



Danfoss and Smardt Chiller Group Deliver High-Efficiency Cooling for NEXTDC's Melbourne Data Center

A Quest for Perfection

NEXTDC is a leader in innovative data center outsourcing, connectivity, and infrastructure management solutions. In 2012, the company launched its M1 Melbourne hyperscale colocation facility, designed with a strong focus on sustainability and energy efficiency.

This commitment was recognized in 2016 when M1 achieved a 4.5-star NABERS rating, driven in part by the installation of Smardt chillers powered by Danfoss Turbocor oil-free compressor technology. Continuing to optimize performance, NEXTDC raised the benchmark again in 2019, becoming the first Australian data center to achieve a 5-star NABERS rating.

With a reputation built on sustainability, efficiency, and a 100% uptime guarantee, NEXTDC continues to push the limits of data center performance — even after reaching the industry's highest standards.

The challenge

Pushing Data Center Cooling Efficiency Further

NEXTDC worked closely with the Smardt Chiller Group, a long-standing OEM partner of Danfoss, to further enhance the efficiency and performance of the cooling system at its M1 data center facility.

As part of the 2016 expansion of the M1 facility, NEXTDC installed three additional Smardt chillers designed to deliver maximum energy efficiency while supporting the growing cooling demands of the data center environment.

Unlike conventional cooling applications in offices, schools, or commercial buildings — where systems may operate only part of the year — data center cooling systems run continuously, 24/7, to protect critical IT infrastructure generating significant heat loads.

As a result, even small efficiency improvements can translate into substantial annual energy savings. To meet increasing industry demands for sustainable and energy-efficient operations, data centers have progressively adopted advanced cooling technologies and raised server room operating temperatures.



While higher chilled water temperatures help reduce chiller power consumption, they also create new challenges for compressor performance and operating limits.

To address these challenges, Smardt collaborated with Danfoss to expand the operating range of the oil-free Danfoss Turbocor® compressors. The joint engineering effort enabled the compressors to operate efficiently at higher chilled water temperatures and lower ambient conditions — two operating scenarios commonly referred to as “low lift” conditions. Operating at low lift significantly improves system efficiency and reduces energy consumption, but it also requires advanced compressor optimization and control strategies.

Smardt and Danfoss engineers successfully overcame these technical challenges through software enhancements and targeted compressor improvements, enabling stable and reliable low-lift operation for the oil-free centrifugal Turbocor compressors.

Building on this innovation, the Smardt team further optimized system controls to maximize performance under low-lift conditions, helping NEXTDC achieve greater cooling efficiency, lower operating costs, and improved sustainability outcomes.

→ “The low-lift solution can save more than 30% in energy costs.”



The solution

Low lift, high reward

Smardt piloted this new low-lift configuration, SmardtLift™, with NEXTDC and it was installed on one of their Smardt chillers at the M1 data center facility. The pilot proved that the chiller could run quite efficiently during low lift scenarios. This means that it will activate when the ambient temperature of the data center is within an optimum threshold of what the cooling system requires. This method significantly cuts energy costs of the chillers — by just over 30% depending on the ambient conditions. This validation of savings paves the way for upgrading the remaining chillers and creating even greater savings for the facility as a whole. This low-lift operation produces the highest efficiency possible today for oil-free chillers. Another characteristic of oil-free chillers is that there is no performance degradation over time. In contrast, an oil-based chiller typically loses 10% to 30% of its capacity and efficiency over the life of the chiller — mainly caused by oil coating the heat exchangers and acting as an insulator, which inhibits optimum heat transfer. The Danfoss Turbocor compressor also supports the data center's 100% uptime guarantee requirements,

multiple compressor chiller configuration versus a single-compressor oil-based chillers. And because there is no oil system to hinder fast startup times, Smardt chillers powered by Danfoss Turbocor compressors over 30-second fast restart — the shortest restart time in the industry.

→ “The Danfoss solution supports the data center’s 100% uptime guarantee and overs a 30-second fast restart — the shortest restart time in the industry.”

Zachary Dominique
Global Head of Data Center Sales

The result

Total solutions provider

Not only were Danfoss and Smardt able to engineer a solution that can operate efficiently in low-lift conditions, but they also collaborated closely to validate this new solution. In this world-class plant, the large heat exchangers and the variable speed drives that were needed to complete the hydronic system were also manufactured by Danfoss. This demonstrates Danfoss’s understanding of the total cooling system. The solution has performed so well at the M1 Melbourne plant that NEXTDC has decided to roll out the SmardtLift low-lift chiller configuration across its fleet of data centers — improving their efficiency across the board. Who knew that the trick to improving the most well-oiled machine was a customized oil-free chiller?

Danfoss engineers developed a solution that could **operate efficiently in low-lift conditions**, and also worked with **Smardt** to validate this new solution.

