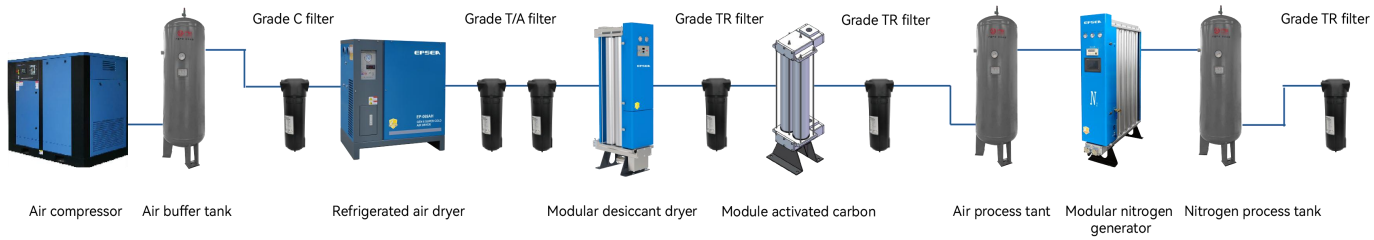

1. Main technical indicators and parameters

EPV-12MZ+ PSA Modular Nitrogen Generator		
1.1 Nitrogen output indicator		
Nitrogen flow	12Nm³/Hr	(Picture for reference appearance)
Nitrogen purity	99.999%	
Nitrogen pressure	0.1~0.65MPa	
Nitrogen atmospheric dew point	≤-40℃	
Upstream air tank	Customer-owned 0.3m³/0.8MPa	
Downstream nitrogen tank	Customer-owned 0.1m³/0.8MPa	
1.2 working condition		
Input fluid	Compressed air	
Air consumption	1.3m³/Min	
Air inlet pressure	0.6~0.8MPa	
Air inlet temp.	≤38℃	
Max ambient temp.	45℃	
Cycle time	48-58s	
Regeneration method	Variable pressure desorption, alternate purge	
1.3 Machine features		
L×W×H	400*1508*1810mm（EST.）	
Weight	460±20kg（EST.）	
Air inlet pipe diameter/connection	DN20（Rp3/4 Female thread）	
Nitrogen outlet pipe diameter/connection	DN15（Rp1/2 Female thread）	
1.4 Rated condition		
Power supply	1Phase/220V/50Hz	
Rated power	0.2kW	

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1.5 Air-to-nitrogen ratio (the following shows the standard molecular sieve data for inlet pressure of 0.7MPa, If you need lower requirements, molecular sieve with higher performance can be selected.

Required purity	99.999	99.99	99.9	99.5	99	98	97
Air to nitrogen ratio	6.5	4.5	3.5	2.6	2	1.8	1.7

1.6 Main component features		
	Aluminium module&Adsorption cylinder	1. Our company launched high-strength 6063-T5 integrated extrusion aluminum profile, the use of advanced technology independent manufacturing mold, performance stability, sales in the industry ranks first. 2. A single adsorption cylinder < φ150mm, volume < 25L, does not belong to the pressure vessel, free of annual inspection. 3. The patented diverter allows the air flow of each adsorption cylinder to be evenly dispersed, and makes efficient use of carbon molecular sieve. It is the same filling volume as the twin tower nitrogen maker, with 10% higher output and 3% lower gas consumption.
	Carbon molecular sieve	1. Performance testing should be conducted on each batch of adsorbents to meet our performance requirements before they can be stored for nitrogen production machine loading 2. Stable performance, excellent air-nitrogen ratio, efficient separation.
	Control system	1. Configure PLC and 7-inch touch screen to choose a variety of intelligent operation and data monitoring. 2. Standard configuration includes digital flow sensor, digital pressure sensor and purity sensor to ensure accurate perception of system status. 3. Adopt advanced (VP) variable cycle control logic to intelligently adjust the working cycle according to the actual traffic load to achieve variable cycle operation. For example, when the actual load rated flow rate is 80%, the control logic intelligently adjusts the variable cycle from 50s to 70s, thereby saving air consumption by up to 20%. When the actual load rated flow rate is reduced to 50%, the variable cycle is further extended to 100s, achieving air consumption savings of up to 50%. This intelligent regulation not only improves the operating efficiency of the system, but also effectively reduces energy consumption and low-carbon emission reduction.

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	Digital flow meter	1. Standard SMC thermal digital flowmeter, with temperature and pressure compensation to ensure accurate data. 2. Digital display function makes the reading intuitive and clear. 3. At the same time, it has the function of signal remote transmission, which is convenient for users to carry out remote monitoring and data collection. Provide reliable data support for users.
	All stainless steel pneumatic valve	1. Standard Y-type design of well-known brand, increase flow rate and reduce flow resistance, increase flow rate up to 30%. 2. The valve has a very long service life, after strict testing and verification, it can run for 24 hours continuously no less than 3 million times, which is equivalent to 24 hours continuous operation of more than 6 years of service life. 3. Its self-lubrication features ensure maintenance-free convenience, and the all stainless steel material allows it to work stably in harsh environments. Each machine comes standard with 5-7 pieces (depending on the equipment model).
	Pressure sensor	Strong anti-interference ability, accurate detection of back-end pressure changes, suitable for remote transmission and energy-saving shutdown control, to ensure stable system operation and reduce energy consumption.
	Pressure regulating valve	1. The whole aluminum alloy material is durable and corrosion resistant to ensure longer service life. 2. The accuracy of pressure regulation can meet the fine demands of different situation on pressure.
	Gas analyzer	New long life electrochemical sensor with high accuracy and fast response.
	Pilot solenoid valve	1. Low power consumption 2. Sensitive action, good air tightness without internal leakage
	Filter felt	High density, strong toughness, can effectively filter fine particles, small piezoresistance, prevent friction between molecular sieve and wire mesh, powder.

1.7 Optional configurations (not included in this offer)

For additional requirements beyond the scope of this configuration, we will further understand and provide tailored solutions to meet your individual needs.

Note: It is recommended to install desiccant dryer or activated carbon degreaser in upstream of the nitrogen generator, which can effectively protect the life of molecular sieve of the nitrogen generator, prolong the service life for 3-5 years, reduce the failure rate, and save the maintenance cost of the nitrogen generator.

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2.Control system

2.1 Operating parameter		
Parameter name	**Measuring range**	**Standard/Optional**
Digital output flow meter	Selection according to equipment rating	Standard
Outlet pressure sensor	0~1.6MPa	Standard
Nitrogen purity test	79～99.999% / 21%~10ppm	Standard
2.2 Control function		
Function name	**Functional description**	**Standard/Optional**
Remote start	Passive dry contact	Standard
Remote stop	Passive dry contact	Standard
Remote chain start-stop	Passive dry contact	Standard
Operation signal	Passive dry contact	Standard
Fault signal	Passive dry contact	Standard
Remote communication	International standard modbus protocol / using RS485 to connect to the PC side	Standard
Sensor failure	Alarm indication/recording	Standard
Energy saving control	Flow control/pressure control parameter setting required function	Standard

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3.Function feature introduction

3.1.Overview:

Our module nitrogen generator innovative structure, integrated, centralized design, small integrated volume. All components can be used with electricity and ventilation - simple installation and operation. Inside the adsorption cylinder, we have a patented shunt diffuser designed to effectively reduce the flow velocity and disperse the air flow, ensuring that the gas is evenly passed through the carbon molecular sieve bed, making the equipment superior in performance and durability.

In terms of control, we use the standard PLC control system to realize the visual operation of data, and the degree of intelligence is very high. The system is equipped with a rigorous variable period (VP) control logic and feedback system, which can intelligently adjust the switching frequency to meet the use in different scenarios. In addition, real-time monitoring of nitrogen output indicators facilitates remote operation and data viewing.

In addition, the machine is equipped with a downstream pressure sensor, which automatically saves energy shutdown when the set pressure is reached, further reducing energy consumption. We can also provide our customers with tailor-made control solutions to meet the changing operating conditions of field equipment.

The MCGS visual configuration interface makes the display and real-time control of various parameters more intuitive and convenient. Multiple devices can be connected in parallel to meet customers' nitrogen requirements in different scenarios, improving device flexibility and adaptability.

3.2.Main features of the machine

(1) Low gas consumption

All models of the modular nitrogen generator adopt new, high-quality molecular sieve without refurbishment and scraps to ensure the high efficiency and stability of the product. We work closely with molecular sieve manufacturers, through strict testing and development, successfully developed a low nitrogen ratio molecular sieve, its nitrogen purity 99.99%, and the minimum air nitrogen ratio is lower than 4.5 (lower air nitrogen ratio needs to be customized), compared with conventional molecular sieve 99.99% air nitrogen ratio generally in the range of 4.8-5.2, has a significant advantage. The application of this innovative technology has enabled our modular nitrogen generator to achieve a significant improvement in performance and better meet the needs of users for efficient and stable nitrogen production.

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(2) The perfect replacement for small flow models

The production of a small flow (20Nm³/h) nitrogen machine is not easy, because the requirements on key processes such as pressure vessels, welding, and painting are no different from those of large equipment, requiring a lot of time, manpower and material resources. However, many small flow nitrogen machines on the market often use simple production schemes, and there are many shortcomings:

- The lack of compliance certification of the container, and even the use of conventional seamless pipes or seamed pipes, not only does not meet industry standards, but also has serious safety risks.
- Due to the small model, the integration of valves, gas tanks and other components becomes particularly difficult, resulting in the overall equipment appears uncoordinated and lack of aesthetics.
- Maintenance is difficult, such equipment is often faced with maintenance difficulties and high maintenance costs after 1-2 years of use, and it is difficult to achieve long-term use.

And our module nitrogen generator with its highly integrated advantages, the perfect solution to the above problems. All parts in the equipment are equipped with the industry's top configuration to ensure the overall quality of the equipment.

(3) Blizzard filling

By using a blizzard filling device, we successfully optimized the loading process of the molecular sieve and significantly improved its compactness. Compared to the traditional method of relying only on motor vibration/percussion, our filling technology can increase the volume of the same size adsorption cylinder by at least 10% more filling, and ensure that no powder is achieved. It can not only ensure that the molecular sieve is more stable in the tower, but also effectively prevent its subsidence and powder phenomenon. As a result, our technology is able to ensure that the molecular sieves in the tower maintain excellent performance for up to 5 years without frequent replacement or addition of molecules, thus saving customers significant costs and time.

(4) Impure emptying

The standard nitrogen unqualified emptying system can intelligently monitor the purity of nitrogen. Once the purity of nitrogen does not reach the preset or required concentration standard of the workshop, the system will automatically trigger the control valve to remove unqualified exhaust gas in time to ensure the purity and safety of the production environment. When the purity of nitrogen exceeds the set value or meets the specific requirements of users, the system will automatically close the exhaust valve and open the qualified air delivery valve, which will accurately transport high-purity nitrogen to the workshop to meet the production needs. The whole process does not require manual intervention, and realizes intelligent monitoring and automatic regulation of nitrogen purity, which greatly improves production efficiency and safety.

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(5) Energy saving operation and power saving

The modular nitrogen generator comes standard with digital flow, digital pressure and purity sensors and uses advanced variable cycle control logic (VP). This logic can flexibly adjust the working cycle according to the actual load to achieve high efficiency and energy saving. At 80% rated flow, the working cycle can be extended to 70 seconds, saving 20% air consumption; At 50% rated flow, the cycle is extended to 100 seconds, saving 50% air; At 30% flow, the cycle can reach 130 seconds, and the energy saving effect is more than 60%. When the flow rate is less than 10%, the pressure energy saving access control, by suspending the PLC program to achieve zero gas consumption; When the pressure is lower than the set lower limit, the PLC program automatically starts to ensure stable operation. This innovative combination makes the equipment both efficient and energy efficient, bringing significant economic and environmental benefits to the user.

Due to the continuous update of technology, the company reserves the right to change and upgrade the product without prior announcement, please refer to the final confirmed version when ordering.

3.3. PI diagram of process principle

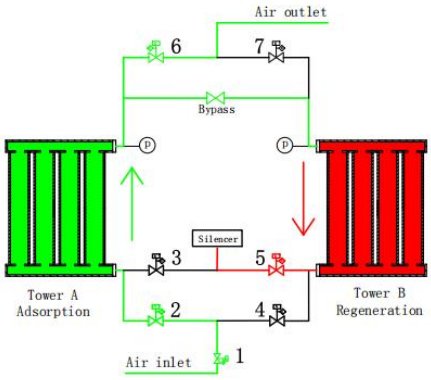

Fig. 1 Grade A adsorption, Grade B regeneration

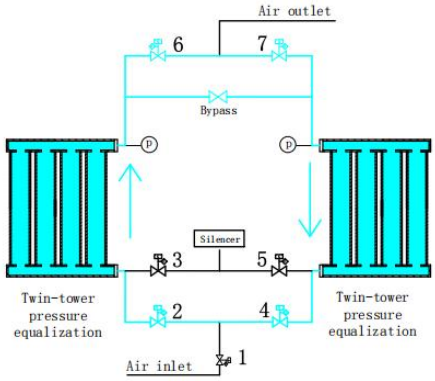

Fig. 2 Two groups of equalised pressure

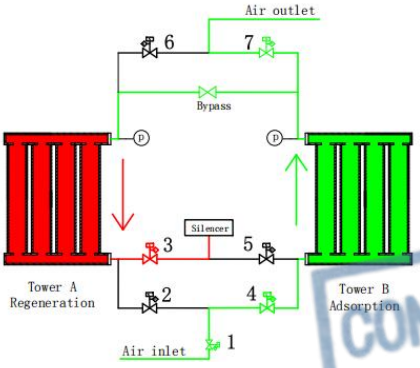

Fig. 3 Grade A regeneration, Grade B adsorption

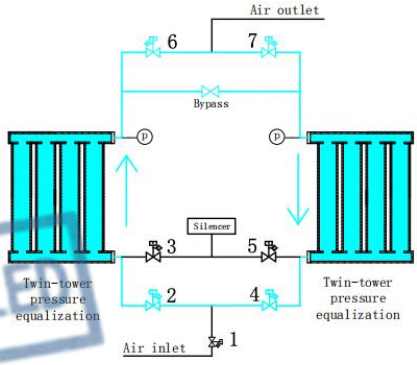

Fig. 4 Two groups of equalised pressure

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3.4.Part of the site physical reference picture

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