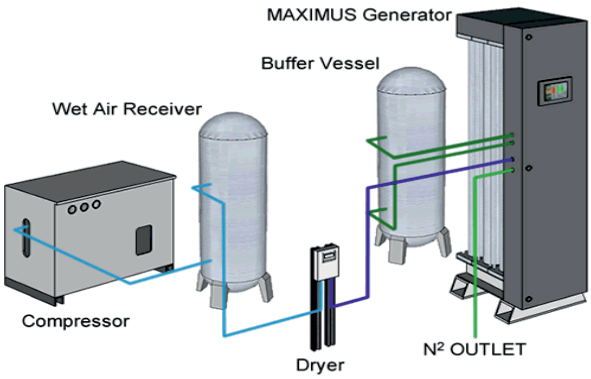
Properties of Nitrogen	
Symbol	N
Number	7
Standard Atomic Weight	14.0067
Density	1.251 g/L
Melting Point	63.15K, -210°C, -346°F
Boiling Point	77.36K, -195.79°C, -320.33°F
Critical Point	126.19K, 3.3978MPa

Skid & Packaged Systems

Skid Based Systems

Complete packaged systems for floor, skid or container mounting are available.

Our experienced design team can package complete nitrogen systems from variable speed compressors, compressed air dryers, filters, Gas Generator, boosters and associated equipment to meet any gas requirement, giving the most efficient on-site gas generation package available.



Utilising energy efficient drives, DDS (dew-point dependant switching) desiccant dryers and PDS (purity dependant switching) nitrogen gas generators use the most advanced control methods of providing some of the most efficient packaged on-site gas systems available in the World today.

Please feel free to send us your full on-site gas requirements for a packaged system proposal

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Laboratory Nitrogen

Pure Air : Pure Instrument Air - 40°C Dewpoint

Zero Air : THC free air <0.1ppm CH_4

Nitrogen / Air : Combined nitrogen and air generators

Zero Nitrogen : THC free nitrogen <0.1ppm CH_4

Hydrogen

Noblegen range of Hydrogen Generators.

Laboratory : 100ml/min to 1000ml/min (5 to 10 bar)

Industrial : 600l/hr to 1000l/hr @ 15 bar

Co_2 Purifier

Noblegen offers a range of small and efficient CO2 Removal Purifiers, utilising the reliable and efficient PSA technique to remove CO2 to less than 1 ppm.
All the Purifier range is controlled using a PLC and manifold valves to give reliable and efficient operation.
Either bench or wall mounted the Noblegen CO2 Purifier is an important part of any efficient laboratory removing the need for high pressure gas cylinders.

O_2 Analyser

Chemical Cell and Zirconia Analyser

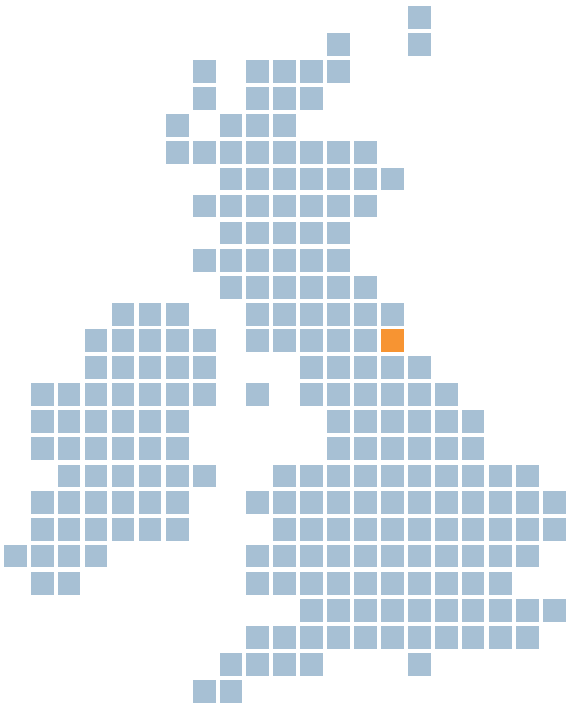
Chemical Cell 0-25%

Zirconia 0.01ppm - 100%

Bench mounted or custom built solutions

Service and Warranty

Wirac Automation Ltd can meet all your service needs on it's Noblegen Gas Generators, from the supply of spares kits, components and accessories.
Our dedicated team of service engineers can supply the full range of installation, commissioning and service requirements for all our systems giving you the confidence that you are investing in a fully supported range of products.
If you already own another brand of gas generator and do not have a service contact then we are also able to offer service and support for them, please contact us with details of your requirements.
Service contracts and extended warranties can be quoted and carried out by our service engineers.
We hold stocks of components to service – compressed air filtration products, desiccant dryers and on-site gas generation equipment
Our commitment to manufacturing quality products is shown in our 24 month warranty, along with a life-time warranty on the carbon molecular sieve used on our nitrogen gas generators.
To maintain this warranty all we ask is that you carry out the minor servicing required to keep your system running efficiently and reliably.



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