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Technical Version:T.2020

NITROGEN GENERATOR

Pressure Swing Adsorption Technology

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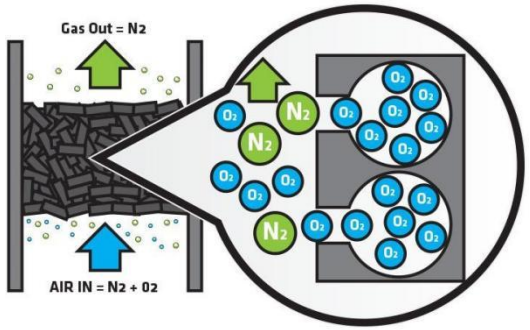
Airstone Nitrogen | The Theory

The pressure swing adsorption (short for PSA) nitrogen generator is a high-tech, energy-saving separation technology that directly produces nitrogen from the air at normal temperature. Using compressed air after a series of purifications of water removal, oil removal and dust removal under pressure swing adsorption,
Due to the kinetic effect, the diffusion rate of oxygen on the carbon molecular sieve is significantly higher than that of nitrogen. When the adsorption does not reach equilibrium, the nitrogen is enriched in the gas phase. Through PLC automatic control technology, continuous production of high-quality nitrogen is achieved.

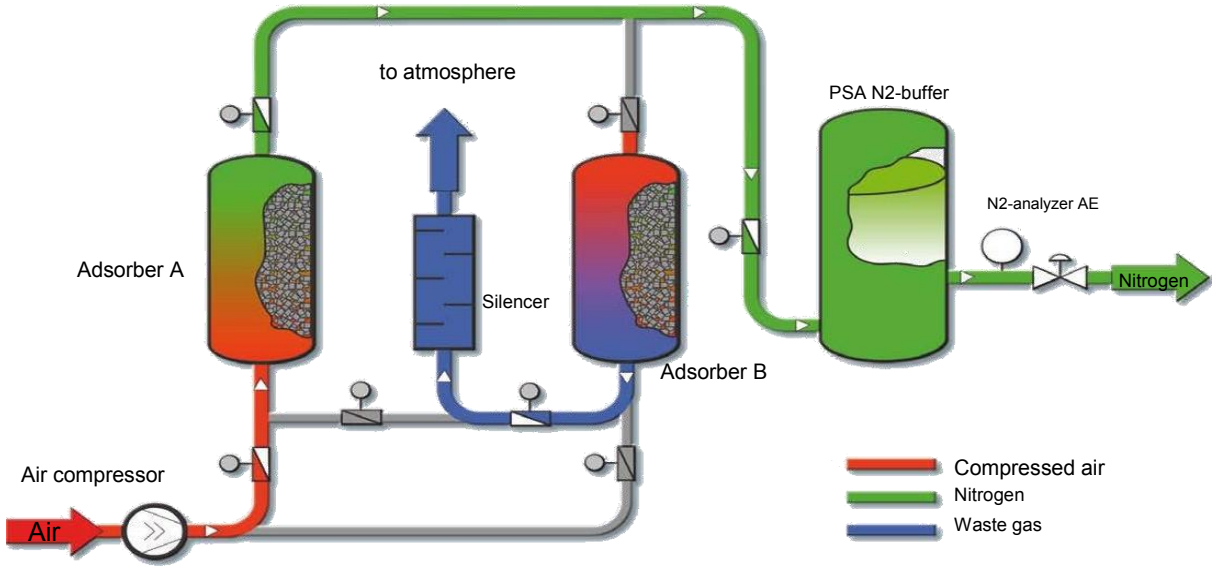
The device has the advantages of compact, fully automatic operation, reliable operation, fast start and stop, low operating cost, convenient production and maintenance at normal temperature, and the purity and output of nitrogen can be appropriately customized. It is an efficient on-site nitrogen generator.



The separation of nitrogen and oxygen from air takes place in an adsorber vessel filled with carbon molecular sieve.

-Different diffusion of O2 molecules get into the pore structure of the carbon molecular sieve than for nitrogen molecules.
-Different capacity of O2 molecules get into the pore structure of the carbon molecular sieve at pressure of about 0.6-1.0Mpa

Airstone Nitrogen | The Processing



There are two alternately process cycle for PSA nitrogen generator:

–Pressurisation/adsorption

–Depressurisation/desorption

Compressed air alternately pressurises each of two identical adsorber towers. Beginning at a point in the cycle where one adsorber tower (A) is being pressurised and the other adsorber tower(B) is undergoing depressurisation, the description of the PSA process cycle is as follows:

As compressed air enters adsorber tower A, moisture, oxygen, and carbon dioxide are adsorbed. After operating pressure is reached, nitrogen product flows from adsorber bed A into a nitro- gen product receiver prior to entering the product piping. Simultaneously, adsorber tower B is depressurised to atmospheric pressure.

Upon completion of nitrogen production from adsorber tower A, an equalisation step occurs. Adsorber tower B (atmospheric pressure) is pressurised to an intermediate pressure as the gas remaining in adsorber bed A (at operating pres- sure) flows into adsorber tower B. During this step, air is not consumed nor is product gas generated. Therefore a nitrogen receiver is applied to allow for a constant flow, purity and pressure of the nitrogen product throughout the PSA cycle.

Adsorber tower A then undergoes depressurisation and the oxygen enriched waste gas is vented to the atmosphere. Depressurisation permits the release of oxygen, carbon dioxide, and water vapor previously adsorbed during nitrogen production from adsorber tower A. At the same time, adsorber tower B is brought to opera- ting pressure, and begins its nitrogen production portion of the cycle.

Following nitrogen production, adsorber tower B undergoes equalisation and subsequent de- pressurisation. The cycle continues at the point where adsorber tower A undergoes pressurisation and adsorber tower B is depressurised.

Run Automatically

- Control By Programmable Logic Controller (PLC)
- Control the inlet compressed gas in and out automatically
- Monitor and alarm the abnormal working status
- Display parameter values

Operating The System

- Plug and play
- One-press On/ Off
- One-press Start/ Stop
- 10-20 mins or so to get the deliver finished gas

Long Lifespan

- Advanced absorber structure
- Reliable and smart programe design
- Vortex honeycomb type gas distribution structure
- Blizzard-type CMS filling strengthen the gas flow
- Components from high-end supply chain

Installation Site

Due to the severe ambient conditions and in order to protect the PSA unit from driving rain and direct sunlight, it is strongly recommended to install the PSA unit in a closed shelter, at least a roof covering the valve skid and the compressor shall be supplied.

Airstone Nitrogen | Airstone Series Configuration

Ref. AirstoneSeries

Airstone PSA Nitrogen Generator Host Configuration (Major parts)

Item	QTY	Supply	Remark
Twin Adsorption Tower	2	Airstone	
Carbon Molecular Sieve	1	Airstone T-CMS	8-10 Years
PLC Control System	1	Siemens/ Inovance	
N2 Online Analyzer	1	ChangAi	
Pneumatic Angle Valve	12	Burkert/ Gemu/ ESG	3 Million Cycle
Electronmagnetic Valve	12	AirTAC	3 Million Cycle
Touch Screen Interface	1	Weinview	
Muffler	1	Airstone	
Pressing Sealing Device	2	Airstone	
Flow Meter	1	Airstone	
Connecting Pipe and Valve	1	Airstone	
Skid-mounted Frame	1	Airstone	
Color	1	Airstone	

* Actual configuration will be based on requests..

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Airstone Nitrogen | Airstone Series Configuration

Airstone T-
CARBON MOLECULAR SIEVE

SIEMENS / INOVANCE
PLC CONTROLLER

Burkert/ Gemu/ ESG
PNEUMATIC ANGLE VALVE

AIRTAC
ELECTRONMAGNETIC VALVE

CHANG-AI
N2 REAL-TIME ANALYZER

Airstone PATENT
SEALING COVER DEVICE

AIRSTONE T-CMS MOLECULAR SIEVE

High efficiency, high anti impact strength to prolong life time

ESG PNEUMATIC ANGLE VALVE

Action 3 million circles without leak, malfunction decreased by 50%

SIEMENS PLC CONTROLLER

Visual display, parameters can be modified, stable and high-effective

CHANG-AI N2 REAL-TIME ANALYZER

TAccuracy reaching 0.01%, with batter life for over 2-3 years

AIRTAC ELECTRONMAGNETIC VALVE

Well-known qualified and stable brand name with high performance

AIRSTONE SEALING COVER DEVICE

One-time sealing , assuring 8-10 years application

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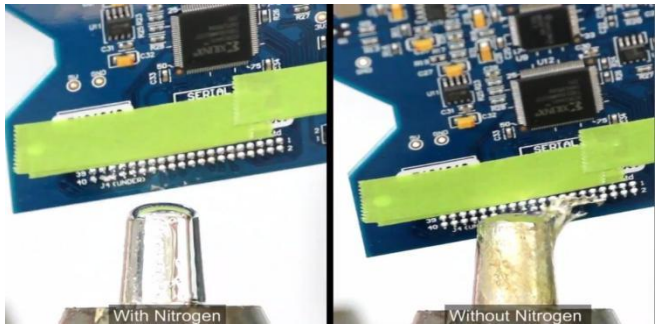
Airstone Nitrogen | Various Applications

N2 For Laser Cutting ·



N2 For SMT/ PCB

N2 For Food Industry

N2 For Petroleum

N2 For Aluminum

N2 For Food Packaging

Airstone Nitrogen | An Alternative to Purchasging Gas/Liquid

For quiet a long time, There is no choice for users but to purchase bottled nitrogen from nitrogen station with higher price .generally end users could be paying up to and over $2.50 per 100 cubic feet of nitrogen consumed. In addition to the base price, there are many other cost like

- Delivery costs
- Cylinder and tank rental fees
- Bulk evaporating losses
- Handling and procurement labor costs
- Liability insurance

But in the long tems, it will be better to build your own Nitrogen system

How to calculate the cost between the N2 generator and the purchasing gas/ liquid.

A: THE COST OF PURCHASING N2 GAS OR N2 LIQUID

You can get the answer based on your current offer.

B: THE COST THE N2 GENERATION SYSTEM

a) One-time machines purchasing

b) Power consumption

- based on the total power of the actual confirguration
- electronic charge: based on your local market (About 0.2usd/KW·h in Chinese industrial zone).

c) Simple maintaining cost and spare parts.

Comparing to the A & B

It's easy to see why the typical nitrogen generation system has a return on investment (ROI) of about 6 to 18 months.

Airstone Nitrogren | Flow Chart

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Airstone Nitrogren | Different Style

General Type

Twin-tower PSA Nitrogen Generator

Boxing Type

Cover WIth Box PSA Nitrogen Generator

Container Type

Easy to move all in one set

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Airstone Nitrogren | Customers' Site

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Airstone Nitrogren | Models

NAS*-96 Series

No.	Model	Flow Rate	Purity	Pressure	Air Con	Inlet	Outlet	Size
1	NAS10-96	10Nm³/h	**96.00%**	6bar - 8bar	5 KW	15 mm	15mm	1480*850mm
2	NAS20-96	20Nm³/h	**96.00%**	6bar - 8bar	5 KW	25mm	15mm	1700*900mm
3	NAS30-96	30Nm³/h	96.00%	6bar - 8bar	7 KW	25mm	15mm	1800*950mm
4	NAS40-96	40Nm³/h	**96.00%**	6bar - 8bar	11 KW	25mm	25mm	1950*1100mm
5	NAS50-96	50Nm³/h	96.00%	6bar - 8bar	15 KW	32mm	25mm	2200*1150mm
6	NAS60-96	60Nm³/h	**96.00%**	6bar - 8bar	18 KW	32mm	25mm	2250*1210mm
7	NAS80-96	80Nm³/h	96.00%	6bar - 8bar	22 KW	40mm	25mm	2400*1350mm
8	NAS100-96	100Nm³/h	**96.00%**	6bar - 8bar	30 KW	40mm	32mm	2650*1400mm
9	NAS150-96	150Nm³/h	96.00%	6bar - 8bar	37 KW	50mm	32mm	3250*1900mm
10	NAS200-96	200Nm³/h	**96.00%**	6bar - 8bar	55 KW	50mm	32mm	3410*2150mm
11	NAS300-96	300Nm³/h	96.00%	6bar - 8bar	75 KW	65mm	40mm	3650*2300mm
12	NAS400-96	400Nm³/h	**96.00%**	6bar - 8bar	90 KW	65mm	40mm	3800*2400mm
13	NAS500-96	500Nm³/h	96.00%	6bar - 8bar	110 KW	80mm	50mm	4150*2430mm
14	NAS600-96	600Nm³/h	**96.00%**	6bar - 8bar	150 KW	80mm	50mm	4300*2500mm
15	NAS800-96	800Nm³/h	96.00%	6bar - 8bar	200 KW	100mm	65mm	4700*2600mm
16	NAS1000-96	1000Nm³/h	**96.00%**	6bar - 8bar	250 KW	100mm	65mm	5000*2800mm
17	NAS1500-96	1500Nm³/h	96.00%	6bar - 8bar	355 KW	125mm	80mm	5050*4550mm
18	NAS2000-96	2000Nm³/h	**96.00%**	6bar - 8bar	450 KW	150mm	100mm	5350*5250mm

NAS*-99 Series

No.	Model	Flow Rate	Purity	Pressure	Air Con	Inlet	Outlet	Size
1	NAS10-99	10Nm³/h	99.00%	6bar - 8bar	5KW	15mm	15mm	1480*850mm
2	NAS20-99	20Nm³/h	**99.00%**	6bar - 8bar	7KW	25mm	15mm	1700*900mm
3	NAS30-99	30Nm³/h	99.00%	6bar - 8bar	11KW	25mm	15mm	1800*950mm
4	NAS40-99	40Nm³/h	**99.00%**	6bar - 8bar	15KW	25mm	25mm	1950*1100mm
5	NAS50-99	50Nm³/h	99.00%	6bar - 8bar	18KW	32mm	25mm	2200*1150mm
6	NAS60-99	60Nm³/h	**99.00%**	6bar - 8bar	22KW	32mm	25mm	2250*1210mm
7	NAS80-99	80Nm³/h	99.00%	6bar - 8bar	30KW	40mm	25mm	2400*1350mm
8	NAS100-99	100Nm³/h	**99.00%**	6bar - 8bar	37KW	40mm	32mm	2650*1400mm
9	NAS150-99	150Nm³/h	99.00%	6bar - 8bar	55KW	50mm	32mm	3250*1900mm
10	NAS200-99	200Nm³/h	**99.00%**	6bar - 8bar	75KW	50mm	32mm	3410*2150mm
11	NAS300-99	300Nm³/h	99.00%	6bar - 8bar	90KW	65mm	40mm	3650*2300mm
12	NAS400-99	400Nm³/h	**99.00%**	6bar - 8bar	110KW	65mm	40mm	3800*2400mm
13	NAS500-99	500Nm³/h	99.00%	6bar - 8bar	150KW	80mm	50mm	4150*2430mm
14	NAS600-99	600Nm³/h	**99.00%**	6bar - 8bar	200KW	80mm	50mm	4300*2500mm
15	NAS800-99	800Nm³/h	99.00%	6bar - 8bar	250KW	100mm	65mm	4700*2600mm
16	NAS1000-99	1000Nm³/h	**99.00%**	6bar - 8bar	315KW	100mm	65mm	5000*2800mm
17	NAS1500-99	1500Nm³/h	99.00%	6bar - 8bar	450KW	125mm	80mm	5050*4550mm
18	NAS2000-99	2000Nm³/h	**99.00%**	6bar - 8bar	600KW	150mm	100mm	5350*5250mm

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Airstone Nitrogren | Models

NAS*-295 Series

No.	Model	Flow Rate	Purity	Pressure	Air Con	Inlet	Outlet	Size
1	NAS10-295	10Nm³/h	**99.50%**	6bar - 8bar	5KW	15mm	15mm	1500*880mm
2	NAS20-295	20Nm³/h	**99.50%**	6bar - 8bar	7KW	25mm	15mm	1730*910mm
3	NAS30-295	30Nm³/h	99.50%	6bar - 8bar	11KW	25mm	15mm	1850*970mm
4	NAS40-295	40Nm³/h	**99.50%**	6bar - 8bar	15KW	25mm	25mm	2000*1150mm
5	NAS50-295	50Nm³/h	99.50%	6bar - 8bar	18KW	32mm	25mm	2250*1250mm
6	NAS60-295	60Nm³/h	**99.50%**	6bar - 8bar	22KW	32mm	25mm	2350*1270mm
7	NAS80-295	80Nm³/h	99.50%	6bar - 8bar	30KW	40mm	25mm	2430*1350mm
8	NAS100-295	100Nm³/h	**99.50%**	6bar - 8bar	37KW	40mm	32mm	2750*1500mm
9	NAS150-295	150Nm³/h	99.50%	6bar - 8bar	55KW	50mm	32mm	3400*1600mm
10	NAS200-295	200Nm³/h	**99.50%**	6bar - 8bar	75KW	50mm	32mm	3500*2200mm
11	NAS300-295	300Nm³/h	99.50%	6bar - 8bar	90KW	65mm	40mm	3750*2400mm
12	NAS400-295	400Nm³/h	**99.50%**	6bar - 8bar	110KW	65mm	40mm	3900*2500mm
13	NAS500-295	500Nm³/h	99.50%	6bar - 8bar	150KW	80mm	50mm	4260*2600mm
14	NAS600-295	600Nm³/h	**99.50%**	6bar - 8bar	200KW	80mm	50mm	4400*2700mm
15	NAS800-295	800Nm³/h	99.50%	6bar - 8bar	250KW	100mm	65mm	4700*2600mm
16	NAS1000-295	1000Nm³/h	**99.50%**	6bar - 8bar	315KW	125mm	65mm	5200*2900mm
17	NAS1500-295	1500Nm³/h	99.50%	6bar - 8bar	450KW	150mm	80mm	5050*4650mm
18	NAS2000-295	2000Nm³/h	**99.50%**	6bar - 8bar	600KW	150mm	100mm	5550*5350mm

NAS*-39 Series

No.	Model	Flow Rate	Purity	Pressure	Air Con	Inlet	Outlet	Size
1	NAS10-39	10Nm³/h	99.90%	6bar - 8bar	5KW	15mm	15mm	1700*1100mm
2	NAS20-39	20Nm³/h	**99.90%**	6bar - 8bar	11 KW	25mm	15mm	1900*1150
3	NAS30-39	30Nm³/h	99.90%	6bar - 8bar	15 KW	25mm	15mm	2000*1250
4	NAS40-39	40Nm³/h	**99.90%**	6bar - 8bar	18 KW	25mm	25mm	2150*1300
5	NAS50-39	50Nm³/h	99.90%	6bar - 8bar	22 KW	32mm	25mm	2300*1400
6	NAS60-39	60Nm³/h	**99.90%**	6bar - 8bar	30 KW	32mm	25mm	2350*1430
7	NAS80-39	80Nm³/h	99.90%	6bar - 8bar	37 KW	40mm	25mm	2600*1550
8	NAS100-39	100Nm³/h	**99.90%**	6bar - 8bar	45KW	40mm	32mm	2800*1700
9	NAS150-39	150Nm³/h	99.90%	6bar - 8bar	75KW	50mm	32mm	3150*1900
10	NAS200-39	200Nm³/h	**99.90%**	6bar - 8bar	75 KW	50mm	32mm	3610*2150
11	NAS300-39	300Nm³/h	99.90%	6bar - 8bar	110KW	65mm	40mm	4000*2300
12	NAS400-39	400Nm³/h	**99.90%**	6bar - 8bar	150KW	80mm	50mm	4150*2300
13	NAS500-39	500Nm³/h	99.90%	6bar - 8bar	200KW	80mm	50mm	4350*2800
14	NAS600-39	600Nm³/h	**99.90%**	6bar - 8bar	250KW	100mm	65mm	4600*3000
15	NAS800-39	800Nm³/h	99.90%	6bar - 8bar	315KW	125mm	65mm	5300*3100
16	NAS1000-39	1000Nm³/h	**99.90%**	6bar - 8bar	400KW	125mm	65mm	5400*4600
17	NAS1500-39	1500Nm³/h	99.90%	6bar - 8bar	600KW	150mm	80mm	5650*5350
18	NAS2000-39	2000Nm³/h	**99.90%**	6bar - 8bar	750KW	150mm	100mm	6550*6250

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Airstone Nitrogren | Models

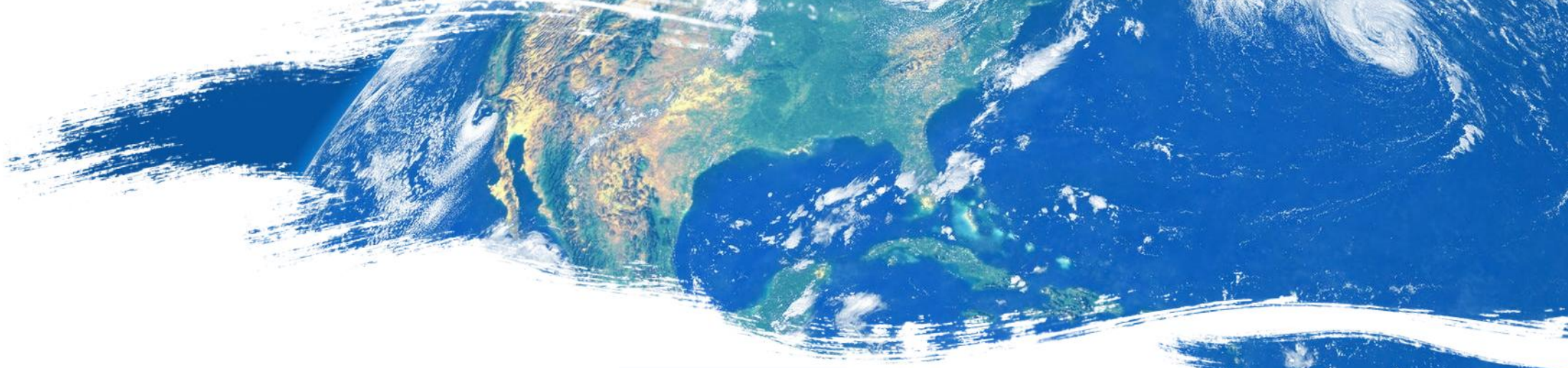
NAS*-49 Series

No.	Model	Flow Rate	Purity	Pressure	Air Con	Inlet	Outlet	Size
1	NAS5-49	5Nm³/h	99.99%	6bar - 8bar	5KW	15mm	15mm	1600*1100
2	NAS10-49	10Nm³/h	**99.99%**	6bar - 8bar	7KW	15mm	15mm	1900*1150
3	NAS20-49	20Nm³/h	99.99%	6bar - 8bar	15KW	25mm	15mm	2150*1300
4	NAS30-49	30Nm³/h	**99.99%**	6bar - 8bar	55KW	32mm	15mm	2400*1500
5	NAS40-49	40Nm³/h	99.99%	6bar - 8bar	30KW	40mm	25mm	2450*1600
6	NAS50-49	50Nm³/h	**99.99%**	6bar - 8bar	37KW	40mm	25mm	2600*1670
7	NAS60-49	60Nm³/h	99.99%	6bar - 8bar	45KW	50mm	25mm	2650*1800
8	NAS80-49	80Nm³/h	**99.99%**	6bar - 8bar	55KW	50mm	25mm	2900*2100
9	NAS100-49	100Nm³/h	99.99%	6bar - 8bar	75KW	65mm	32mm	3050*2300
10	NAS150-49	150Nm³/h	**99.99%**	6bar - 8bar	90KW	65mm	40mm	3050*2300
11	NAS200-49	200Nm³/h	99.99%	6bar - 8bar	110KW	80mm	50mm	3600*2350
12	NAS300-49	300Nm³/h	**99.99%**	6bar - 8bar	200KW	100mm	65mm	3900*2600
13	NAS400-49	400Nm³/h	99.99%	6bar - 8bar	250KW	100mm	65mm	4600*4300
14	NAS500-49	500Nm³/h	**99.99%**	6bar - 8bar	315KW	125mm	80mm	4900*4600
15	NAS600-49	600Nm³/h	99.99%	6bar - 8bar	355KW	125mm	80mm	5300*5100
16	NAS800-49	800Nm³/h	**99.99%**	6bar - 8bar	450KW	150mm	100mm	5600*5400

NAS*-59 Series

No.	Model	Flow Rate	Purity	Pressure	Air Con	Inlet	Outlet	Size
1	NAS5-59	5Nm³/h	99.999%	6bar - 8bar	5KW	15mm	15mm	1480*850mm
2	NAS10-59	10Nm³/h	**99.999%**	6bar - 8bar	11KW	25mm	15mm	1700*900mm
3	NAS20-59	20Nm³/h	99.999%	6bar - 8bar	22KW	25mm	15mm	1800*950mm
4	NAS30-59	30Nm³/h	**99.999%**	6bar - 8bar	30KW	25mm	25mm	1950*1100mm
5	NAS40-59	40Nm³/h	99.999%	6bar - 8bar	45KW	32mm	25mm	2200*1150mm
6	NAS50-59	50Nm³/h	**99.999%**	6bar - 8bar	55KW	32mm	25mm	2250*1210mm
7	NAS60-59	60Nm³/h	99.999%	6bar - 8bar	75KW	40mm	25mm	2400*1350mm
8	NAS80-59	80Nm³/h	**99.999%**	6bar - 8bar	75KW	40mm	32mm	2650*1400mm
9	NAS100-59	100Nm³/h	99.999%	6bar - 8bar	90KW	50mm	32mm	3250*1900mm
10	NAS200-59	200Nm³/h	**99.999%**	6bar - 8bar	200KW	50mm	32mm	3410*2150mm
11	NAS300-59	300Nm³/h	99.999%	6bar - 8bar	315KW	65mm	40mm	3650*2300mm

For Parameter of purity of 99.9995%, and more information about the systems, please feel free to contact with us.



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