

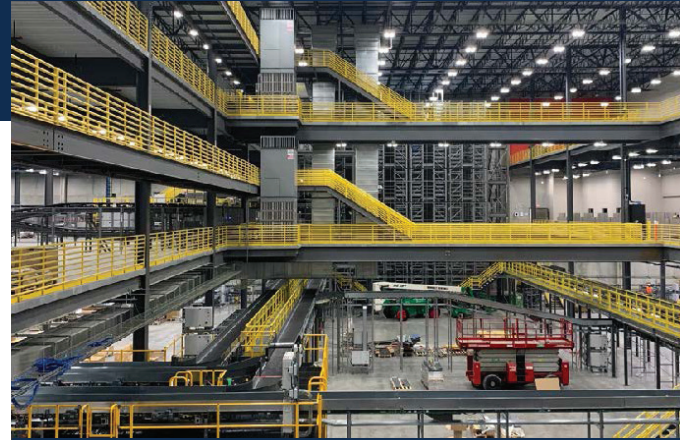
| Digi-Key Electronics

LOCATION | Thief River Falls, Minnesota
BUILDING TYPE | Manufacturing Facility
ENGINEER | Widseth Smith Nolting
MECHANICAL CONTRACTOR | Robert Gibb & Sons, Inc

| BACKGROUND

- 26 Johnson Air-Rotation Systems units provide efficient humidity control and consistent temperature in the factory
- Strategic planning for piping and unit placement took place between SVL, the manufacturer, and the engineer
- Factory-mounted steam generators were added to the air rotation units to reduce static during the winter months

This unique design required an unprecedented air handling solution. Booming e-commerce at Digi-Key Electronics made it necessary to embark on a 2.2 million-square-foot expansion to their headquarters in Thief River Falls, Minnesota. The addition would yield a 3 million-square-foot multi-level manufacturing facility that would be the workplace for 3,400 employees and serve as a new distribution hub.



A multi-level design presented a unique air handling challenge

| CHALLENGE

With ceilings from 18' to 74', the expansive factory had an evolving floor-to-ceiling layout and an extensive conveyor storage system. The challenge for engineers, especially within the conveyor storage area, was to keep temperatures and humidity within a specific range from floor to ceiling with low air velocity. Strategic piping and placement of highly efficient air rotation systems would be necessary, as would staying within budget and ease of long-term maintenance.



Johnson Air-Rotation units combat air stratification

| SOLUTION

SVL worked with engineer Widseth Smith Nolting and manufacturer Johnson Air-Rotation HVAC Systems to identify the best configuration for optimal efficiency. The factory's varying ceiling heights were no problem for 26 Johnson Air-Rotation units (16 for heating and cooling and ten more just for airflow.) In addition, the design incorporated steam generators, DX cooling, and gas heat to reduce static electricity during Minnesota's frigid winter months. The conveyor storage system area received three large air rotation units that keep humidity constant and temperatures (floor to ceiling) within 8 °F. "Ductwork could not be run in a traditional fashion in most areas," explains Widseth engineer Adam Siemers. "We were looking for low-footprint solutions to condition the space without extreme amounts of ductwork. Although some areas used rooftop units and traditional ductwork, the Johnson Air-Rotation Units were used to condition the majority of the building with high-volume, low-speed air. Units with heating and cooling were stationed around the perimeter, while the inner portions of the building used fan-only units to further homogenize and destratify the temperature and humidity conditions." Despite the factory's high ceilings, Johnson Air-Rotations' systems now maintain comfortable air throughout the facility. They also accommodate humidification dispersion grids created by other manufacturers, making it a great budget-friendly choice.