



WHITE PAPER:

SCALING HVAC SOLUTIONS FOR DATA CENTER DEMANDS

**THE CRITICAL ROLE OF ACCESS
HARDWARE IN HVAC SYSTEM DESIGN**



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EXECUTIVE SUMMARY

Data Center Growth: Data center spending is projected to increase by 24.1% in 2024, reaching \$293.09 billion, as AI, cloud computing, and digitalization drive unprecedented expansion. This growth is expected to continue as AI applications demand more advanced and robust infrastructure, particularly in data centers.

HVAC Industry Response: To meet the evolving needs of data centers, HVAC manufacturers are shifting focus from traditional HVAC units to specialized cooling solutions with a direct focus on data center cooling. Specialized cooling solutions include advanced technologies such as liquid cooling systems, which efficiently manage the heat generated by high density servers.

Role of Access Hardware: Access hardware, including latches, hinges, seals, and locking mechanisms, plays a critical role in the reliability and scalability of HVAC systems in data centers. These components ensure that HVAC units can operate efficiently in demanding environments, are easy to maintain, and meet stringent safety and regulatory standards, all of which are essential as data centers continue to proliferate.





THE NEXT DIGITAL REVOLUTION ACCELERATES THE GROWTH OF DATA CENTER

The digital revolution, driven by AI, cloud computing, and the increasing digitalization of industries, is fueling an unprecedented expansion of data centers worldwide. The scale and complexity of AI workloads demand more robust infrastructure, leading to a surge in data center investments. According to Gartner, investments in data center infrastructure will reach approximately \$293.09 billion (LoDolce, 2024). This growth trend is expected to persist, driven by the rapid adoption of AI applications that require advanced computing power and storage capabilities.

As the data center market expands, they are becoming more than just repositories of digital information; they are the backbone of modern economies, enabling everything from e-commerce to advanced analytics. However, this expansion comes with significant challenges, particularly in the areas of cooling and energy efficiency. The heat generated by densely packed servers, especially those handling AI workloads, requires specialized HVAC systems capable of maintaining optimal operating conditions while minimizing energy consumption.



THE HVAC INDUSTRY'S RESPONSE

In response to this growing demand, the HVAC industry is pivoting to meet the unique needs of data centers. This shift involves developing advanced cooling systems that manage the high-density environments typical of modern data centers. A secondary, but equally critical consideration in the HVAC industry is a renewed focus on energy efficiency within an HVAC environment (Conversation, 2024).

HVAC manufacturers face both challenges and opportunities as they enter or expand in this market. On one hand, the technical demands of data centers require innovations in cooling technology and energy management. On the other hand, the growing data center market presents a significant opportunity for HVAC manufacturers to develop specialized solutions and establish long-term partnerships with data center operators.



THE PIVOT OF HVAC INTO THE DATA CENTER SPACE

MARKET DRIVERS AND TRENDS

Several factors are driving HVAC manufacturers to focus on the data center market. The rise of AI is a primary driver, as it requires data centers with advanced cooling systems to manage the intense heat generated by AI workloads. Additionally, there is an increasing emphasis on sustainability, with data centers under pressure to reduce their carbon footprint and improve energy efficiency.

Traditional HVAC markets are adapting to these new demands by incorporating advanced technologies such as liquid cooling systems and AI-driven climate control. Liquid cooling, for example, is expected to become more prevalent by 2025, as it offers a more efficient way to manage the

heat generated by high-density servers. Although the transition to liquid cooling will be gradual due to its initial costs and implementation complexities, it represents a significant technological shift that HVAC manufacturers must embrace.

Another trend is the geographical expansion of data centers into emerging markets. Regions with lower costs and favorable conditions, such as Northern Virginia and Portland, are seeing increased investments as companies seek to manage costs while expanding their data center capabilities. This geographical diversification requires HVAC manufacturers to be adaptable and ready to support data centers in diverse environments.





GROWTH OPPORTUNITIES FOR HVAC MANUFACTURERS

The data center market presents significant growth opportunities for HVAC manufacturers.

Key areas of opportunity include:



CUSTOM COOLING SOLUTIONS:

As data centers become more specialized, there is a growing demand for custom cooling solutions tailored to specific needs. HVAC manufacturers that can offer bespoke systems will be well-positioned to capture market share.

LONG-TERM PARTNERSHIPS:

Establishing long-term partnerships with data center operators is another avenue for growth. These partnerships can provide HVAC manufacturers with a steady stream of business while allowing them to refine and improve their products based on real-world feedback.

GEOGRAPHICAL DIVERSIFICATION:

As data centers expand into new regions, like Mexico and the American southwest, HVAC manufacturers are expanding into emerging markets. By developing solutions that are adaptable to different environments, manufacturers can broaden their customer base, thus increasing revenue.



THE ESSENTIAL ROLE OF ACCESS HARDWARE IN SCALING HVAC MANUFACTURING

As the data center industry experiences rapid growth, HVAC manufacturers face the challenge of scaling their operations to meet this surge. A critical component of this scalability is the role of access hardware. These essential components—ranging from latches and hinges to custom seals and locking mechanisms—not only ensure the reliability and efficiency of HVAC systems but also enable manufacturers to deliver tailored, compliant, and cost-effective solutions. By understanding the importance of access hardware, HVAC manufacturers can better position themselves to capitalize on the booming data center market.

1. RELIABILITY AND DURABILITY

Access hardware components like latches and hinges ensure HVAC units operate reliably in demanding data center environments. Their quality directly affects the longevity and performance of these systems, which is critical for maintaining continuous operation.

2. CUSTOMIZATION AND FLEXIBILITY

Customizable access hardware allows HVAC manufacturers to tailor their systems to the specific needs of different data centers, enabling quick adaptation to varying demands and supporting scalable growth.

3. EFFICIENCY IN INSTALLATION & MAINTENANCE

Efficient access hardware simplifies the installation and maintenance of HVAC systems, reducing downtime and service time in data centers, where every minute counts.

4. SAFETY AND COMPLIANCE

Access hardware ensures HVAC units meet safety and regulatory standards, protecting sensitive equipment and maintaining system integrity in data centers.

5. SUPPLY CHAIN INTEGRATION

Reliable access hardware partners provide a consistent supply chain, helping HVAC manufacturers avoid delays, reduce lead times, and effectively manage inventory during growth.

6. INNOVATION & TECHNOLOGICAL ADVANCEMENT

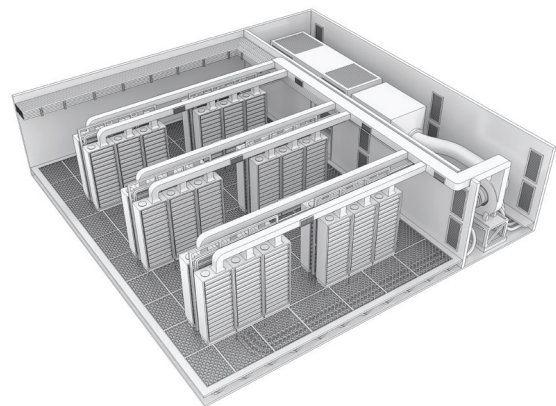
Innovative access hardware enables new HVAC system designs, such as improved airflow and enhanced security, keeping manufacturers at the forefront of technological trends.

7. COST EFFICIENCY

High-quality access hardware reduces installation and maintenance costs, minimizes component failure risks, and ensures safety compliance, making HVAC systems more cost-effective.

8. SCALABILITY

Scalable access hardware solutions ensure HVAC manufacturers can meet the increasing demands of the growing data center market efficiently and reliably.





HOW THE RIGHT ACCESS HARDWARE PARTNER SUPPORTS HVAC MANUFACTURER GROWTH

For HVAC manufacturers venturing into the data center market, having the right access hardware partner is crucial. Access hardware plays a critical role in the construction and maintenance of data centers, and manufacturers need dependable partners who can provide high-quality components and support services.

SUPPLY CHAIN SERVICES

A robust supply chain is essential for meeting the fast-paced demands of data center construction and maintenance. The right access hardware partner can offer a range of supply chain services, including:

- **Inventory Management:** Efficient inventory management ensures that HVAC manufacturers have the components they need when they need them, reducing the risk of delays and stock-outs.
- **Product Visibility:** Enhanced product visibility allows manufacturers to track components throughout the supply chain, improving planning and coordination.
- **Lead Time Reduction:** Reducing lead times is critical in the data center market, where projects often operate on tight schedules. A dependable access hardware partner can help streamline operations and minimize lead times.

These services are vital for ensuring that HVAC manufacturers can meet the demands of the rapidly growing data center market. By partnering with a supplier that offers these capabilities, manufacturers can focus on what they do best; developing and delivering advanced cooling solutions.

THE ADVANTAGES OF STRATEGIC SUPPLY CHAIN PARTNERSHIPS

Working with a partner that provides not only high-quality products, but also comprehensive support services offer several advantages, like:

- **Zero Stock-Outs:** In the fast-paced world of data center development, stock-outs can lead to costly delays. A dependable partner can help ensure that manufacturers always have the components they need, when they need them.
- **Streamlined Operations:** By providing integrated supply chain services, a good partner can help HVAC manufacturers streamline their operations, reduce costs, and improve efficiency.
- **Technical and Operational Expertise:** Access hardware partners with deep industry knowledge can offer valuable insights and support, helping manufacturers navigate the complexities of the data center market.

These advantages make a compelling case for HVAC manufacturers to seek out strategic partnerships in the access hardware space. By doing so, they can better position themselves to capitalize on the expanding data center market.





CONCLUSION

The rapid growth of data centers, driven by AI and other advanced technologies, presents both challenges and opportunities for HVAC manufacturers. As data centers become more complex and energy-intensive, the demand for specialized cooling solutions is increasing. HVAC manufacturers are responding to this demand by developing innovative technologies such as liquid cooling systems, AI-driven climate control, and sustainable cooling solutions.



The right access hardware partner can play a critical role in supporting HVAC manufacturers as they navigate this evolving market. By providing comprehensive supply chain services and technical expertise, a strategic partner can help manufacturers meet the fast-paced demands of data center development and maintenance.

NEXT STEPS

As the data center market continues to grow, HVAC manufacturers have a unique opportunity to expand their offerings and establish themselves as leaders in this space. To fully capitalize on this



opportunity, manufacturers should explore partnership opportunities in the access hardware space. Strategic collaboration can provide the support and resources needed to succeed in this dynamic and rapidly evolving market.

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At Allegis, we live and breathe access hardware, opening doors to unparalleled quality and innovation. We help solve customer-specific problems and supply thousands of products, including handles, latches, hinges, drawer slides, gas springs, sealing profiles, adhesives, and more. To us, these are more than components; they are a factor in contributing to our customers' success. Our global supply network and engineering expertise ensure you get the perfect part for your application. If we do not have it, we will find it; if it does not exist, we will create it, providing a customized solution experience.

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Carl Craven is HVAC Industry Market Engineer/Engineering Manager for Allegis Corporation, a Minneapolis-based custom supplier and distributor of latches, hinges, gaskets, and other access products. Craven has more than 30 years experience in the HVAC industry as a mechanical engineer and as a industry market engineer. Craven joined Allegis Corporation 18 years ago where he specializes in working with HVAC system manufacturers in developing solutions to their manufacturing challenges. Prior to Allegis, Craven worked with Southco Inc., and Modine Manufacturing. Craven is the curator of the Klima-Flex Users Group. Craven earned a Bachelor of Science degree in mechanical engineering from Michigan Technological University.

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