

# Nitrogen Gas Generator

## NITROSource N2-20P - N2-80P

### Engineering Data Sheet



## Description

The NITROSource PSA range of nitrogen generators operate on the Pressure Swing Adsorption (PSA) principle to produce a continuous stream of nitrogen gas from clean dry compressed air.

Pairs of dual chamber extruded aluminium columns, filled with Carbon Molecular Sieve (CMS), are joined via an upper and lower manifold to produce a two bed system. Whilst one bed is online and removing oxygen from the process air the other is regenerated.

Clean, dry particulate free compressed air enters the bottom of the online bed and flows up through the CMS. Oxygen and other trace gases are preferentially adsorbed by the CMS, allowing nitrogen to pass through. At the end of this adsorption phase the inlet, outlet and exhaust valves close on both beds. The upper and lower equalisation valves open, allowing the pressure to equalise between the beds. This equalisation phase is designed to reduce energy consumption and enhance the overall performance of the generator.

Once equalised the bed entering regeneration is depressurised. The oxygen adsorbed during the adsorption phase is vented to atmosphere via an exhaust valve and silencer. A small proportion of the outlet nitrogen gas is also expanded into this bed to help the desorption of oxygen from the CMS.

The bed entering the adsorption phase is pressurised using a controlled flow of nitrogen gas from the nitrogen buffer vessel (Back Fill) and a controlled flow of clean, dry, particulate free compressed air (Front Fill).

The CMS beds alternate between adsorption and regeneration modes to ensure continuous and uninterrupted nitrogen production.

## Technical Specification

### Product Selection

NITROSource PSA Performance @ 20 °C (68 °F) Ambient Air Temperature & 7 barg (101.5 psi g) Air inlet pressure															
Model		5 ppm	10ppm	50ppm	100ppm	250ppm	500ppm	0.10%	0.40%	0.50%	1%	2%	3%	4%	5%
N2-20P	m3/hr	3.5	4.5	6.7	8.0	9.7	11.1	12.4	16.7	17.7	21.3	25.3	29.8	30.9	33.7
	CFM	2.1	2.6	3.9	4.7	5.7	6.5	7.3	9.8	10.4	12.5	14.9	17.5	18.2	19.8
N2-25P	m3/hr	5.3	6.8	10.1	12.0	14.6	16.7	18.6	25.1	26.6	32.0	38.0	44.7	46.4	50.6
	CFM	3.1	4.0	5.9	7.1	8.6	9.8	10.9	14.8	15.7	18.8	22.4	26.3	27.3	29.8
N2-35P	m3/hr	7.0	9.0	13.4	16.0	19.4	22.2	24.8	33.4	35.4	42.6	50.6	59.6	61.8	67.4
	CFM	4.1	5.3	7.9	9.4	11.4	13.1	14.6	19.7	20.8	25.1	29.8	35.1	36.4	39.7
N2-45P	m3/hr	8.8	11.3	16.8	20.0	24.3	27.8	31.0	41.8	44.3	53.3	63.3	74.5	77.3	84.3
	CFM	5.2	6.7	9.9	11.8	14.3	16.4	18.2	24.6	26.1	31.4	37.3	43.8	45.5	49.6
N2-55P	m3/hr	10.5	13.5	20.1	24.0	29.1	33.3	37.2	50.1	53.1	63.9	75.9	89.4	92.7	101.1
	CFM	6.2	7.9	11.8	14.1	17.1	19.6	21.9	29.5	31.3	37.6	44.7	52.6	54.6	59.5
N2-60P	m3/hr	11.6	15.0	22.3	26.6	32.3	36.9	41.2	55.5	58.9	70.8	84.1	99.1	102.7	112.1
	CFM	6.8	8.8	13.1	15.7	19.0	21.7	24.2	32.7	34.7	41.7	49.5	58.3	60.4	66.0
N2-65P	m3/hr	13.3	17.1	25.5	30.4	36.9	42.2	47.1	63.5	67.3	80.9	96.1	113.2	117.4	128.1
	CFM	7.8	10.1	15.0	17.9	21.7	24.8	27.7	37.4	39.6	47.6	56.6	66.6	69.1	75.4
N2-75P	m3/hr	14.5	18.6	27.7	33.1	40.2	46.0	51.3	69.1	73.3	88.2	104.7	123.4	127.9	139.5
	CFM	8.5	10.9	16.3	19.5	23.7	27.1	30.2	40.7	43.1	51.9	61.6	72.6	75.3	82.1
N2-80P	m3/hr	16.1	20.7	30.8	36.8	44.6	51.1	57.0	76.8	81.4	98.0	116.4	137.1	142.1	155.0
	CFM	9.5	12.2	18.1	21.7	26.3	30.1	33.5	45.2	47.9	57.7	68.5	80.7	83.6	91.2

NITROSource PSA Performance @ 20 °C (68 °F) Ambient Air Temperature & 7 barg (101.5 psi g) Air inlet pressure														
Air : N2 (N2-20 - N2-55)	9.3	7.2	5.1	4.6	4.1	3.7	3.4	2.9	2.8	2.6	2.3	2.2	2.2	2.1
Air : N2 (N2-60 - N2-65)	9.8	7.6	5.3	4.9	4.3	3.9	3.5	3.0	2.9	2.7	2.5	2.3	2.3	2.2
Air : N2 (N2-75 - N2-80)	10.1	7.8	5.5	5.0	4.4	4.0	3.7	3.1	3.0	2.8	2.5	2.4	2.4	2.3
Outlet	Bar g	6.0	6.0	6.0	6.0	5.9	5.9	5.8	5.8	5.7	5.7	5.6	5.5	5.4
	Psi g	87.0	87.0	87.0	87.0	85.6	85.6	84.1	84.1	82.7	82.7	81.2	79.8	78.3

### Inlet Parameters

Air Quality	ISO 8573-1: 2010 Class 2.2.2 (2.2.1 with high oil vapour content)
Pressure	5 –13 bar g (72.5 - 188.5) psi g
Temperature	5 – 50 °C (41 – 122 °F)
Purity	20.948% (wrt O2) 0.0314% (wrt CO2)

### Port Connections

Air Inlet	G1"
N <sub>2</sub> Outlet to Buffer	G1"
N <sub>2</sub> Inlet from Buffer	G1/2"
N <sub>2</sub> Outlet	G1/2"

### Electrical Parameters

Generator Supply <sup>(1)</sup>	100 - 240 +/- 10% Vac 50/60Hz
Generator Power <sup>(2)</sup>	55 W
Fuse <sup>(3)</sup>	3.15 A
Max Dryer Power <sup>(4)</sup>	100W

- (1) The generator does not require adjustment when connecting to 115v and 230v electrical supplies.  
(2) The power rating specified is for the generator alone and does not take in to account any pre-treatment dryer connected to the dryer supply terminals of the generator.  
(3) (Anti Surge (T), 250v, 5 x 20mm HBC, Breaking Capacity 1500A @ 250v, IEC 60127, UL R/C Fuse).  
(4) The dryer is fed directly from the generator supply.

### Environmental Parameters

Ambient Temperature	5 – 50 °C (41 – 122 °F)
Humidity	50% @ 40°C (80% @ MAX ≤ 31°C)
IP Rating	IP20 / NEMA 1
Pollution Degree	2
Installation Category	II
Altitude	< 2000 m (6562 ft)
Noise	<80 dB (A)

### Packed Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	ins	mm	ins	mm	ins	Kg	lbs
N2-20P	725.5	28.6	1994	78.5	1090	42.9	398.4	878.3
N2-25P					1260	49.6	495.4	1092.1
N2-35P					1430	56.3	580.4	1279.6
N2-45P					1600	63.0	686.4	1513.3
N2-55P	825.5	32.5	1994	78.5	1770	69.7	782.4	1724.9
N2-60P					1935	76.2	897.4	1978.4
N2-65P	828.5	32.6			2100	82.7	997.4	2198.9
N2-75P	831.5	32.7			2275	89.6	1093.4	2410.5
N2-80P					2445	96.3	1186.4	2615.6

## Approvals and Compliance

### Approvals

#### Directives

97/23/EC: Pressure Equipment Directive

2004/108/EC: Electromagnetic Compatibility Directive

2006/95/EC: Low Voltage Directive

#### Safety and Electromagnetic Compatibility Standards

This equipment has been tested and complies with the following European Standards:

**EN 61326-1:2013** EMC - Electrical equipment for measurement, control and laboratory use. EMC requirements. (Equipment tested to: Emissions - Light, Immunity - Heavy)

**BS EN 61000-3-2:2006+A2:2009** Electromagnetic compatibility (EMC). Limits for harmonic current emissions (equipment input current = 16 A per phase)

**BS EN 61000-3-3:2013** Electromagnetic compatibility (EMC). Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current = 16 A per phase and not subject to conditional connection.

**BS EN 61010-1:2010** Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements

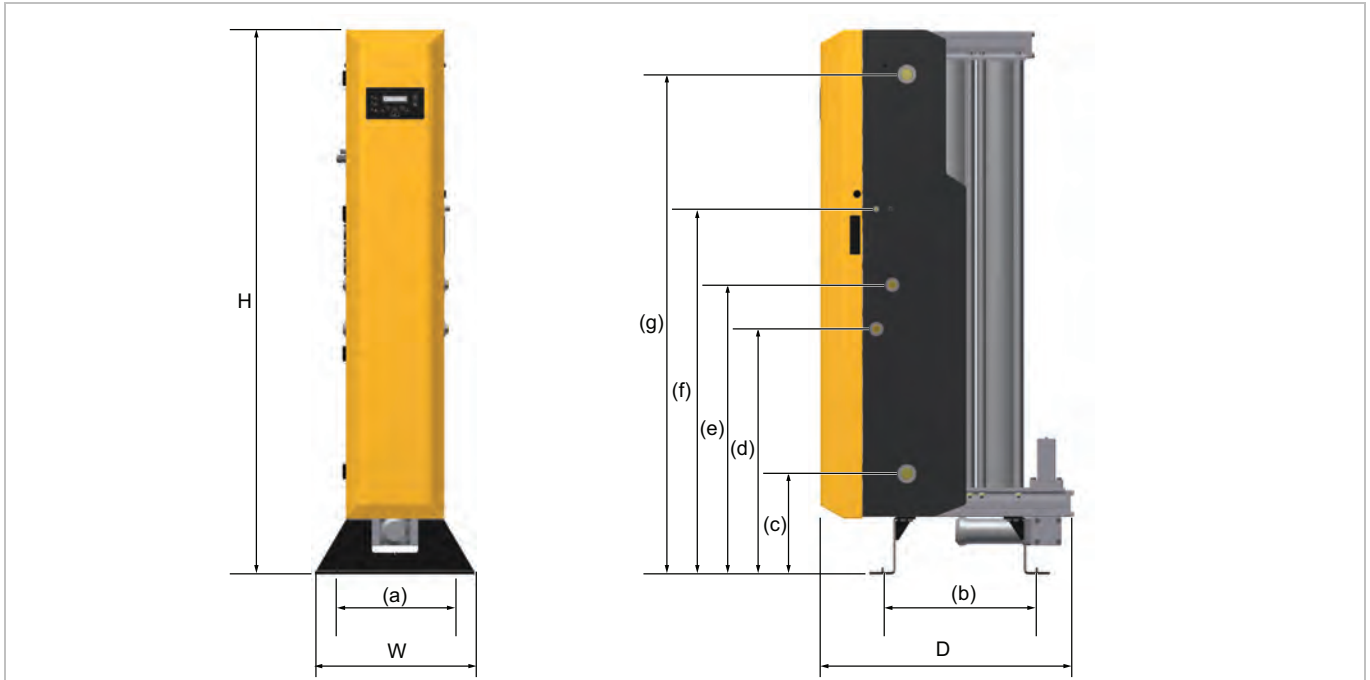
#### General

Designed generally in accordance with ASME VIII DIVISION 1: EDITION 2010 2011a Addenda

### Compliance

This gas generator is compliant with FDA and European Pharmacopeia Regulations for use as a medical gas generator.

## Weights and Dimensions



Model	Dimension																				Weight	
	H		W		D		(a)		(b)		(c)		(d)		(e)		(f)		(g)		Kg	lbs
	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins		
<b>N2-20P</b>	1894	74.6	550	21.7	893	35.2	500	19.7	535.5	21.1	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	299	659.2
<b>N2-25P</b>	1894	74.6	550	21.7	1062	41.8	500	19.7	704.5	27.7	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	384	846.6
<b>N2-35P</b>	1894	74.6	550	21.7	1231	48.5	500	19.7	873.5	34.4	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	469	1034.0
<b>N2-45P</b>	1894	74.6	550	21.7	1400	55.1	500	19.7	1042.5	41.0	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	553	1219.2
<b>N2-55P</b>	1894	74.6	550	21.7	1569	61.8	500	19.7	1211.5	47.7	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	638	1406.5
<b>N2-60P</b>	1894	74.6	550	21.7	1738	68.4	500	19.7	1380.5	54.4	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	722	1591.7
<b>N2-65P</b>	1894	74.6	550	21.7	1907	75.1	500	19.7	1549.5	61.0	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	807	1779.1
<b>N2-75P</b>	1894	74.6	550	21.7	2076	81.7	500	19.7	1718.5	67.7	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	892	1966.5
<b>N2-80P</b>	1894	74.6	550	21.7	2245	88.4	500	19.7	1887.5	74.3	350	13.8	853.5	33.6	1007	39.6	1271	50	1739	68.5	976	2151.7

## Materials of Construction

<b>Silencer Baffle and End Cap</b>	Aluminium
<b>Columns, Manifolds and Exhaust Manifolds</b>	Aluminium Extrusion EN AW-6063 T6
<b>Manifold and Purge End Plates</b>	Cast Machined EN AW-6082 T6
<b>Inlet, Outlet and Equalisation Valve Plates</b>	Machined EN AC-44100-F
<b>Inlet and Exhaust Cylinders</b>	Aluminium Alloy
<b>Generator Feet</b>	8MM Steel Plate
<b>Dust Filter</b>	Aluminium Housing
<b>Fittings</b>	Nickel Plated Brass and Nickle Plated Mild Steel
<b>Pressure Gauges</b>	Steel casing and dial, brass connector and movement
<b>Adsorbant</b>	Carbon Molecular Sieve (CMS)
<b>Seal Materials</b>	Nitrile, Viton, EPDM, PTFE (tape)
<b>Paint</b>	Epoxy coated

# Preventative Maintenance

## Cleaning




Clean the equipment with a damp cloth only and avoid excessive moisture around any electrical sockets. If required you may use a mild detergent, however do not use abrasives or solvents as they may damage the warning labels on the equipment.

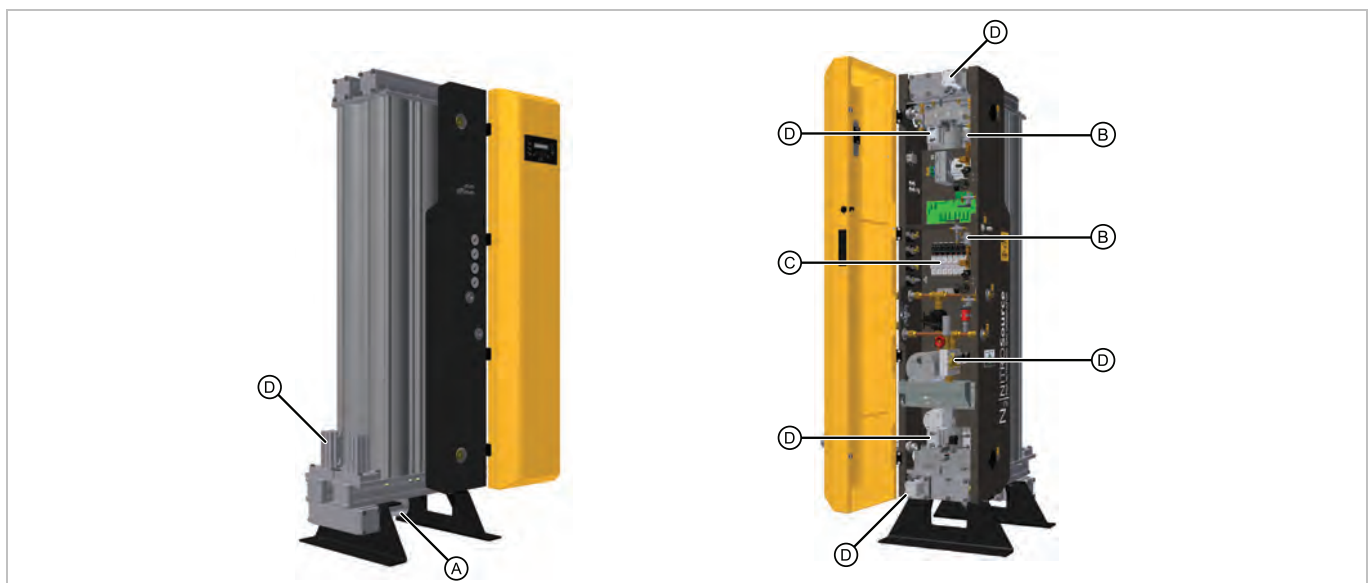
## Maintenance Schedule

Description Of Service Required		Service Recommended Every: <sup>(1)</sup>						
Component	Operation	Daily	3 Months (2000 Hrs.)	6 Months (4000 Hrs.)	12 Months (8000 Hrs.)	24 Months (16000 Hrs.)	36 Months (24000 Hrs.)	60 Months (40000 Hrs.)
Generator	Check the status indicators located on the front panel.	👁️						
System	Check the inlet air quality.		👁️					
Generator	Check for air leaks		👁️					
Generator	Check the pressure gauges during purging for excessive back pressure.		👁️					
Generator	Check the condition of the electrical supply cables and conduits.		👁️					
Generator	Check oxygen sensor(s) and calibrate if necessary		🔄					
Generator	Check for cyclic operation			👁️				
Generator	Replace Exhaust silencer and filter element(s) <b>Recommended Service A</b>				🔧			
Filtration	Replace Oxygen sensor(s) <b>Recommended Service B</b>					🔧		
Generator	Replace control valves <b>Recommended Service C</b>						🔧	
Generator	Replace cylinder and solenoid valves <b>Recommended Service D</b>							🔧

(1) The service operations should be performed at the hours run or fixed time intervals specified (whichever occurs first)

Key:

	Check (Operator)		Essential Procedure (Service Personnel only)		Essential Procedure (Responsible Body or Service Personnel only)
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## Preventative Maintenance Kits

The following preventative maintenance kits must be installed by service personnel only.

### High Purity Generators (PPM)

#### Generators without EST Functionality (Model Nos. N2XXPAXN)

Ref.	Catalogue No.	Description	12	24	36	48	60	72	84	96	108	120
A	M12.NONEST.0001	12 Month Non EST Service Kit (Every 12 Months)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B	M24.PPM.0001	24 Month PPM Service Kit (Every 24 Months)		✓		✓		✓		✓		✓
C	M36.STD.0001	36 Month Standard Service Kit (Every 36 Months)			✓			✓			✓	
D	M60.STD.0001	60 Month Standard Service Kit (Every 60 Months)					✓					✓

#### Generators with EST Functionality (Model Nos. N2XXPAXY)

Ref.	Catalogue No.	Description	12	24	36	48	60	72	84	96	108	120
A	M12.EST.0001	12 Month EST Service Kit (Every 12 Months)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B	M24.PPM.0001	24 Month PPM Service Kit (Every 24 Months)		(x2)		(x2)		(x2)		(x2)		(x2)
C	M36.STD.0001	36 Month Standard Service Kit (Every 36 Months)			✓			✓			✓	
D	M60.STD.0001	60 Month Standard Service Kit (Every 60 Months)					✓					✓

### Low Purity Generators (%)

#### Generators without EST Functionality (Model Nos. N2XXPBXN)

Ref.	Catalogue No.	Description	12	24	36	48	60	72	84	96	108	120
A	M12.NONEST.0001	12 Month Non EST Service Kit (Every 12 Months)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B	M24.PCT.0001	24 Month Percentage Service Kit (Every 24 Months)		✓		✓		✓		✓		✓
C	M36.STD.0001	36 Month Standard Service Kit (Every 36 Months)			✓			✓			✓	
D	M60.STD.0001	60 Month Standard Service Kit (Every 60 Months)					✓					✓

#### Generators with EST Functionality (Model Nos. N2XXPBXY)

Ref.	Catalogue No.	Description	12	24	36	48	60	72	84	96	108	120
A	M12.EST.0001	12 Month EST Service Kit (Every 12 Months)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B	M24.PCT.0001	24 Month Percentage Service Kit (Every 24 Months)		(x2)		(x2)		(x2)		(x2)		(x2)
C	M36.STD.0001	36 Month Standard Service Kit (Every 36 Months)			✓			✓			✓	
D	M60.STD.0001	60 Month Standard Service Kit (Every 60 Months)					✓					✓

## Kit Contents



Catalogue No.	Description	Contents
M12.NONEST.0001	12 Month Non EST Service Kit (Every 12 Months)	Exhaust Silencer 025AR Dust filter element



Catalogue No.	Description	Contents
M12.EST.0001	12 Month EST Service Kit (Every 12 Months)	Exhaust Silencer 025AR Dust filter element In-line filter



Catalogue No.	Description	Contents
M24.PPM.0001	12 Month PPM Service Kit (Every 24 Months)	PPM Cell c/w wiring
M24.PCT.0001	12 Month Percentage Service Kit (Every 24 Months)	% Cell c/w wiring



Catalogue No.	Description	Contents
M36.STD.0001	36 Month Standard Service Kit (Every 36 Months)	8 Bank solenoid valve



Catalogue No.	Description	Contents
M60.STD.0001	60 Month Standard Service Kit (Every 24 Months)	40 x 25mm stroke cylinders (x6) Over moulded valve discs and guides (x6) 50 x 100mm stroke cylinders (x2) Valve discs (x2 sets) Valve bonnets (x2) Assorted o-rings Fixing screws



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