Overcoming the obstacles of hot summer climates to ensure food safety and cut energy consumption

The growth of e-commerce, rising wages and new mandatory Sunday closing regulations are together creating major challenges for the Korean supermarket sector. Amid the resulting industry downturn, retailers are seeking new growth opportunities in their offline stores to offer their customers low-cost, fresh and convenient foods and non-food products. To complicate matters, rising average summer temperatures create further demands in terms of food safety management. As a result, supermarkets have become much more focused on solutions that can help safeguard the quality of their food and other popular products.

Positioned as Korea’s most approachable and consumer-friendly store, N Supermarket is constantly striving to improve its customer value proposition by offering quality products from top producers and manufacturers, both domestically and from abroad, and all at the most competitive prices. Their efforts to source directly from suppliers, and to invest strongly in research and development, have resonated well with consumers. In just a few short years since launching, N Supermarket has grown to become one of the most recognized brands in the market, with an expanded product offering and accelerated sales growth in a short period of time.

To further maximize profitability by ensuring the availability of fresh foods to shoppers, N Supermarket needed a refrigeration solution that could guarantee year-round food safety. The company also wanted to add value to its supply chain by maximizing energy efficiency and cost savings, even during the implementation project.

After a review and consultation, N Supermarket chose Emerson’s refrigeration package solution – delivering high-performance, energy efficiency and operational stability – founded on Emerson’s unrivaled cooling and freezing technology. Following the installation, N Supermarket’s refrigeration coefficient of performance (COP) was improved by 20%, with year-round fresh food safety. The company also saw a reduction in overall life-cycle costs, and savings of up to 20% in annual power consumption, thanks to the Emerson system’s flexible capacity and speed adjustment features.

Project Background

N Supermarket needed a compressor and freezer solution that could provide stellar refrigeration performance and operational stability in a high-temperature environment – ensuring food quality and safety even on the hottest summer days. Additionally, they needed an efficient and reliable solution to meet the unique requirements of a supermarket environment – such as space, location and staffing.
Korean Supermarket Improves Refrigeration Performance by 20% With Emerson Solution

– which are quite different from those of large retailers.

On testing Emerson’s drive and controller package, optimized with variable speed compressors, the company observed the system’s stable high-performance, energy efficiency and overall reliability. Based on their years of know-how and experience in several locations, N Supermarket decided to adopt the package at its stores.

Challenges

N Supermarket needed to operate a refrigeration system in a relatively limited space when compared to larger retailers, and to use quieter compressors to reduce noise pollution and inconvenience to the public in city center locations. It also required proven system reliability to minimize additional staffing needs, specifically in the area of safety management.

Solutions

N Supermarket installed Emerson’s reliability-tested compressor, drive and controller package, utilizing variable speed refrigeration condensing units. The Emerson variable speed compressor delivers system stability and high-efficiency, based on reliable refrigeration performance and vapor injection technology, and ensures reduced noise and vibration. The system is a foundation for N Supermarket to expand its business with safety and stability.
With Emerson’s vapor injection technology, that stably compresses vapors in high-temperature environments, reliable compressor operation was guaranteed even in high summer temperatures, food safety was ensured, and a 20% improvement in COP was achieved.

By adopting a variable speed compressor equipped with vapor injection technology (the only compressor used in Korean supermarkets which utilizes vapor injection technology), refrigeration performance and part load modulation was enhanced, successfully reducing the overall life-cycle cost.

Use of Emerson’s scroll variable speed compressors, which enable flexible adjustment of operation range and speed according to refrigeration load, through an enhanced control algorithm, enabled a 20% cut in annual power consumption.

The intelligent store solution installed on Emerson’s controller and drive offers an integrated monitoring solution for refrigeration facilities, allowing operators to monitor each unit’s running condition, and thus make better decisions to optimize resources and enhance profitability.

Emerson’s pre-validated compressor, drive and controller reduced downtime and services calls, and improved food safety and quality by keeping fresh goods in optimal condition.

Emerson’s CoreSense™ technology enabled the deployment of an optimal compressor algorithm to protect the drive, detect the maximum operating current, and shield the compressor and drive from unfavorable conditions such as over-current and over-heating, to maximize overall performance reliability.

Emerson’s scroll compressor, which allows faster and more accurate system diagnosis, provided enhanced protection features and improved overall system reliability.

Adoption of Emerson’s variable speed compressor – which produces significantly lower noise when compared to semi-hermetic reciprocating compressors and supports part load operation that enables low noise running – supported the business growth without inconveniencing neighbors and nearby residents.

Use of the R404A hydrochlorofluorocarbon refrigerant in place of R22 (the most representative chlorofluorocarbon-type refrigerant that is known for its damaging impact on the earth’s ozone layer) enables a significantly more environmentally friendly operation.
Future Plans

N Supermarket plans to upgrade existing 5 HP compressors with 7.5-20 HP compressors at every supermarket location. The firm is also closely reviewing its current refrigerant system using R404A refrigerant, with the intention of shifting to a more eco-friendly refrigerant technology, reducing its impact on global warming, within the coming two-to-three years.

From the Customer

Emerson’s ZRH(V) series horizontal scroll compressor is a very suitable product for use in air-conditioning solutions for new-energy buses. It has excellent cooling and heating capabilities, and is durable and stable while guaranteeing very high energy efficiency. Since its application, we have received positive feedback from our clients regarding our air-conditioning products. We look forward to continuing our collaborative partnership with Emerson and to continue providing our end-customers with stable, reliable and energy-efficient air-conditioning solutions.