

Making our world more productive



## MINIGAN containerized supply solutions for gaseous nitrogen

Our MINIGAN series leverages the cooling power of liquid nitrogen (LIN assist) as the refrigeration source. Eliminating the need for mechanical refrigeration equipment such as expansion turbines, MINIGAN is a compact, simple, flexible and reliable solution for today's air separation needs.

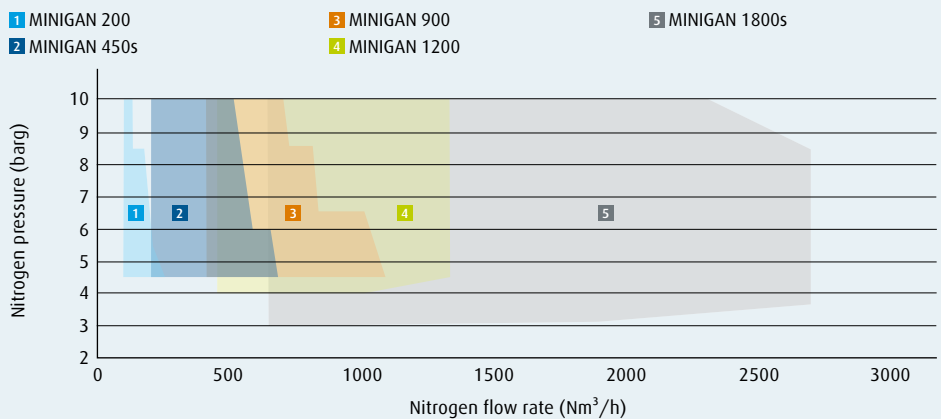
### Time-tested technology

A steady, predictable, on-demand stream of gases such as nitrogen is essential to ensure production continuity across industries as diverse as electronics, pulp and paper, mining, petrochemicals, metal fabrication and heat treatment. In segments such as electronics, purity may also be mission-critical – with levels of 99.9999% (1 ppm O<sub>2</sub>) or sometimes even higher required. Semiconductor players rely on a high-purity, cost-effective supply of nitrogen to develop new gas-enabled solutions for today's mobility and energy efficiency challenges in emerging applications.

### Local supply solution

Here at Linde CryoPlants, we have developed a family of compact plants to ensure reliable, flexible supplies of gaseous and liquid nitrogen. As part of this portfolio, our MINIGAN family is designed specifically for the production of gaseous nitrogen (GAN). It comes in a range of sizes scaling from MINIGAN 200 to MINIGAN 1,800 supporting capacities of up to 2,700 Nm<sup>3</sup>/h at purity levels of up to 99.9999% (1 ppm O<sub>2</sub>). It can be customized to individual requirements to ensure the perfect fit for your specific application challenges. These on-site nitrogen supply solutions are the ideal way

### Wide model range to suit individual volume requirements (based on 50 Hz)



to overcome the cost, logistical and flexibility constraints of bulk deliveries. Installed at your site, MINIGAN puts you in control – you are no longer reliant on gas deliveries from an independent provider.

### Reliability you can count on

MINIGAN uses liquid nitrogen injection (LIN assist) technology as the refrigeration source to ensure rapid cooling. This makes it a highly cost-effective solution to operate. It saves time by ensuring ease of installation and deployment on site. Located on a simple foundation slab, it has a compact footprint. With its ruggedized modular construction, it is

built to the highest international standards to withstand even the harshest of environmental conditions. It comes with factory-assembled, pre-tested modules (warm-end container and the coldbox).

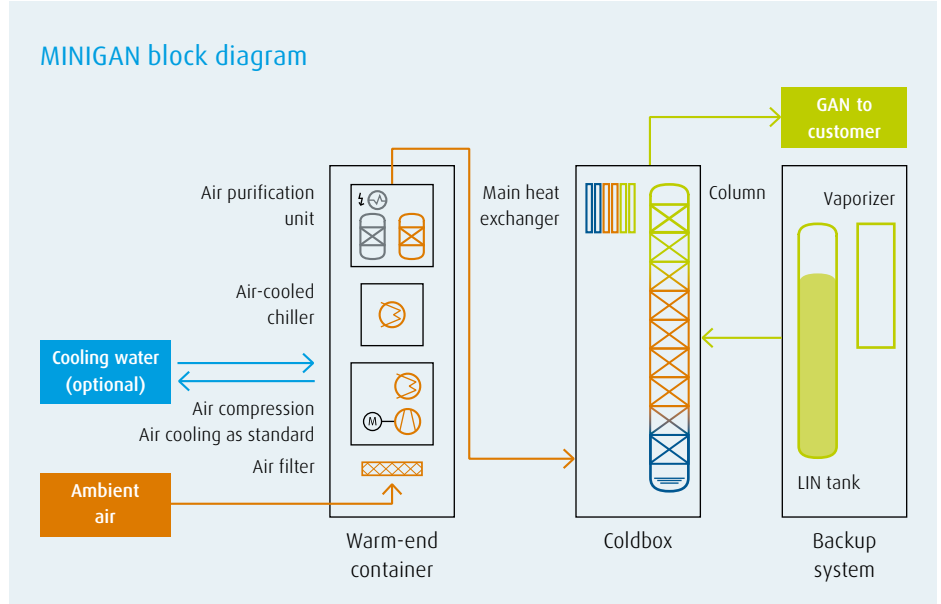
### Proven track record

Having already successfully supplied and commissioned over 250 air separation plants including 120 MINIGAN plants worldwide, Linde CryoPlants Ltd. is renowned for its engineering excellence, innovative technologies and strong commitment to customer service. Our expert engineers cover the full service spectrum from installation to remote control, leaving you free to focus on your core business.



# Optimized process flow

Regardless of the model, MINIGAN systems consist of multiple process steps – each of which is dimensioned to support the target flow and pressure requirements. For added flexibility and additional reserves of liquid nitrogen, the design includes a backup system.



## Technical features

- Ambient temperature from -35 °C to +45 °C
- LIN assist operation
- Safe shutdown in the event of power failure
- Automatic start-up and shutdown
- Climate-controlled warm container
- Plant status signals (flow, pressure, purity)
- Alarm and pre-alarm signals
- No cooling water or instrument air required
- All-weather outdoor installation
- Remote communication and control
- Option for dust filters and frequency controller on compressor
- Low noise option
- Online oxygen analyzer
- Standard O<sub>2</sub> purity of 1 ppm, up to 0.1 ppm on request
- Product pressure from 4 to 10 barg (model-specific)
- More than 50% turndown

