



THE ONSITE  
GAS COMPANY  
inmatec.com



## PN NITROGEN GENERATORS

Nitrogen generation right onsite:  
safe, efficient and sustainable



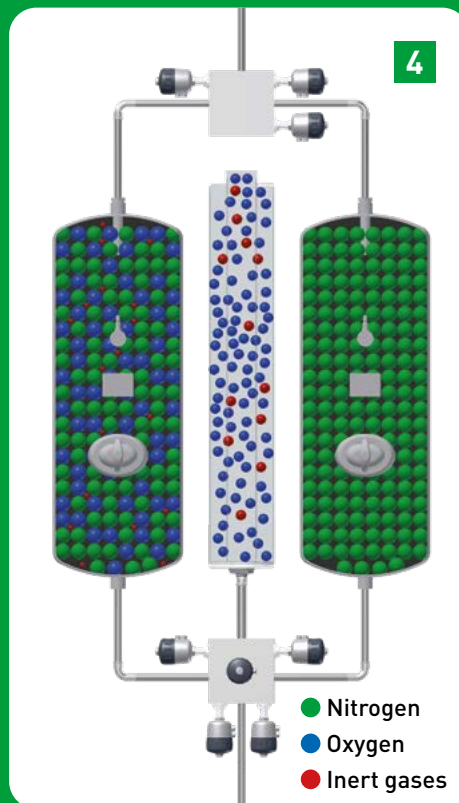
# Saving money, remaining independent

Generating nitrogen independently instead of buying it – those who decide to produce it themselves not only save money but also remain independent of liquid gas manufacturers. After all, liquid nitrogen is expensive. High transport and storage costs as well as long-term supply contracts create additional expenses. With highly efficient onsite nitrogen generation, you will not only be independent but you will also produce exactly the purity your application requires – with complete transparency onsite. Many systems will pay off after just a few years. An investment that will be quickly noticeable in your budget.

## PSA Technology

The mode of action is based on the adsorption principle. For nitrogen generation, compressed air alternately flows through two receivers filled with CMS. The oxygen molecules of the ambient air, which is supplied under pressure, is absorbed on the surface of the CMS. The free nitrogen molecules pass through the CMS without being obstructed and are directed into a separate downstream product receiver. This is where the nitrogen is stored for subsequent use.

After the CMS in the first receiver have been saturated with oxygen molecules, the process is switched to the second receiver. While the CMS in the first receiver regenerate under pressure relief and by being flushed, the oxygen molecules are absorbed under pressure in the second receiver. This generates a continuous flow of nitrogen.





### 1 OXYGEN ANALYSIS (ZIRCONIUM OXIDE SENSOR)

The zirconium oxide sensor installed as standard is durable and particularly reliable. Temperature-resistance and quick response times guarantee continuous and reliable monitoring of purity.

### 2 MICRO, ACTIVATED CARBON AND DUST FILTERS

Two inlet and outlet filters ensure a high degree of compressed air quality, maximum protection of the molecular sieve used as well as a high level of nitrogen quality for the consumer. This is how the system stands out with a particularly long service life.

### 3 CONSOLE AND RECEIVER

All PSA receivers have been designed for  $\geq 2$  million load cycles in accordance with DGRL and feature fatigue strength. From series PN 220, high-quality sieve bottoms ensure a flow-optimised design. The integrated sinter filters prevent particle transfer from the CMS in use, increase service life and ensure the best possible product quality.

### 4 HIGH-QUALITY CMS MADE OF COCONUT SHELLS

The carbon molecular sieve (CMS) made of biodegradable material is not just environmentally friendly, it is also characterised by a long service life and low air factors, thanks to exceptional adsorption properties. Sustainable, powerful and efficient

### 5 VALVE BLOCK AND HIGH-QUALITY PNEUMATIC VALVES

The valve block's compact design minimises leakage risks and allows easy accessibility for maintenance. The efficient arrangement of the high-quality pneumatic valves results in quick response times and precise control. Reliable and maintenance-friendly

### 6 SENSOR & CONTROL TECHNOLOGY

A pressure sensor and a flow control located at the outlet of the generator ensure efficient operation and continuous monitoring of the nitrogen quality.

The perfect interaction between sensor and control technology is not just energy efficient and optimised for consumption but it also guarantees maximum operational safety and excellent product quality.

### 7 INLET AND OUTLET PRESSURE REGULATORS

The inlet and outlet pressure regulators guarantee a constant flow of the incoming or outgoing gas, which increases process stability.

### 8 9" TOUCHSCREEN CONTROL

The high-quality control offers maximum user friendliness. The entire process is presented visually and clearly. Numerous interfaces allow transparent process monitoring as well as easy integration into the customer's existing infrastructure.



PN 2000 NITROGEN GENERATOR

# Lower Cost as a package



## AUTOPURE TECHNOLOGY

During start-up or a minor decrease in product purity, the receiver is flushed with nitrogen until the required purity class has been reached. Only then will the generator open the nitrogen outlet and make the nitrogen available at the required purity. The product gas of lower quality is extracted until the required purity has been reached. This ensures a constantly high and consistent product quality and is therefore particularly suitable for sensitive applications in the food and pharma industry.

### Our quality promise at an attractive price

**Package option 1** combines AutoPure Technology with a pressure sensor to monitor the generator's intake pressure and a flow sensor at the generator's outlet to continuously monitor the flow quantity.

**Your benefits:** Consistently high purity, a long service life and maximum operational safety at a great price



## ENERGY EFFICIENCY CONTROL

Using the sensors supplied and an additional oxygen sensor (zirconium oxide sensor), the EEC constantly measures the nitrogen requirement and the purity quality of the gas produced. During this process, the control analyses the current requirement and predicts future need. At full load, the generator runs at continuously high capacity. At partial load (when demand fluctuates), the generator's control reduces performance by increasing the cycle time (dwell time) of the adsorbing receiver. The resulting reduction of switching cycles leads to a significant saving with regard to purge air losses, a significantly lower air consumption and thus maximum energy savings.

Energy-intensive applications (large-scale plants) with fluctuating demand in particular will benefit from this solution.

### Our energy savings package at an attractive price

**Package option 2** includes Package option 1 supplemented by an additional temperature sensor and a pressure dew point sensor to continuously monitor compressed air temperature and humidity at the generator inlet.

**Your benefit:** Requirement-orientated, efficient and maximum energy savings at a great price



## BASE LOAD SWITCHING

The base load switching function controls two redundant supply systems. One system is in charge of the master function, while the second system manages the slave function. Switching between the two systems is automatic and is controlled by pressure and flow.

**Your benefits:** Thanks to the additional redundancy, supply is guaranteed at all times. In the event of necessary surplus production, capacities can be flexibly adapted to the additional requirement and optimised. Furthermore, uniform utilisation increases generator service life. In addition, required servicing and maintenance do not necessarily result in downtimes because a back-up system is available.

Increased efficiency, reliability and stability of the production process – you can have it all in one option with base load switching control.



## REDUNDANT VALVE BLOCK

If needed, the availability or reliability of the system can be increased by using a redundant valve block in the generator's inlet and outlet. Activation of the ball valves switches to the second (redundant) pipework during generator operation. In most cases, a fault involves the process valves. The valve block therefore covers redundancy in about nine out of ten cases. The switch takes place manually. Process valves can be cleaned or replaced without system downtimes. This results in easy, maintenance-friendly and cost-effective redundancy compared with two parallel systems.



# An unbeatable duo: PNK and H<sub>2</sub>KAT

## Maximum purity and efficiency

Those who require nitrogen of the highest purity class (0.001% O<sub>2</sub>/5.0) will not just make significant savings with this during the investment but also with regard to running costs, thanks to minimised energy requirements. The intelligent combination of a modified PN nitrogen generator and an H<sub>2</sub>KAT hydrogen converter make for unbeatably efficient nitrogen processing.

### PNK

In a way, the PNK is the “right hand” of the H<sub>2</sub>KAT. Technically perfectly synchronised, they are always used in this combination. The generator which has been designed for a specific purity of 0.1% (3.0) features an H<sub>2</sub>KAT switch cabinet, oxygen analysis, pressure sensor as well as AutoPure Technology & Energy Efficiency Control.

Eight PNK models (PNK 150 to PNK 2000) with free air deliveries from 20 to 375 Nm<sup>3</sup>/h cover a great range of free air deliveries. The pre-configured models are perfectly adapted to the relevant H<sub>2</sub>KAT model and can be easily combined.

### H<sub>2</sub>KAT

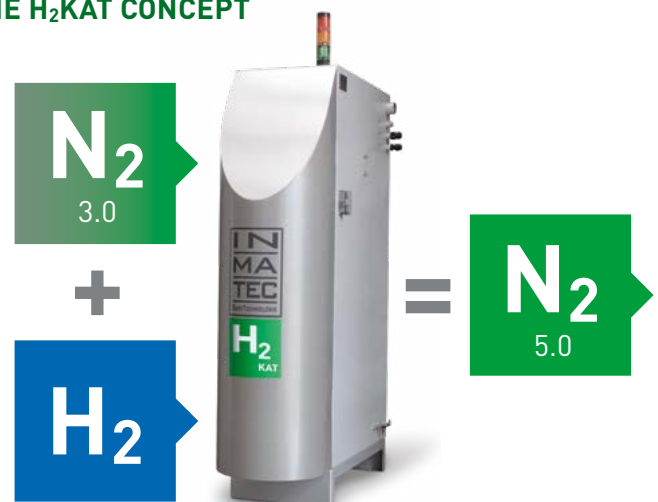
Using the downstream H<sub>2</sub>KAT hydrogen converter, nitrogen generation is energy-optimised. To do this, nitrogen provided by the generator, which has a residual oxygen purity of 0.1% (3.0), is purified in a specially developed reaction process (Deoxo). The H<sub>2</sub> and O<sub>2</sub> molecules in the H<sub>2</sub>KAT are absorbed to create H<sub>2</sub>O. This means that the remaining oxygen molecules are removed from the nitrogen in an energy efficient way by adding small quantities of hydrogen and released as water. This two-step process allows the generation of extremely pure nitrogen with a residual oxygen purity of 0.001% (5.0) with very low compressed air quantities. This saves energy costs and up to 70% primary energy.

The H<sub>2</sub>KAT is available in eight versions, with the highest purity of 0.001% O<sub>2</sub> (5.0) and free air deliveries of up to 300 Nm<sup>3</sup>/h. It features oxygen analysis to continuously monitor purity, a flow sensor (N<sub>2</sub>) as well as a temperature and pressure sensor. The H<sub>2</sub> hydrogen supply is not included in the delivery.

### ALL COMBINATIONS AT A GLANCE

PNK model	Purity	H <sub>2</sub> KAT model	Purity	Volume Flow N <sub>2</sub> Nm <sup>3</sup> /h
PNK 150	3.0	H <sub>2</sub> KAT 20	5.0	20
PNK 270	3.0	H <sub>2</sub> KAT 40	5.0	40
PNK 350	3.0	H <sub>2</sub> KAT 60	5.0	60
PNK 500	3.0	H <sub>2</sub> KAT 80	5.0	80
PNK 750	3.0	H <sub>2</sub> KAT 100	5.0	100
PNK 1000	3.0	H <sub>2</sub> KAT 150	5.0	150
PNK 1500	3.0	H <sub>2</sub> KAT 200	5.0	200
PNK 2000	3.0	H <sub>2</sub> KAT 300	5.0	300

### THE H<sub>2</sub>KAT CONCEPT





# Cleverly combined

**The combination of PNK and H<sub>2</sub>KAT allows a reduction in compressed air consumption by about 40-50% whilst significantly reducing the size of a comparable, conventional nitrogen generator. The result: maximum energy, space and cost savings!**

The generator produces a residual oxygen purity of only 0.1% (instead of 0.001%). The air factor can therefore be reduced by less than half. This means that the generator can be much smaller, resulting in lower generator procurement costs. However, you not only save with regard to the generator but also the upstream compressed air components, meaning you can use a much smaller compressor with fewer processing components. Smaller components require less power, which results in lower operating costs.

The fact that little space is needed makes this the perfect solution for container applications. Furthermore, the concept is particularly suitable for sophisticated applications that make high demands on purity.

## **Continuous purity monitoring and “state-of-the-art” 9” touchscreen control**

Another advantage is that continuous monitoring of quality and purity takes place centrally via the control of the PNK generator. Oxygen sensors installed as standard in both the PNK and the H<sub>2</sub>KAT ensure continuous purity monitoring of both models. All values can be displayed and accessed via the state-of-the-art, convenient 9” touchscreen control of the upstream nitrogen generator (PNK). The control clearly shows all relevant functional and quality parameters for both systems and provides numerous connection and integration options. Everything at a glance at all times

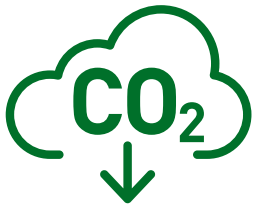
Using the downstream high-pressure compressor and nitrogen storage, the system can be flexibly expanded up to 300 bar and a photovoltaic system can be connected. In Germany, the system is also eligible for BAFA funding.

## **ALL BENEFITS AT A GLANCE**

- Significantly lower investment costs, thanks to a smaller compressor, generator and processing distance
- Significantly lower air factor compared with conventional nitrogen generation
- Reduction of compressed air consumption by about 40 to 50%
- Extremely compact
- High degree of energy efficiency and low CO<sub>2</sub> emissions



H<sub>2</sub>KAT



## Investing in a clean future

Sustainable production has great influence on the competitiveness of a company. Sustainable management within the sense of Corporate Social Responsibility (CSR) requires investments for the economic use of natural resources and the protection of both climate and environment.

The investment in environmentally friendly technologies initially requires money but it will pay off. By reducing carbon dioxide (CO<sub>2</sub>) emissions as part of production and transport, you will make a contribution to climate protection.

In addition, companies benefit economically from significant savings in energy costs, reduced energy taxes and government subsidies. In this way, investments in Inmatec-N<sub>2</sub> generation systems usually pay off very quickly.

## Your partner in nitrogen supply

Inmatec has been developing and producing nitrogen and oxygen generators since the company's foundation in 1993. We supply tailor-made solutions to the whole world and are now one of the international market leaders. With our PSA systems, membrane systems and H<sub>2</sub>KAT subsequent cleaning to generate the highest purity classes, we meet the most demanding requirements. The high-pressure solutions and container design guarantee efficiency, quality and independence. With our many years of experience and global presence, Inmatec's "Made in Germany" seal represents absolute peak performance.

Situated in Herrsching, our company has been part of the BOGE Group since 2023 and can, in addition to our own team, make use of its international sales and service organisation. This means we are able to work for you even more effectively and purposefully. Discover the fascinating world of onsite technologies

### ALL BENEFITS AT A GLANCE

→ **Experience since 1993 – with more than 9,000 systems installed all over the world**

**Development and manufacture "Made in Germany"**

**Reliable and adjustable technology**

**High degrees of efficiency and quality**



**INMATEC**  
GaseTechnologie  
GmbH & Co.KG

Otto Boge Straße 1-7  
33739 Bielefeld, Germany

Branch office:  
Gewerbstraße 72  
82211 Herrsching, Germany

Phone: +49 8152 9097-0  
Fax: +49 8152 9097-10  
info@inmatec.de / [inmatec.com](http://inmatec.com)



Subject to changes. The information in this brochure merely contains general descriptions or features that may vary for specific applications. Inmatec 11/2024