

Working principle of GASPU pressure swing adsorption PSA nitrogen generator

Basic Information

- Place of Origin: china
- Brand Name: GASPU
- Certification: ce
- Model Number: PD



Product Specification

- Model: PSA-NG
- Control Power Supply: 0.2kw 220v 50Hz
- Function: Nitrogen Making
- Customize: Available
- Surrounding Requirement: No Dust & Corrosive Gas 0-40
- Production Capacity: 100 Sets Per Month
- Condition: New
- Key Selling Points: Long Service Life
- Achieve High Purity: Yes
- Dew Point: -40°C
- High Purity: 99.5%-99.999%
- Flow Rate: 5-5000 Nm3/h
- Marketing Type: Hot Product 2022
- Highlight: **gaspu psa nitrogen generator,
gaspu onsite nitrogen generation,**

Product Description

Working principle of GASPU pressure swing adsorption nitrogen generator

Core principle

Adsorption separation

The pressure swing adsorption (PSA) nitrogen generator uses air as raw material and utilizes the selective adsorption difference of carbon molecular sieve for oxygen and nitrogen to achieve separation. Oxygen molecules have a smaller diameter and diffuse faster under pressure, and are preferentially adsorbed by carbon molecular sieves; Nitrogen accumulates in the gas phase and is output as finished nitrogen due to its slow diffusion rate.

Decompression regeneration

When the carbon molecular sieve in the adsorption tower reaches adsorption saturation, the adsorbed oxygen and other impurity gases are desorbed by reducing the pressure (such as switching to normal or negative pressure), completing the regeneration of the molecular sieve and preparing for the next adsorption cycle.

Twin tower alternating cycle

The equipment is usually equipped with dual adsorption towers, and the pneumatic valves are controlled by PLC programs to achieve alternating operation of the two towers: one tower adsorbs and produces nitrogen under pressure, while the other tower regenerates under reduced pressure, ensuring continuous and stable nitrogen supply.

Workflow

Compressed air pretreatment

After being pressurized by the compressor, the air passes through a dryer and filter to remove impurities such as moisture and oil, ensuring that the gas entering the adsorption tower is clean and avoiding molecular sieve contamination.

Adsorption and nitrogen production stage

After compressed air enters the adsorption tower, carbon molecular sieves adsorb impurity gases such as oxygen and carbon dioxide. The purity of nitrogen gradually increases to the set value (such as 95%~99.999%) with adsorption time, and is finally output through the outlet.

Switching and Regeneration Stage

When one tower is saturated with adsorption, the system automatically switches to another tower to continue nitrogen production. The original adsorption tower enters a pressure relief regeneration state, releasing adsorbed impurity gases and completing the cycle.

Technical features

Automated control: using PLC program and pneumatic valve linkage to achieve fully automatic operation without manual intervention.

Purity adjustable: By adjusting parameters such as adsorption time and pressure, nitrogen purity can be flexibly controlled to meet different industrial needs.

Continuous gas supply: The dual tower alternating design ensures the continuity of nitrogen production and avoids interruption of gas supply due to the regeneration process.

Low energy consumption: Compared to cryogenic air separation, PSA technology has lower energy consumption and is suitable for small and medium-sized nitrogen demand scenarios.

Key components and optimization

Carbon molecular sieve: As a core adsorbent material, it needs to have high adsorption capacity and compressive strength, and its performance directly affects nitrogen purity and equipment efficiency.

Pre processing system: Precision filtration and drying devices can extend the lifespan of molecular sieves and ensure long-term stable operation of the system.

Pressure control: Optimizing adsorption/regeneration pressure parameters can improve nitrogen recovery rate and reduce energy consumption.

Through the above process and technological optimization, GASPU PSA nitrogen generator can achieve efficient and stable nitrogen production, which is widely used in fields such as chemical engineering, electronics, and food processing.



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