



## Efficiency on the spot

CryoGAN generators for cost-effective on-site production of high purity nitrogen



*The advantages of CryoGAN generators like these ones at Julon in Slovenia are that they offer a continuous supply and enable costs to be calculated precisely.*



*On-site installation is carried out by qualified specialists.*



### **Capacity combined with sector-specific purity**

CryoGAN stands for the cryogenic production of gaseous nitrogen. CryoGAN nitrogen generators have a production capacity of 220 to approx. 5000 scm/h. The lower end of the production spectrum is covered by standard ranges, which yields advantages in terms of costs and delivery time. The systems at the top end of the spectrum are custom-designed to meet the precise specifications of the customer. This facilitates optimum utilization of the system's potential in terms of costs and energy use.

The gas purity can be varied up to purity class 6.0 (=99.9999 % vol.). CryoGAN nitrogen generators thus open up the possibility of adjusting the nitrogen purity to suit the specific requirements of different sectors such as medicine, food or metallurgy.

### **Utilizing the optimization potential "on-site"**

More and more users are convinced that cryogenic on-site systems are the right solution for them. "On-site" production can offer clear advantages, especially when there is a continuously high demand for nitrogen.

These advantages are utilized to optimum effect by Messer's CryoGAN technology:

- Over 50% less energy is used compared with the production of liquid nitrogen – a positive contribution in terms of costs and the environment.
- Deliveries by road are largely unnecessary, thus reducing costs as well as noise and environmental pollution.
- On-site production ensures optimum security of supply, which is further safeguarded in conjunction with Messer's back-up system and logistics.
- Maintenance and service by qualified specialists as well as remote monitoring – 24 hours a day, 365 days a year – through Messer's European Control Center facilitate a comprehensive, hassle-free supply of nitrogen.



*For the use of nitrogen in metallurgy, the gas purity can be adjusted for specific requirements.*

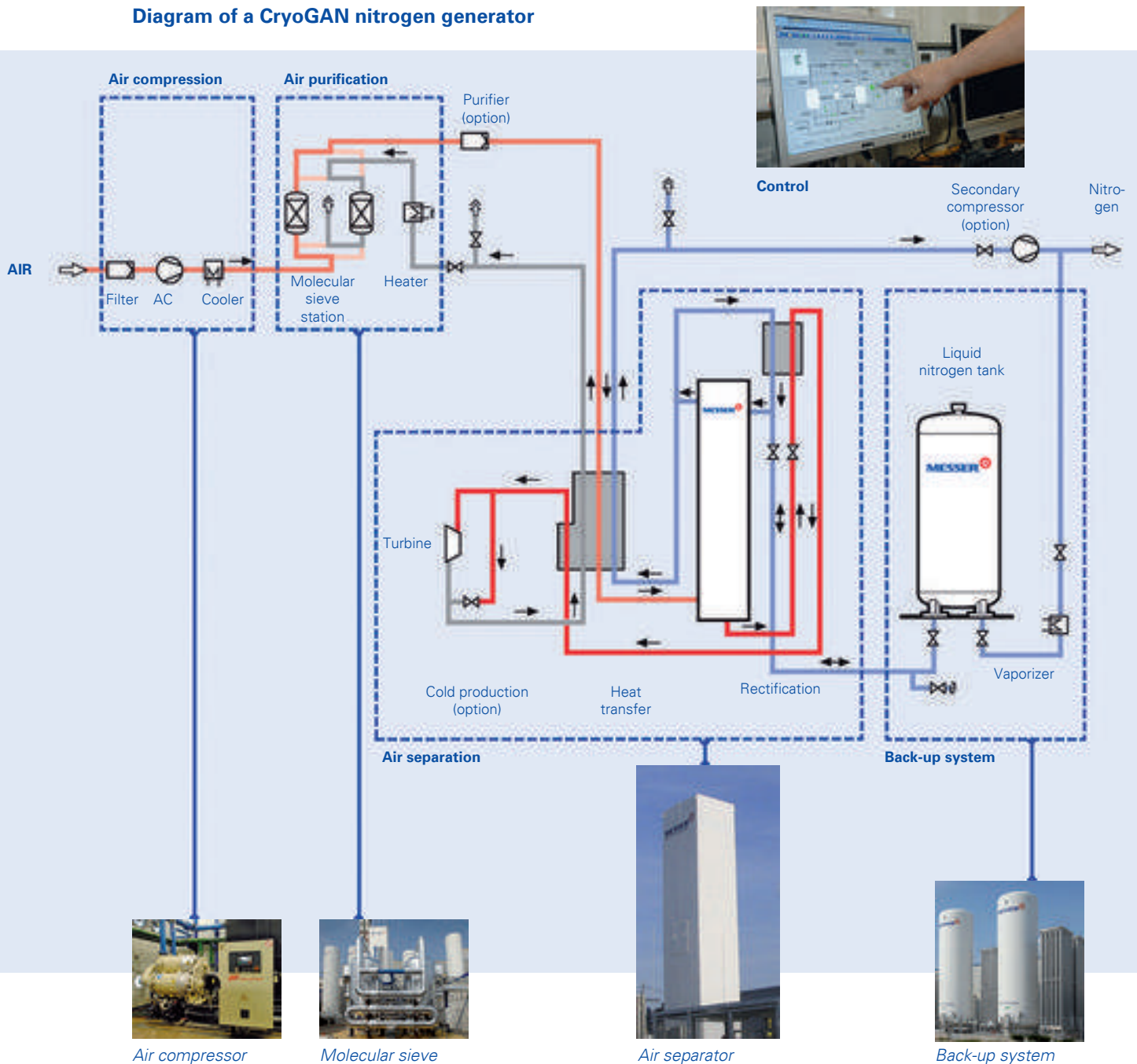


*In the food industry, gases are treated as foodstuffs and therefore have to meet special quality standards.*



*High purity gases play an important role in surgery in particular.*

## Diagram of a CryoGAN nitrogen generator



### Powerful as a matter of principle

Irrespective of their capacity, the basic principle is the same for all CryoGAN nitrogen generators and consists of the following components:

**Air compression:** The air is filtered and compressed to 7 to 10 bar and then pre-dried.

**Air purification:** Two adsorbers operated alternately separate out air components that are not required such as water vapor, carbon dioxide and hydrocarbons.

**Heat transfer:** Through heat exchange with the cold separation products, the air in the main heat exchanger is cooled to near the condensation temperature. In this process, the product flows are heated to the ambient temperature.

**Rectification:** The “heart” of the system separates the air into high purity nitrogen and an oxygen-enriched residual gas. The nitrogen is separated into two flows, one of which is fed back to the rectification column as a return flow after condensation. The other one flows through the main heat exchanger, where it gives off its “cold energy” to the air before escaping the system as a gaseous product.

**Cold source:** The system’s refrigeration requirement is met by either the use of liquid nitrogen or the cold produced by an expansion turbine.



*One of the latest CryoGAN nitrogen generators was commissioned at Bosch in Hungary.*

### Operating conditions and safety are constantly monitored

To enable optimum operation and monitoring of the CryoGAN nitrogen generator, Messer has set up its European Control Center in Budapest. It is in contact with the data transmission system of every single plant and thus keeps a constant watch on the most important operating data as well as all warning messages.

Generally, the start-up of the nitrogen generator and continuous operation are controlled remotely. Moreover, all CryoGAN nitrogen generators are regularly serviced by Messer employees to ensure safe and trouble-free operation.



### Technical data and options for CryoGAN nitrogen generators

<b>Product:</b>	high purity nitrogen, Purity up to 6.0
<b>Pressure:</b>	up to approx. 8 bar (higher pressure possible with product compressor)
<b>Output:</b>	150 scm/h – approx. 5,000
<b>Power</b>	0.28 – 0.35 kWh/Nm <sup>3</sup>
<b>Back-up system:</b>	consists of an evaporation device and liquid nitrogen tank. Covers peaks in demand, secures supply during maintenance-related downtimes and deals with the cold supply in the absence of an expansion turbine
<b>Secondary compressor:</b>	increases the plant's output pressure
<b>Purifier:</b>	additional gas purification stages for even higher nitrogen qualities



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